Imperative 8. Ecosystem Protection and Enhancement

Ensuring the health of watershed ecosystems through protection and enhancement actions helps the sustainable delivery of ecosystem services, including adequate water quality and quantity, reduced drinking water treatment and infrastructure costs, reduced flood mitigation costs, increased resilience to climate change stressors and natural hazards, opportunities to recover listed species and provide habitat for native fish and wildlife, and reduced risk for invasive species introductions and establishment.

Objectives

- Restore watershed ecological function (ridgetop to ocean approach), including restoring riparian areas and instream flow and habitat functions, values, and benefits; re-establishing hydrologic and sediment transport regimes to a more natural state; restoring natural channel morphology; protecting, maintaining, and improving water quality in the region for all beneficial uses; and implementing watershed restoration projects that (a) cool streams and improve summertime flows for sensitive species and water quality impairments, and (b) identify, meet, protect, and restore peak and ecological flows.
- Balance instream and out-of-stream water uses.
- Ensure year-round summer stream flows are sufficient to meet the instream water needs of fish and wildlife.
- Waterbodies consistently attain water quality standards that protect drinking water and other beneficial uses.
- Anticipate and prepare for the effects of climate change stressors, which are predicted to influence precipitation, temperature, coastal inundation, ecosystem function, and water quality.
- Prioritize restoration work and support land practices that reduce drinking water contaminants.
- Identify, meet, protect, and restore peak and ecological flows.
- Promote natural water storage using beavers, wetlands, and green infrastructure.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
44	**Riparian Restoration; Restore Channels; Floodplain Reconnection; Restore Stream Flow: Support restoration projects that involve diverse landowners and land management goals in locations that will achieve the greatest ecological returns on investment (e.g., cooler streams and improved summertime flows for sensitive species and to address water quality impairments).**	A diversity of landowners participates in the implementation of restoration projects that enhance ecological function in the region.	**Lead:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, US Forest Service, Bureau of Land Management **Participants:** Private landowners, Soil and Water Conservation Districts, Salmon Safe, Mid-Coast Watersheds Council, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Oregon Department of Environmental Quality, volunteers, Lincoln County Department of Community Development, NOAA Fisheries, US Geological Survey, Tribal nations, Oregon Watershed Enhancement Board	PHASES 1-3	The estimated cost to implement the full suite of restoration and improvement projects to address actions in this section and support ecological functions: $70M to $1.1.27M[42]	▪ National Fish and Wildlife Foundation Resilient Communities[43]. ▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase I or Phase II Implementation). ▪ OWEB Partnership Technical Assistance Grant. OWEB Small Grant Program. ▪ OWEB Operating Capacity Grants. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ Jubitz Family Foundation Environmental Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program.

[42] Source: Oregon Forest Resources Institute: https://oregonforests.org/sites/default/files/2019-01/OFRI_2019-20_ForestFacts_WEB.pdf

[43] Community demonstration & capacity-building projects that help communities understand environmental risks and opportunities and organize and take actions to improve local resiliency by enhancing natural buffers and system functions.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
						▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ Starker Forests Grant. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program.
45	**Riparian Restoration; Restore Channels; Floodplain Reconnection; Restore Stream Flow: Use established methods (e.g., field assessment, remote sensing, and physical models, such as Heat Source) and local knowledge to prioritize stream reaches for riparian buffer restoration projects. Increase wooded buffer zones on priority streams.**	Healthy riparian areas in priority stream reaches. Achieve a clear understanding of locations/stream reaches where preservation of existing functional buffers would result in greatest protection against degradation of existing water quality.	**Lead:** US Forest Service, private landowners, Oregon Department of Forestry, Oregon Department of Environmental Quality, Oregon Department of Agriculture, Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council **Participants:** Tribal nations, private landowners, Oregon Department of Fish and Wildlife	PHASE 2	$250,000	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ OWEB Operating Capacity Grant. ▪ OWEB Restoration Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
46	**Riparian Restoration; Restore Channels: Advocate for the restoration and conservation of native riparian vegetation to facilitate large natural wood recruitment, maintain water quality, ensure ecological function, and produce habitat for aquatic species, including beavers.**	Native riparian vegetation is restored and conserved to support and enhance ecological function in the region. Riparian zones, including intermittent flow stream zones, are expanded and/or restored, to levels that provide adequate ecological functions.	**Lead:** Oregon Department of Environmental Quality, Mid-Coast Watersheds Council, Oregon Department of Agriculture, Oregon Department of Forestry **Participants:** Oregon Department of Fish and Wildlife, watershed councils, US Forest Service, Lincoln County Soil and Water Conservation District, Tribal nations, private landowners	PHASE 1	Riparian Restoration to provide ecological functions[44] on 357 miles of impaired streams: Low estimate (Min CREP buffer on 1518 acres) = $7,131,746 $7M Median (partially functioning buffer on 2818 acres) = $13,244,671 $13M High Estimate (fully functioning buffer on 4,335 acres) = $20,376,418 $20M	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ OWEB Small Grant Program. ▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ Jubitz Family Foundation Environmental Grant. ▪ OWEB Forest Collaboratives Grants (federal lands). ▪ Meyer Memorial Trust Healthy Environment Program. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program. ▪ ODFW Riparian Lands Tax Incentive Program.

