

# HABITAT IMPROVEMENT PROGRAM HIP4 2022 ANNUAL MONITORING REPORT

Bonneville  
POWER ADMINISTRATION



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Figure 1: 2022007(Last Chance Springs)LWD Install

## SUMMARY

This is the 3<sup>rd</sup> annual monitoring report required under the new Habitat Improvement Program 4 Biological Opinions (HIP4) (NMFS No# WCRO-2020-00102, USFWS 01E0FWOO-19FY-0710). This report summarizes activities completed in calendar year 2022 and summarizes reports on the incidental take resulting from those activities and compares them with previous years.

Annually, Bonneville Power Administration (Bonneville) and partners (sponsors) implement substantial habitat enhancement work in the Columbia River basin to improve tributary habitat as “offsite” mitigation for the impacts the federal hydrosystem and to help meet the Agencies’ obligations under the Endangered Species Act (ESA) by fulfilling commitments begun under the 2008 NMFS Federal Columbia River Power System BiOp (as supplemented in 2010 and 2014) (2008 BiOp) and ongoing commitments under the 2020 NMFS Columbia River System BiOp (2020 CRS BiOp). The 2008 BiOp called for identifying tributary habitat restoration projects and the 2020 CRS BiOp largely continues the tributary habitat restoration program.

Actions funded by Bonneville are implemented through BPAs Habitat Strategy, which seeks to facilitate watershed-scale prioritization and planning efforts to identify priority work for fish habitat restoration. The program is one of the largest and most complex of its kind in the world and includes collaborative work with states, tribes, federal agencies, local governments and non-profit organizations to implement the most biologically beneficial actions in the highest priority areas for ESA-listed salmonids. The HIP is the primary means by which this habitat enhancement work gets reviewed, refined, and then covered under the ESA.

In 2022 Bonneville has been successful in meeting incidental take criteria. However, juvenile take was higher than most years. This is likely attributable to a greater number of high risk projects being implemented under category 2f Channel Reconstruction. This action requires the extensive dewatering of entire stream reaches, thus necessitating extensive fish salvage.

In addition to a diverse portfolio of projects, project quality assurance and quality control remain a priority. BPA continues to improve internal capacity to deliver high quality projects through optimizing and refining the HIP Review Process. After nearly 7 years of experience, the HIP Review process has become streamlined and standardized based upon receiving feedback, re-evaluating failures, and capitalizing upon successes.

Engineering Technical Services (ETS) continues to provide a thorough and detailed technical review of all medium and high risk projects. BPA EC leads are well trained in performing a separate functional review. NMFS habitat biologists continue to provide comments to high risk and medium risk projects. Through these multi layered detailed project reviews, BPA can now exercise a higher level of discretionary authority on the type and quality of projects that it funds and shape their outcome. The HIP4 Handbook continues to be refined and has been used as a tool to provide much needed clarifications, guidance and strives to reflect the current state of science on restoration standards and practice.





Figure 2: Tucannon Stage Zero



Figure 3: 2022020(Suspension Reach)LWD

## HIP4 PROJECTS AUTHORIZED

The HIP4 BOs authorized 98 projects, of which 14 were withdrawn, leading to a total of 84 projects being implemented in 2022 (Table 1, 2, & 3) (FIGURE 1&2). Each project has multiple activity categories (Work Elements). Work Elements are the most discrete unit of action that BPA may undertake, with a contract typically consisting of multiple work elements.

In alignment with Bonneville’s contracting rules, projects are mainly reported on the contract level, occasionally multiple contracts may be lumped together if they share the same sponsor & location. Figures 1 & 2 are overlain with USFWS field office and NMFS branch jurisdictions. A majority were low risk (43), 31 were medium risk, and 10 were high risk. Each medium and high risk underwent the HIP Review process which included a thorough technical review by BPA Engineering Technical Services (ETS), and if high risk, Interagency review by the Service Habitat Biologists.

**TABLE 1: HIP4 PROJECT AUTHORIZATIONS (43 LOW RISK) 2022**

HIP_NO#	PROJECT
2022001	Chahalpam Floodplain Restoration
2022002	ODFW Willamette Valley O & M
2022004	Sunnyside Wildlife O&M
2022009	Snag Boat Bend Riparian Reforestation Final
2022011	John Day Fish Habitat Enhancement Program
2022013	Oregon Fish Screens - Low Risk Projects I
2022014	Grande Ronde Subbasin Invasive Weed Treatments
2022015	Low-Tech Implementation at Big Creek Ranch - Year 2
2022022	Oregon Fish Screens - Low Risk Projects II
2022025	Willamette Mission Floodplain Reforestation, Phase 7
2022027	Rainwater Wildlife Area
2022028	Isquuulktppe Watershed Project
2022030	Pahsimeroi River Weed Treatments
2022033	Lemhi River Restoration Weed Treatment and Hydroseeding
2022034	2021-25 and 2021-26 Riparian Fence and Planting
2022035	Stabler Bend Vegetation Management
2022036	Low Tech Restoration at IDL
2022039	South Fork Salmon River, Big Creek & Little Salmon River Watershed Restoration
2022040	Yakima Basin Side Channels - Veg Mgmt
2022045	Upper John Day Conservation Lands Program
2022047	Trout Creek Watershed Noxious Weed Program
2022048	LWP Groups 2&3 Habitat Restoration -2012-99 Nason Creek
2022049	Asotin County Conservation District Habitat Enhancement and Restoration
2022050	Southern Territories Habitat Project - Plant and Remove Vegetation
2022052	Salmon River Basin Nutrient Enhancement



2022057	Oregon Fish Screens Project - Low Risk Projects III
2022060	Shillapoo Wildlife Area
2022061	Middle Fork John Day Plant Propagation/Planting and Maintenance
2022062	Hellsgate Big Game Winter Range O&M
2022065	Malheur River Wildlife Mitigation Site
2022066	Irrigation Infrastructure Replacement - Lemhi River Fish Screens
2022071	Upper Salmon Fish Screen O & M
2022074	Pine Creek Conservation Area O & M
2022078	Oregon Fish Screens Project - Low Risk Projects IV
2022083	Elk Creek Riparian Planting
2022086	Asotin Creek Wildlife Area O&M
2022092	Oregon Fish Screens Project - Pump Screens
2022093	North Fork Walla Walla River Springs Connectivity Project
2022094	Oregon Fish Screens Project - Fields Creek #4, #8, #9 and JDR # 59
2022095	Lower Yakima Valley Riparian Wetlands Restoration
2022096	Chewuch Root Canal / Chiwawa Outlet / Mad River Outlet Test Pits
2022097	South Tongue Point Restoration Project Phase 1
2022098	Yakima Steelhead VSP Project



Figure 4: 2022020(Suspension Reach)LW bank buried structure

**TABLE 2: HIP4 PROJECT AUTHORIZATIONS (31 MEDIUM RISK) 2022**

HIP_NO#	PROJECT
2022007	Last Chance Springs Habitat Restoration Project
2022012	Alder Creek Floodplain
2022017	WA Estuary MOA - South Bachelor Island
2022019	Hayden Creek Hermits - BLM Habitat Improvement Project - Phase II
2022020	Suspension Reach Habitat Restoration Project
2022024	Crocker Creek Culvert Replacement
2022026	Columbia Stock Ranch – Weed Treatment, Fence Installation, Fence Pulling,
2022029	Lapwai Creek Reach 14
2022032	Page/Krenz Ditch Decommissioning
2022037	Passage Barrier Removal on Road Creek /Culvert Replacement 2007-268-00
2022038	Tucannon PA-13: Phase I
2022041	Lower Elochoman III Restoration
2022042	Lower Elochoman II Restoration
2022043	Free Willow, Lower Willow Creek Fish Passage Restoration
2022044	Dalton Lake Restoration
2022046	Jim Brown Creek Beaver Dam Analogs
2022051	Southern Territories Habitat Project - Teepee and Swale TPBR Implementation
2022053	Lower Duck Habitat Restoration Project
2022058	Couse Creek Dam Removal Blue Mountain Station Road
2022059	Chahalpam Chub Pond Project
2022063	Hidaway Creek RM 1.3 Restoration
2022064	Cottonwood Creek Cole-Engle Diversion Passage
2022068	Beaver Creek Channel Restoration
2022069	Lostine Side Channel and Wetland Complex
2022070	Catherine Creek State Park Restoration Project
2022072	Deep Creek Habitat Restoration
2022076	Deep Creek Habitat Restoration
2022077	Indian Creek Cold Water Refugia Enhancement
2022079	Coleman Creek 4.3 - Beard/Leuck
2022080	Cascade Forest Conservancy Beaver Dam Analog Installation on Stump Creek
2022087	Asotin County Conservation District - Lick Creek Instream Fire Response
2022090	Oregon Fish Screens Project – Pine Hollow Passage Project





