Restoring ecosystem function and fish habitat in the Hood River Watershed.

Aquatic Ecosystems Restoration Notice of Funding Opportunity No. R23AS00106

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Applicant Organization: Oregon Department of Fish and Wildlife
Project Title: Restoring ecosystem function and fish habitat in the Hood River Watershed.

Table of Contents

Executive Summary

The Oregon Department of Fish and Wildlife (ODFW) and Hood River Watershed Group (HRWG) are applying for the Bureau of Reclamation's Aquatic Ecosystem Restoration grant opportunity to assist the recovery and delisting of Lower-Columbia River salmon and steelhead in the Hood River Watershed. ODFW is a category A applicant and is mandated by the State of Oregon to protect and manage the state's fish and aquatic habitat for the benefit of Oregonians. We are applying for funding under Task Area A: Design to implement a bundle of Five projects across East Fork Hood River, Neal Creek, and Baldwin Creek in Oregon. This proposal seeks funding to advance the recovery of Endangered Species Act (ESA)-listed Lower-Columbia River Salmon and steelhead by implementing high-priority fish passage and habitat restoration projects that are voluntary, large-scale, on-the-ground actions that advance existing landscape conservation or restoration plans within the Hood River Watershed. The project builds on the Bureau of Reclamation's Hood River Basin Study (2013), which assessed current and future water supply, demand, and quantity of suitable fish habitat in the Hood River Basin. Funding this proposal will provide for the 100 percent designs to remove two fish passage barriers (1 culvert and one diversion dam), and restore at least 3.5 miles of fish habitat, which will improve wetland function, increase stream complexity, restore riparian habitat, and floodplain connectivity. Project completion is expected to occur within 2 years of federal award and the proposed aquatic restorations will be conducted on private land or state land.

Project Locations: The Hood River basin is a 482-square-mile region located in northern Oregon. It extends from the summit of Mount Hood to the south, the ridgeline of the Cascade Range to the west, and the Columbia River to the north (Figure ES-1). The region includes the City of Hood River and many unincorporated communities, such as Odell and Parkdale, all of

which are in Hood River County. The county's approximate population is 23,000. The Middle Fork and East Fork combine to form the East Fork Hood River drainage, which accounts for approximately 45 percent of the total basin area and natural flow through the mainstem Hood River. The projects located on Baldwin Creek and the East Fork Hood River are located near 45.5631(north), -121.5828 (west).

Project Description:

This proposal requests funding for five projects across the lower East Fork Hood River subbasin, in upper Neal Creek, and in lower Baldwin Creek. The projects restore access to historical habitats to promote the recovery of lower-Columbia River spring Chinook salmon, coho salmon, and winter steelhead. This evolutionarily significant unit (ESUs) is listed as "threatened" under the Federal Endangered Species Act (ESA). The ESA listings identify the extensive reduction in connectivity and access to historical estuarine and freshwater habitats as primary factors leading to the decline in ESU sustainability. All projects aim to improve salmon passage, habitat, and productivity in areas designated as "essential fish habitat." The projects contained in this proposal were identified and prioritized through a two-year planning process that generated a "Strategic Action Plan" (SAP) for the watershed. All the projects presented in this proposal address the primary and secondary factors limiting salmon production in each of the sub-watersheds. Juvenile salmon survival is limited in these watersheds by insufficient instream flows and instream rearing habitat in the summer and elevated water temperatures in the summer. The projects proposed here will increase access for juvenile salmon to critical areas of high-quality habitat in winter and/or areas of cold-water refuge in summer. Projects will also increase the availability of high-quality spawning reaches for adult salmon and steelhead, while undertaking targeted restoration of instream and riparian habitats. The projects will remove fish passage barriers (culvert), replace a degraded water diversion and irrigation systems, restore water efficiency and protect instream water supply, and recover stream, riparian, and floodplain functions.

Project Budget

A. ODFW and the HRWG are requesting federal funding assistance from the Bureau of Reclamation's Aquatic Ecosystems Restoration program in the amount of $500,000 to assist with the design and study activities listed in this application. All federal funds will be used for contractual services to implement the projects for design and engineering services to incorporate culvert replacement, upgrades to fish screening and irrigation diversion systems, stream habitat restoration and floodplain connectivity. We are requesting funds for 10% indirect rates and 20% contingency for inflation. Federal funding would provide for the study and design phase to include monitoring ($20,000), Project outreach ($75,000), and Design ($405,000).

Table 1. —Summary of Non-Federal and Federal Funding Sources FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1. ODFW- State Drought Funds	$91,250
2. Oregon Watershed Enhancement Board	$73,000
3. OWEB, Jubitz Family Foundation	$99,000
4. OWEB Council Capacity and Irrigation District Support	$100,000
Non-Federal Subtotal	$ 363,250
Other unsecured non-federal funding (Applications Pending)	$0
REQUESTED RECLAMATION FUNDING	$ 500,000

Evaluation Criterion A- Project Benefits

General Project Benefits

The watershed processes in the Hood River Basin that create and maintain anadromous fish habitats have been considerably altered in the last 150 years. This has been due largely to the resource extraction activities and other land use including irrigation water use and demand. Together, these resource extraction activities have reduced the quality and quantity of stream habitat in the East Fork Hood River watershed and other tributaries and have severely diminished the viability of the Mid-Columbia River salmon and steelhead populations. Five irrigation districts are in Hood River County: the Dee Irrigation District (DID) on the West Fork, East Fork Irrigation District (EFID) and Mount Hood Irrigation District (MHID) on the East Fork, FID on the mainstem Hood River, and MFID on the Middle Fork. The irrigation districts range in size from 870 acres to 15,150 acres. The irrigation districts generally divert during the irrigation season from April 15 to September 30, which is during the critical juvenile rearing period for ESA listed spring Chinook salmon and summer steelhead. There are seven major instream water rights in the Hood River basin held in trust by OWRD for the people of Oregon that vary between 5 and 250 cfs/month (Water Use Assessment 2013). There are also three smaller instream water rights (typically a few cfs) that are the result of conserved water agreements; an agreement that ensures a portion of the water conserved will remain instream. For example, DID recently installed 4.5 miles of pipe, from which it will conserve 3 cfs. This right is currently transferred to an instream water right that protects instream flow for Mid-Columbia River salmon. Implementing water conservation programs in the basin is increasingly important because of population increases, irrigated agriculture needs, and water supply needs for ESA listed fish.

The core planning team identified the following salmon habitat-forming watershed processes as the highest priority for protection and restoration: flows (hyporheic and base flows), large woody debris delivery, channel migration and floodplain function/channel interaction (including estuaries), riparian community diversity and function, and stream connectivity through fish passage and barrier removal. All the projects presented in this proposal address the primary and secondary factors limiting salmon and steelhead production in each of the sub-watersheds. Juvenile coho survival is limited in these watersheds by insufficient off-channel rearing habitat

in the winter and elevated water temperatures in the summer. The projects proposed here will increase access for juvenile spring Chinook salmon, coho salmon, and summer and winter steelhead to critical areas of high-quality instream habitat in winter and/or areas of cold water refugia in summer. Projects will also increase the availability of high-quality spawning reaches for adult Chinook and coho salmon, while undertaking targeted restoration of instream and riparian habitats.

This proposal seeks funding to advance the recovery of Oregon's Lower-Columbia River salmon by implementing five high-priority fish passage and habitat restoration projects. These projects were selected from Strategic Action Plans (SAPs) developed for independent salmon populations and guided by The Final ESA Recovery Plan for Lower-Columbia River steelhead" (NOAA 2014), and the lower-Columbia River Conservation and Recovery Plan for steelhead (ODFW 2010). The lower Columbia River Recovery Sub-domain is one of three sub-domains comprising the Interior Columbia River Recovery Domain. This sub-domain is home to one ESA-listed steelhead species, Lower Columbia River steelhead. The National Marine Fisheries Service (NMFS) completed its most recent 5-year status review in 2022 and concluded the ESU should remain listed under the ESA as threatened. The Lower-Columbia River Conservation and Recovery Plan for steelhead was developed using a lengthy public process to understand and determine the fish management needs for the conservation and utilization of anadromous salmonids along much of the Lower-Columbia River and tributaries. Public involvement in plan development included: a series of meetings with four Stakeholder Teams distributed along the Columbia River; an independent, scientific opinion survey east of the Cascades conducted by Oregon State University; meetings with habitat experts working on the Columbia River. Together the core planning team and the recovery plans identified these projects as necessary for recovery of the Lower-Columbia River stratum of steelhead as the key populations that when recovered would help to delist the ESU.

The projects in this proposal encompass a suite of watershed corrective actions identified as high priorities in the SAPs. They target key locations throughout the watersheds to generate substantial ecological benefits while also providing benefits to landowners and surrounding communities. Fish passage corrective actions include replacing or removing undersized and failing fish passage culverts, removing irrigation dams, restoring natural fish passage, and improving irrigation infrastructure to increase instream flows.

The projects seek to ensure that local partners give highest priority to restoration projects with the greatest potential to: 1) reduce the primary factors limiting salmon and steelhead production, 2) restore watershed processes, and 3) promote species and watershed resilience to climate change. These benefits will affect water resources management within the East Fork Hood River, Baldwin Creek and Neal Creek . These projects provide regional benefits by addressing the primary and secondary limiting factors including a lack of instream rearing habitat and elevated water temperatures, which increase juvenile salmon mortality in the winter and summer. The projects address the regional benefits by recovery within the Ecologically Significant Unit management and regional recovery scale as well as the watershed-reach scale for anadromous fish populations along the Mid-Columbia River. The project supports water users by improving irrigation efficiency and fish screen replacement that improve water conveyance and protect agricultural land from erosion, removal of a failing dam, and replacement of a culvert that is

undersized and restricts fish passage, and floodplain connectivity in the watershed. The projects will provide other regional benefits through local job creation within an underserved community and provide community resilience.

First and foremost, most of the projects improve infrastructure to address climate-driven increases in precipitation and efficient water management. The projects will upgrade a water diversion system that improves the use of water rights for local landowners. Climate-driven atmospheric rivers increase the threat of catastrophic flooding. Culverts installed decades ago were not designed to handle the peak flows generated in these events, and culvert failures are increasingly common. When failures occur, the ensuing debris torrents not only scour streambeds, but they also damage roads, bridges, levees, fences, and other infrastructure. Projects in this proposal aim to upgrade an undersized culvert, significantly reducing threats to recreational and working lands from climate-driven flooding and associated culvert failures.