[44] Methods based on *Cost Estimate to Restore Riparian Forest Buffers and Improve Stream Habitat in the Willamette Basin, Oregon* (DEQ, 2010): ftp://deqftp2.deq.state.or.us/dwaltz/MCWPP/WillametteRipCost030310_V2.pdf

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
47	**Watershed Function and Ecosystem Services: Implement more erosion control practices.**	Reduced sediment delivery to regional streams. Lands are managed for multiple benefits, including ecological function and values (i.e., mimic natural watershed hydrology, sediment and nutrient processes and carbon storage). Larger proportion of road network is hydrologically disconnected from streams. Private landowners widely implement Oregon Plan voluntary measures and report project data to the Oregon Watershed Restoration Inventory (OWRI)[45] or other databases, to track improvements.	**Lead and Participants:** Public and private landowners, Lincoln County, Oregon Department of Transportation, Oregon Department of Agriculture, Oregon Department of Forestry, watershed councils, Lincoln Soil and Water Conservation District, Oregon Department of Fish and Wildlife	PHASE 2		▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Forest Collaboratives Grants (federal lands). ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Clean Water State Revolving Fund. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program. ▪ ODFW Riparian Lands Tax Incentive Program.
48	**Sediment Processes: Evaluate anthropogenic sources of fine sediment from all land uses, including mass wasting and unsurfaced roads.** **Prevention, Upgrades, and Repair: Seek funding opportunities to reduce shallow landslide risk and other sediment delivery hazards (e.g., undersized culverts, outdated road maintenance, legacy roads) and perform road upgrades, repair, and decommissioning.**	Mass wasting (shallow landslides and debris flows), surface and hillslope erosion and road sediment are reduced from all land uses. Natural sediment processes are restored to extent possible. A reduction in anthropogenic causes of mass wasting, culvert failures, and road sediment delivery to Mid-Coast region streams Private forest operations widely implement Oregon Plan voluntary measures and report project data to OWRI or other database to track improvements.	**Lead:** US Forest Service, Bureau of Land Management, Oregon Department of Forestry, private industrial forestry, private small woodland landowners **Participants:** Watershed councils, Lincoln SWCD, Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Department of Fish and Wildlife, Lincoln County, private landowners	PHASES 1-3	$150,000	▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase II Implementation). ▪ OWEB Restoration Grants. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program.
49	**Floodplain Reconnection and Wetlands: Protect beaver populations and encourage beaver pond creation, especially in critical areas with low summer flows.**	A measurable increase in wetland habitat and the amount of naturally stored water in critical areas where summer flows are low.	**Lead:** US Forest Service, Bureau of Land Management, Oregon Department of Fish and Wildlife, Mid-Coast Watersheds Council **Participants:** Oregon Department of Forestry, Oregon Department of Agriculture, Lincoln County, private landowners	PHASE 1	$150,000	▪ Bureau of Reclamation Cooperative Watershed Management Grant (Phase I). ▪ OWEB Operating Capacity Grant. ▪ Jubitz Family Foundation Environmental Grant.
50	**Riparian Restoration; Restore Channels; Restore Stream Flow: Design and implement restoration projects with partners to directly address impairments and improve conditions (e.g., erosion prevention and control, riparian and wetland buffers, urban tree protection).**	Restoration projects are collaboratively implemented to address limiting factors and improve ecological function.	**Lead:** Watershed councils, US Forest Service, Bureau of Land Management, Lincoln Soil and Water Conservation District **Participants:** Oregon Department of Agriculture, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, OSU Extension Service, Oregon Department of Forestry	PHASE 3	$250,000	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase II Implementation). ▪ OWEB Partnership Technical Assistance Grant. OWEB Small Grant Program.