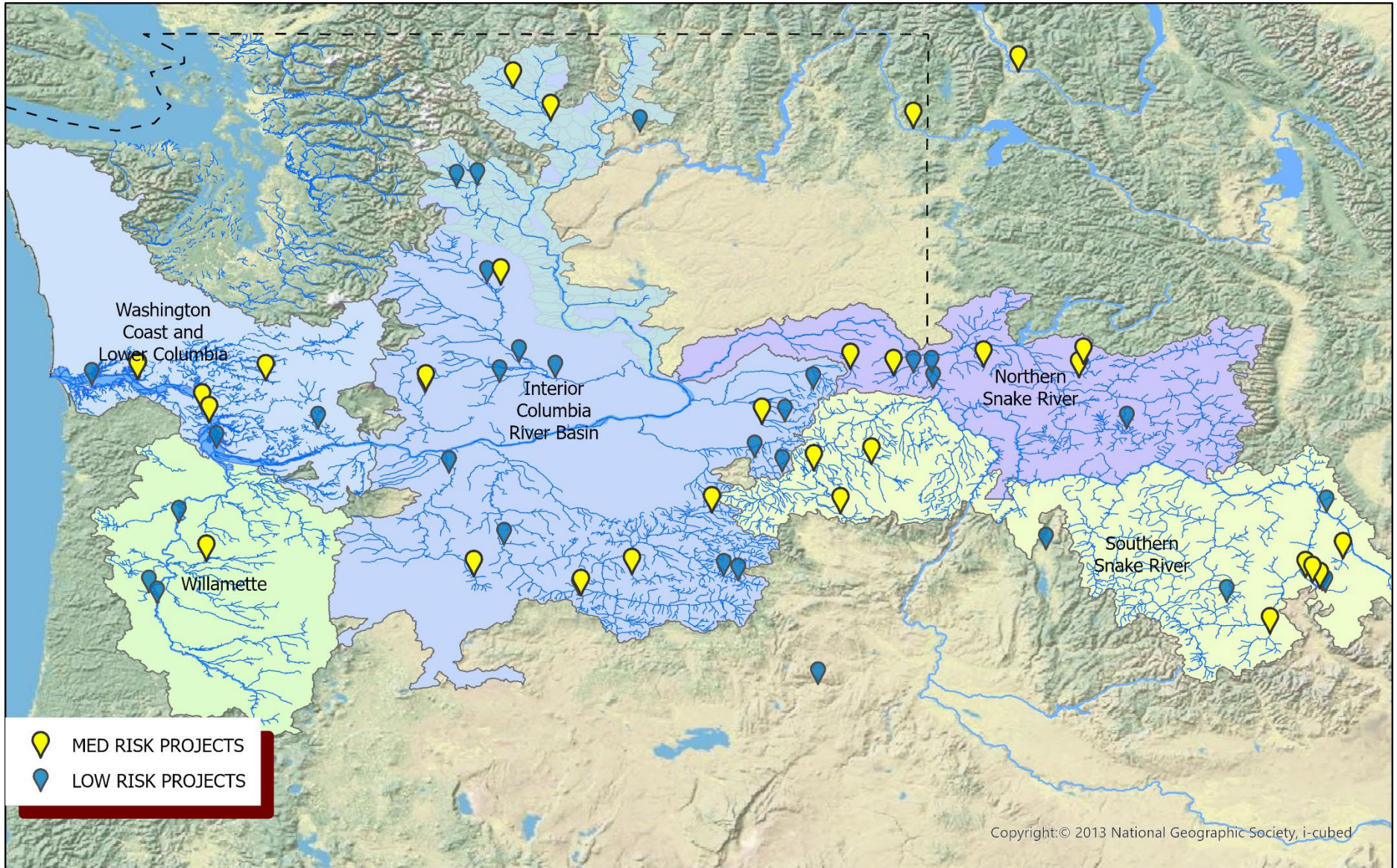
Figure 5: Merit Oxbow New Side Channel



Figure 6: 2022/2023 Merit Oxbow Side Channel

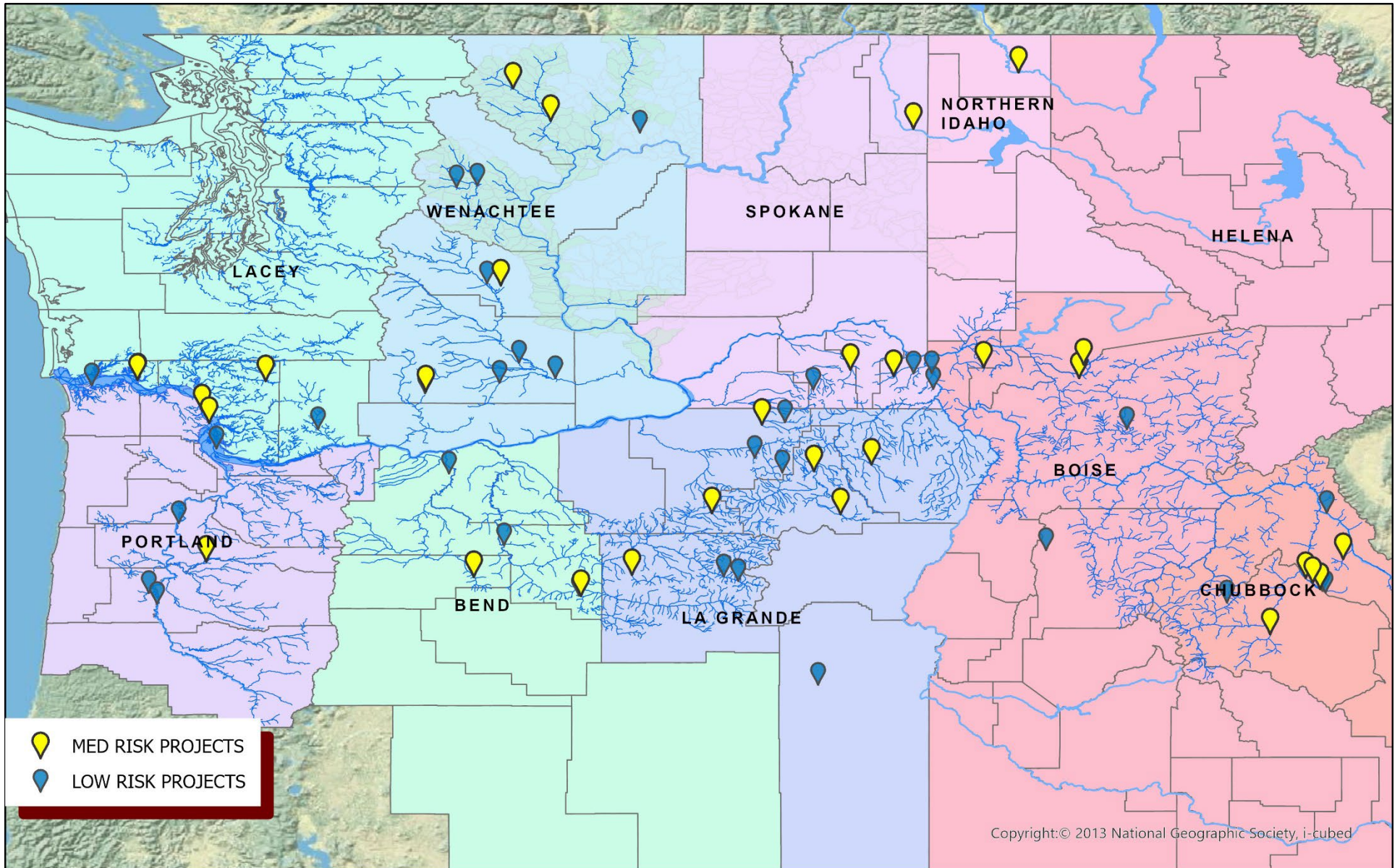


MAP 1: 2022 MED-LOW RISK HIP4 PROJECT LOCATIONS (NMFS)



