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Hood River Basin Aquatic Habitat Restoration Strategy Executive Summary

**Mt. Hood National Forest
Hood River Ranger District**



Photo by Darcy Morgan

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Mt. Hood National Forest
Hood River Ranger District
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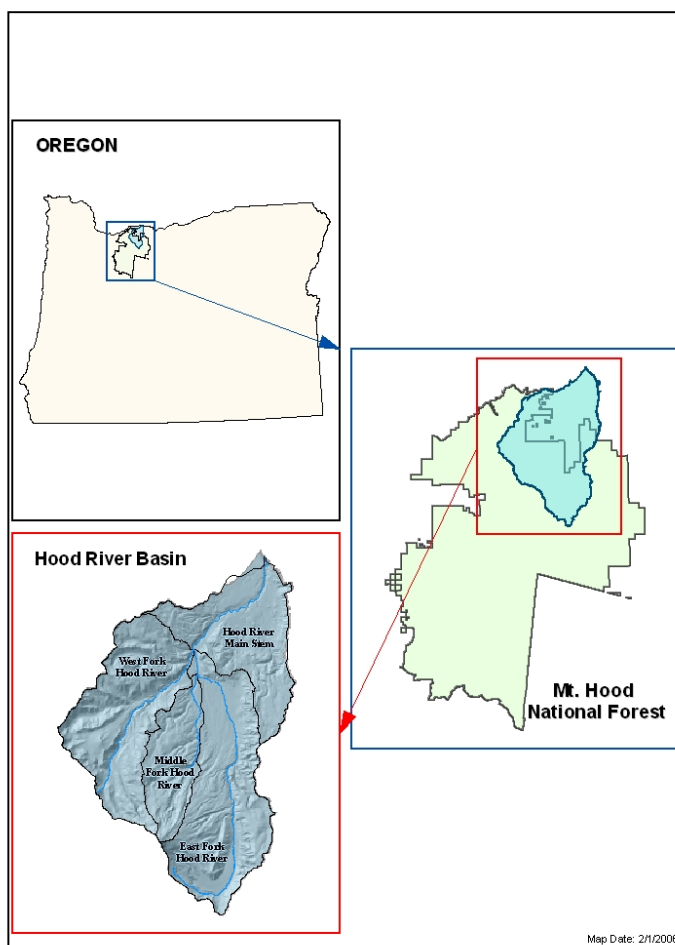
Executive Summary

Introduction

Basin Overview

The Hood River Basin is located approximately 60 miles east of Portland, Oregon. The basin comprises part of the Middle Columbia-Hood 4th field watershed and is roughly 340 square miles (217,337 acres) in size. It contains three individual 5th field watersheds, and nested within those are 12 individual 6th field watersheds. The river is comprised of three main tributaries; East Fork, Middle Fork, and West Fork; and it enters the Columbia River 22 miles upstream from Bonneville Dam in the City of Hood River, Oregon. The basin lies entirely within Hood River County, and is largely comprised of public lands – roughly 65 percent of the basin. Roughly one-third of the remaining land is privately owned and occurs predominately in the lower elevations. The entire basin contains lands ceded to the Confederated Tribes of the Warm Springs Reservation of Oregon.

