Restoring habitat connectivity for Lower Columbia River Salmonids in the North Fork Klaskanine River.

Aquatic Ecosystems Restoration
Notice of Funding Opportunity
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Applicant Organization: Oregon Department of Fish and Wildlife
Project Title: Restoring habitat connectivity for Lower Columbia River Salmonids in the North Fork Klaskanine River.

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Executive Summary

The Oregon Department of Fish and Wildlife (ODFW) and local partners are applying for the Bureau of Reclamation's Aquatic Ecosystem Restoration grant opportunity to assist the recovery and delisting of Lower Columbia River salmon in the North Fork Klaskanine 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 B: Construction to implement fish passage and aquatic habitat connectivity within the North Fork Klaskanine River. The North Fork Klaskanine River is a tributary stream to the Young's Bay Estuary in the Lower Columbia Estuary of Oregon. This proposal seeks funding to advance the recovery of Endangered Species Act (ESA)-listed Oregon Columbia River Chinook salmon, chum salmon, coho 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 Lower Columbia River watershed. Funding this proposal will remove a fish passage barrier, improve water management and efficiency through upgrades to a fish screen, increase stream complexity, restore riparian habitat, and provide instream flows to benefit aquatic ecosystem restoration. Project completion is expected to occur within 2 years of federal award and the proposed aquatic restorations will be conducted on state land.

Project Location: The Ogee Dam is located on the North Fork Klaskanine River near the rural community of Olney, Oregon. The project location is 14 miles southeast of Astoria in Clatsop County, on Highway 202. The site is at an elevation of about 25 feet above sea level, at latitude 46.0892 (North) and longitude -123.7158 (West). The area of the site is 16.56 acres, owned by Oregon Department of Fish and Wildlife (ODFW).

Project Description:
This proposal seeks funding to advance the recovery of Oregon's Lower Columbia River salmon stocks by implementing a high-priority fish passage project. The North Fork Klaskanine River is a major tributary to Young's Bay and the first major watershed that ocean-returning fish encounter in the Lower Columbia River and estuary. Fish passage has historically been blocked by three water diversion dam structures that function to take water from the North Fork and North Fork Klaskanine River to provide a year-round water source for the hatchery, referred to as Intake #1 (Ogee Dam), Intake #2, and Intake #3 (North Fork Dam). Over the past several years project partners engaged in a process to develop fish passage solutions in the watershed. This led to a 2020 removal of one hatchery dam on the North Fork Klaskanine and a natural like fish passage structure built at a second dam in 2022, thus fully opening fish passage upstream of this proposed barrier removal project. Fish passage at the North Fork Klaskanine Diversion #1 dam (Ogee Dam) is the final phase of a watershed scale project to maximize wild fish passage and stream connectivity while maintaining hatchery management. Providing fish passage at the Ogee dam will provide access to 12 miles of spawning and rearing habitat for ESA listed coho salmon, spring Chinook salmon, winter steelhead, with additional benefits for coastal cutthroat trout, Pacific lamprey and Western brook lamprey.

Project Budget

Oregon Department of Fish and Wildlife is requesting $3,500,000 in contractual costs to execute a contract for completion of the fish passage project at North Fork Klaskanine Intake #1 Dam. To implement this project ODFW will submit an invitation to bid for contractual services through an open public contract process. ODFW 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 received from contractors associated with competitive bids on similar projects in western Oregon and Washington. The budget is solely for contractual services and does not include any inflationary factors, personnel, fringe benefits, travel, or indirect costs. Expense items are based on the engineered basis of design cost estimates for the project. These expense items include 1) mobilization, demobilization, and bonding ($90,000); 2) demolition and earth work required for removal of the Ogee dam concrete, asphalt, metal, and soil materials ($1,500,000); 3) removal of the Ogee dam requires upgrades to the fish screen and weir infrastructure to ensure water supply is provided to the hatchery ($870,000); 4) construction of the project will be completed during in-water work periods to isolate the water and fish from the work area and will require costs for temporary water management ($40,000); and 5) to account for the discontinuity between the streambed elevation upstream and downstream of the dam and the need to maintain grade for channel stability after dam removal a roughened channel will be constructed of engineered fill and streambed material ($1,000,000). All federal funding amounts are associated with construction to support the fish passage project and upgrades of fish screening to meet NOAA screening criteria. Final construction ready design plans

have been funded through the ODFW Fish Passage Drought funds (HB5202). Resource Legacy Foundation has contributed $200,000 through the Open Rivers Initiative (Grant #16158). USFWS contributed $100,000 to collection of the topographic survey, hydraulic analysis, and the development of the alternative analysis report during early scope of work phases of the project. USFWS will also contribute in-kind match to securing federal permitting requirements of the project. NCWA will contribute $10,000 to in-kind funding support of the project to assist with riparian vegetation planting and soil erosion control. NCWA will also contribute to the outreach and education materials developed with this project. All non-federal match funds have been secured for the project. OWEB contributed $165,000 to project construction through materials for the roughened channel. ODOT contributed $56,000 in state funds for rock supply materials for the protection of the highway 202 bridge abutment and center pier. Bonneville Power Authority contributed $42,000 for Pacific lamprey conservation initiatives by providing fish passage.