Hood River County is a largely rural and historically resource-dependent region dotted with numerous underserved communities, including many on lands of the Confederated Tribes of Warm Springs Indian Community. Steep reductions in timber harvest on federal lands since the 1990s, coupled with significant declines in commercial and Tribal fisheries, have precipitated a slow transition from resource-based economies to those that rely on income from recreation and transfer payments. (Transfer payments— e.g., unemployment, welfare, social security, and government subsidies—are the primary source of personal income in many coastal communities). Socioeconomic impacts from this transition are being experienced in all the communities near the projects in this proposal. The SAP planning teams are almost entirely comprised of stakeholders that live within the region, including tribes, federal and state land managers, farm, and forest operators, elected officials, non-profit organizations, and other residents. Socioeconomic goals are considered a core element of each SAP. The financial support for local businesses and contractors generated from SAP implementation is regarded locally as an important economic input. In fact, a University of Oregon study found that for every $1 million invested in restoration, 15 to 30 new jobs are created. If awarded, these funds will support construction, trucking, engineering, and other contractors throughout the region, as well as several coastal watershed partnerships. These employment benefits will be measured by each of our sub-grantees, who will track the number of local contractors hired and organizational staff supported.

Status of the species and/or habitat that will benefit from the project:
This proposed project design serves as a blueprint for the recovery of Lower Columbia River steelhead populations that occupy Oregon tributaries to the Columbia River. The steelhead populations are part of the steelhead (Oncorhynchus mykiss) Distinct Population Segment (DPS). The DPS, which is listed as threatened under the Endangered Species Act (ESA), includes all steelhead populations in Oregon and Washington tributaries to the Columbia River from downstream of the Hood River system. They aim to recover the populations and their habitats to levels that are not only viable, but also provide sustainable fisheries and other ecological, cultural, social and economic benefits for future generations. Improving the status of Oregon's Lower Columbia River steelhead populations is critical to DPS recovery. The populations play essential roles in achieving viability for three of four major population groups within the DPS. Status of most of the populations needs to improve to achieve viability criteria. The plan's recovery strategies and actions seek to remove threats to the long-term persistence of

the populations and improve biological status, so the populations meet viability requirements and support DPS recovery.

Sub Criterion A.2 Quantification of Specific Project Benefits

The proposal for this funding opportunity is a bundle of projects that implement voluntary, large-scale, on-the-ground conservation activities to advance existing landscape conservation or restoration plans within the Hood River watershed. This proposal seeks funding to advance the recovery of spring Chinook salmon (threatened), steelhead and coho salmon by implementing high-priority fish passage projects and habitat restoration in several sub-basins. The projects contained in this proposal will upgrade fish passage barriers (dams and culverts), construct instream large wood habitat, and restore wetland and floodplain connectivity and enhance habitat complexity, this will result in: 3.5 miles of salmon spawning and rearing habitat reconnected, and 38 acres of floodplain/ wetlands reconnected. The projects will also provide 18 acres and 5 miles of riparian habitat enhanced through conservation and wood structure placement. The projects will provide the following design, engineering, and environmental services up to a 100% phase.

- Conduct topographic and LiDar surveys for the design and hydraulic analysis of project measures and deliverables. Contractor will conduct topographic surveys along the project reach, and use data collected to develop a hydrologic and hydraulic model. Peak stream flow frequencies will be estimated using available gauge data or published regression equations appropriate for the site. Hydraulic conditions will be modeled using the U.S. Army Corp of Engineers HEC-RAS hydraulic model. The project site is within FEMA (Federal Emergency Management Agency) flood mapping for Hood River County. Existing conditions hydraulic analysis will be compared to existing structures to determine existing flood risk as it relates to FEMA regulations.
- Prepare basis of design report and engineer stamped 100% design plans, technical specifications document, and budget for construction in Neal Creek Watershed.
- Develop a 100% design for the Lower East Fork Hood River & Baldwin Creek Fish Passage and Instream Habitat Restoration Design Project, including engineering, permit level drawings, and construction cost estimate.
- Contract cultural resource services to perform a cultural resource assessment along the project reach. This will include a State Historic Preservation Office records review, pedestrian survey, shovel test (if necessary),report of findings, and completion of a SHPO clearance form.

A.2.2 Task A: Design and Engineering applicants

Species and Habitat Benefits

Addresses recovery of multiple species within the Oregon Conservation Strategy; chinook salmon, coho salmon, winter steelhead, coastal cutthroat trout, Pacific lamprey, beaver, Acorn Woodpecker, clouded salamander, Cascades frog, northern red-legged frog, Lewis's woodpecker, tailed frog, Columbia torrent salamander and Del Norte salamander.

The federally coordinated Pacific Lamprey Conservation Initiative (PLCI) is a regional strategy that covers California, Oregon, Idaho, Washington, and Alaska (Luzier et al. 2009 and 2011; USFWS 2012). The PLCI is driven by partnerships to improve the status of Pacific Lamprey throughout its range in the United States. The conservation agreement is a cooperative effort among entities to improve habitats, reduce threats, and improve the population status of Pacific Lamprey. These four projects will contribute to lamprey conservation by opening access to historic spawning and rearing habitat.

The Lower East Fork Hood River and Baldwin Creek have documented populations of spring Chinook, winter steelhead, coho salmon, and resident cutthroat trout and Pacific lamprey. Except for resident trout and lamprey, all these species are listed as threatened under the Endangered Species Act. The primary limiting factors that this project will address are fish passage and habitat restoration in the Hood River Watershed. Many of the drainages in the Hood River Basin are steep, glacier-fed streams that experience naturally low summer flows and annually altered spawning and rearing substrate. Additionally, impacts from past land management include fish passage barriers from irrigation diversions and road infrastructure, development within the 100-year floodplain, removal of large wood, nutrient contamination from livestock operations, and channel alterations to improve agricultural lands.

The Lower East Fork is a dynamic river with high water velocities and volumes, high glacial sediment deposition, and infrastructure development (roads, houses) within the 100-year floodplain. Baldwin Creek has been significantly impacted by past land uses including agriculture, timber harvest, water withdrawal, livestock grazing in the riparian area/floodplain, and residential development. This has resulted in loss of riparian vegetation, reduced shade, poor habitat complexity, channel modifications, blocked fish passage, wetland loss, elevated stream temperatures, and a largely disconnected floodplain. Elevated nitrogen and phosphorous (nutrient) concentrations exceeding recommended criteria were measured in Baldwin Creek in 1998, 2001, and 2002 (Hood River AWQMAP, 2020). A failing diversion dam and a perched culvert are limiting or blocking passage upstream for all life stages of native fish in the creek. Artificially impeded fish passage is rated as a key factor in limiting fish production in the Hood River Basin, and limits access to areas that are important for over-wintering and flood refuge.

The proposed project expands on the extensive habitat restoration work initiated or maintained under the Oregon Plan for Salmon and Watersheds (Oregon Plan) and the Oregon Conservation Strategy. The project enhances watershed projects developed through the requirements of Oregon's Native Fish Conservation Policy (NFCP) (OAR 635-007-0502 to 0509). A general summary of the overall status results for each climate resilient fish stocks that this project will

help with recovery is provided below (Table 1). Incorporating viability results and climate resilient stocks in the project area for anadromous fish populations will help restoration of these strata during periods of poor ocean and freshwater conditions.

Table 1. Climate Resilient fish stocks identified in the *Conservation and Management Plan*

		Chinook[a]	Spring Chinook	Chum	Winter Steelhead	Summer Steelhead	Cutthroat
SMU Viability Results	Viable Populations	17	1	3	19	2	19
	Non-Viable Populations	1	1	1	0	0	0
	Populations with Unknown Viability	0	0	9	0	0	0
	Viable Strata	4/4	1/1	*N/A*	4/4	2/2	4/4
Indicators of Confidence in Results	Populations with Declining Trend	7	1	4[b]	2	0	*N/A*
	Populations with Incomplete Data	4	0	13	17	0	19
Current Overall SMU Status		Strong – Guarded	Sensitive - Vulnerable	Sensitive – Critical	Strong – Guarded	Sensitive - Vulnerable	Strong – Guarded

Watershed Benefits

ODFW Recovery Plan for Lower Columbia Salmon & Steelhead (Chapter 7) lists relevant strategies for the species and watershed benefits that include restoring fish passage and connectivity to habitats blocked or impaired by artificial barriers, and maintain unimpaired passage and habitat connectivity, "protect remaining high-quality off-channel habitat from degradation and restore degraded areas with high intrinsic potential for high quality habitat", and “restore degraded water quality and maintain unimpaired water quality”. The recovery plan identifies Baldwin Creek as having historic populations of spring Chinook and current populations of coho and steelhead. It also identifies the Baldwin Creek reach within the project area has having high intrinsic potential for both coho and winter steelhead.

NOAA-NMFS ESA Recovery Plan for Lower Columbia Chinook, Coho, Chum & Steelhead list Specific strategies for coho salmon (6-33) that include "Improving fish passage at Laurance Lake Dam on the Clear Branch River and at other barriers in the Hood subbasin, such as irrigation diversions and road and railroad crossings, also will benefit the Upper Gorge/Hood population." Specific strategies for Steelhead (9-36): "Actions of particular benefit to steelhead focus on protecting and restoring habitat complexity and diversity, access to side channels and off channel habitats, and floodplain connectivity and function in high priority stream reaches."

This proposal also provides fish passage to Columbia River tributaries where upstream critical habitats have been blocked for decades. In most populations, winter salmonid parr capacity will continue to limit smolt production in the near term due to a lack of fish passage and access to stream habitat complexity. Increasing water temperatures and decreasing base flows in the future create an even more severe summer habitat bottleneck. The primary management strategy to minimize long-term impacts of climate and ocean change on salmon, trout, and lamprey centers on the access to freshwater and estuarine habitats. Maintaining and restoring fish passage to access diverse and productive rearing habitats will support the expression of the full complement of life history diversity and help sustain populations. The project will provide co-benefits to the community by improving upstream passage and upgrading the water intake and screen system.