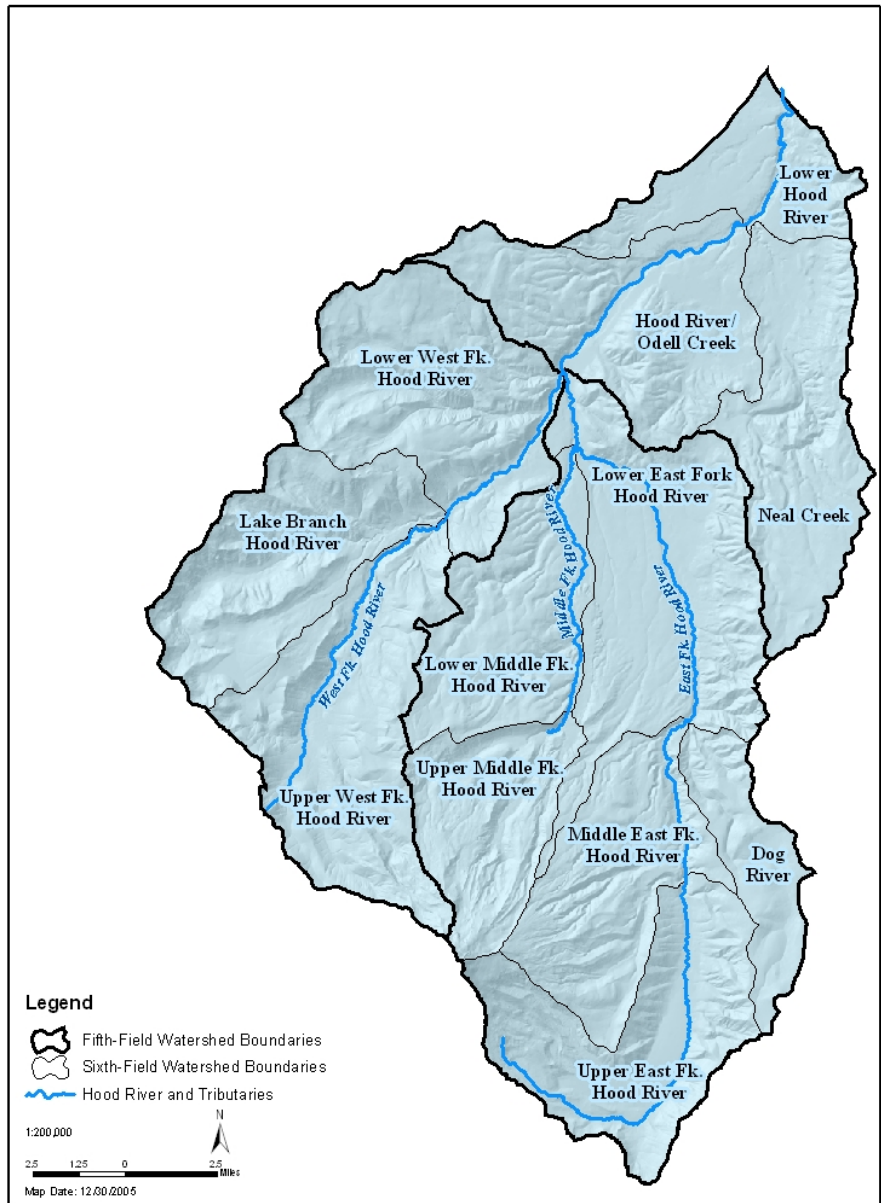
Native, anadromous fish populations are comprised of spring and fall Chinook, summer and winter steelhead, coho, and Pacific lamprey. Resident, native salmonid species include cutthroat trout, bull trout, rainbow trout, and mountain whitefish. Sea-run cutthroat trout are still present in low numbers. Many of these fish species have dwindled to very low numbers, and several Endangered Species Act listings were made by the National Marine Fisheries Service and U.S. Fish and Wildlife Service, affecting five of the six anadromous populations (spring and fall Chinook, summer and winter steelhead, and coho) and one resident species (bull trout).



Hood River Basin Vicinity Map.

In 2005, a collaborative working group comprised of key stakeholders representing 14 agencies and entities convened in a series of meetings and workshops to develop an aquatic habitat restoration strategy for the Hood River Basin. Prior to 2005, there had been many collaborative efforts in the basin focused on developing and implementing aquatic habitat restoration strategies and actions; however, a single basin-wide strategy identifying priority watersheds, limiting factors, and priority hilltop-to-valley-bottom restoration actions had not yet been compiled.