Table 1. —Summary of Non-Federal and Federal Funding Sources FUNDING SOURCES	**AMOUNT**
Non-Federal Entities	
1. Resource Legacy Funds	$ 200,000
2. ODFW- State Drought Funds	$ 200,000
3. Oregon Watershed Enhancement Board	$165,000
4. ODOT	$56,000
5. BPA-PLCI	$42,000
Non-Federal Subtotal	$ 663,000
Other federal funding (USFWS)	$100,000
REQUESTED RECLAMATION FUNDING	$ 3,500,000

Evaluation Criterion A- Project Benefits

General Project Benefits

The watershed processes in the North Fork Klaskanine River 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 the creation and use of dams. The North Fork Klaskanine River is a Young's Bay tributary and the first major watershed that ocean returning salmonids and lampreys encounter in the Lower Columbia River Estuary. It provides valuable spawning, rearing and cold-water habitat to support salmon and trout osmoregulation as smolts adjust to saline conditions in the Pacific Ocean. The Lower Columbia Chum Salmon Strategic Action Plan (SAP) (NCWA 2021) identifies the Klaskanine subbasin as a priority for habitat restoration activities. Improving fish access and natural stream dynamics will set the stage for future recovery efforts for chum and other key aquatic species. The Lower ColumbiaRiver is a high priority basin for native fish recovery by ODFW's Conservation and Recovery Program. ODFW and USFWS are signatories to the Pacific Lamprey Conservation Agreement and seek to implement lamprey conservation in the Lower Columbia River and tributaries (USFWS 2012). This proposal targets fish passage at a hatchery dam on the North Fork Klaskanine River which is on ODFW's 2019 Statewide Fish Passage Priority List (Group 5).

The project proposed here will increase access for juvenile coho to critical areas of high-quality upstream 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 coho salmon, while undertaking targeted restoration of instream and riparian habitats. The 14 square mile North Fork Klaskanine basin originates on the west slope of Wickiup Ridge. The Youngs River and Klaskanine systems are rich and diverse in aquatic life with many ESA-listed species including Lower Columbia coho salmon, fall and spring chinook, winter steelhead, chum salmon, coastal cutthroat trout (resident and anadromous life history forms), Pacific lamprey and western brook lamprey. Historically, there were abundant runs of chum salmon. Chum salmon are considered extirpated from Oregon tributaries of the Columbia River, though in recent years they are observed in increasing numbers. They may be from natural populations or strays from other tributaries or hatcheries. Regardless of origin, adult chum has been observed in lower sections of large rivers in fall, and juveniles are occasionally collected in estuary sloughs. Adult chum salmon arrive in earlyfall, peaking in November. The Klaskanine watershed is part of a focused, multi-stakeholder effort for Lower Columbia Chum salmon recovery (SAP) led by the North Coast Watershed Association (NCWA). The SAP identifies access to habitat and process-based restoration are targeted actions for chum recovery in this Basin.

The projects in this proposal encompass a suite of fish passage 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 removing a dam, restoring natural fish passage and water efficiency actions to increase instream flows by improvements to a water pipeline that is leaking and upgrading to a new fish screen.

The projects seek to ensure that ecosystem benefits give highest priority to restoration projects with the greatest potential to: 1) reduce the primary factors limiting Lower Columbia River 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 North Fork Klaskanine River and the Young's River Basin (see supplemental map). These projects provide regional benefits by addressing the primary and secondary limiting factors including a lack of off-channel rearing habitat and elevated water temperatures, which increase juvenile coho 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 Lower Columbia River. The project supports removal of a failing dam, and water efficiency through pipeline construction that will reduce water conflicts and provide instream flow benefits to Lower Columbia River salmon and steelhead stocks. 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 remove a failing dam and construct new water diversion systems that improve the use of water within the Basin. Climate-driven atmospheric rivers increase the threat of catastrophic flooding. Dams installed decades ago were not designed to handle the peak flows generated in these events, and dam

failures are increasingly common. When failures occur, the ensuing debris torrents not only scour streambeds, but they also damage infrastructure.

The Oregon Coast is a largely rural and historically resource-dependent region dotted with numerous underserved communities, including many on lands of the Confederated Tribes of Siletz Indians, Confederated Tribes of Grand Ronde, the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians. 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 local 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:

NOAA Fisheries delineated geographic recovery planning areas, for the ESA-listed salmon and steelhead populations on the West Coast. The Lower Columbia River Recovery Sub-domain is part of the Willamette/Lower Columbia Salmon Recovery Domain. It encompasses the estuary and all Columbia River sub-basins up to White Salmon, Washington and Hood River, Oregon, and also includes the Willamette River up to Willamette Falls. There are four ESA-listed salmon and steelhead species that will benefit from this project: Lower Columbia River Chinook salmon, Lower Columbia River coho salmon, Columbia River chum, and Lower Columbia River steelhead. Additional species of Pacific Lamprey, coastal cutthroat trout, Western brook lamprey, and various amphibians will benefit from this project.

This project is a high priority within Oregon and the Youngs Bay watershed. Many strategic plans and watershed assessments support the need for fish passage in the watershed. The Oregon Conservation Strategy (ODFW 2016) identifies habitat fragmentation and fish passage as limiting factors for coastal populations of several salmonids including spring Chinook, chum, coho salmon, summer and winter steelhead and cutthroat trout. They are also identified as limiting factors for both Pacific and western brook lamprey. Fish Passage at artificial barriers is identified as an important conservation action to address these limiting factors.

The Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead and ESARecovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon, Columbia River Chum Salmon, and Lower Columbia River

Steelhead (NOAA Fisheries 2013) identifies blocked/impaired fish passage as one of several primary, habitat-related limiting factors affectingrecovery of this Evolutionarily Significant Unit (ESU). The document identifies removal or modification of barriers as one of several management actions to protect and restore watershed processes and facilitate species recovery. This project directly addresses the recovery plans for regional habitat connectivity to historical areas necessary for improved wild production of listed salmon and steelhead populations.