[45] Oregon Watershed Restoration Inventory (OWRI)

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
			Oregon Watershed Enhancement Board, water providers			▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ Georgia-Pacific Environment Grant Program. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ EPA Clean Water State Revolving Fund. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ EPA Nonpoint Source Section 319 Grants. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Riparian Lands Tax Incentive Program.
51	**Restore Stream Flow: Evaluate the mechanisms and conditions for restoring hyporheic flows (the transport of surface water through sediments in flow paths that return to surface water) in the Mid-Coast using a suite of strategies (articulated in the Oregon Plan and other plans).**	Channel conditions (morphology) and watershed mechanisms exist for restoring hyporheic flows. Mechanisms, conditions, and locations for restoring hyporheic flows are identified. Projects to restore hyporheic flows are developed and implemented.	**Lead:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, US Forest Service, Bureau of Land Management **Participants:** Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, US Geological Survey, Tribal nations		$150,000	▪ OWEB Technical Assistance Grant. ▪ OWEB Restoration Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ OWRD Water Projects Grants and Loans. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
52	**Protect Stream Flow: Recommend limits on further appropriation of water on high priority streams where water available for meeting aquatic life needs (OAR Chapter 690, Division 500).**	Further appropriation of water on high priority streams is limited to protect native fish and wildlife. The criteria for high priority streams is identified (e.g., streams which lack adequate summertime flow).	**Lead:** Oregon Department of Fish and Wildlife, Oregon Water Resources Department, Oregon Department of Environmental Quality (OAR 690-Div 33 review)[46] **Participants:** Mid-Coast Watersheds Council, Salmon-Drift Creek WC, Confederated Tribes of Siletz Indians of Oregon, water providers and municipalities, Wild Salmon Center	PHASE 2	$150,000	▪ Charlotte Martin Foundation Wildlife and Habitat Grant. ▪ OWEB Water Acquisition Grant. Business Oregon Drinking Water Source Protection Fund. ▪ OWRD Water Projects Grants and Loans. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program.
53	**Restore Stream Flow: Support projects that result in increased water retention capacity in channels, floodplains, and adjacent uplands and wetlands using a variety of strategies.**	Review proposed restoration and enhancement projects with this objective as one outcome.	**Lead:** US Forest Service, Bureau of Land Management, MidCoast Watersheds Council, Salmon-Drift Creek Watershed Council, local planners **Participants:** Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon	PHASES 1-3	Cost estimates included in actions 44 and 46	▪ OWEB Focused Investment Partnership (FIPs). ▪ Bureau of Reclamation Cooperative Watershed Management Grant (Phase I or Phase II Implementation).

[46] https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3153

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
		Strategies and projects are implemented that increase water retention capacity in Mid-Coast channels, floodplains, uplands, and wetlands.	Department of Forestry, Oregon Department of Agriculture, Oregon Department of State Lands, Oregon Water Resources Department, US Geological survey, Tribal nations			▪ OWEB Small Grant Program. ▪ OWEB Restoration Grant. ▪ USDA NRCS Agricultural Conservation Easement Program. ▪ OWRD Water Projects Grants and Loans. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS National Coastal Wetlands Conservation Grant Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
54	**Restore Stream Flow: Determine ecological flows (seasonally varying flow targets and temperature-based flow targets), and identify basin-wide in-stream demands. Support development of additional instream water rights. Implement flow restoration efforts in high priority areas as determined by Instream Water Right Monitoring and other means (e.g., ODFW's Aquatic Habitat Prioritization) (OAR Chapter 690, Division 77).**	Ecological flows are identified for the highest priority waterways. Projects are identified to protect and restore instream flow.	**Lead:** Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Parks and Recreation Department **Participants:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, water users, Oregon Department of State Lands, local planners	PHASE 1	$250,000	▪ OWEB Partnership Technical Assistance Grant. ▪ OWRD Water Projects Grants and Loans. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
55	**Restore Stream Flow: Use established voluntary programs, or other tools, to convert existing water rights (e.g., irrigation, commercial use, other out-of-stream uses) to instream uses that protect critical flows needed to support fish and wildlife, water quality, recreation, and scenic attraction.**	An analysis is conducted in Mid-Coast watershed basins to prioritize locations in need of instream water rights. In-stream water rights are established that protect the full suite of flows for a diversity of uses.	**Lead:** Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Parks and Recreation Department (state agencies for new rights), Oregon Department of State Lands, water providers and municipalities **Participants:** Oregon Department of Fish and Wildlife, Mid-Coast Watersheds Council, Oregon Water Resources Department, Oregon Watershed Enhancement Board (nonprofits for existing rights), water rights holders	PHASE 1 for analysis PHASE 2 to obtain or transfer rights	$250,000	▪ OWEB Water Acquisition Grant. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program.
56	**Control Invasive Weeds: Identify priority invasive species in each watershed, and seek funding to support control and management of invasives in streams and along stream corridors while encouraging establishment of native vegetation.**	Priority invasive species are identified, controlled, and managed. Prevent new invasive species introductions and decrease the scale and spread of current infestations.	**Lead:** Mid-Coast Watersheds Council, Oregon Department of Agriculture, Soil and Water Conservation Districts **Participants:** Oregon Invasive Species Council, local watershed groups, Oregon Department of Forestry, Oregon Department of Fish and Wildlife	PHASES 1-3	$250,000	▪ Oregon Invasive Species Council (OISC) Invasive Species Education and Outreach Grant. ▪ OWEB Operating Capacity Grant. ▪ OWEB Restoration Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ ODA Noxious Weed Grant Program. ▪ ODFW's Wildlife Integrity Program. ▪ USFWS Coastal Program.
57	**Protect Existing Complex Forest; Strategic Thinning; Prescribed Fire; Promote Native Understory Vegetation: Advocate for implementation of the Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan, especially as it relates to wildfire mitigation in the Mid-Coast.**	Implementation of the Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan, especially as it relates to wildfires, is supported throughout the Mid-Coast Region.	**Lead:** Lincoln County, US Forest Service, Oregon Department of Forestry	PHASE 1	$150,000	
58	**Easements and acquisitions: Acquire land, or obtain conservation easements, to protect critical land areas managed for water quality protection.**	Critical lands are in drinking water source areas/watersheds are protected. Key areas are publicly owned and managed, or managed for conservation. An increasing proportion of acreage in drinking water source areas is protected.	**Lead:** Counties, water providers and municipalities, US Forest Service, Bureau of Land Management, watershed councils, non-governmental organizations, Natural Resources Conservation Service, corporations, McKenzie River Trust	PHASES 1-2	$10,000,000	▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase I or Phase II Implementation).