The collaborative efforts and products described herein do just that. The primary goal of this strategy is to address aquatic habitat restoration needs for resident and anadromous fish species, while at the same time addressing needs for streamflow and water quality improvements. All stakeholders involved in the development of this strategy recognized from the outset that several recent efforts in the basin have come very close to delivering an overall end-product for which this effort was directed. Therefore, the working group relied heavily upon reviewing existing work and available products combined with some new synthesis and packaging in order to develop a stand-alone aquatic habitat restoration strategy for the entire basin.



Hood River Basin 5th and 6th Field Watershed Boundaries.

Participating agencies and entities included:

- Confederated Tribes of the Warm Springs Reservation of Oregon
- East Fork Irrigation District
- Farmer's Irrigation District
- Hood River Soil and Water Conservation District
- Hood River Watershed Group
- Middle Fork Irrigation District
- National Marine Fisheries Service
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Oregon Department of Forestry
- Oregon State University Extension Service
- Oregon Water Resources Department
- Oregon Watershed Enhancement Board
- U.S.D.A. Forest Service

Why is a Basin-wide Aquatic Habitat Restoration Strategy Needed?

Many institutions that provide funding for aquatic habitat restoration activities are beginning to require an overall basin-wide strategy that is closely linked to a comprehensive assessment of watershed conditions, water quality impairments, priority fish populations and geographic focus areas that identifies necessary high priority restoration actions. These institutions also require partnering, cost-leveraging, and demonstrable on-the-ground results. Some of the primary institutions that commonly fund watershed and aquatic habitat restoration efforts throughout the State of Oregon and Pacific Northwest are developing broad state-wide or regional strategies to focus financial investments where there is a demonstrated need, articulated priorities, and clear restoration benefit. As funding becomes scarce and competition in the region expands, a greater emphasis will be given to funding high priority restoration actions in priority watersheds. This is largely being brought about for two reasons:

1. To demonstrate accountability and show completion of high priority restoration actions for whole watersheds, and
2. To focus or concentrate available funding to specific areas in order to achieve tangible, aggregated restoration benefits at the watershed-scale as opposed to a “shotgun approach” where many different restoration actions are implemented over a broad landscape making it difficult to detect a restoration benefit.

While this effort was largely spearheaded by Forest Service staff from the Mt. Hood National Forest, it is intended to provide utility to all Hood River Basin stakeholders interested in aquatic habitat restoration and to foster further development and unification of an already strong and vigorous partnership base. The Hood River Basin is known statewide and regionally as a basin with a strong collaborative partnership base that gets high quality and innovative aquatic habitat restoration work completed on-the-ground. This strategy is intended to fortify the existing, strong collaborative partnership in the basin.

What is a Basin-wide Aquatic Habitat Restoration Strategy?

The basin-wide aquatic habitat restoration strategy provides a geographic focus and framework for directing future resources (staff time and funding) towards fulfilling high priority restoration needs for fish habitat and water quality improvements. Specifically, the strategy:

- Identifies priority 6th field watersheds in the basin that provide the cornerstone for addressing freshwater habitat restoration needs of resident and anadromous fish as well as water quality improvements.
- Describes the limiting factors affecting fish production and water quality.
- Identifies known restoration actions previously identified that will address limiting factors in priority watersheds.
- Identifies types of high priority restoration actions within particular watersheds where they are highlighted through a limiting factors analysis but have yet to be fully scoped and verified on-the-ground.
- Establishes the sequence in which actions should be pursued in order to achieve the maximum benefit.
- Provides a rough estimate of the restoration needs (i.e., quantity) and implementation costs by activity type for each of the 6th field watersheds in the basin.

The strategy also displays a suite of restoration tools to accomplish identified opportunities; lays out a framework for developing a basin-specific technical assistance, outreach, and education plan; and highlights important information gaps from which to guide the development of future inventory and monitoring activities.