The Oregon Plan for Salmon and Watersheds is a community-based action plan that engages many partnerships and stakeholders into restoring salmonid species in the state of Oregon. Government, alone, cannot conserve and restore salmon across the landscape. Watershed councils, soil and water conservation districts, and other volunteer efforts are vehicles for getting the work done. The Oregon Plan involves the following activities that are relevant to this project: (1) coordination of effort by all parties, (2) development of action plans withrelevance and ownership at the local level, (3) monitoring progress, and (4) making appropriate corrective changes in the future. This project engages partnerships, Tribes, state, and federal agencies in recovery activities for chum salmon, spring Chinook salmon, coho salmon, and Pacific lamprey. The Bi-state Mainstem Lower Columbia River and Columbia River Estuary subbasin plans identify the management of Columbia River fisheries at sustainable levels, maintaining a viable population through adequate wild fish spawner abundance and directing harvest away from depressed stocks. This project achieves both goals through barrier removal and fish passage of wild fish and contributes to the biological objectives of the recovery plans for chum salmon, spring Chinook, winter steelhead, and coho salmon. Under current conditions wild fish are trapped between the hatchery facility and an area immediately below the Ogee dam, where this project focuses on removal of this barrier to reduce undesirable direct and indirect impacts to wild populations. While these strategy recommendations are listed in the estuary and lower Columbia River subbasin plans, conservation benefits from this project apply to anadromous stocks in every subbasin of the Columbia River. Increased predation by avian birds, pinnipeds, and impacts from hydro-power dam operations have reduced wild populations throughout the Columbia River and this project directly addresses wild fish population access to historically important areas for population resilience.

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 North Fork Klaskanine River watershed. This proposal seeks funding to advance the recovery of multiple Lower Columbia River salmon and steelhead stocks by implementing a high-priority fish passage project. The projects contained in this proposal will remove a fish passage barriers and create access to further upstream habitat complexity, this will result in: 12 miles of salmon and steelhead spawning and rearing habitat reconnected and also return 11 cfs of water to instream flows.

A.2.2 Task B: Construction applicants

Species and Habitat Benefits

Working with its federal, state, tribal, and local partners, NOAA Fisheries published a Recovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon,

Columbia River Chum Salmon, and Lower Columbia River Steelhead (July 2013). To recover four salmon and steelhead species that spawn and rear in the lower Columbia River or its tributaries in Oregon and Washington. The Lower Columbia Recovery Plan is based on locally developed plans, each of which covers a different portion of the species' range. The Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (2010) prepared by the Oregon Department of Fish and Wildlife identifies the recovery of these species through fish passage that reconnects wild salmon to historic spawning and rearing habitats.

The 14 square mile North Fork Klaskanine basin originates on the west slope of Wickiup Ridge. The Youngs River and Klaskanine systems are rich and diverse in aquatic life with many ESA-listed species including Lower Columbia coho salmon, fall and spring chinook, winter steelhead, chum salmon, coastal cutthroat trout (resident and anadromous life history forms), Pacific lamprey and western brook lamprey. Historically, there were abundant runs of chum salmon. Chum salmon are considered extirpated from Oregon tributaries of the Columbia River, though in recent years they are observed in increasing numbers. They may be from natural populations or strays from other tributaries or hatcheries. Regardless of origin, adult chum has been observed in lower sections of large rivers in fall, and juveniles are occasionally collected in estuary sloughs. Adult chum salmon arrive in earlyfall, peaking in November. The Klaskanine watershed is part of a focused, multi-stakeholder effort for Lower Columbia Chum salmon recovery (SAP) led by the North Coast Watershed Association (NCWA). The SAP identifies access to habitat and process-based restoration are targeted actions for chum recovery in this Basin.

Coho salmon have a longer dependence on freshwater habitats than chum salmon. Coho fry emerge in early spring and remain in freshwater for at least a year. High quality stream conditions and habitat access are necessary year-round to insure survival. Key attributes for coho salmon include off-channel and beaver pond habitat for winter high flow refugia, large wood as cover, and low levels of fine sediment in spawning gravel; all of which exist in the North Fork Klaskanine River if fish passage is provided through this barrier removal project.

Native coastal cutthroat trout, a species of concern, are abundant in the North Fork Klaskanine River. This project specifically targets restoration at migratory life history forms of coastal cutthroat trout. Coastal cutthroat have the mostcomplex life history strategy of any salmonid. They express several life history forms resulting in resilient, adaptive, and widely distributed populations. Four life-history types recognized include: resident, fluvial, ad-fluvial and anadromous. Their populations have plasticity between life history types with interchange of individuals from one life history to another. Relevant to this project, evidence suggests that resident fish make significant contributions of individuals to augment the anadromous life history (ODFW 2004). Improving passage on the North Fork Klaskanine River will have immediate benefits to resident cutthroat trout and immediate potential to augment the more imperiled sea-run life history.

Pacific and western brook lamprey are documented above the Ogee Dam and occur in the project area. Pacific lamprey is a culturally and ecologically important anadromous species which migrates from ocean to freshwater spawning and rearing habitats where their larval form spend 3-8 years residence in sand substrate before migrating as juveniles. Aquatic connectivity is a key limiting factor (Lamprey Technical Workgroup 2020). Unlike most

anadromous fishes that have evolved strict homing behavior, Pacific lamprey do not home to natal streams, but instead use migratory pheromones to reach spawning areas (Moser et al. 2015). This makes systems like the Klaskanine, which are among the first that ocean-returning fish encounter, extremely valuable for lamprey conservation. Lamprey produced here have potential to return and spawn in other parts of their range, bolstering the larger meta-population and assisting with the seeding and recovery of more critically imperiled sub-basins. Pacific lamprey are important to the ecosystem, contribute to food web dynamics, act as a buffer for salmon from predators, and contribute important marine nutrients to inherently nutrient-poor watersheds and can make up a large portion of the biomass in streams (USFWS 2019).