Restoring fish passage in the watershed restores several layers of ecosystem function in compounding fashion. Fish passage will increase resilience of the ecosystem and fish stocks. With habitat connectivity restored native migratory fish may access expanded stream habitats. As habitat capacity increases, productivity of salmonids also increases because of additional spawning and rearing habitat availability. Uninterrupted migration ensures that spawning coincides with environmental conditions conducive to egg and fry survival, and that available spawning habitat is more likely to be seeded proportionately. The entire ecosystem benefits from that increased productivity through increased marine derived nutrient loading within the forest ecotype, genetic diversity and positively affecting primary production while also providing a food source for killer whales. Specific projects include the following that will benefit the watershed:

Design and Engineering- Baldwin Creek fish passage, water management, and habitat restoration

We are planning for a larger project along this cold-water tributary to the East Fork Hood River. There is a failing diversion dam at a former fish farm that ODFW has been involved with, and a perched culvert at the large property just downstream from this diversion. The landowners in between are interested in habitat and riparian restoration in general. The purpose of this project will be to restore aquatic habitat as an aid to the recovery of ESA-listed spring Chinook salmon, winter steelhead, and coho, as well as resident cutthroat and Pacific lamprey. Improving instream habitat and fish passage are listed as priority actions within the Hood River Basin Partnership Strategic Action Plan (2021) and multiple local planning and assessment documents. These documents identify the lack of habitat quantity and quality, including passage barriers, channel stability, habitat diversity, and sediment load, as primary factors limiting the natural production of spring Chinook, steelhead, and other salmonids in the East Fork Hood River.

This project will develop restoration designs, resulting in 1.25 miles of restored instream habitat, improved passage to approximately two miles of stream, and reconnection of up to 11 acres of floodplain on Baldwin Creek. Work will include topographic surveying, hydrologic and hydraulic modeling, cultural resource surveying, wetland delineations, and 90% design drawings. Hood River Basin Partnership Strategic Action Plan, Thiemann, 2021 (page 62). The Action Plan identifies and prioritizes projects and strategies to improve watershed health, water quality, and fish populations in the Hood River Watershed. Baldwin Creek within the project area is identified as a "high priority habitat restoration project" for the Lower East Fork Hood River Subbasin.

HRWG will pursue implementation funding with the completed designs.

Design & Engineering – Lower East Fork Hood River Habitat Restoration (Phase 2, 3, 4)
The Oregon Department of Fish and Wildlife, Watershed Group, and in partnership with the Confederated Tribes of the Warm Springs (CTWS), is seeking to develop and implement three instream habitat enhancement projects along ~2 miles (three separate reaches) of the lower East Fork Hood River to benefit salmon and steelhead. This work will build upon Phase 1 of Lower East Fork Hood River habitat restoration that was implemented by the CTWS in 2019. Phase 1 promotes floodplain and off-channel habitat connectivity by splitting flows through side

channels to create more diverse habitat conditions. The project included 11 large wood structures that were designed to improve juvenile rearing and adult holding and spawning habitat for winter steelhead, coho salmon, and spring Chinook salmon. This Lower East Fork Hood River subbasin is ranked first for restoration and includes recommended stream restoration projects to improve channel connectivity with floodplains and side-channels on the Lower East Fork Hood River from Dog River downstream to Baldwin Creek and segments of Baldwin Creek.

The goal of these projects is to improve juvenile rearing and adult holding and spawning habitat for winter steelhead, coho salmon, and spring Chinook salmon. This will increase stream-floodplain interaction in the project reach, reduce stream velocity, and increase deposition of spawning gravels. Improving instream habitat is listed as a priority action within the Hood River Basin Strategic Action Plan (2021) and numerous local planning and assessment documents. These documents identify the lack of habitat quantity and quality, including streamflow, channel stability, habitat diversity, and sediment load, as primary factors limiting the natural production of spring Chinook and other salmonids in the East Fork Hood River.

These projects will develop restoration designs resulting in upwards of two miles of restored instream habitat and reconnected floodplain on the Lower East Fork Hood River. Work will include topographic surveying, hydrologic and hydraulic modeling, cultural resource surveying, wetland delineations, and 90% design drawings.

HRWG will pursue implementation funding with the completed designs.

Design & Engineering – Neal Creek Phase 3 Habitat Restoration

HRWG and CTWS are seeking to develop and implement an instream habitat enhancement project within the upper Neal Creek Watershed. This project will add to the instream and floodplain habitat enhancement completed in 2021 and 2022. With the completion of the first two project phases, a total of 1.25 miles of Neal Creek and its floodplain have been enhanced for juvenile rearing and adult holding and spawning habitat for winter steelhead and coho salmon.

Proposed treatment reaches for Phase 3 are located on Hood River County Forest land, upstream of the “Bridge to Nowhere”, including possible sites on the mainstem and both the East and West Forks of Neal Creek, but likely focused on the West Fork. Neal Creek through county land, upstream of the West and East Fork confluence, is outside of FEMA flood regulations and away from nearby infrastructure that could be negatively impacted by flooding.

Neal Creek is a high priority sub-watershed for HRWG and CTWS. Neal Creek is one of the few clear water (non-glacial) tributaries of the lower Hood River and contains a viable population of threatened winter steelhead, threatened coho salmon, cutthroat trout, and resident rainbow trout. Based on ODFW sampling and population estimates, Neal Creek is estimated to provide 5-10% of steelhead production in the Hood River Basin. LiDAR analysis and conceptual planning of Neal Creek identified several reaches as having high Intrinsic Potential (IP) for steelhead spawning and rearing.

The purpose of Phase 3 will be to restore aquatic habitat as an aid to the recovery of ESA-listed winter steelhead and coho. Improving instream habitat is listed as a priority action within the

Hood River Basin Strategic Action Plan (2021) and numerous local planning and assessment documents. These documents identify the lack of habitat quantity, diversity, and quality, particularly spawning and juvenile rearing habitat, as primary factors limiting the production of winter steelhead and coho in Neal Creek. Limited spawning and rearing habitat in the Hood River Watershed is a result of generally steep, glacier-fed streams that are naturally low in suitable habitat, the removal of large wood from streams until the early-80's, and other past land management activities including fill from roads and driveways, development within the 100-year floodplain, and channel alterations to improve agricultural lands.

On Neal Creek specifically, the combination of channel alterations, fill from private and county roads, and large wood removal has led to an incised channel that lacks roughness, has high rates of sediment transport, and is largely disconnected from its floodplain. In 1996, a 100-year flood exacerbated these problems by scouring away gravels, cobbles, and woody debris.

Habitat surveys conducted along Neal Creek in 2014 found low amounts of large woody debris and poor habitat quality for salmonid spawning and rearing. The average slope of the project reach is 2%, which would support a significantly higher number of pools and spawning gravels if more large wood and good floodplain connectivity were present.

This project will develop restoration designs, resulting in 1.25 miles of restored instream habitat on Neal Creek. Work will include topographic surveying, hydrologic and hydraulic modeling, cultural resource surveying, wetland delineations, and 90% design drawings.

HRWG will pursue implementation funding with the completed designs.

Water Supply Benefits

Each project has water conservation and efficiency benefits that will contribute to the overall watershed health within the Hood River Basins. Conservation measures developed through the design of each project will provide water supply and water use benefits in the context of each projects ability to increase instream flow during peak water demands. This peak demand period is during the summer months when streamflow is the lowest and when conservation efforts would have the most positive impact on flow. Irrigation diversions occur from April 15 through September 30 peaking at 15 times that of the other water use peak. Therefore, small percentage reductions in irrigation water use could result in significant water savings. Irrigation water use can be reduced by converting to more efficient fish screens (on-farm use changes), replacing open canals with pipes, implementing a use-based rate structure, and operational changes that provide more instream flow. On-farm use could reduce consumptive water use by 16 cfs (about 6.5 percent of total on-farm use) through a program converting to more efficient fish screen systems. Eliminating losses in conveyance systems would reduce irrigation use up to 23 cfs.

Glacier melt has historically contributed almost 40 percent of the total flow (50th percentile) in the East Fork Hood River during August and slightly more than 50 percent in September. This flow pattern benefited anadromous salmon and steelhead, however recent changes in flow and temperature because of climate change result in earlier melt water from the glaciers. Consistent with other studies in the Pacific Northwest (Reclamation 2008; Reclamation 2011), peak streamflow on the Hood River is expected to shift to earlier in the year with a loss of flow during

the summer months. In addition to higher peaks, the period between October and December is steeper and begins earlier than the historical timing. The period between April and September indicates that future runoff is expected to be less than historical runoff during the spring and summer months. In all the irrigation districts, the major change in water shortages occur during the July to September timeframe when streamflow is low. While some shortages are experienced earlier in the irrigation season, the late summer months reflect the most significant changes. Upgrades to fish screens, water systems, and replacement of diversion dams and culverts will increase water supply to each Basin. These water supply benefits will improve the resilience of salmon and steelhead through water savings of instream flow and connectivity to habitats with adaptive flow pattern changes.

Water conservation benefits achieved through upgrading to new fish screens, piping, and conveyance changes will result in a total water conservation savings in each Basin. Irrigation water conservation is considered a significant source of water savings in the Hood River Basin. Therefore, the designs and basis of design options developed through this federally funded project will provide valuable project solutions to improve the water supply and instream flow requirements through a reduction in water volume in consumptive uses at each project. This is directly developed through the scenarios and alternatives developed by Bureau of Reclamation and project partners in Hood River County to implement the Hood River Basin Water study (Reclamation,2013).

Other Quantifiable Benefits

The Hood River Watershed is a high priority focal area and an important tributary along the Lower Columbia River as one of fourteen cold-water refuges. Restoration along the Lower East Fork Hood River and its tributaries is currently the top priority for regional agencies and other basin partners. The Lower East Fork has high intrinsic potential for steelhead habitat, moderate intrinsic potential for spring Chinook, and likely has the highest potential for winter steelhead recovery. Baldwin Creek is one of the few clear water, low gradient tributaries of the Lower East Fork Hood River and contains winter steelhead, coho salmon, resident cutthroat trout, and Pacific lamprey. As such, fish passage and instream habitat enhancement on the Lower East Fork and Baldwin Creek offers an excellent opportunity to aid in the recovery of these ESA-listed species. Improving instream habitat is listed as a priority action within the Hood River Basin Strategic Action Plan (2021) and numerous local planning and assessment documents. These documents identify the lack of habitat quantity and quality, including streamflow, channel stability, habitat diversity, and sediment load, as primary factors limiting the natural production of spring Chinook and other salmonids in the East Fork Hood River. CTWS has conducted riparian assessments and analysis of Intrinsic Potential (IP) for winter steelhead and spring Chinook habitat on the Lower East Fork and Baldwin Creek (WPN 2019). The assessment highlighted the Lower East Fork and Baldwin Creek as providing the best opportunity to respond positively to instream and floodplain restoration. Restoring continuous fish passage to up to two miles of spawning and rearing habitat for salmon and steelhead on Baldwin Creek will provide significant ecological lift in the Lower East Fork Hood River Watershed, increasing the presence and abundance of native fish above the barriers. In a watershed with limited cold, clearwater habitat, opening passage at the barriers will provide critical year-round habitat, with particular importance during low summer flows and high velocity winter flows. This type of habitat will become increasingly important as climate change emphasizes these extremes.