Relation to Watershed Analyses, TMDL Assessment, Subbasin Planning, and Other Analyses

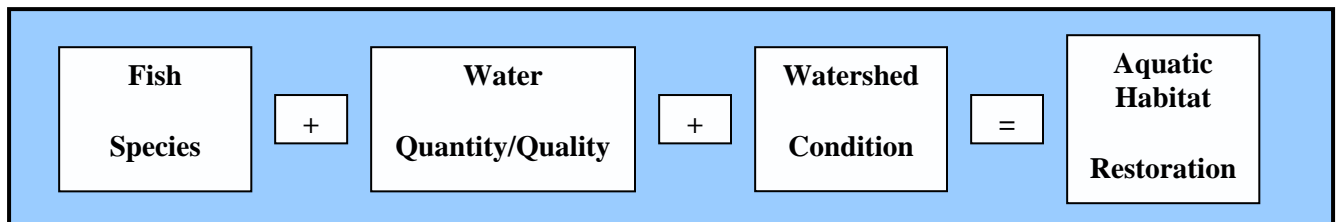
Several previous efforts have been made to assess and analyze stream channel, fish habitat, watershed, and water quality conditions in the basin. These include watershed analyses (both federal and state); the Western Hood Subbasin Total Maximum Daily Load Assessment; the Hood River Watershed Group's 2002 Watershed Action Plan (updated in 2005); the Hood River Basin Fish Passage Barrier Prioritization Strategy; and the Northwest Power and Conservation Planning Council's Subbasin Plan. Each of these efforts has been extremely useful in diagnosing conditions and restoration opportunities in various locations within the basin. The key findings and products from these previous efforts, particularly relating to identification of altered watershed process and limiting factors, were extracted and synthesized in the development of this comprehensive basin-wide, aquatic habitat restoration strategy integrating the needs for both fish population recovery and water quality improvements.

Aquatic Restoration Strategy

Geographic Framework

A model incorporating three components; *Fish Species Priority*, *Water Quantity/Quality*, and *Watershed Condition*; was developed to establish the relative restoration priority for each of the 6th field watersheds in the basin.

Conceptual Model Used to Establish Aquatic Habitat Restoration Priorities at the 6th Field Watershed Scale, Hood River Basin.



Fish Species Priority identifies important river and stream reaches for: summer steelhead, bull trout, winter steelhead, fall Chinook, coho, spring Chinook, cutthroat trout, rainbow trout, and Pacific lamprey. *Water Quantity/Quality* identifies reaches of concern due to lack of in-stream flow and water quality impairment. *Watershed Condition* identifies the relative condition of each 6th field watershed, integrating both inherent sensitivity as well as anthropogenic and natural perturbation history. Watersheds in better condition receive a higher priority for restoration. Integrating all three components, an aquatic habitat restoration score was derived for each watershed. Two watersheds tied for the highest score and three tied for the second highest score. The amount of fish habitat available determined by *Fish Species Priority* was used to break these ties and establish an overall relative ranking, 1 through 12.

Aquatic Habitat Restoration Priority for 6th Field Watersheds, Hood River Basin.