Watershed Benefits

The design techniques and strategies 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 both the North Fork and Klaskanine River tributaries. The project will provide access to localized riparian habitat within stable vegetated corridorsthat 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, it will also store water in adjacent wetlands to improve stable flow (water quantity) and temperature (water quality) conditions in the North Fork Klaskanine River.

The basin has excellent restoration potential with low gradient habitat and good canopy coverage (86% canopy coverage), habitat complexity and pool depths. Based on intrinsic potential information (valley width, stream gradient, active channel width, stream flow), much of the stream habitat in the North Fork Klaskanine River are moderate to good candidates for enhancement activities due to low gradient, moderate-wide channels, and broad valleys. There is high beaver activity, activated side channel complexes, and instream wood inthe North Fork and tributaries. The watershed iscomprised of forest land with a mix of state forest land in the upper parts of the watershed and private non-industrialforest in the lower watershed.

Americans derive significant economic, recreational, ecological and health benefits from robust aquatic habitats, including recreational fishing opportunities, favorable water quality and healthy

wildlife communities. Improving fish passage, habitat connectivity and habitat stability is a priority for Lower Columbia River salmon and steelhead stocks. These barriers impede fish passage to historic spawning waters, coldwater refuge streams and feeding grounds. Stable riverbanks with strong native plant communities, called riparian buffers, are part of a healthy ecosystem and are vital to many fish and wildlife species. Riparian buffers provide important nesting and foraging sites for a host of migratory bird species and contribute to healthy fish habitat through shade and cool water temperatures, biotic inputs, and woody debris. Riparian buffers also reduce sediment and nutrient inputs into our rivers and lakes by filtering and absorbing runoff from residential areas and farms. This project will restore aquatic habitat connectivity and provide a stable riparian habitat through streambank restoration and construction of a roughened channel to mimic the natural channel slope and dimensions.

Water Supply Benefits

The project has water conservation and efficiency benefits that will contribute to the overall watershed health within the North Fork Klaskanine River and Young's River Basin. Because leakage represents the largest real losses for most water delivery systems; the project focuses on assessing and addressing water loss minimization through leakage control and upgrades to a new vertical fish screen. Metrics focus on measures of leakage tailored to system characteristics and upgrade to new pipe material, identifying a water volume level of loss, and measures (in place and planned) to assess and control water loss. Water savings from this project will contribute to efficient use and return to the North Fork Klaskanine River which will benefit aquatic habitat during drought and climate change conditions. Only taking what is needed and efficient use of water is critical to minimize aquatic resource impacts of hydrologic alteration from water use.

Removal of the Ogee dams along with the roughened channel construction will stabilize streambed sediment transport and provide a natural flow regime in the watershed that will restore the natural hydrograph within the basin and make water available at a more advantageous timing for adult Lower Columbia River salmon spawning and summer juvenile rearing. The dam also impounds water which increases the stream temperature. This will have multiple ecological benefits by restoring a natural flow regime, reducing water temperatures, and providing efficient use of water at a time that is less stressful to salmon and steelhead.

The North Fork Klaskanine Investigation Report (ODFW 2008) uses USGS stream gauge, Oregon Water Resources Department (OWRD) gauge data and flow reports that have indicated seasonal trends in flow are affected by snowmelt in the spring and summer rainfall, with the highest flows occurring in the winter months. This pattern has suited the ecological life histories of anadromous Pacific salmon and steelhead stocks in the basin, however, recent alterations to this pattern have resulted from the allocation of water and consumptive uses that divert the water at critical summertime periods. The project will restore this pattern through dam removal and replacing undersized road crossing structures with full channel spanning bridges that allow water to be stored in the floodplain and released during critical summer months. Correcting these barriers will provide access to perennial, cool water important for over-summering coho, steelhead, chinook, cutthroat, and resident trout. The Strategic Action Plan identifies these tributaries as important thermal refugia for juvenile salmonids. Summer temperatures range from 13-14 °C in these tributaries, compared to mainstem Lower Columbia River temperatures of 23°C or more. This project builds on a high-priority restoration project at the confluence of each tributary to provide cover, habitat complexity, cool water inputs, and valuable refugia habitat for

juvenile salmonids during the summer months when temperatures in the mainstem reach critically high levels.

Other Quantifiable Benefits

This work, combined with other river restoration actions that rebuild ecosystems and natural infrastructure, delivers an influx of investment and job growth in our most underinvested communities. Along the Oregon Coast, structural unemployment has remained high over the last two decades as new industries such as health care and tourism have struggled to compensate for declining fishing and timber industries. Both the Great Recession and the pandemic related slowdown impacted families, in particular, BIPOC families in these rural tourism hubs. Restoration work supplies a direct counterbalance to these structural job issues by bringing family wage work in skilled trades for former loggers, heavy machine operators, and other blue-collar industries. In 2020, regional studies calculated that a new $1.2 million investment in restoration that year created 29 full-time and 168 seasonal jobs on the coast.

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

Salmon recovery requires action at all levels of government and by all stakeholders to be effective. Partnerships among federal, state, local, and tribal entities, together with non-governmental and private organizations, are key to restoring healthy salmon runs and ensuring the cultural, economic, and environmental benefits they provide. Implementing recovery actions is especially critical at the local level. The Ogee Dam (Dam) is located on the North Fork Klaskanine River just downstream of the confluence of the North Fork and mainstream channel of the Klaskanine River near the community of Olney, Oregon. The Ogee Dam is centrally located within the Klaskanine Hatchery and was designed and constructed to perform two key functions for the hatchery: 1) Act as a grade control structure for diversion of water at Intake #1, and 2) Prevent hatchery fish from moving upstream and facilitate adult salmon collection for egg production goals. The water diversion (Intake #1) associated with the Ogee Dam is located approximately 100 feet upstream of the concrete weir. The intake is passive in nature and relies on maintaining a backwater condition to divert flow into the intake. Flow entering at the intake channel passes through a screening system before being conveyed to the hatchery. The intent of the screen is to prevent wild juvenile fish from being diverted to the hatchery. With removal of the dam the fish screen will need to be replaced and constructed to meet NOAA fish screening criteria.