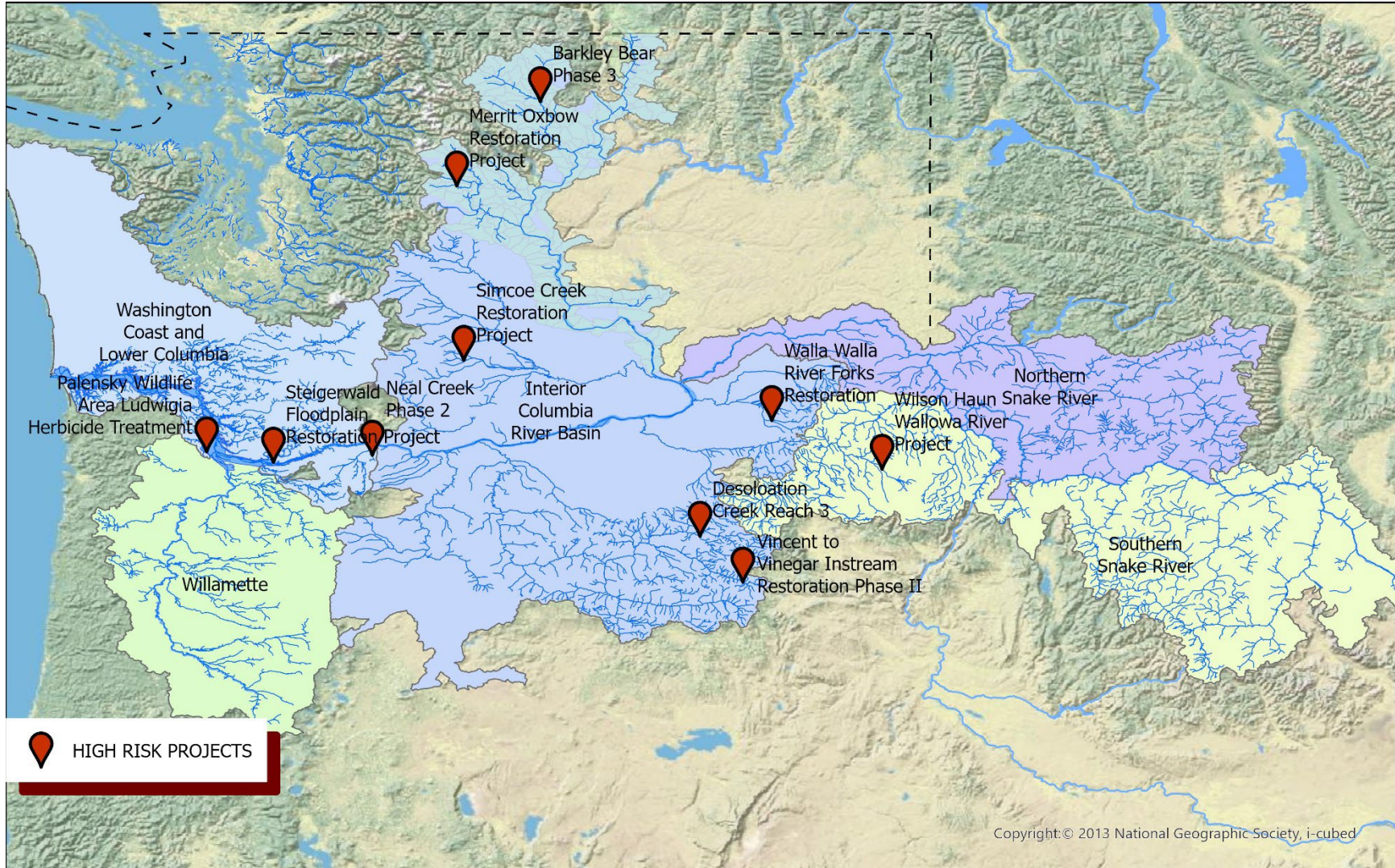


MAP 2: 2022 MED-LOW HIP4 PROJECT LOCATIONS (USFWS)



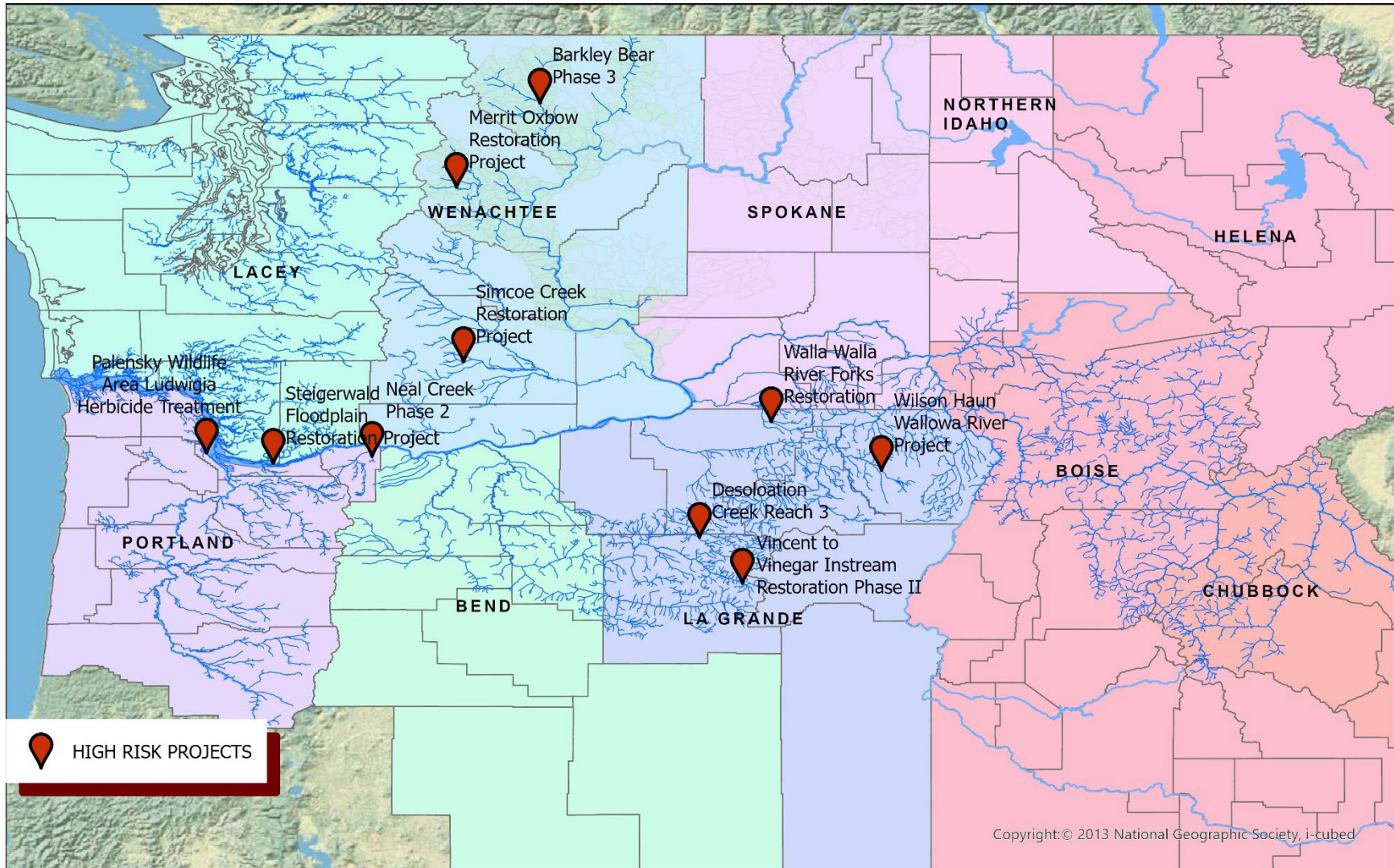


MAP 3: 2022 HIGH RISK PROJECT LOCATIONS (NMFS)





MAP 4: 2022 HIGH RISK PROJECT LOCATIONS (USFWS)



### HIGH RISK PROJECT SHOWCASE:

These projects are BPA’s most significant achievements towards salmon restoration in 2022 (Table 3). Most of them are a continuation of previous year’s contracts that were designed and approved in previous years. These are complex projects that require extensive collaboration, funding, design and planning. Locations of these projects are shown in Figure’s 3 & 4. All of these projects were considered high risk and involved both USFWS and NMFS interagency review and final approval. While BPA was the funding entity and provided extensive technical assistance, the project sponsors were essential in creating and maintaining landowner relationships and negotiations.

**TABLE 3: HIGH RISK PROJECTS (10)**

HIP_NO#	PROJECT
2022006	Desolation Creek Reach 3
2022016	Steigerwald Floodplain Restoration Project
2022023	Merrit Oxbox Restoration Project
2022055	Vincent to Vinegar Instream Restoration Phase 2
2022056	Wilson Haun Wallowa River Project
2022067	Palensky Wildlife Area Ludwigia Herbicide Treatment
2022073	Simcoe Creek Restoration Project
2022081	Walla Walla River Forks Restoration
2022084	Neal Creek Phase 2
2022088	Barkley Bear Phase 3

**TABLE 4: Desolation Creek Reach 3 High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022006	CTUIR	Desolation Creek	<ul style="list-style-type: none"> <li>• Bridge and Culvert removal or replacement</li> <li>• Installation of Fords</li> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Set back of berms, dikes, levees</li> <li>• Bioengineered Streambanks</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Channel Reconstruction</li> </ul>
Fish Capture	0 captured 0 killed		

**Description:**

Proposed work addresses floodplain manipulations by incorporating grading, large wood placement, and native plantings. Stream complexity is addressed through riffle construction to reestablish appropriate stream grade and encourage floodplain inundation, new channel, large wood structures, and native plantings. Moving 0.35 miles of the USFS 1003 road out of a



wetland to adjacent hillslope margins replaces two passage barriers and places the roadbed on dry ground.

**Primary project features:**

- Two side channels (1,300') near Stations 15+00 and 83+00 were developed with partial bypass excavation though neither not connected to Desolation Creek. Nine large wood structures were developed within the channels which won't interfere with bypass.
- Floodplain surfaces in the lower and upper most extents of the project site (near Stations 15+00 and 105+00) were graded to their final elevation (~2.6 acres) and 55 large wood structures were constructed within, and 250 native willow cuttings were placed. Where wood will be placed along the existing channel margin a 50' of native soils were left in place to protect excavated areas during high flows.



Figure 7: 2022006(Desolation Creek)Excavation



Figure 8: 2022006(Desolation Creek)Excavation

**TABLE 5: Stiegerwald Floodplain Restoration High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022016	BPA, BOR, USFWS	Lower Columbia River (Gibbons Creek)	<ul style="list-style-type: none"> <li>• Dams, water control or legacy structure removal</li> <li>• Headcut and Grade Stabilization</li> <li>• Bridge and Culvert removal or replacement</li> <li>• Set back of berms, dikes, levees</li> <li>• Bioengineered Streambanks</li> </ul>
Fish Capture	0 captured 0 killed		

			<ul style="list-style-type: none"> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Channel Reconstruction</li> <li>• Herbicides</li> </ul>
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**Description:**

The Steigerwald Reconnection Project broke ground in 2019 and was completed in 2022. This project was the largest habitat restoration project in the history of the lower Columbia River. Key partners including the US Army Corps, WSDOT, BNSF, the City of Washougal, the Port of Camas-Washougal, Friends of the Columbia Gorge, and USFWS Key funders: BPA (\$28 million), Washington Department of Ecology’s Floodplains by Design (\$4 million).