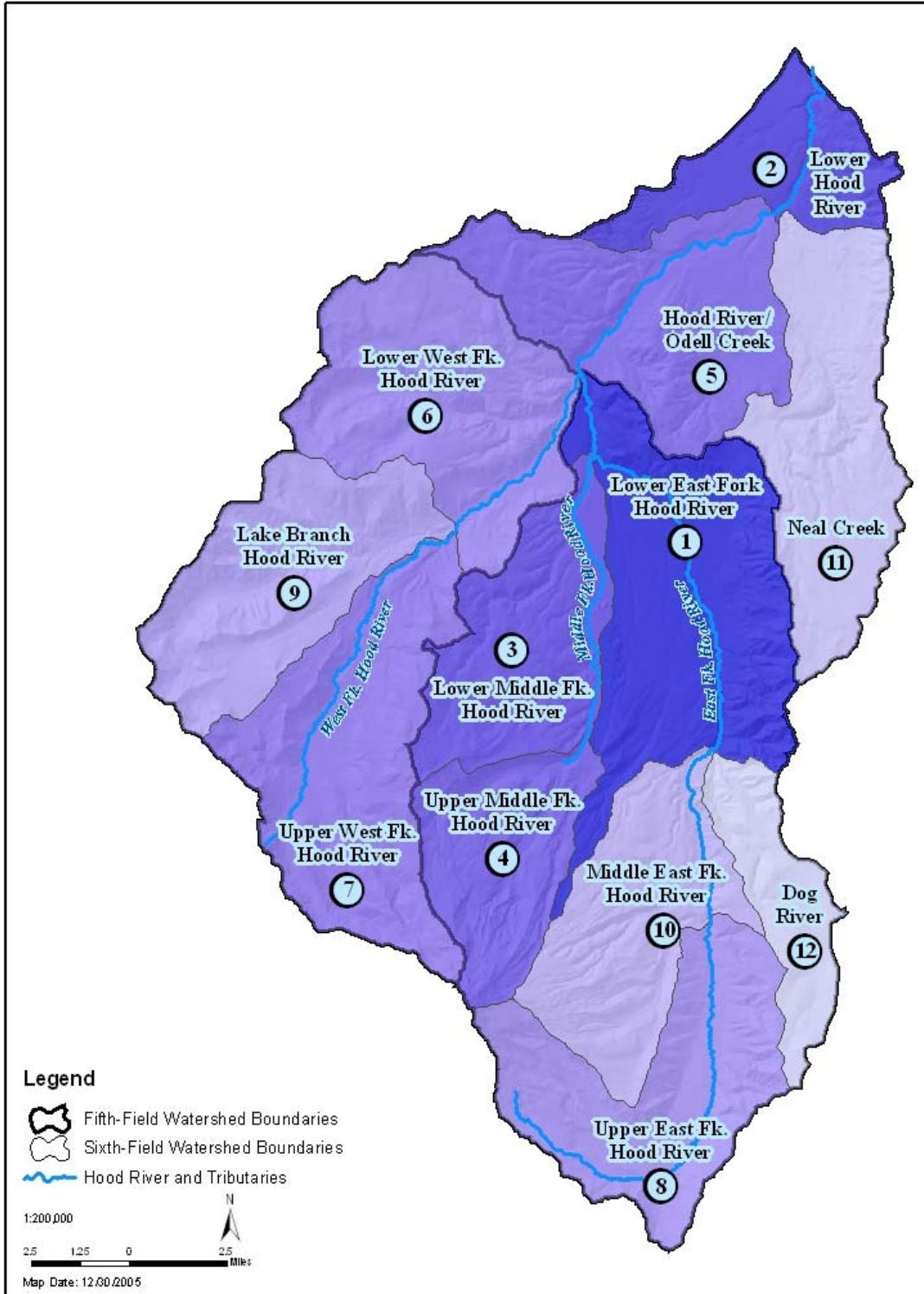
6 th Field Watershed	Fish Species Priority ¹	Water Quantity & Quality Priority ²	Watershed Condition ³	Aquatic Habitat Restoration Score	Aquatic Habitat Restoration Priority based on Fish Species Priority Habitat Quantity
Lower East Fork	4	1	8	13	1
Lower Hood River	2	2	9	13	2
Lower Middle Fork	3	4	7	14	3
Upper Middle Fork	6	7	1	14	4
Hood River – Odell	1	3	10	14	5
Lower West Fork	5	6	6	17	6
Upper West Fork	7	11	2	20	7
Upper East Fork	10	10	1	21	8
Lake Branch	11	8	3	22	9
Middle East Fork	9	9	5	23	10
Neal Creek	8	5	11	24	11
Dog River	12	12	4	28	12

Note: Rankings are from 1 to 12, where 1 = highest priority and 12 = lowest priority.