The Ogee Dam is constructed of concrete and consists of a concrete weir structure and spillway. It is likely that the spillway was appended onto the original Ogee Dam structure to address downstream bed scour and incision. Despite these treatments, the channel bed downstream of the dam structure has continued to incise, resulting in undermining of the appended spillway structure. A survey in November 2019 and personal communications with ODFW staff suggest that the extent of undermining may be extensive. The crest of the Ogee Dam weir was surveyed at an elevation of 84.8 feet with a streambed elevation downstream of the structure surveyed at 71.2 feet, representing a 13.6 foot drop over the entire structure. The dam is a complete barrier to both juvenile and adult salmon and steelhead and obstructs lamprey passage under most, if not all, flow conditions. Due to channel incision on the North Fork Klaskanine River below the dam and changes to stream dimensions there is a need for grade control after dam removal. The fish

passage approach consists of removing the existing Ogee Dam and associated infrastructure and building a roughened channel to facilitate fish passage and grade control. The primary objective that drove the development of this approach was because of hatchery operational requirements and site conditions determined from hydraulic modeling. To account for the discontinuity between the streambed elevation upstream and downstream of the dam, and the need to maintain the viability and functionality of the water diversion at Intake #1, the roughened channel needs to be steeper than adjacent stream reaches upstream and downstream of the project. The steeper grade of the roughened channel also necessitates that the median substrate size will be larger than adjacent reaches to resist scour.

Providing fish passage at the Ogee Dam will require careful consideration of mitigation measures to meet the agreed upon proportion of hatchery origin fish on spawning sites (pHOS) values with the goal of maintaining a wild population in the watershed of fish that are not impacted by genetics of the hatchery raised fish. Potential mitigation measures to prevent hatchery stock from moving upstream and spawning and to limit access of hatchery raised returning adult fish above the hatchery include construction of an inflatable weir (Obermeyer) or another temporary weir. This weir will be integrated into the design to act as a seasonal barrier that allows for the capture and sorting of hatchery Select Area Bright fall Chinook salmon while providing free passage to all other wild fish. Project partners discussed and produced a decision support document for the project based on site characteristics and constraints. The selected approach considers several variables including the functionality and reliability of water diversion at the hatchery, meeting pHOS obligations as discussed with NOAA-NMFS staff, maintaining structural soundness of the bridge crossing connecting the northern portion of the property, and providing fish passage that meets the state and federal requirements and screening guidelines. The dam removal site constraints include construction of a roughened channel to provide grade control and backwatering of flow into the screen at the water diversion of Intake #1. This design approach also minimized project costs and reduces operational and maintenance associated costs. This project was discussed with the federal agencies and local stakeholders to ensure that site operation and the proposed approach is technically sound, safe for the public, and implements the appropriate methods to maintain the fisheries resource.

The design techniques and strategies employed in this project strategically increase system-wide resilience and connectivity to provide access to a full range of habitat conditions that 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 conditions in the Lower Columbia and Oregon Coast through increased temperature and changes in seasonal flow variation. Specifically, the climate considerations that our project target by re-connecting aquatic corridors include amelioration of potential higher summer stream temperatures and reduced fragmentation of fish and wildlife movement corridors. Ecosystem processes and changing ocean conditions will dictate the sustainability of salmon and trout, however this project results in the removal of the last physical barrier to fish migration and therefore contributes to solutions that can augment these changes. While mitigation for development of the Columbia River hydro system is focused on the preservation and recovery of depressed salmonids, the preservation of the fishery infrastructure is equally important if recovery is indeed defined by harvestable, naturally spawning

populations. This project on the North Fork Klaskanine River will provide wild fish passage to enhance ecosystem resilience in the Lower Columbia Estuary and Youngs Bay system.

Prior Planning and Design:

Over the past several years, Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife (USFWS), and other stakeholders have been engaged in a process to evaluate operational and engineering opportunities and constraints to address wild fish access above the Klaskanine Salmon Hatchery located on the North Fork Klaskanine River (Figure 1). Fish passage has historically been blocked by three water diversion dam structures that function to take water from the North Fork and North North Fork Klaskanine to provide a year-round water source for the hatchery, referred to as Intake #1 (Ogee Dam), Intake #2, and Intake #3 (North North Fork Dam). In the summer of 2020, fish passage was addressed at Intake #2 by complete removal of the diversion dam and intake structure. Complete dam removal was a feasible approach at Intake #2 because 1) The height of the dam limited the amount of sediment that was stored behind the structure, 2) Sedimentation issues at the diversion intake channel and issues with the diversion pipe resulted in continuous maintenance issues, and 3) The point of diversion was redundant, given the presence of Intake #1, limiting the need for a third point of diversion. In 2020 a design process was initiated to provide fish passage at Intake #3 on the North North Fork Klaskanine (Figure 2). The selected design approach consisted of keeping the existing dam in place to maintain the function of the point of diversion while constructing a roughened ramp downstream of the dam. The construction of fish passage for Intake #3 was completed in the Fall of 2022.