During construction year #3, the project focused on completion of final project elements and opening the refuge for public access. These actions included removal of the remaining portion of the temporary haul road that was located within the western end of Expanded Habitat Area -1 (EH-1). Final grading and shaping of EH-1, a wetland feature. Construction of Upland Habitat Areas (UH) 1 and 2. Construction of approximately 600 ft of the trail network, atop the alignment of UH-2. Removal of the N/S Straub Rd and culvert and regrading to match existing adjacent wetlands. Placing rock surface along the west side of floodwall north of SR14 to reduce future maintenance needs.

**Primary project features:**

- This project has now reconnected 965 acres of diked floodplain, formerly pasture and hayfields, to the Columbia River. Based on the estimated Columbia River levels, as much as 560 acres will be annually flooded by winter rains and the Columbia River spring freshet. In addition, more than 100 acres of new wetland have been created.
- Installed dual PIT arrays
- Planted approximately 95,000 bareroot trees/shrubs and 24,000 willow live stakes and 2,500 cottonwood poles. Interplanting 220 acres and new planting on 15 acres riparian and upland habitat
- Herbicide treatments will help control invasive species and maximize survival of native plantings.





Figure 9: 2022016(Stiegerwald)Road Removal



Figure 10: 2022016(Stiegerwald)Pit Array Installation

**TABLE 6: Merrit Oxbow Restoration High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022023	Cascade Fisheries	Wenatchee River (Nason Creek)	<ul style="list-style-type: none"> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Install habitat forming structures</li> </ul>

Fish Capture	240 captured 4 killed	<ul style="list-style-type: none"> <li>Riparian Vegetation Planting</li> <li>Install Habitat forming materials</li> </ul>
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**Description:**

The projects aimed to address high priority ecological concerns in Nason Creek by establishing a perennial side channel with connection to off channel wetland habitat, installing wood structures to increase instream complexity and habitat, and establishing riparian vegetation in the floodplain and newly created side channel.

**Primary project features:**

- Excavating 836 feet of side channel to create a perennially flowing connection to the mainstem
- Connecting the new side channel to relic oxbows and “First Bend” side channel to create a total of over 1700 linear feet of perennial side channel, providing a total of 0.43 acres of off channel habitat at low flow and 2.67 acres off channel habitat at the 1.25 year event
- Installing approximately 24 wood structures to improve instream habitat complexity and cover
- Planting approximately 3750 willow, cottonwood and dogwood live stakes along new side channel, and helping ensure success by controlling invasive weeds at the project site



Figure 11: Top of roughend channel (beaver activity post construction)





Figure 12: 2022023(M. Oxbow)Apex Jam



Figure 13: 2022023(M. Oxbow)ELJ Install

**TABLE 7: Vincent to Vinegar Instream Restoration High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022055	Confederated Tribes of Warm Springs Reservation	Middle Fork John Day River	<ul style="list-style-type: none"> <li>• Dams, Water Control or Legacy Structure removal</li> <li>• Grade Stabilization</li> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Set-back or Removal of Existing Berms, Dikes, and Levees</li> <li>• Bioengineered Streambanks</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Channel Reconstruction</li> </ul>
Fish Capture	1179 captured 7 killed		

**Description:**

The Vinegar to Vincent Fish Habitat Improvement project removed the railroad grade along the Middle Fork, rerouted the channel, introduced large woody debris, rebuilt and lengthen a cattle exclusion fence, and reactivated the historic side channels and floodplains. By restoring this reach to a more natural condition, we improved the habitat for not only all anadromous salmonids and life stages, but for lamprey, resident rainbow trout, bull trout, other native fish species, and freshwater mussels.

**Primary project features:**

- Increase Aquatic and/or Floodplain Complexity
- Excavation and reactivation of new and historic main and side channels
- Enhancement of the floodplain through the removal of 4,300 feet of the railroad grade
- Increased habitat diversity through the enhancement of 3.8 acres of floodplain wetland.





Figure 15: 2022055(Vincent to Vinegar) Flooding before and after



**TABLE 8: Wilson Haun Wallowa River High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022056	Trout Unlimited	Middle Lemhi River	<ul style="list-style-type: none"> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Install habitat forming materials</li> <li>• Herbicides</li> </ul>
Fish Capture	4159 captured 66 killed		

**Description:**

The Wilson-Haun Wallowa River Project is located on private property along the Wallowa River. The restoration treatments were applied along the Wallowa River from river mile 31-31.7. In the summer and fall of 2022, TU and project partners led a large construction and rehab effort on the Wallowa River mainstem floodplain. The Wilson-Haun Wallowa River Project construction will continue into the 2023 field season. Work in 2022 included channel fill, large wood placement, bar creation, pond creation, side-channel and wetland habitat creation, low-tech restoration, planting, and seeding.

**Primary project features:**

- Restoring floodplain hydrology and ecological function using restoration treatments that improve or encourage habitat for ESA-listed salmonids
- Floodplain grading/channel fill
- Large wood placements/boulder placements
- Low-tech process-based restoration (LTPBR) techniques
- Riparian vegetation enhancement



Figure 14: Wilson Haun Fish Salvage





2022056(WilsonHaun)Mainstem Isolation



2022056(WilsonHaun)Building Floodplain Habitat





Figure 15: 2022056 Wilson Haun Apex Structure

**TABLE 9: Palensky Wildlife Area Herbicide Treatment High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022067	ODFW	Willamette River (Multnomah Channel)	<ul style="list-style-type: none"> <li>Herbicides</li> </ul>
Fish Capture	0 captured 0 killed		

**Description:**

The J.R. Palensky Wildlife Area is located along the southern shoreline of the Multnomah Channel downstream from its confluence with the Willamette River. In the summer of 2021, invasive creeping primrose (*ludwigia*) was first detected in Horseshoe Lake on the wildlife area. By late 2021, more than 9 acres of the lake was fully infested. ODFW applied aquatic herbicide between June and October to control the growth of *ludwigia* at the site.

**Primary project features:**

- Herbicide treatment of *ludwigia* as required to fully eliminate the infestation



**TABLE 10: Simcoe Creek Restoration High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022073	Yakama Nation	Simcoe Creek	<ul style="list-style-type: none"> <li>• Grade Stabilization</li> <li>• Bridge and Culvert Removal or Replacement</li> <li>• Improve 2ndary Channel and Wetland Habitats</li> </ul>
Fish Capture	0 captured 0 killed		<ul style="list-style-type: none"> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Channel Reconstruction</li> </ul>

**Description:**

The project eliminated fish passage barriers to allow for the ability to travel to better spawning grounds upstream as well as improved flow conditions through infrastructure (bridge construction), improved habitat complexity, and spread water out into the habitat for an overall environmental uplift.

**Primary project features:**

- Large wood structures were keyed into the banks for erosion control / bank protection, increasing instream habitat complexity for native fish usage, and to slow water.
- Fish passage was improved at the two existing box culverts with rock aprons and wood structures, and an appropriate grade through the newly installed bridge.
- Inset floodplain benches were created and planted for additional habitat complexity, that will be inundated on an annual basis and allow for racking of materials and riparian growth.



2022073(Simcoe Creek) Excavation



2022073(Simcoe Creek) Cofferd Dams

**TABLE 11: Walla Walla River Forks High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022081	Grant Soil and Water Conservation District	Walla Walla River	<ul style="list-style-type: none"> <li>• Consolidate or Replace Existing Irrigation Diversions</li> <li>• Grade Stabilization</li> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Set-back or Removal of Existing Berms, Dikes, and Levees</li> <li>• Bioengineered Streambanks</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> <li>• Fish Screens</li> </ul>
Fish Capture	122 captured 0 killed  Bull Trout: 6 captured 0 killed		

**Description:**

This project aimed to improve floodplain connection and in-stream habitat conditions within the Walla Walla River, North Fork Walla Walla River, and South Fork Walla Walla River through selective levee removal, side channel grading, large wood enhancement, and improvement of two irrigation diversions for fish passage and entrainment issues.

**Primary project features:**

- Increase complexity and reconnect side channel
- Removal of berm



- Diversion improvements
- Riparian plantings

**TABLE 12: Neal Creek High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022084	Confederated Tribes of Warm Springs Reservation	Neal Creek	<ul style="list-style-type: none"> <li>• Improve 2ndary Channel and Wetland Habitats</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> </ul>
Fish Capture	24 captured 0 killed		

**Description:**

Primary project elements included side channel construction, alcove construction, large wood structures, and native riparian revegetation in disturbed areas post-construction. There are two side channel construction sites in the project area. A total length of 640 feet of side channels were excavated. Two off-channel alcoves were created. Large wood was used throughout the project site to directly create habitat, drive habitat forming processes, and create desired hydraulic conditions such as increased floodplain roughness.

**Primary project features:**

- Excavation of floodplain side channels to reconnect the channel and floodplain, provide off-channel habitat, and promote natural habitat forming processes.
- Excavation of off-channel alcoves to provide off-channel habitat and greater floodplain connectivity
- Log jam construction to promote floodplain connectivity, improve habitat suitability and stability, and promote natural habitat forming processes



Side Channel 1 Entrance - Pre-Project



Side Channel 1 - During



Side Channel 1 - Post-Project





Side Channel 2– Pre-Project



Side Channel 2 – During



Side Channel 2 – Post-Project





Alcove 2 – Pre-Project



Alcove 2 – During



Alcove 2 – Post-Project



**TABLE 13: Barkley Bear Phase 3 High Risk Project**

HIP4 NO#	SPONSOR	LOCATION	HIP CATEGORIES
2022088	Methow Salmon Recovery Foundation	Middle Methow River	<ul style="list-style-type: none"> <li>• Dams, Water Control or Legacy Structure Removal</li> <li>• Install habitat forming structures</li> <li>• Riparian Vegetation Planting</li> </ul>
Fish Capture	0 captured 0 killed		

**Description:**

In 2022, we completed the final planned phase of project work which entailed removing the concrete headgate at the top of the floodplain side channel. This improves the connectivity of the floodplain and side channel and finishes the work as shown on project designs.