The channel, floodplain, and riparian restoration will increase quality and amount of habitat throughout the project reaches where there are currently limited rest areas, no large wood, and no floodplain connection. The project areas can support side channel and large wood habitat features and have broad floodplains and low gradients to help retain wood structures and trap and sort spawning-sized gravels. With the placement of large wood structures, the project areas will get the "push" they need to increase floodplain connection and restore natural hydrologic processes like nutrient cycling, energy dissipation, and deposition of gravels. CTWS and HRWG have prioritized the Lower East Fork Hood River and Baldwin Creek for their potential to support threatened steelhead and salmon habitat. CTWS and HRWG will begin the design process in June 2023, with the goal of implementing 1-2 phases of construction in 2024. The total restoration benefit currently targeted between the Lower East Fork and Baldwin Creek project areas would be approximately 2.5 miles, building upon a first phase of Lower East Fork Hood River habitat restoration implemented by CTWS in 2019.

Evaluation Criterion B- Prior Restoration Planning and Stakeholder Involvement and Support

The Basin Study (2013) was funded through Reclamation's Basin Study Program which is under the Department of the Interior's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program. For the Hood River Basin Study, Hood River County was Reclamation's non-Federal cost-share partner. The primary partners on this basin study were the Bureau of Reclamation, Hood River County and the HRCWPG. The HRCWPG includes the County, Hood River Watershed Group, Columbia Gorge Fruit Growers Association, Hood River County Soil and Water Conservation District, multiple water districts, environmental groups, local resource specialists, MFID, East Fork Irrigation District (EFID), FID, Mount Hood Irrigation District (MHID), Dee Irrigation District (DID), Oregon Department of Fish and Wildlife, Oregon Water Resources Department, Confederated Tribes of Warm Springs Oregon, Natural Resources Conservation Service, and various interested citizens of Hood River County. It is notable that the Confederated Tribes of the Warm Springs were pleased with the Basin Study process and the full spectrum of long-term alternatives presented, including water conservation. This study sought to quantify current and potential future water supply and demand imbalances through 2060, and then develop adaptation and mitigation strategies to address them. The County and their consultants conducted efforts to quantify existing water use; water conservation; and fisheries spawning, rearing, and migrating habitat throughout the study process. In turn, this information was adjusted based on anticipated population growth, changes in land use, and subsequent changes in water use and supply, including supply changes due to climate change.

Prior Planning and Design:

As previously stated, these projects have been identified and prioritized through a two-year planning process that generated a "Strategic Action Plan" (SAP) convened locally and facilitated by the Hood River Watershed Group. The HRWG is a small team of federal, state, and non-

profit partners that began meeting in 2021 to support local Hood River water use and fish passage needs. The Hood River Basin study developed 38 alternatives to address the basin's imbalances in water supply and demand. These alternatives identify risks posed to water supply and opportunities to mitigate those risks through developing water supplies, improving water management, and sustaining or improving environmental quality and ecological resiliency. From these 38 alternatives, six were more fully evaluated and grouped into three major categories: water conservation, groundwater recharge, and surface water storage. These alternatives are provided to stimulate potential further evaluation or implementation by Hood River County or their partners. Each project will be completed to a 100% design, technical specifications document, basis of design document, and budget developed by certified engineers. The proposal is to complete the 100% design documents and implement ecosystem recovery actions in the Basin. All projects have the same regulatory permits to secure. Rather than list the same permits for each project, the permits are: NEPA, ESA, DEQ 401, County Land Use, Riparian Ordinance, FEMA Floodplain Cert, Joint Removal-Fill, Cultural Resource Survey-SHPO, ODFW & NOAA-fish salvage, and ODFW fish passage. In addition, all projects will be constructed during the approved in water work periods to protect aquatic resources.

ODFW's Engineer will review all designs, in coordination with The Department of Interior geomorphologist and NOAA-NMFS engineers along with input from the project manager, to ensure designs meet project goals and objectives before releasing funds for construction. These are high priority water use and fish passage projects identified in the Hood River Basin Study that will be a priority for implementation. The specific project phase and timelines are listed below and developed through the planning of these projects.

Element	Description	Start Date	End Date
Landowner Cooperative Agreements	Communicate with all landowners about the process and design. Complete landowner agreements.	6/2023	8/2023
Topographic Surveys & Data Collection	Contract with engineer to conduct topographic surveys along project reach and collect any necessary data to inform hydrologic and hydraulic modeling.	7/2023	9/2023
Hydrology and Hydraulic Modelling	Engineer to develop hydrology and hydraulic model.	9/2023	11/2023
Wetland Delineation and Cultural Resource Assessment	Contract with engineering and cultural resource services to perform wetland delineations, as needed, and cultural resource assessment.	11/2023	2/2024
Agency Consultations	Consult with Corps, DSL, and SHPO to determine specific permitting requirements. Work with lead permitting agency throughout project design.	7/2023	9/2024
90% Design and Stamped Drawings	Complete analysis, designs, and permit level drawings.	6/2023	6/2024

The diversion dam and culverts have been inspected by Oregon engineers and are rated in 'Poor' or 'Critical' condition. The structural issues observed include, but are not limited to rusted inverts, open joints, cracking, distortion, and partial collapse of the structure. The condition of each culvert increases the risk of failure that will result in extreme damage to the roadway. Failure to replace will impact mobility and medium to high social disparity areas, isolate communities from emergency services, present a serious safety risk to the traveling public, and have a negative effect on climate resiliency. To allay this structural impairment and fish passage impact, we propose to use the following project planning and scoping process.

Oregonians have demonstrated extensive and diverse support for community-based, habitat improvement work under the Oregon Plan. Participants in this effort include watershed councils, Soil and Water Conservation Districts, Salmon-Trout Enhancement Program volunteers, industrial and private landowners and a variety of non-governmental organizations and individuals. Projects were selected over the two year planning phase including public and private landowner inputs as part of the CCP process described previously.

Up until relatively recent history, culverts and bridges were designed primarily for hydraulic conveyance of specific flood events with little thought to how the new structure could affect aquatic species living in the stream. In many cases, culverts sized strictly based on hydraulic area, will narrow the channel excessively resulting in increased velocity through the structure. The increased velocity becomes a barrier when fish can no longer swim upstream. In other cases, culverts were set too flat and over time, a height barrier is created when the culvert outlet erodes to its degraded stream grade, resulting in a perched culvert.

This project proposal involves Stream Simulation Design (Aquatic organism passage; AOP) as part of the scope of each project, the primary design philosophy is to make the channel inside a culvert or under a bridge simulate the characteristics and function of the adjacent natural channel so that it will present no more of an obstacle than the natural channel. This results in a structure that is generally wider than what was previously installed to accommodate a natural stream section through the structure. Culverts that pose a barrier to aquatic species will be replaced with newer culvert types that span 1.2 times the channel width and provide aquatic organism passage.

Stakeholder Support for the Proposed Design Project

(a) Stakeholder Support. The SAP process recognizes that a plan is only as valuable as the extent to which a community is prepared to implement it. Accordingly, when considering where SAPs should be initiated, ODFW and the CCP place a premium on working with local teams that ensure diverse stakeholder participation and have demonstrated community support. When a local partner ("the convenor") submits a proposal to engage a watershed in an SAP process, the CCP assesses whether the local team has representation from the major industrial landowners; local landowner groups (e.g., irrigation districts, soil and water conservation districts etc.); large state and federal landowners; NGO and advocacy groups; elected officials; and the general public. Once a watershed is accepted into the program, each meeting agenda dedicates a block of time for participants to discuss outreach priorities (both messaging and audience) and report back on their outreach activities.

All the projects were generated by these locally convened, multi-stakeholder planning teams, and, therefore, have a broad base of community support. In addition to local partners, HRWG maintains regular contact with our federal congressional delegation, briefing them regularly on the status of SAPs, coastal issues and priorities, and funding needs for SAP implementation. Attached is a letter of support from Oregon's coastal congressional members and letters from tribes and other stakeholders. Letters of Support are provided in the supplemental Attachments.

(b) Inclusive Planning and Engagement. ODFW and project partners are committed to the health of rural communities that depend on salmon for livelihoods and cultural vitality. These communities are feeling the worst effects of climate change, whether its Indigenous communities facing the loss of key food sources and cultural traditions or fishing, hunting, and recreation-based communities facing job losses, and a strained social fabric. Restoration work through

barrier removal is a keyway to restore resilience in watersheds and rural communities, including those communities that have been historically underserved.

To ensure that members of rural communities are fully engaged in how these investments are made, our SAP (planning) process relies on a diverse team of local community members in each watershed. Tribal partners have been key stakeholders in the SAP processes as members of the CTWS have been (and continue to be) active participants in the planning processes. While there's still much work to be done to support tribal communities' recovery from a century and half of broken treaties and loss of access to fish and game, the restoration of home watersheds with the help of federal resources is a key step along the way to reconciliation and honoring tribal sovereignty.

(c) Community Outreach and Education. Community outreach supporting the projects presented in this proposal will take place in two ways. First, the local project managers will publicize the projects in print media, on their respective websites, in social media, at public outreach events, and through presentations to resource managers and elected officials. Following project construction, managers will also host site project tours for funders, managers, elected officials, and local stakeholders. All these outreach opportunities will highlight the essential role of the diverse set of partners convened, including funders, landowners, and the local partnership that managed the work.