With the completion of a fish passage improvement project at Intake #3 and the removal of the dam at Intake #2, the only remaining barrier to free movement of wild fish at the Klaskanine Hatchery is the Ogee Dam. Facilitating fish passage at the Ogee Dam is constrained by the need to continue to operate Intake #1, which supplies a significant portion of the water required to run the hatchery, and to provide a limit to upstream movement of adult hatchery fish that are returning to the hatchery to spawn. USFWS and ODFW contracted with an engineer to complete the basis of design report and 60% design plans in 2020 and completed in the spring of 2023. The project incorporates a robust set of data used to develop and evaluate the design performance of the project. HMS model and HEC-RAS 2D models have been run to evaluate current site conditions with the dam. These models were developed based on the collection of realtime flow data to develop a rating curve that represents flow conditions of the North Fork Klaskanine River rather than using modeled flow data from adjacent watersheds that can introduce significant error into the models. Current conditions data will be compared to post-dam removal site conditions to assess fish passage flow conditions including water depth, velocity, and channel margin hydraulic conditions. As-built surveys will compare post dam removal to pre-dam conditions including elevations, pool depth and spacing, and fish passage dimensions of the roughened channel.

ODFW's Engineer will review all designs, in coordination with NOAA-NMFS engineers and the project manager, to ensure designs meet project goals and objectives before releasing funds for construction. These are high priority fish passage projects identified in each SAP watershed that will be a priority for implementation. The specific project phase and timelines are listed below and developed through the planning of these projects.

Project Phase	Start-End Date	Milestones and Funding Source (Resource Legacy Funds-secure and pending; OWEB not applied for)
Stakeholder Engagement	March 2021-March 2023	Meet with stakeholders, Tribes and landowners to select preferred alternatives and review designs (secure match)
Design	April 2023-March 2024	60% design completed, technical specifications, Preliminary Designs and Check-in status review.
Permitting	Jan-March 2024	Submit and secure all permits. Check-in status review
Construction (Year 2)	July-Sept 2024 and August-Oct 2025	Construction can only occur during in water work periods which forces a 2-year construction window.
Operation & Maintenance	July 2024-Dec 2025	Develop operation and maintenance manual for fish passage facility owners
Monitoring	Oct 2023-Dec 2025	Monitoring by sponsor per management plan.

Stakeholder Support for the Proposed Construction 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, WSC 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. Over the past several years, Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife (USFWS), Resource Legacy Foundation, American Rivers, North Coast Watershed Association, and other stakeholders have been engaged in a process to complete operational and engineering opportunities and constraints to address wild fish access above the Klaskanine Salmon Hatchery located on the North Fork Klaskanine River. In the summer of 2020, fish passage was addressed at Intake #2 by complete removal of the diversion dam and intake structure. In 2022 fish passage at Intake #3 was completed on the North Fork tributary stream. Collectively these phases of project implementation will open 12 miles of stream habitat for coho salmon, spring Chinook salmon, winter steelhead, coastal cutthroat trout, Pacific lamprey and western brook lamprey. Partners

involved with this effort have developed signage to discuss the value of fish passage for Pacific lamprey to access upstream spawning and rearing habitat.

(c) Community Outreach and Education. Outreach and education efforts developed through this project will incorporate a timeline of construction events through videography that will be distributed through multiple social media outlets. A project storymap will be developed that can be widely shared with the NCWA members, the public, and Tribes through association meetings and website content. This project complements a new conservation campaign being launchedby the NCWA titled: Return of the Redds. Return of the Redds was developed with an OWEB technical assistance grant and is a collaboration between the NCWA, local landowners, the forest products industry, local nonprofits, state, andfederal agencies, all united around a common goal: To revitalize the once abundant chum populations of Big Creek and Youngs Bay watersheds. This project will be highlighted on the Return of the Redds website (www.returnoftheredds.com) hosted on the North Coast Watershed Association website (www.clatsopwatersheds.org) as an example of a partnership project to improve salmonid habitat and for all native aquatic species. In addition to the web content, we will develop an interpretive sign to be installed at the hatchery to share the project's history, process, and benefits to the public. The land is publicly owned and managed by ODFW, this will provide open access to angling, recreation, wildlife viewing, and the signage will provide educational materials for fish passage and salmonid restoration. Pacific lamprey, spring Chinook Salmon and chum salmon are culturally valuable species for many Tribes in Oregon. Fish passage through this project will engage three Tribes and provide improved population numbers for cultural and harvest opportunities for Tribal, commercial, recreational fisheries as well as prey items for pinnipeds and marine mammals. Orcas have been observed feeding in the Youngs bay and Lower Columbia River Estuary where they prey on fish produced from the Young's River and North Fork Klaskanine River.

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 have been completed up to the 60% 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 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 Oregon Coast 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 Oregon Coast, 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 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: 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 Lower Columbia River tributaries. 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 Oregon Coast.

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 Lower Columbia River salmon (NMFS 2013) 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 OC coho 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 eleven 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 Coast 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 Coast 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 Coast 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 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**
5 Tribes	American Indian	78	90	90
Clatsop County (41007950600)	Hispanic/Latino White American Indian	60	77	59
Astoria (41007950100)	Hispanic/Latino White American Indian	79	72	16

Tribal Benefits: The Oregon Coast is a largely rural and historically resource-dependent region dotted with numerous underserved communities, including many on lands of the Confederated Tribes of Siletz Indians, Confederated Tribes of Grand Ronde, the Cow Creek Band of Umpqua Tribe of Indians, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians. 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. 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 ODFW, and our local partners is whether coho 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, removing the dam and restoring the historic stream channel alignments will protect people, property, infrastructure, and agriculture from frequent and devastating flood events. In addition, 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. 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.