**Primary project features:**

- Remove Barkley Headgate
- Reconnect channel
- Increase Aquatic and Floodplain Complexity
- Maintain Riparian Plantings



Figure 16: 2022088(Barkley Bear) Headgate Removal





Figure 17: 2022088(Barkley Bear) Reconnection



Figure 18: 2022088(Barkley Bear) Levee Removal Area



## ACTIVITY CATEGORIES

Within each individual project there are a variable amount of activity categories. BPA generally lumps each set of activity categories by contract which typically share location, project and project sponsor, with the exception of herbicides, fish screens, surveys, and O&M activities which could have multiple locations lumped by program. The activity categories in orange are new and are a recent development of HIP4. The activity categories in red represent deviations from the mean, in these cases significant increases or decreases.

**TABLE 14: ACTIVITY CATEGORY SUMMARY**

Category	Subcategory	8-year Average	2022 Totals
<b>1. Fish Passage Restoration</b>			
	a. Dams, Water Control or Legacy Structure Removal.	5	8
	b. Consolidate, or Replace Existing Irrigation Diversions.	5	3
	c. Headcut and Grade Stabilization.	8	8
	d. Low Flow Consolidation.	1	1
	e. Providing Fish Passage at an Existing Facility.	4	2
	f. Bridge and Culvert Removal or Replacement.	9	9
	g. Bridge and Culvert Maintenance.	1	3
	h. Installation of Fords.	2	2
<b>2. River, Stream, Floodplain, and Wetland Restoration.</b>			
	a. Improve Secondary Channel and Wetland Habitats.	17	21
	b. Set-back or Removal of Existing, Berms, Dikes, and Levees.	9	6
	c. Protect Streambanks Using Bioengineering Methods.	9	8
	d. Install Habitat-Forming Instream Structures (Large Small Wood, Boulders)	27	38
	e. Riparian Vegetation Planting.	40	47
	f. Channel Reconstruction.	8	8
	g. Sediment and Gravel.	4	4
<b>3. Invasive and Non-Native Plant Control.</b>			
	a. Manage Vegetation using Physical Controls.	31	28
	b. Manage Vegetation using Herbicides (Riverine)	38	24
	c. Manage Vegetation using Herbicides (Estuary)	5	4
	d. Manage Vegetation using Herbicides (Willamette)	0	1
	e. Juniper Burning	1	1
	f. Prescribed Burning	3	4
<b>4. Piling Removal.</b>			
	Pile Removal	1	0
<b>5. Road and Trail Erosion Control, Maintenance, and Decommissioning.</b>			
	a. Maintain Roads.	5	5
	b. Decommission Roads.	2	0
<b>6. In-channel Nutrient Enhancement.</b>			
	Nutrient Enhancement.	1	0

<b>7. Irrigation and Water Delivery/Management Actions.</b>			
	a. Convert Delivery System to Drip or Sprinkler Irrigation.	2	0
	b. Convert Water Conveyance from Open Ditch to Pipeline or Line Leaking	3	0
	c. Convert from Instream Diversions to Groundwater Wells for Primary Water	1	0
	d. Install or Replace Return Flow Cooling Systems.	1	0
	e. Install Irrigation Water Siphon Beneath Waterway.	1	1
	f. Livestock Watering Facilities.	4	0
	g. Install New or Upgrade/Maintain Existing Fish Screens.	1567	1713
<b>8. Fisheries, Hydrologic, and Geomorphologic Surveys.</b>			
	Surveys	18	6
<b>9. Special Actions (for Terrestrial Species).</b>			
	a. Install/develop Wildlife Structures.	2	2
	b. Fencing construction for Livestock Control	11	10
	c. Plant Vegetation.	5	22
	d. Tree Removal for LW Projects.	12	3
	e. Willamette Valley Prairie Restoration	5	7



## INCIDENTAL TAKE REPORTING

In the HIP4 the NMFS and USFWS HIP4 BOs defined four categories of incidental take based on the likelihood of adverse effects to ESA-listed species.

### 1. Capture of juvenile and adult fish during in-water work area isolation.

NMFS anticipates the capture of 7,500 juveniles (6000 juveniles in the Interior Recovery Domain, 1500 juveniles from the Willamette/Lower Columbia Recovery Domain), and the capture of up to 4



adults (3 from the Interior Columbia Recovery Domain and one from the Willamette/Lower Columbia Recovery Domain of the salmon and steelhead species considered in this consultation.

USFWS anticipates no more than 350 bull trout will be captured in a single year, and no more than 5 percent of the total number captured will be killed (up to 18 in a single year).

**TABLE 15: INCIDENTAL TAKE DUE TO FISH HANDLING (NMFS)**

Pacific Salmon and Steelhead		
	Capture	Mortality
<b>2014</b>	3593	8
<b>2015</b>	3541	59
<b>2016</b>	2435	130
<b>2017</b>	2446	78
<b>2018</b>	3282	189
<b>2019</b>	1174	33
<b>2020</b>	<b>3504</b>	<b>84</b>
<b>2021</b>	<b>6640</b>	<b>329</b>
<b>2022</b>	<b>7452</b>	<b>92</b>

**TABLE 16: INCIDENTAL TAKE DUE TO FISH HANDLING (USFWS)**

Bull Trout		
	Capture	Mortality
<b>2014</b>	14	0
<b>2015</b>	29	0
<b>2016</b>	5	0
<b>2017</b>	0	0
<b>2018</b>	4	0
<b>2019</b>	0	0
<b>2020</b>	<b>95</b>	<b>0</b>
<b>2021</b>	<b>11</b>	<b>5</b>
<b>2022</b>	<b>7</b>	<b>0</b>

**2. Harm due to habitat-related effects.**

NMFS anticipates a maximum of 150 projects to be implemented each year. USFWS anticipates no more than 90 of these projects requiring near or in-water work (IWW). NMFS estimates that each action may modify up to 300 linear feet of riparian and shallow-water habitat; therefore, the extent of take for construction-related disturbance of streambank and channel areas in 45,000 linear stream feet (8.5 miles) per year partitioned between recovery domains.

USFWS anticipates no more than 4 active Marbled Murrelet (MAMU) nests will be disturbed/displaced per year (2 in Oregon, 2 in WA). No MAMU nests have been reported disturbed this year.

USFWS anticipates no more than 1,100 acres of potential Streak Horned Lark (SHL) habitat may be treated in a single year. Project activities have occurred in areas near managed SHL habitat. This occurred in the Willamette Valley Wildlife Management Areas (Herbert Farm and Coyote Creek).

**TABLE 17: INCIDENTAL TAKE DUE TO HABITAT RELATED EFFECTS**

	Average	2022
IWW	45	24
Total	97	84

	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average
IWW	35	45	41	40	43	43	52	56	57	46
Total	86	96	86	95	92	113	99	96	112	97

**Harm due to construction related disturbance (Turbidity).**

The extent of take will be exceeded if the turbidity plume generated by construction activities is visible above background levels, about a 10 percent increase in natural stream turbidity, downstream from the project area source to be measured/observed every four hours, and take is exceeded when activities continue to result in visible suspended sediment beyond two consecutive monitoring intervals.

There was one case of turbidity exceedance (2022063), but the appropriate HIP protocols were followed. Work was paused until background readings were reached, unless work was ending for the day and as a corrective measure a floating sediment barrier was set up in the lower portion of the site.

In 2022 there were **0 reported instances** where turbidity was elevated to high levels (250 NTU) above background.

**4. Application of herbicides to control invasive and non-native plant species**

The best available indicator for the extent of take due to the proposed invasive plant control is the annual limitation on the extent of treated riparian acres. To limit the potential negative effects from herbicide use while still allowing use of herbicides in this restoration program, NMFS limits BPA’s take to 1,500 riparian acres of treatment each year.

**TABLE 19: ACRES TREATED WITH HERBICIDE**

	RIPARIAN	UPLAND
2013	409	2482
2014	449	8282
2015	715	7399



2016	836	8940
2017	831	5561
2018	533	2127
2019	1020	2976
2020	929	4612
2021	1336	4356
2022	<b>991</b>	<b>3433</b>

## NON COMPLIANCE

In 2022 there was 1 recorded instance of non-compliance with the HIP. We attribute this to the fact that BPA’s restoration partners (project sponsors) are typically the same year after year, and have been thoroughly trained in the use of the HIP, are familiarized with the HIP4 Handbook and aided by the in-depth technical reviews provided by BPA Engineering Technical Services.

The non-compliance event comes from one over application of glyphosate (2022045, CTWS). The sponsor was notified and will be required to have pre-approval of herbicide use in any future contracts.