Second, the CCP will promote these projects and the broader recovery effort underway through its website and storymap pages, which is designed to engage lay audiences in recovery and provide technical resources to managers and funders. The site describes the high potential for Lower Columbia River coho recovery (and de-listing) and what is required to achieve and sustain it. It will also include landing pages for the completed SAPs and feature case studies on the projects funded under this program. These will complement a story map on the site that ODFW developed to promote coast coho recovery and conservation planning. Finally, ODFW has staff dedicated to promoting our work and that of our partners on social media and in print media. In addition to featuring these projects across our multiple social media feeds, we will also circulate press releases for the annual projects. These will list the projects funded and feature quotes from local partners, agency leadership, and congressional members. ODFW and project partners will also include several of these projects in tours we routinely lead with agency leaders, major donors, foundation staff, the press, students, and interns.

Evaluation Criterion C— Project Implementation and Readiness to Proceed

Designs will be engineered by Professional Engineers registered to practice in the State of Oregon. Each project will be implemented to improve fish passage and enhance aquatic connectivity. The project proposal will meet NOAA and ODFW Fish passage laws and administrative rules by removing each dam and restoring natural channel dimensions and placement of wood structures to facilitate hydraulic diversity and riparian habitat restoration through placement of native vegetation. All these projects contain potential risks for environmental impacts and compliance. These projects all contain Section 7 listed ESA species, will be federally funded, and will need to complete federal review and approval processes before construction. To mitigate these risks, these projects will include project managers that are familiar with the environmental compliance requirements and work with local contractors that are experienced with environmental regulations. ODFW will work with federal agencies on programmatic NEPA compliance under the ARBO II and Regional Programmatic Aquatic

Restoration BiOP. This will reduce risks to project delivery timelines by streamlining Section 7 process and minimize the amount of anticipated take through pre-negotiated design criteria and best management practices for aquatic habitat restoration and road/stream crossing replacements. All construction will be completed within 2 years to allow for environmental reviews and in-water work periods for the protection of fish and aquatic habitats within the Essential Fish Habitat areas. Anticipated state and local environmental applications and permit including local county permits will be expedited through project partnerships and programmatic approval.

To implement this project, we will submit an invitation to bid for contractual services through an open public contract process. This process will provide local contractors the opportunity to bid and secure financial support for each project. It is anticipated that eleven individual local contractors will be hired and provide local economic stimulus. We will follow procurement policy to ensure all applicable state rules are implemented during solicitation of these contractual services. Cost estimates were generated based on fair market value construction and contractual costs through an engineer scoping process and received from contractors associated with competitive bids on similar projects in western Oregon and Washington. If awarded this federal funding opportunity, programmed projects will be phased over two years to expedite completion of each project. All real property and right-of-way acquisition necessary for the project will be completed in a timely manner in accordance with 49 CFR part 24. The scheduling of projects listed will accomplish project milestones and deliverables in a timely manner to minimize constraints.

Designs will be completed up to the 100% phase through development of a Decision Support Document within each project. Preliminary survey work and hydraulic analyses have been completed with data collection, engineering design, cost estimating, report preparation, and construction support through local engineering. The proposed projects have multiple project elements along with several unknowns that will require an incremental design process and associated stakeholder review to get to bid-ready construction drawings. The RFP identifies the need to complete the bid-ready construction drawings by February 1,2024 and ready for in-water work construction during July through September 2024 and final reporting in August-October 2025. Supplemental materials and project timelines are included in the Attachments.

Assessment of Project Risks and Mitigation Strategies.
Achieving the desired status for Lower Columbia River salmon and steelhead will result in sustainable and thriving populations that support a healthier economy and stronger, more consistent fisheries. To accomplish these goals, individual populations require improvements in abundance, productivity, spatial structure, and/or diversity through reductions in risk associated with the environmental and physical barriers that are affecting the populations. Limiting factors are defined as biological, physical, or chemical conditions altered to such an extent by anthropogenic (i.e., human-related) activities that they impede achievement of population biological performance goals. This project proposal will help to manage risk from two limiting factors; impaired access to spawning and/or rearing habitat, and instream obstructions that prevent access to coldwater refuge and complex habitat stream reaches. The eleven fish passage projects will not only help achieve the benefits for the salmon, steelhead and trout covered by each project, they will also be beneficial to all other native fish species residing in these streams. Because our projects are spread across the Hood River watershed, we will disperse the climate

and physical barriers risk spatially across a geographic area to protect life history expressions that will result in climate resilient stocks. ODFW experience with past problems observed with project risk are mostly timing delays associated with environmental agency review of permits and technical construction delays that could be overcome with increased technical oversight and accountability. ODFW and HRWG will manage this risk by using programmatic approval process in coordinating environmental reviews and establish contract agreements for each program that will include: 1) requiring grantees to provide pre-project assessments and prioritizations to the ODFW; 2) encourage grantees to address habitat limiting factors in the project watershed; 3) increase the requirements for technical oversight and accountability within contractual work.

Evaluation Criterion D—Presidential and Department of the Interior Priorities

Climate Change: Currently, there is already a lack of adequate streamflow in the basin during the summer months to meet the competing demands for water. This imbalance is expected to be exacerbated by climate change. The basin's natural runoff is projected to increase during the fall and winter months and decrease during the spring and summer months when water uses are greater. Hood River basin streamflow relies heavily on snowmelt at the beginning of summer and Mount Hood glacial melt during August and September of each year. Warming temperatures in future years will increase the speed of snowpack and glacial melting. Also, glaciers and snowpack are projected to continue to decrease in size and volume. Currently, between 50 and 70 percent of flow during the critical water use period is provided from glacial melt. Once the Mount Hood glaciers fully recede, the basin will lose one of its largest water storage supplies.

Analysis showed that future average temperatures increased between 0.7ºC in the spring in the LW/W scenario and 2.4ºC in the summer in the MW/D scenario. Also, modeling showed that future precipitation varied between a 33 percent decrease in the summer in the MW/D climate change scenario, to a 12 percent increase in the LW/W climate change scenario in the fall. These results indicate that the air temperature in the Hood River Basin will continue to increase in the future. Temperature increases will affect water supply (surface water, glacier melt, snow melt) volume and timing, and water use (e.g., irrigation, hydroelectric power). Since the 1920s, the amount of snowpack in the Hood River Basin has decreased. This pattern of decline is expected to continue through 2060. This decrease in snowpack results in higher streamflow in the winter and lower streamflow runoff during the spring and summer months. In addition, the Mount Hood glaciers have a significant contribution to the basin's water supply and warming temperatures have been reducing their size and volume since the 1920s. The Middle Fork and East Fork of the Hood River are fed in part by the glaciers of Mount Hood. As such, these systems have a high percentage of glacier melt contribution to their overall total annual streamflow. Partners and stakeholders agreed that it was important to examine steps that could be taken to improve existing use of the basin's water resource. Since summer flow was already an issue and was proved to be a larger concern due to the impacts of climate change, alternatives that could restore in stream water during summer months were prioritized. Based on this direction, we selected four alternatives that were more fully evaluated and grouped into three major categories: water conservation, fish passage flows, and instream water protection. The Hydrologic analysis in the Hood River Basin Study (2013) shows the most potential for improving water supply on the East Fork Hood River, thereby leaving more water in the East Fork Hood River during summer

months when flows are most critical for meeting the ecosystem functions and instream flow requirements for ESA listed mid-Columbia River salmon and steelhead.

The design techniques and plans employed in this project strategically increase system-wide resilience and connectivity to provide a full range of habitat conditions to meet the natural life history variations and adaptive strategies inherent in healthy aquatic species populations. These benefits will accrue not only to anadromous and resident aquatic species, but also provide some incremental improvement in whole watershed conditions. Climate change models indicate the likelihood of changing environmental conditions in the Lower Columbia and Oregon Coast. Specifically, the climate considerations that our project target by re-connecting aquatic corridors include: a) amelioration of potential higher summer stream temperatures and reduced fragmentation of fish and wildlife movement corridors by restoring bedload transport and functional removal of barriers; b) address impacts of increased peak flows and increased frequency and intensity of flood flows by re- connecting linear aquatic corridors which allow fish to move throughout the system to access flow velocity, temperature refugia, foraging and juvenile rearing habitats throughout the water year; c) address reduced aquatic species migratory corridors and habitat connectivity through systematic removal of instream barriers to ensure that fish upstream and downstream movement corridors are accessible for all life history forms in a broad variety of flow regimes throughout the year. This project will allow wild fish access to beaver modified habitats in multiple Oregon Columbia River-Hood River sub-basins. The project will provide access to localized riparian habitat within a stable vegetated corridor that serve as fringing wetland, shade, and foraging and cover for a variety of riparian dependent fish and wildlife species. As this multi-phase approach to fish passage and aquatic connectivity is completed, benefits to holistic ecosystem variability and adaptive life history strategies inherent in healthy aquatic species populations will be enhanced. Ecosystem processes and changing ocean conditions will dictate the sustainability of salmon and trout, however this project results in the removal of the physical barrier to fish migration and therefore contributes to solutions that can augment these changes. Thereby each project will provide wild fish passage to enhance ecosystem resilience in the Lower Columbia River.

ODFW along with stakeholders has developed specific habitat-focused strategies and actions that could reduce risk from climate and ocean change. Many of the actions are also identified in the Final ESA Recovery Plan for Oregon Lower Columbia River Salmon (NMFS 2022) and are being implemented in the ESU to address primary and secondary limiting factors. To provide the greatest long-term benefit, these actions need to be targeted at locations that are most likely to support Lower Columbia River salmon now and in the future. Therefore, climate change projections and considerations have been incorporated into the selection of these four project locations. This is particularly important in the southern half of the ESU, where summer temperature and flow conditions are most likely to become a primary limiting factor in the foreseeable future.

Barriers that block some salmon populations may be affected by climate change that drive mismatches between juvenile arrival timing and prey availability in the marine environment. This barrier removal project provides salmon benefits by opening access to critical habitat that will maintain phenological diversity and can contribute to metapopulation level resilience by reducing the risk of a complete mismatch in outmigration timing. These projects will maintain

and augment such life history diversity because the projects are located across a wide coastal geographic range, across populations from higher elevation and further inland streams, and result in populations that arrive in the estuary later to encounter distinct prey abundances between freshwater and marine habitats.

Disadvantaged or Underserved Communities: As American settlers of European descent began to appear in the Oregon in the mid-1800s, the many rivers and tributary streams became important resource for them as they relied upon these rivers for water supply, trade, fish harvest, and irrigation water. Rural and coastal communities are one of the most underserved communities and rely on low-cost sources of food and resources. Production of salmon from Oregon streams serve as a low cost and healthy source of food for many of the residents in Oregon communities. This project will provide low-income communities a source of food and economic stimulus through tourism and the fishery activities this project will help to sustain. Residents of the area rely on natural resources for food, income, and materials. The benefits of this project will provide a low-income resource to these underserved communities.