Metric	Target Value
Instream restoration - miles restored	12 miles of habitat for spawning and rearing
Outreach/Education/Technical Assistance - # people targeted	local community and three tribal communities:
Socioeconomic benefits	Increased recreational, commercial, and subsistence fishing
Outreach and Education	Develop Storymap and video release on social media channels
Monitoring - # monitoring programs	one monitoring program implemented for performance assessment of the project
Economic benefits - # jobs sustained	Local construction company and business profits, fisheries through the SAFE program are sustained
Economic benefits - # jobs created	Local contractor from rural community hired to implement project

Sustainability Performance Measures. When devising the performance measures, ODFW and partners 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 strategy 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. The project 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 streambank failures and the numerous ecological, social, and economic impacts they can cause. The project incorporates 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. Each restoration strategy contains a chapter on Monitoring and Evaluation that includes short-term measures of success (called "implementation metrics") and longer-term indicators, which evaluate the cumulative impacts of project implementation over time. All metrics and indicators meet USFWS and NOAA's Tier I Guidance for fish passage barrier removal projects (section 3.1). The implementation metrics proposed in the strategy are: 1) the number of barriers converted from unconnected to connected and made accessible to fish passage, 2) the acres of tidal wetland / slough and non-tidal areas reconnected, and 3) miles of habitat reconnected. To align with the parameters from NOAA's Guidance that are not included in the strategy, we will require project managers to provide (as appropriate for the project type): pre and post project data on site passability metrics (channel width, channel gradient, and jump height), passage limitations by life stage (e.g., spawning, summer rearing, winter rearing), and/or the presence or absence of target fish species.

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.

Figure 1. Overview of North Fork Klaskanine River and points of diversion including Intake #1 at the Ogee dam. Intake #2 was removed in 2020 and fish passage was constructed at Intake #3 in 2022.

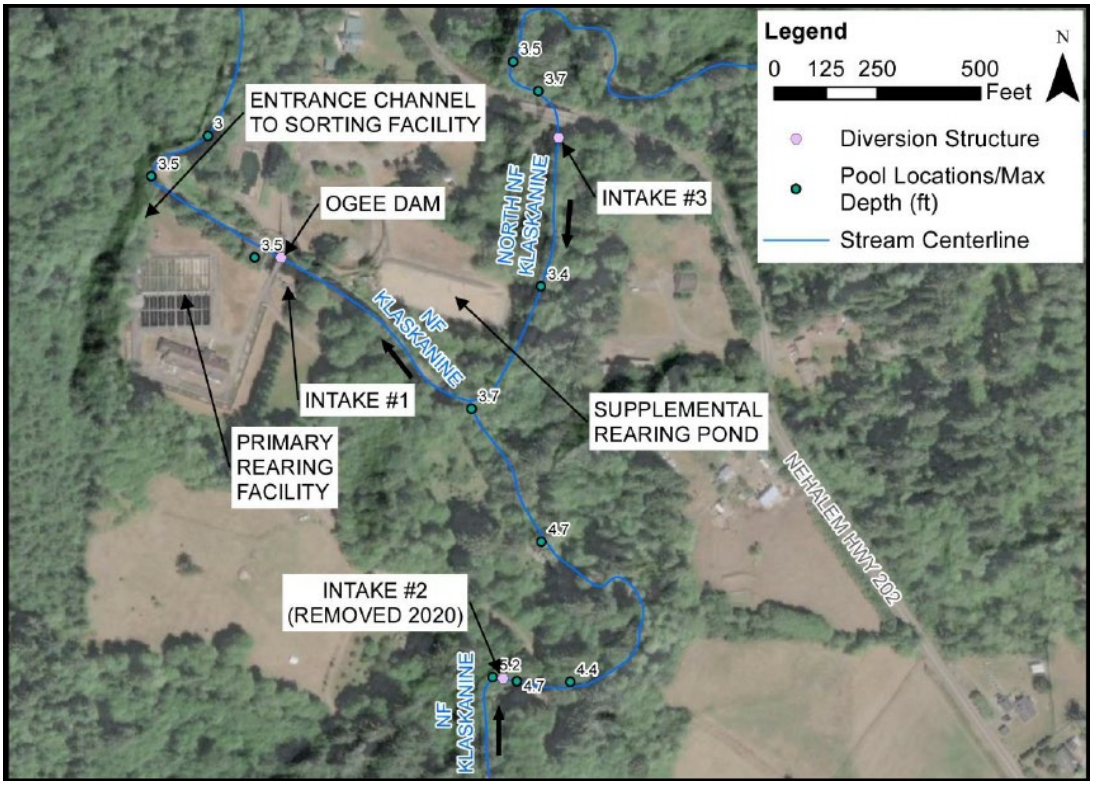


Figure 2. Site location and topographic map of the North Fork Klaskanine Dame (Ogee dam)