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Initial Estimated Investment	Potential Funding Sources
			Participants: private landowners, Oregon Watershed Enhancement Board			▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ USDA NRCS Emergency Watershed Protection Program. Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ ODFW Access and Habitat Program. ▪ OWEB land acquisition funds.
59	**Support and advocate for the compilation of a hierarchy of necessary spatial analyses and modeling to determine which conservation strategies, and locations on the landscape, will result in the greatest environmental returns on investment (ROI) (e.g., ecological function) and achieve the highest priorities in existing species recovery plans (e.g., improving winter and summer rearing habitats). Advocate for implementation of strategies in federal Coho recovery plan and Oregon coast Coho Conservation Plan (OWEB FIP Framework).**	Spatial analyses are conducted/compiled to identify strategies, and locations on the landscape, to achieve the greatest environmental returns on investment (ROI) (e.g., ecological function) and actions support existing recovery plans.	**Lead:** Mid-Coast Watershed Council, Oregon Watershed Enhancement Board, Oregon Department of Environmental Quality, US Forest Service, Lincoln County Soil and Water Conservation District, Oregon Water Resources Department, Lincoln County **Participants:** Environmental Protection Agency (Bob McKane/Visualizing Ecosystem Land Management Assessments (VELMA) modeling), US Geological Survey, Tribal nations, non-governmental organizations, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife	PHASE 2	$250,000	▪ OWEB technical assistance grants.
			TOTAL		**$99.5M–$1,169M**	

Performance Metrics

- Ecological function (i.e., natural watershed hydrology, sediment, nutrient and carbon processes) is enhanced throughout Mid-Coast watersheds.
- Stream habitat projects are implemented to address key limiting factors.
- Native trees and shrubs are planted in riparian areas and on floodplains.
- Invasive species are eradicated, or controlled, to desired levels.
- Lateral side-channels and floodplains are reconnected to stream channels.
- Measurable improvement in aquatic habitat condition and trends for all primary land uses in the Mid-Coast strata based on ODFW aquatic habitat inventory and Oregon Plan Habitat Monitoring methodology.[47]
- Water rights transactions keep more water in streams and incorporate conservation and water efficiency strategies.
- No net loss in working lands acreage in the Mid-Coast region of Oregon.
- Net increase in land acquisition and easements that protect water quality.
- Natural storage (e.g., beavers, wetlands) projects are implemented.
- Land is preserved in priority areas.

[47] Oregon Plan Habitat Monitoring: https://odfw.forestry.oregonstate.edu/freshwater/inventory/op_reports.htm.

Metric Methodology

- The Mid-Coast adopts a tool to assess ecosystem recovery (e.g., 5-Star Recovery System in Action), and evaluates progress in protecting and enhancing Mid-Coast ecosystems through time.
- ODFW aquatic habitat inventory & Oregon Plan Habitat Monitoring methodology is utilized and widely supported[48].

[48] ODFW Aquatic Inventories Project: https://odfw.forestry.oregonstate.edu/freshwater/inventory/methods.html.