Oregon rivers and its tributaries have long influenced the lives of the residents: human, fish, and wildlife alike. Since time immemorial, indigenous peoples have depended on these rivers for many resources including, but not limited to, fishing, trade, transportation, and water supply. Fish within these rivers including salmon, lamprey, steelhead, and cutthroat trout are also an essential component of tribal identity and culture. The Confederated Tribes of Warm Springs, Confederated Tribes of the Grand Ronde, Confederated Tribes of Siletz Indians, Coquille Indian Tribe, and Cow Creek Band of Umpqua Tribe of Indians are highly invested in fisheries management within the Project area. Of primary importance to these tribes is restoration of all populations, and all species of anadromous and resident fish within the traditional lands. Cultural benefits for present and future generations by the Tribes contribute to fisheries management and research within the Basin and are partners in salmon and steelhead restoration efforts. Fish passage provided through this project will benefit the Tribes through increased harvest and cultural resources.

The Council on Environmental Quality's interactive Climate and Economic Justice Screening Tool identified the following underserved communities in the project area.

Community(ies)	Race/Ethnicity	Poverty Rate	Low Income %	Annualized Unemployment Rate
Warm Springs Tribe (41031940000)	American Indian (92%), White (3%)	92	93	99
Hood River County (41027950400)	Hispanic/Latino (56%) White (39%) **Other (13%)**	15	68	54

Tribal Benefits: The Hood River is a rural community and historically resource-dependent region dotted with numerous underserved communities, including many on lands of the Confederated Tribes of Warm Springs Indian community. Steep reductions in timber harvest on federal lands since the 1990s, coupled with significant declines in commercial and Tribal fisheries, have precipitated a slow transition from resource-based economies to those that rely on

income from recreation and transfer payments. (Transfer payments— e.g., unemployment, welfare, social security, and government subsidies—are the primary source of personal income in many coastal communities). These projects will help restore culturally valuable resources and sustainable fish populations for each of these tribal nations.

Evaluation Criterion E—Performance Measures Task B: Construction ONLY.

Socioeconomic Performance Measures. The communities along the Oregon coast are highly dependent on salmon runs and healthy watersheds to support the local economy. Chinook and coho salmon fisheries, specifically, were once a pillar of coastal economies and helped define the culture and character of its communities. Over the long-term the most essential indicator used by the HRWG, and our local partners is whether salmon populations can support recreational, commercial, and subsistence fisheries.

In the near term, the fish passage projects contained in this proposal will generate several important benefits to the community, and there are several indicators that can help us gauge the socioeconomic impacts. First, replacing undersized culverts and improving irrigation diversion dams will benefit the ecosystem by restoring the historic stream channel alignments that will protect people, property, infrastructure, and agriculture from frequent and devastating flood events. In addition, undersized or failing culverts and diversion dams exacerbate flooding, erode banks and levees, and cause road failures. Economic and social consequences to the community include loss of agricultural lands and farm infrastructure, and reduced access to priority areas for timber landowners, land managers, emergency responders, recreationalists, and residents. The culvert barriers, for example, flow under roads that provide access to firefighting crews, timber production, and the public. By replacing the culverts before they fail, the community will be spared an emergency road closure and possible longer-term lane restrictions and weight limits on a temporary fix before a permanent fix can be installed. Local construction crews will likely be selected to correct these and the other barriers in this proposal. Money spent in local communities provides stability for small businesses and helps promote regional economic stability. The other benefits will be measured by miles of stream connectivity, acres of restored floodplain/riparian habitat and wetlands, number of hazards removed, miles of road and levee protected, and dollars spent on local contractors.

Sustainability Performance Measures. When devising the SAP process, ODFW and the HRWG adopted several guiding principles. Among these, the partners sought to ensure that the process: 1) gives greater weight to restoration strategies that restore watershed function (over those that simply boost fish production); 2) incorporates projected water temperatures, instream flows, and landward migration zones (estuaries) using downscaled climate models; and 3) generates projects that have a high assurance of success in the context of potentially dynamic watershed conditions resulting from climate change. Consequently, all the projects contained in the SAPs meet these sustainability objectives.

In addition to including projects with socioeconomic benefits, maximizing these sustainability objectives became a key consideration in selecting the projects for this proposal, which will increase floodplain-channel interaction, improve water quality, and jump start biological processes like macro-invertebrate production in critical rearing areas. All the projects will increase longitudinal connectivity, restoring the transport and sorting of sediments and wood. Restoration of these functions will not only pass fish but substantially reduce the risk of culvert

failures and the numerous ecological, social, and economic impacts they can cause. The Hood River projects incorporate large wood structures to restore lateral hydrologic connectivity, improve water temperatures, retain spawning gravel, and promote pool and cover development. These restoration strategies generate significant improvements in watershed function and promote the system's long-term capacity to produce and maintain critical habitats; in effect "helping the system to help itself." Consequently, we are confident that each project provides a high degree of long-term sustainability. It should also be noted that sustainability (or "longevity" as it is described in the SAPs) was one of the criteria used in evaluating the projects considered during SAP development. One of the primary considerations used in testing a project's sustainability was the potential for a project to withstand changes in watershed condition resulting from climate change (for example, higher peak flows for LWD projects and the extent of landward migration due to sea level rise for the habitat restoration projects). In part because of their capacity to improve watershed function, each of the projects will increase the system's resilience to changing watershed conditions resulting from climate change.

Fish Passage Implementation and Monitoring.

Watershed partners have conducted water quality, stream flow, fish distribution, and habitat monitoring over the past 25 years. The Hood River Basin Partnership (Partnership) seeks to develop a monitoring plan to evaluate the effectiveness of projects identified for implementation in Watershed 2040: Hood River Basin Partnership Strategic Action Plan (SAP). Strategies and projects identified in the SAP range from instream fish habitat and floodplain restoration to water quality improvement, and restoration of instream flows. Projects occur on both public and private lands with multiple project sponsors and funding opportunities.

The Partnership proposes to develop a robust monitoring plan that will enable members to measure progress in implementing restoration, conservation, and water quality projects, get feedback on restoration techniques, evaluate the effectiveness of cumulative actions in achieving ecological outcomes, and implement adaptive management to improve restoration. Monitoring plan metrics will build off what partners currently collect, and add or refine metrics, methodologies, and spatial and temporal distribution of sites where gaps exist. Pre-existing metrics (e.g., continuous temperature monitoring, stream habitat data) and protocols will be reviewed and described in the monitoring plan to ensure consistent application and transparency. New metrics will provide data that are robust and repeatable and focus upon ecologically relevant outcomes. Additional deliverables will include the development of a relational database, methods and an application for data analysis and display, and programmed tablets for field data collection.

Project partners are the Hood River Watershed Group, the Hood River Soil and Water Conservation District, Confederated Tribes of the Warm Springs, US Forest Service Hood River Ranger District, East Fork Irrigation District, Middle Fork Irrigation District, Farmers Irrigation District, and Oregon Department of Fish and Wildlife.

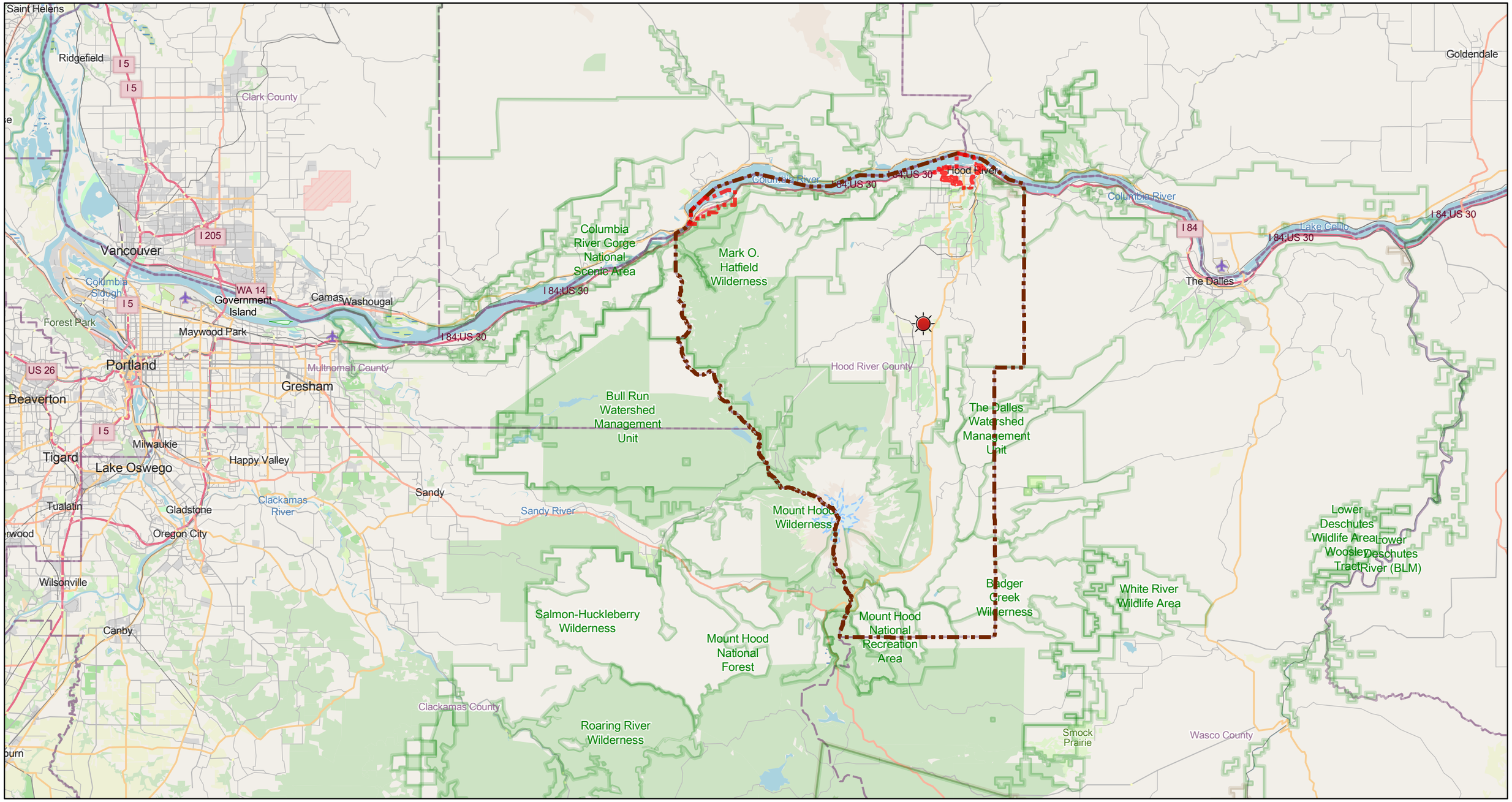
The additional funding included in this grant application will include time for implementing the monitoring plan protocols for pre-project data collection for the restoration design projects

included in the application. The remaining funding will go towards the contractor hired to develop the plan.