**TABLE 20: REPORTED NONCOMPLIANCE EVENTS**

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NA	6	2	1	0	0	0	2	0	1

## HERBICIDE USE

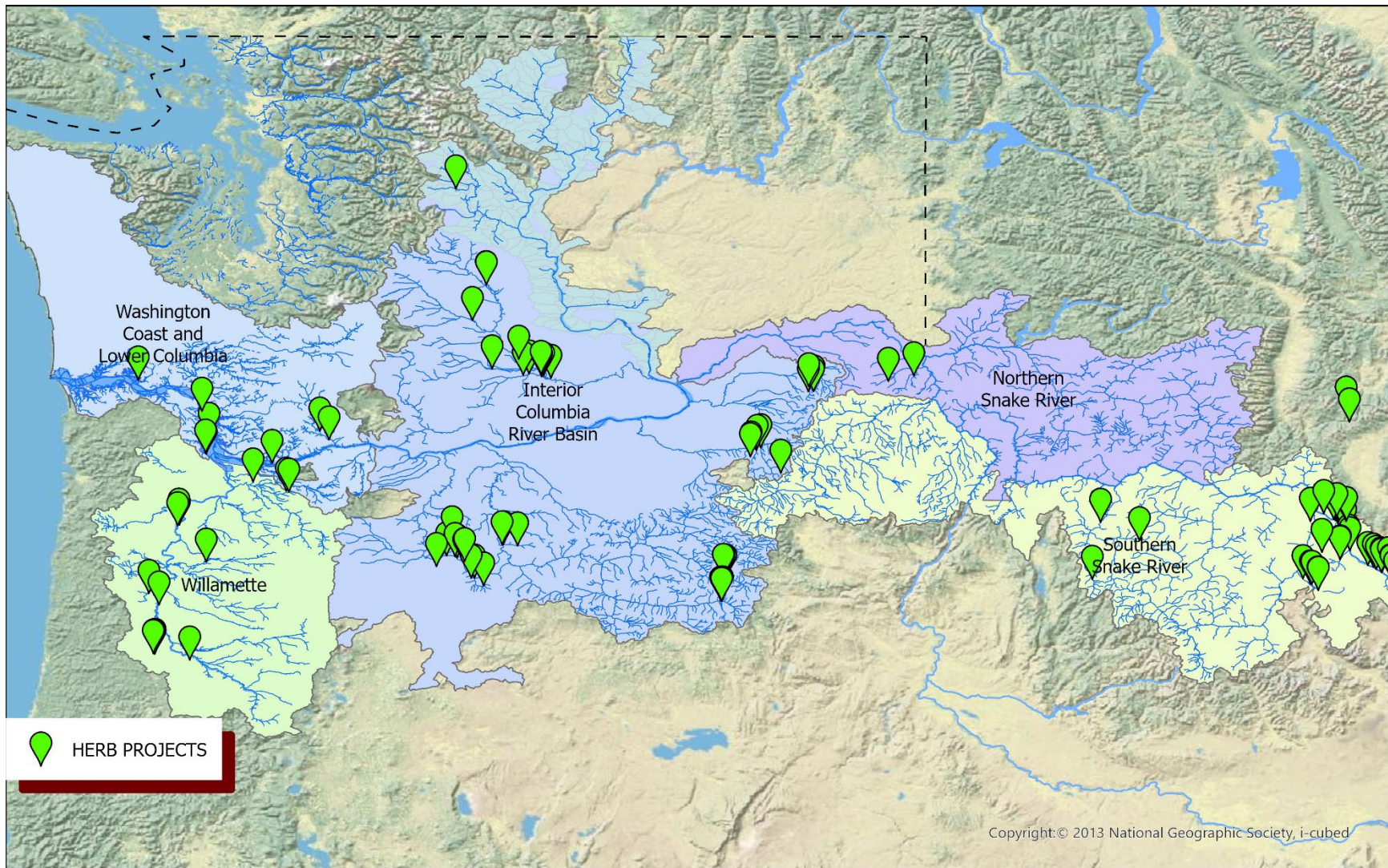
Herbicide use continues to be the most widely used project activity category under the HIP4. This is due to the numerous wildlife mitigation areas that BPA purchases and are managed under contract by various entities.



Figure 19: 2022042(Crocker Creek)Culvert Replacement, before and after

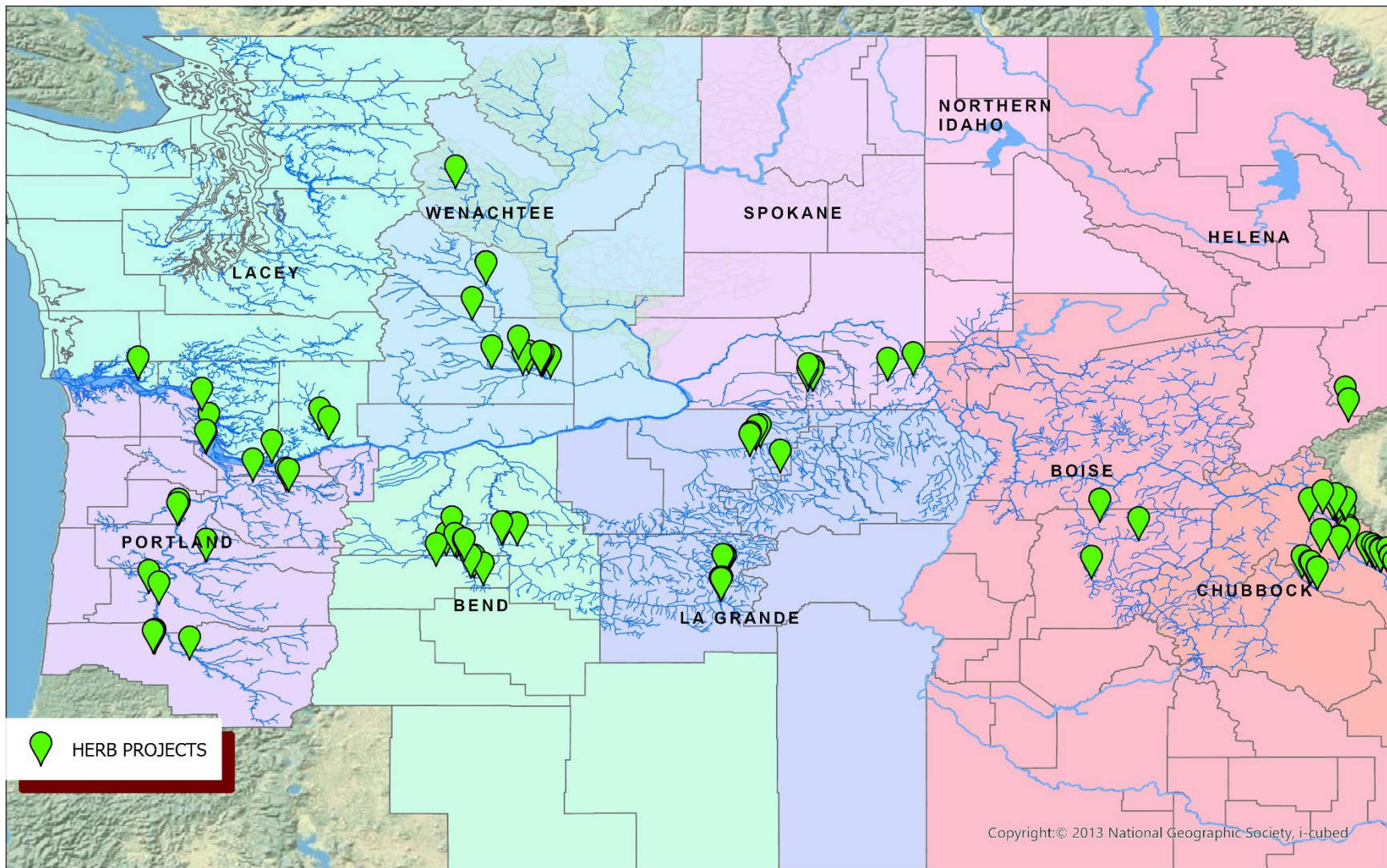


### MAP 5: HERBICIDE APPLICATION (NMFS)





### MAP 6: HERBICIDE APPLICATION (USFWS)





## RIVERINE HERBICIDE APPLICATIONS

The analysis in the BOs affirm that application of chemical herbicides will result in short-term degradation of water quality which will cause injury to fish in the form of sublethal adverse physiological effects. Up to 1,500 total riparian acres may be treated in a calendar year under this programmatic consultation. There are no limits to upland acreage.

The addition of herbicide treatment in the Estuary and the Willamette is expected to increase the amounts of annual herbicide applied in the upcoming years.

**TABLE 21: PROJECTS WITH HERBICIDE USAGE**

HIP4 NO#	PROJECT	RIPARIAN	UPLAND
2022001	Chahalpam Floodplain Restoration	5	0
2022002	ODFW Willamette Valley O & M	58.5	1295.25
2022004	Sunnyside Wildlife O&M	0	59
2022009	Snag Boat Bend Riparian Reforestation Final	143	0
2022014	Grande Ronde Subbasin Invasive Weed Treatments	33.16	10
2022016	Steigerwald Floodplain Restoration Project	50	97
2022025	Willamette Mission Floodplain Reforestation, Phase 7	108.6	0
2022026	Columbia Stock Ranch – Weed Treatment, Fence Installation, Fence Pulling,	30	91
2022027	Rainwater Wildlife Area	0	17.6
2022028	Isquulktppe Watershed Project	0.93	10.3
2022030	Pahsimeroi River Weed Treatments	85.13	19.29
2022033	Lemhi River Restoration Weed Treatment and Hydroseeding	236.4	138
2022035	Stabler Bend Vegetation Management	3.58	0
2022039	South Fork Salmon River, Big Creek & Little Salmon River Watershed Restoration	23.1	25.8
2022040	Yakima Basin Side Channels - Veg Mgmt	0	4
2022041	Lower Elochoman III Restoration	80.2	115
2022042	Lower Elochoman II Restoration	25	75
2022045	Upper John Day Conservation Lands Program	13.45	1
2022047	Trout Creek Watershed Noxious Weed Program	25.2	73.3
2022048	LWP Groups 2&3 Habitat Restoration -2012-99 Nason Creek	5.8	0
2022060	Shillapoo Wildlife Area	20	282
2022062	Hellsgate Big Game Winter Range O&M	27	282.66
2022065	Malheur River Wildlife Mitigation Site	10	89.6
2022067	Palensky Wildlife Area Ludwigia Herbicide Treatment	10.15	0
2022074	Pine Creek Conservation Area O & M	3	36.75
2022086	Asotin Creek Wildlife Area O&M	0	406
2022095	Lower Yakima Valley Riparian Wetlands Restoration	0	304

## ESTUARINE HERBICIDE APPLICATIONS

2022 is the third official year of estuarine herbicide application. This process began in the spring of 2019, through technical assistance from Dr. Scott Hecht and Dr. Nancy Munn of NMFS to explore options for herbicide application within the Estuary using proposed HIP4 conservation measures and methodologies as a baseline action and then refining the treatment with respect to the various estuarine zones (high marsh, low marsh and tidal flat/aquatic bed). Specific guidance with respect to type of herbicide applied, method of application, rate of application, frequency of treatment, timing of treatments, and the location and acreage of treatment area.