¹ Highest priority given to watersheds with the most fish populations present.

² Highest priority given to watersheds with the most degraded water quantity/quality conditions.

³ Highest priority given to watersheds in the best condition.



Overall Aquatic Habitat Restoration Priority for 6th Field Watersheds, Hood River Basin.

Restoration Philosophy

The working group reviewed and endorsed the restoration philosophy set forth in the Hood River Watershed Group's 2002 Watershed Action Plan. It was acknowledged that an effective restoration strategy must first focus on protecting the remaining high quality, productive aquatic habitats in the basin. This is believed to be the most effective and least costly means for ensuring healthy, intact aquatic habitat is maintained over the long term. Where human activities are degrading aquatic habitat, the next course of action would be to curtail those activities or ameliorate their impacts and allow conditions to recover naturally. In situations requiring long timeframes for recovery, active restoration is encouraged. Watersheds in a more healthy condition are considered priority over those that are more degraded. This philosophy is intended to ensure the maximum benefit for the investment made. While the working group agreed this is the best approach, a strong caveat was made – There will often be high priority restoration projects located in lower priority watersheds where funding and implementation in the near-term is justified. The working group acknowledged there will always be geographic-specific restoration opportunities, specific landowners or groups ready to take action, or unique funding sources that will direct active restoration investments in various portions of the basin irrespective of an overall prioritization strategy. The working group strongly supports the continuation of high priority restoration activities even in the lower priority watersheds as opportunities arise based on other factors and to maintain partnership relations that are critical for positive restoration momentum. It is the intent, over the long term, that restoration investments are focused on high priority actions in priority watersheds in order to move the majority of watersheds in the basin with high ecological value more readily towards restored conditions.

Altered Watershed Processes and Limiting Factors Analysis

A restoration framework was developed to identify and guide implementation of high priority restoration actions in a manner such that the primary and secondary altered processes for each 6th field watershed are first addressed, followed next by the limiting factors affecting fish production. The results from three separate watershed assessments, two federal and one state, were carefully reviewed to identify the primary and secondary altered watershed processes. Primary altered processes are those watershed processes and functions most greatly affected by past perturbations or existing conditions on the landscape. Watershed processes and functions that may also be altered, but not to as large a magnitude or geographic extent, are categorized as secondary. An understanding of these altered process and functions was important in order for the working group to identify specific restoration actions in specific locations that address the root-causes of impairment. Altered watershed processes considered include:

- Altered Flow via Agriculture Practices, Timber Harvesting, Roding, and Impervious Surfaces
- Altered Flow Regime via Diversions
- Altered Peak and Base Flows
- Increase in Sediment Production (road-related)
- Impeded Fish Passage (loss of aquatic connectivity)
- Impeded Sediment & Woody Debris Routing
- Elevated Chemical and Bacterial Concentrations in Water

- Increased Stream Temperature
- Lack of In-stream large woody debris (LWD)
- Lack of Riparian LWD Recruitment (current and future)
- Loss of Floodplain Connectivity, Channel Sinuosity, and Channelization

A comprehensive limiting factors analysis for Chinook salmon and steelhead populations was completed during the subbasin planning process that concluded in 2004. This limiting factors analysis utilized the Ecosystem Diagnosis and Treatment (EDT) model. Five environmental attributes were found to have the greatest effect on Chinook salmon and steelhead populations: channel stability, flow, habitat diversity, sediment load, and key habitat quantity. While there are additional species and life-stage specific limiting factors, these five environmental attributes, if addressed through restoration actions, would have the greatest restoration potential benefit for enhancing fish production in the majority of watersheds throughout the basin. The working group melded its assessment of altered watershed processes with the various corresponding EDT limiting factors in order to arrive at a single set or sets of restoration actions that address both. For example, a given watershed that has altered peak and/or base flows correspondingly would have sediment load (SL) and channel stability (CS) identified as key survival factors from the EDT model affecting fish production. Restoration actions would then identified to not only restore altered peak and/or base flows, but also simultaneously address increased sediment load and/or decreased channel stability from a fish habitat production perspective.