Monitoring will be conducted through both basin-wide programmatic monitoring programs as well as efforts specific to the replaced culverts. Fundamental pre- and post-project monitoring will be conducted by a combination of local agency personnel as well as watershed council staff and volunteers and will include:

- Fish presence/absence through a combination of summer and/or winter snorkeling and/or electrofishing. Adult spawner presence (and possibly abundance) will be recorded by foot surveys.
- Longitudinal profile and/or an as-built survey of the stream crossing reach to verify fish passage requirements (i.e., maximum 6" jump height for juvenile salmonids) are satisfied.
- Photopoint monitoring will occur for 3 years following construction. ~~Josephine~~ County routinely assesses and monitors bridges and will continue to do so.
- Physical habitat data (https://odfw.forestry.oregonstate.edu/freshwater/inventory/methods.html) will be utilized to update the current habitat condition of the stream reach affected by the culvert replacement. ODFW collected habitat data in 2008 and 1998, respectively, which will be used to determine habitat quality for fish habitat. Contemporary habitat survey data will also be collected by ODFW staff that conducted a "Level II" survey in 2020 which will serve as a benchmark for assessing habitat quality.
- Cross section monuments will be established upstream and downstream of the stream crossing to monitor any change to the stream channel.

Hood River County Web Map



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City Limits

Districts & Administrative Units

County Boundary

Baldwin Creek Fish Passage & Habitat Restoration Design
Hood River County, Oregon
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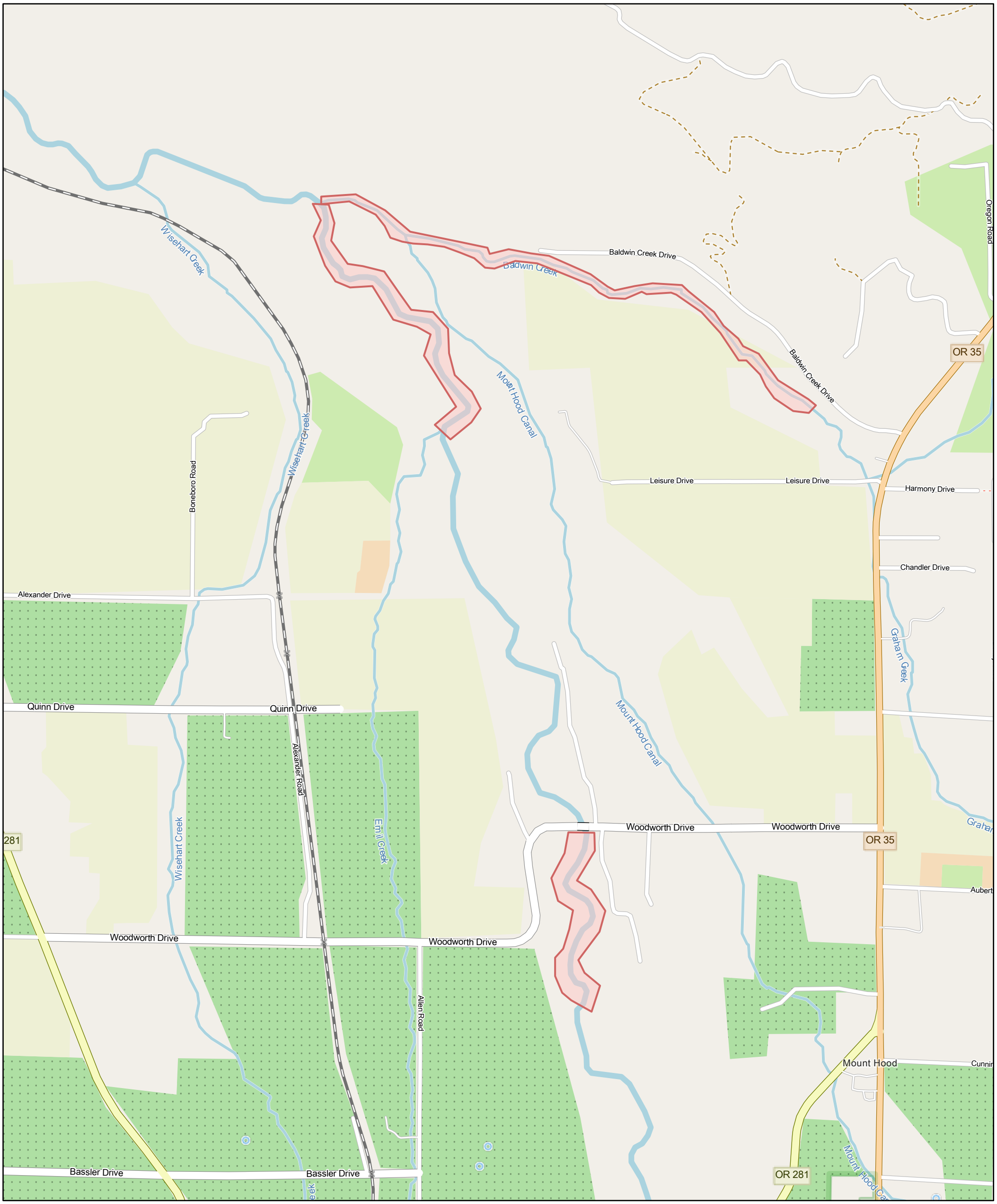
1:577,791

0 5 10 20 mi

0 5 10 20 km

Hood River County Web Map



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Districts & Administrative Units

County Boundary

Lower East Fork Hood River & Baldwin Creek Fish Passage & Habitat Restoration Design Project Overview Map

1:18,056

0 0.13 0.25 0.5 mi

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Hood River County Web Map

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Districts & Administrative Units

County Boundary

Lower East Fork Hood River &
Baldwin Creek Fish Passage
& Habitat Restoration Design
Baldwin Creek Overview Map