During the exchange, information needs were relayed to evaluate the action and direct communication was opened up with the sponsors CREST and Columbia Land Trust. Additional information was provided via site visits and several herbicide application memo (HAM)s were drafted. The HAM contained aerial site maps showing proposed activities and a Light Detection and Ranging (LIDAR) or another type of topographic map depicting site elevations.

This process is still being refined and will likely undergo changes in the future depending on workload and lessons learned.

The following five projects were evaluated:

### 1. Steigerwald Floodplain Restoration (HIP No# 2022016)

LCEP continued to use herbicides to successfully implement the project. Because the Steigerwald Project site, including Gibbons Creek and adjacent floodplains, have been connected directly to the Columbia River, all herbicide treatment will be in accordance with the requirements for estuarine systems. In 2022 45 acres of High Marsh was spot treated to control the growth of invasive reed canarygrass.

### 2. Columbia Stock Ranch – Weed Treatment (HIP No# 2022026)

Project activities for 2022 included weed control, planting, native plant maintenance, future planting site preparation, fence removal, and fence installation. These actions are all paramount to project success in terms of managing the property in order to recover ecological integrity and function to support Columbian white-tailed deer (*Odocoileus virginianus leucurus*) (CWTD), as well as broader ecosystem function. The site contains two treatment areas consisting of a high marsh area and an upland area.

Target species include Himalayan blackberry (*Rubus bifrons*), Canada thistle (*Cirsium arvense*), reed canarygrass (*Phalaris arundinacea*), tansy ragwort (*Jacobaea vulgaris*) and other priority species.

### 3. Elochoman 3 Restoration – Weed Treatment (HIP No# 2022041)



Weed control work in 2022 will target re-sprouting blackberry, priority broadleaf species (knotweed), and begin site prep for planting in 2023. The vegetation control work is paramount to project success in terms of recovering ecological integrity and function supporting Columbian white-tailed deer (*Odocoileus virginianus leucurus*) (CWTD), salmonids, and broader ecosystem function.

Target species include Himalayan blackberry (*Rubus bifrons*), reed canarygrass (*Phalaris arundinacea*), and knotweed species (*Fallopia* spp.). Control of these species will be completed with backpack sprayers and/or vehicle-mounted boom or wand sprayers using approved methods and herbicides as outlined in the HIP.

#### **4. Elochoman 2 Restoration - Weed Treatment (HIP No# 2022042)**

Similar to project 2022041, weed control work in 2022 will target re-sprouting blackberry, priority broadleaf species (knotweed), and begin site prep for planting in 2023. The vegetation control work is paramount to project success in terms of recovering ecological integrity and function supporting Columbian white-tailed deer (*Odocoileus virginianus leucurus*) (CWTD), salmonids, and broader ecosystem function.

Target species include Himalayan blackberry (*Rubus bifrons*), reed canarygrass (*Phalaris arundinacea*), and knotweed species (*Fallopia* spp.). Control of these species will be completed with backpack sprayers and/or vehicle-mounted boom or wand sprayers using approved methods and herbicides as outlined in the HIP and the 2019 technical memorandum.

#### **5. Palensky Wildlife Area Ludwigia Herbicide Treatment (HIP No# 2022067)**

The project included application of aquatic herbicide to control invasive creeping water primrose (*ludwigia*) at the J.R. Palensky Wildlife Area in Multnomah County, Oregon beginning in the summer of 2022. Specifically, ODFW applied the herbicide Glyphosate (Agri-Dex®) in Horseshoe Pond, which discharges into the Multnomah Channel.

### **HIP REVIEW PROCESS (Engineering Technical Services)**

Through the HIP Review process, BPA has been conducting thorough technical reviews of all medium and high risk projects. These technical reviews are conducted by a licensed PE and sometimes involve several iterations of back and forth review junctures between the project sponsors. Functional review is done by BPA staff (EC Lead) who review the project for adherence to HIP4 criteria and coordinate information sharing and collaboration amongst project partners. Both of these reviews together constitute the HIP Review Process.

Project sponsors and other federal partners are actively engaged in the HIP Review process and are submitting projects early. BPA is receiving and reviewing projects that are to be implemented in 2023 and beyond.

**TABLE 22: HIP REVIEW WORKLOAD**

	CY13	CY14	CY15	CY16	CY17	CY18	CY19	CY20	CY21	CY22
Medium Risk	4	14	24	24	23	37	26	64	43	31
High Risk	2	6	2	3	5	14	6	25	11	10



Figure 20: 2022069(Lostine Side Channel)LWD Install



## FISH SCREENS

BPA now funds several state fish screen programs: for O&M actions within the John Day River, Grande Ronde, Imnaha River, Walla Walla, Umatilla River, Deschutes, Willamette, and Hood river subbasins in Oregon, and as well as in the Upper Salmon and Little Salmon River Basins in Idaho.

BPA collected PNFs and PCFs with the following number of actions for both ODFW and IDFG fish screen programs. These included activities performed by ODFW & IDFG screen tenders such as the following:

- Replacement of gearboxes, gear motors, and bearings.
- Replacement of solar batteries and timers and installation of circuit breakers.
- Replacement of side and bottom seals.
- Repairs to paddlewheels.
- Removal of debris and sediment from structures.
- Debris and sediment piles removed or leveled.
- Installation of new weir boards.
- Repair pump screens as necessary
- Replacement of dam boards on fish passage structures.
- Replacement of complete system components within the current concrete structure including screens (screen cradle, stainless steel perforated plate, shaft, bearings, seals), gantries, walkways, handrails, trash racks, paddlewheels, drivelines, and gearboxes.

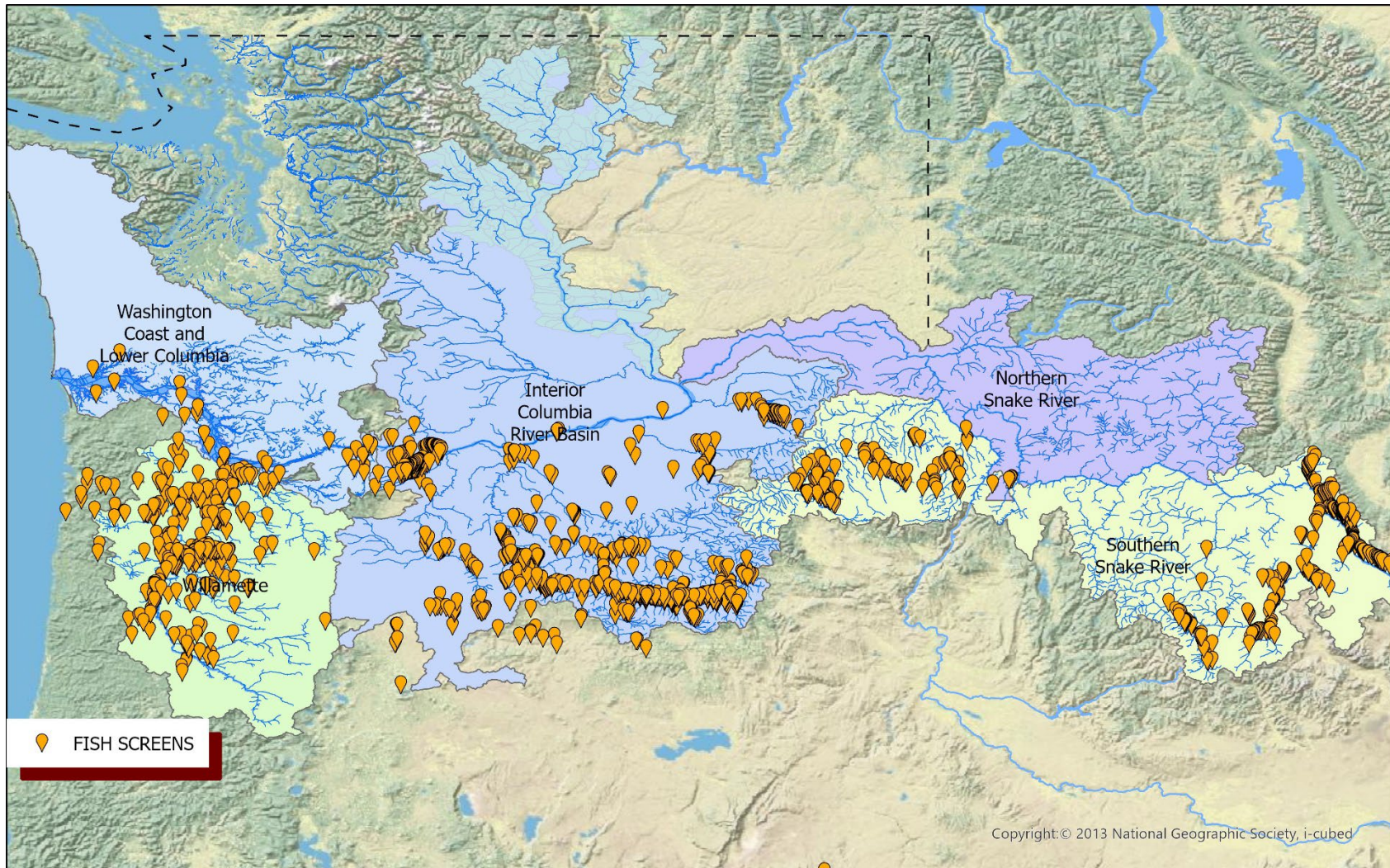
These activities were easily isolated from the water with no impacts to the stream.