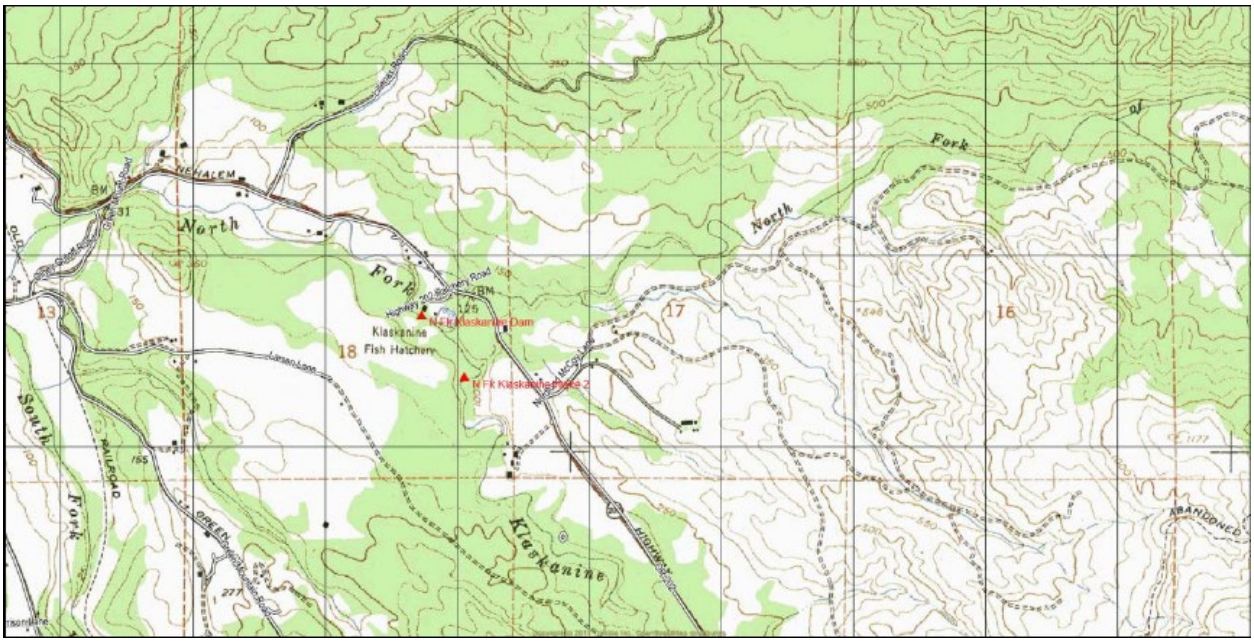
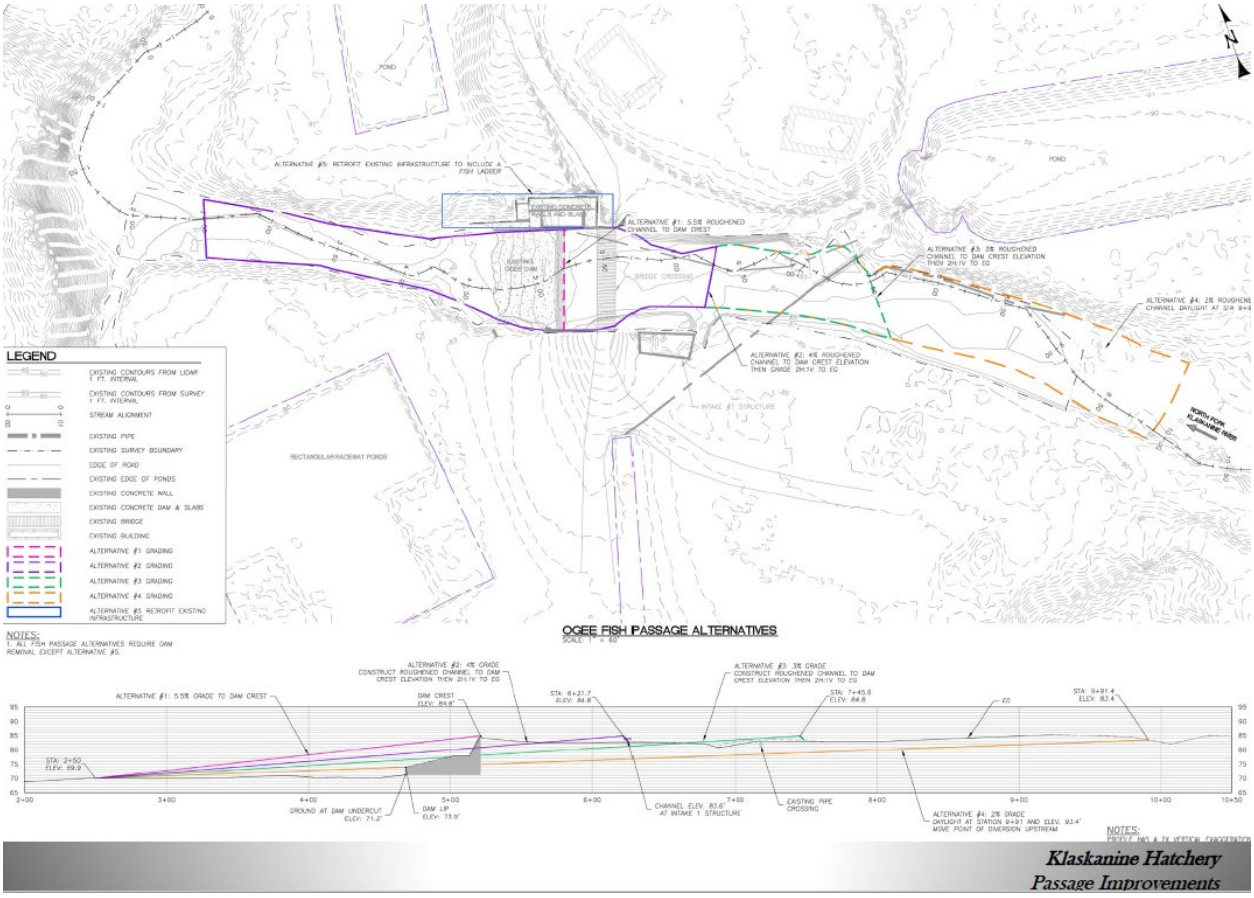


Figure 3. Cross sectional view of the Ogee Crest dam and appended concrete apron located on North Fork Klaskanine River, Oregon.

Figure 4. Ogee dam concrete apron illustrating the undermining and degradation of the apron that has resulted in the incised channel below the dam.

Engineering Sheet 1. Ogee dam roughened channel slope alternatives discussed for final design.



Engineering Sheet 2. Final roughened channel and dam removal design plan for the North Fork Klaskanine River.