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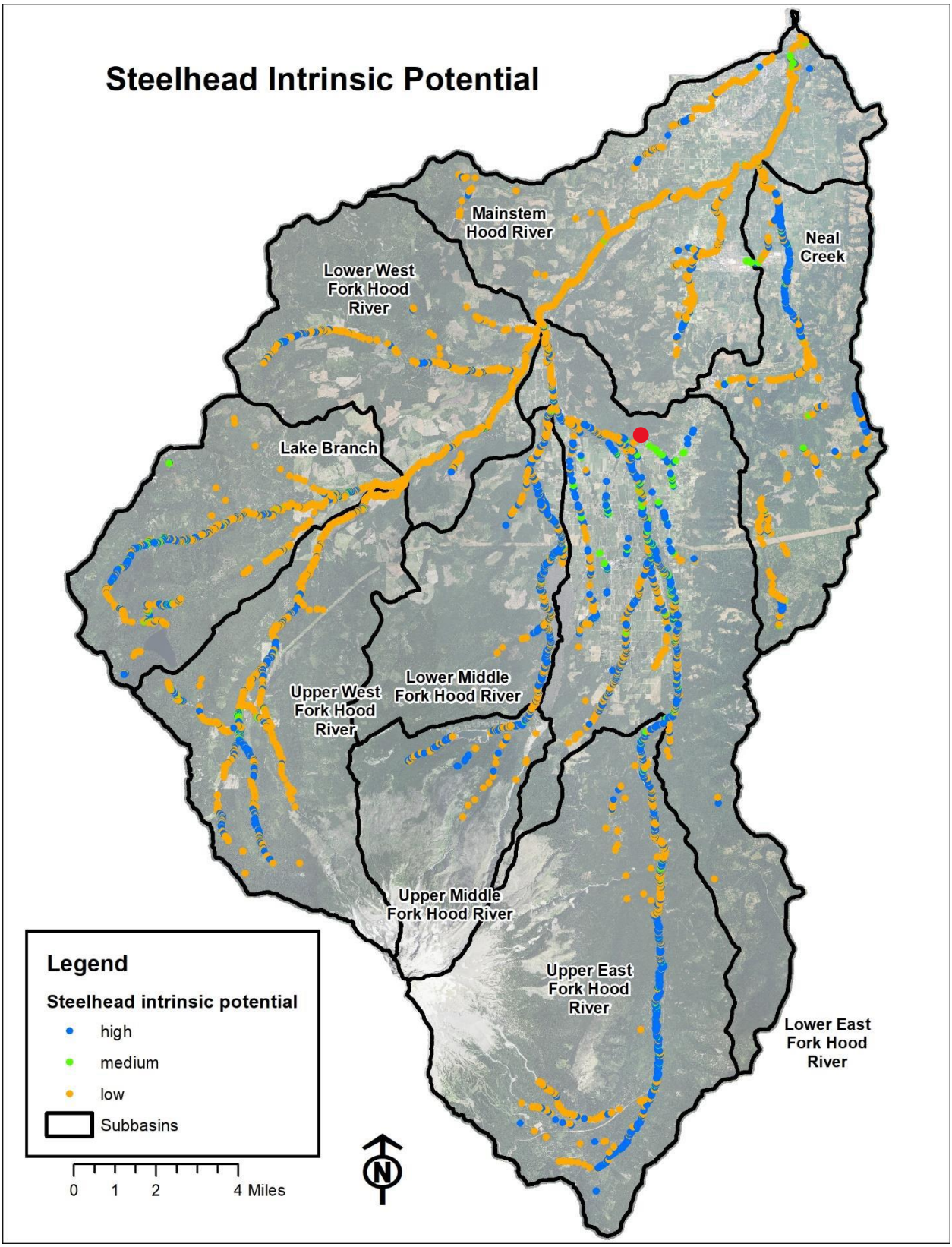
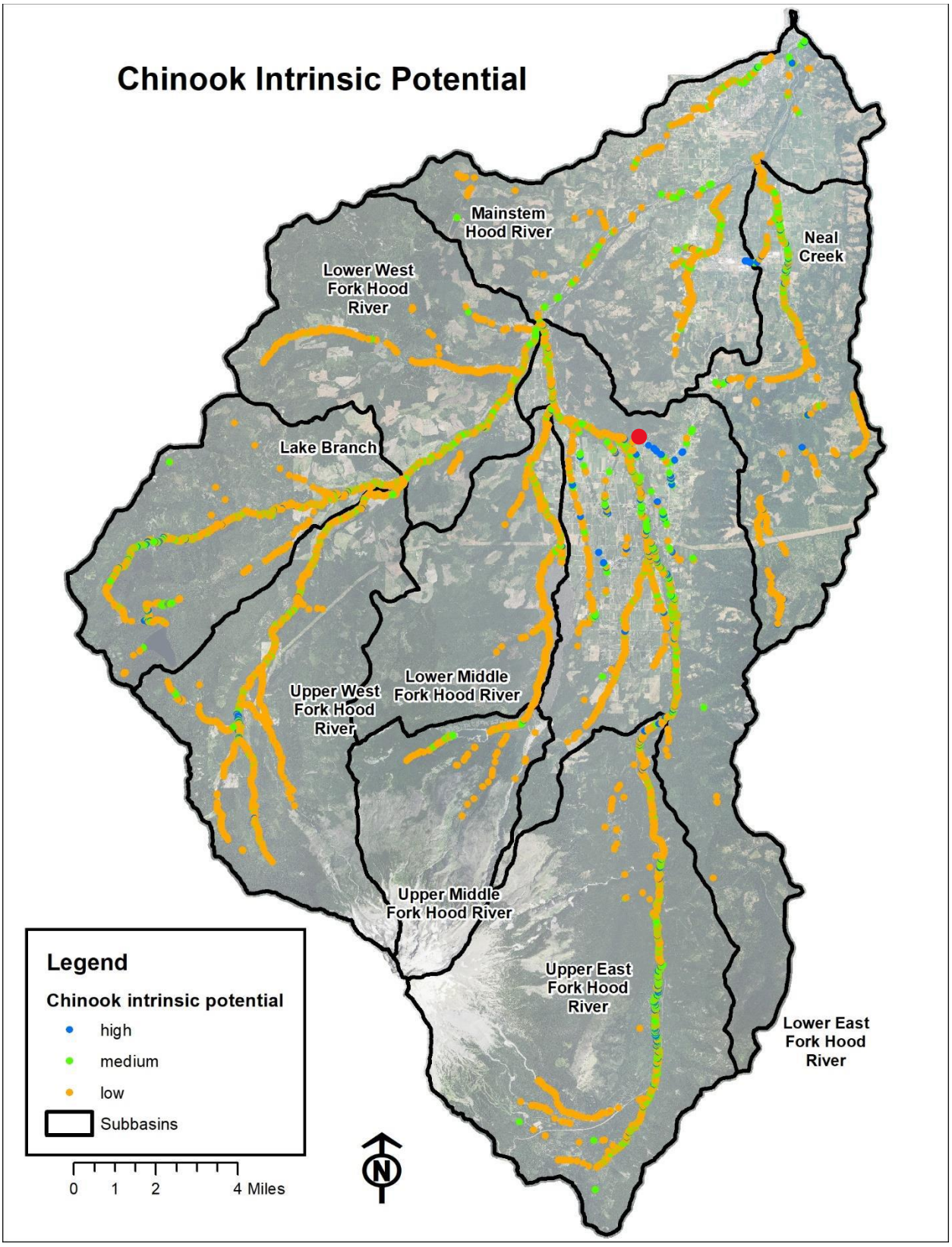
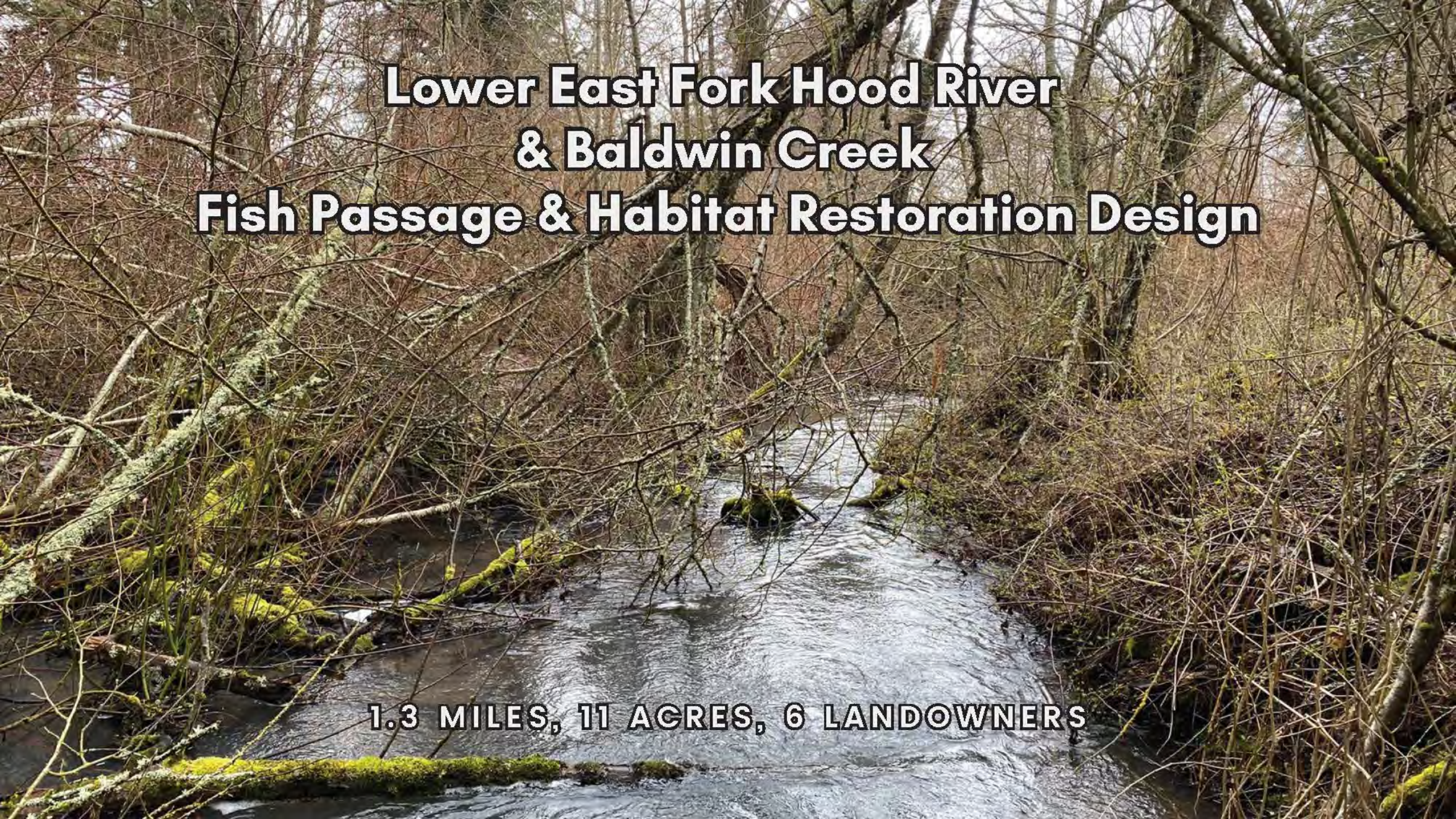


Intrinsic Potential for Steelhead Spawning and Rearing (Heider & Salminen 2019; Parameters from Cooney & Holzer 2006). Project area marked with red dot.



Intrinsic Potential for Spring Chinook Spawning and Rearing (Heider & Salminen 2019; Parameters from Cooney & Holzer 2006). Project area marked with red dot.

Lower East Fork Hood River & Baldwin Creek Fish Passage & Habitat Restoration Design



1.3 MILES, 11 ACRES, 6 LANDOWNERS

Fish Passage – Failing Diversion

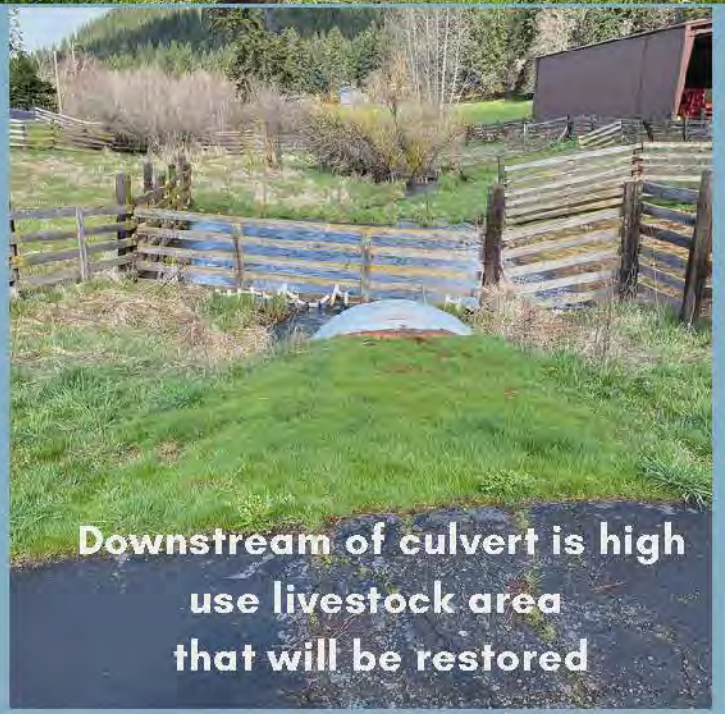
A failing diversion is creating a fish passage barrier at low flows. ODFW has provided temporary improvements in the past, but those attempts have failed.

Riparian and wetland area is 100% reed canary grass

Fish Passage – Perched Culvert

A perched culvert is creating a low flow barrier and possibly a high flow barrier for juveniles

Degraded riparian areas



Downstream of culvert is high use livestock area that will be restored

Habitat Restoration

There are opportunities throughout the project area for riparian and wetland restoration, large wood structures, off-channel habitat, and floodplain connection.