**TABLE 23: FISH SCREENS**

HIP4 NO#	Project Title	No# of Actions
2022013	Oregon Fish Screens Project - Low risk I	1428
2022022	Oregon Fish Screens Project - Low risk II	8
2022057	Oregon Fish Screens Project - Low risk III	4
2022071	Upper Salmon Fish Screen O&M	267
2022078	Oregon Fish Screens Project - Low risk IV	2
2022079	Coleman Creek 4.3 – Beard/Leuk	1
2022092	Oregon Fish Screens Project – Pump Screens	3

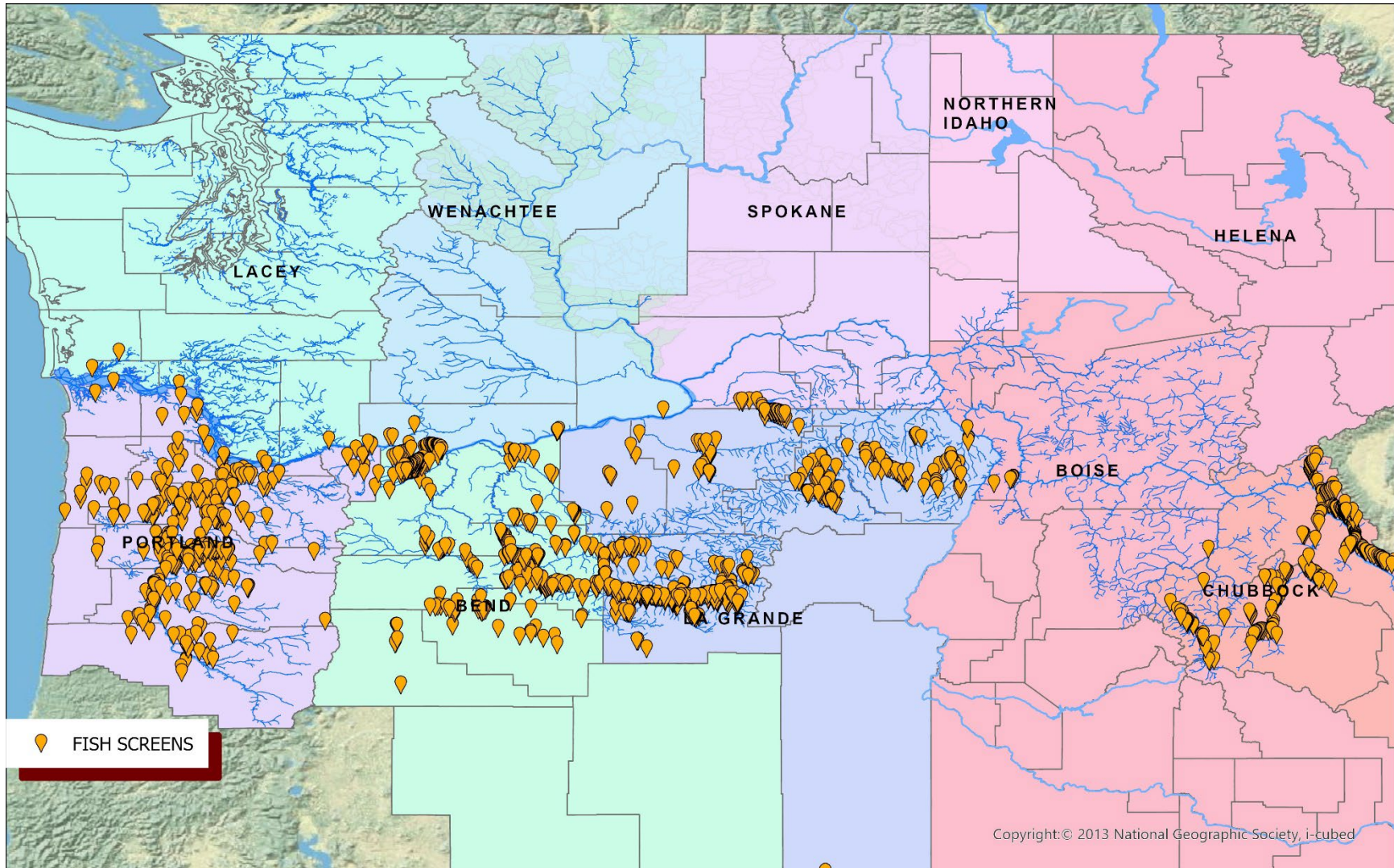
2022 was the fifth full year that the HIP4 was used to cover all actions associated with State Fish Screen Programs. BPA worked closely with State Fish Screen Programs to explore how they track the O&M actions throughout the basin. Initially, it was difficult to predict what specific actions were being taken and the potential impacts to listed species as a result; however, BPA established reporting requirements that included a list of typical actions taken, a list of specific action locations where maintenance was anticipated to occur, and a field form for specific actions that caused reportable impacts (turbidity exceedances and take of listed species).

MAP 7: 2022 HIP4 FISH SCREEN O&M LOCATIONS (NMFS)





MAP 8: 2022 HIP4 FISH SCREEN O&M LOCATIONS (USFWS)



## WILLAMETTE VALLEY WILDLIFE MITIGATION

Category 9e is a new activity category under the HIP 4, exclusively for the ODFW Willamette Wildlife Mitigation Program (WWMP). Operations, maintenance, and restoration activities on nine wildlife management areas (WMAs) is conducted by ODFW in the Willamette Valley. Most actions taken under this contract are for routine management and operations of the wildlife areas. The following project was covered under this activity category (**HIP No: 2022002**).

Previously these projects were covered by PROJECTS, however since BPA is the primary funding agency, ESA coverage was transferred over to the HIP. Since the program was already negotiated under PROJECTS, all conservation measures remained intact to ensure consistency and efficiency.

**TABLE 24: WILLAMETTE VALLEY ACTIONS**

WMA	Listed Species Present	HIP Activity Categories
Coyote Creek South (CCS)	Streaked horned lark	Riparian vegetation planting Physical removal Herbicide application (riverine)
	Coyote Creek Northeast (CCNE)	Streaked horned lark
Flight’s End (FE)	Columbian white-tailed deer	Riparian vegetation planting
	Steelhead	Physical removal
	Chinook salmon	Herbicide application (riverine)
	Coho salmon Chum salmon	Maintain roads
Gail Achterman Wildlife Area (GAWA)	Steelhead	Add LWD into floodplain
	Chinook salmon	Physical removal Herbicide application (riverine)
Herbert Farm and Natural Area (HFNA)	Streaked horned lark	Riparian vegetation planting
	Kincaid’s lupine	Physical removal
	Nelson’s checker-mallow	Herbicide application (riverine)
	Steelhead	
	Chinook salmon	
Palensky Wildlife Area (PWA)	Columbian white-tailed deer	Physical removal
	Steelhead	Herbicide application (riverine)
	Chinook salmon	Maintain roads
	Coho salmon	
	Chum salmon	
Sorenson Meadows (SOR)	Steelhead	Physical removal
	Chinook salmon	Herbicide application (riverine) Prescribed burning

### Description of Activities

**Vegetation Management:** At all seven locations, ongoing vegetation management programs were continued to remove invasive weeds and replant and maintain native species. Vegetation removal included the use of



mechanical (mowing, weed whacking, disking), manual (hand pulling), and chemical (herbicide) methods. Following removal, areas in which weeds were removed were re-seeded or re-planted with native grasses and shrubs. These programs are ongoing and will continue for the foreseeable future.

**Road Maintenance:** Roads and trails were maintained at the Flight's End and Palensky Wildlife Area locations. This work included removing encroaching vegetation and small trees, filling potholes, and repairing and replacing signs which were damaged by the elements or vandalism.

**GAWA Large Wood Placement Project:** Finally, placement of large woody debris at GAWA was completed in the late autumn. During high water flows in winter months, the Willamette River overflows its banks and inundates portions of forested floodplain at the wildlife area. A dozen trees with intact rootwads were loosely placed in these lateral channels to introduce roughness and reduce flow velocity. The locations are being monitored to determine their success in establishing seasonal fish and wildlife habitat and the project may be expanded in future years if results are promising. All work was done in the dry during low flow months and caused no negative impacts to fish or wildlife.



Figure 21: 2021102(PALS)

**MAP 9: 2022 HIP4 WILLAMETTE VALLEY ACTIONS**