Aquatic Habitat Restoration Actions

A mix of restoration actions (i.e., fish passage, streamflow restoration, road decommissioning and/or storm-proofing, upland and riparian thinning, addition of in-stream woody debris, etc.) was then identified at the sub-watershed and/or stream reach scales to address both the altered watershed process and corresponding EDT limiting factors. In this manner, on a watershed-by-watershed basis, priority restoration actions were determined. Restoration actions are prioritized and sequenced to ameliorate the root causes of watershed and aquatic habitat impairment. Specific restoration actions, where known, are identified for specific locations to improve watershed conditions, water quality and fish production potential. Where unknown, types of restoration actions are identified for further planning and development. Results from the Mt. Hood National Forest's Roads Analysis completed in 2003 were utilized to estimate the quantity of road mileage in each watershed for restoration activity, including annual road maintenance, road storm-proofing, and road decommissioning. A table of actions was developed for each 6th field watershed in a top-down, watershed approach addressing all of the primary altered watershed processes, followed next by those addressing the remaining secondary altered watershed processes. A second table was compiled for each 6th field watershed categorizing actions into six restoration activity types: fish passage, flow restoration, road-related, riparian-related, in-stream related, and other/miscellaneous. Estimates of restoration activity need (i.e., quantity) and implementation costs are made and summarized for each 6th field watershed.

Summary of Aquatic Habitat Restoration Actions by 6th Field Watershed for the Hood River Basin.

6 th Field Watershed	Overall Priority	Estimated Cost by Restoration Activity Type						Est. Total Cost
		Fish Passage Actions	Flow Restoration Actions	Road-Related Actions	Riparian-Related Actions	In-Stream Related Actions	Other/Misc. Actions	
Lower East Fork Hood River	1	\$5,750,000	\$191,612	\$125,125	\$230,000	\$3,800,000	\$40,000	\$10,136,737
Lower Hood River	2	\$1,350,000	per S.A. ¹	undetermined	\$80,000	\$1,200,000	\$0	\$2,630,000
Lower Middle Fork Hood River	3	1,770,000	undetermined	\$915,742	\$500,000	\$3,020,000	\$0	\$6,205,742
Upper Middle Fork Hood River	4	\$2,069,473 ²	\$259,700 ²	\$329,741	\$475,000	\$450,000 ²	\$0	\$3,583,914
Hood River/Odell	5	\$1,000,000	\$0	\$97,257	\$215,000	\$1,400,000	\$100,000	\$2,812,257
Lower West Fork Hood River	6	\$2,621,000	undetermined	\$494,343	\$800,000	\$1,470,000	\$0	\$5,385,343
Upper West Fork Hood River	7	\$1,750,000	\$0	\$620,108	\$775,000	\$1,875,000	\$0	\$5,020,108
Upper East Fork Hood River	8	\$3,400,000	\$0	\$1,196,407	\$205,000	\$440,000	undetermined	\$5,241,407
Lake Branch	9	\$2,250,000	\$0	\$792,304	\$775,000	\$310,000	\$0	\$4,127,304
Middle East Fork Hood River	10	\$2,150,000	\$0	\$463,406	\$70,000	\$150,000	undetermined	\$2,833,406
Neal Creek	11	\$3,000,000	\$5,000,000	\$347,688	\$98,000	\$2,170,000	undetermined	\$10,615,688
Dog River	12	undetermined	undetermined	\$446,992	\$25,000	undetermined	\$0	\$471,992
BASIN TOTAL								\$59,063,898

¹ per PacifiCorp Settlement Agreement to decommission Powerdale Dam in 2010.

² estimated costs do not include yet-to-be determined actions by Middle Fork Irrigation District in its Fisheries Management Plan that will update the U.S. Forest Service special use permit for its facilities and operations.

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