CTUIR GRANDE RONDE SUBBASIN RESTORATION PROJECT ANNUAL REPORT

A Columbia River Basin Fish Habitat Project

Northwest Power Planning Council Project # 199608300

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CONFEDERATED TRIBES UMATILLA INDIAN RESERVATION

BONNEVILLE POWER ADMINISTRATION

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Introduction/Background Information

The **CTUIR Grande Ronde Subbasin Restoration Project** was initiated by the Confederated Tribes of the Umatilla Indian Reservation in 1996 to protect, enhance, and restore riparian and instream habitat for natural production of anadromous salmonids in the Grande Ronde River Subbasin. The project works with other agencies and private landowners to promote land stewardship and enhance habitat for focal fish, primarily spring Chinook salmon, summer steelhead, bull trout, and resident trout. Emphasis is placed on improving improving juvenile rearing habitat and adult spawning habitat with emphasis on restoring natural channel morphology and floodplain function, cold water refuge and complex aquatic habitat that supports required life histories for focal species.

During 2015, the CTUIR was involved in numerous planning processes and projects. Planning efforts included: Snake River Basin salmon and steelhead recovery planning, including Project Leader participation on the technical review habitat team, Expert Panel, Grande Ronde Model Watershed Board and Technical Committees, and ongoing coordination with multiple agencies, organizations, and private landowners associated with fish habitat project development. Additionally, project staff continued BPA-CTUIR Accord land acquisition planning, identification, and development of future site specific fish habitat projects. Project development and initial planning included; baseline field surveys, assessments, development of conceptual project plans, coordination with private landowners, and initiation of environmental planning.

During the reporting period, project staff were focused on: 1) CC44 Southern Cross Conservation Property planning, design, and initiation of Year 1 construction; 2) Rock Creek Phase 3 project planning and design; 3) Bird Track Springs planning and design, and 4) CC42 Catherine Creek project concept planning.

Construction on the CC44 Southern Cross project was initiated in November 2015 and continued through the project reporting period with construction completion scheduled for Fall 2016. CTUIR staff administered the construction contract and construction observation/inspection, conducted spring seeding, mulching, and planting, and provided overall management of the project.

CTUIR staff also conducted monitoring and evaluation, including water temperatures, groundwater elevations, vegetation, geomorphic and instream habitat, biological, and photo points.

Work during the reporting period also included coordinating, planning, field surveys, and initial project development/design for upcoming projects along the main-stem of Catherine Creek, Grande Ronde River, Rock Creek, and Lookingglass Creek. Activities included coordinating with project partners and private landowners to develop future project opportunities, baseline field investigations and surveys, development of conceptual plans, initiation of funding proposals, and initiation of environmental compliance planning in preparation for further project development and implementation in 2015 and beyond.

Background

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) retain aboriginal and treaty rights related to fishing, hunting, pasturing of livestock, and gathering of traditional plants within the Tribes Ceded Territory, including the Grande Ronde Subbasin. The CTUIR Department of Natural Resources (DNR) has developed and accepted a First Foods organization and approach to ecosystem management based on the cultural traditions and practices of the Longhouse. The organization follows the serving order of food and conceptually "Extends the Table" to manage for sustainability within the Ceded Territory. The First Foods are considered to be the minimum ecological products necessary to sustain CTUIR culture. The order is watershed-based beginning with water as the foundation and progressing to salmon (Pacific lamprey, steelhead, trout, and whitefish), deer, cous, and huckleberry. The First Foods provide clear linkages to treaty rights and natural resources and defines direction and goals that relate to the community culture. In conjunction with the First Food principle, the CTUIR DNR developed the River Vision (Jones K. L., 2008) that describes and organizes ecological processes and functions that provide the First Foods.

The River Vision outlines physical and biological processes encompassing 5 touchstones: **Hydrology, Geomorphology, Connectivity, Riparian Vegetation, and Aquatic biota** which together with the First Foods, provide an overall framework for guiding tribal programs in regards to protecting and restoring ecological processes and functions. Healthy watershed processes and functions are the fundamental elements that create diversity, resiliency, and the ability of our river systems to provide sustenance and natural resources to support our culture and heritage.

The Subbasin historically supported viable and harvestable populations of spring/summer and fall Chinook salmon (*Oncorhynchus tshawytscha)*, coho salmon (*O. kisutch*), sockeye salmon (*O. nerka),* summer steelhead *(O. mykiss),* Pacific lamprey (*Entosphenus tridentatus*), bull trout (*Salvelinus confluentus*), rainbow/redband *(O. mykiss sp.)*, and mountain whitefish (*Prosopium williamsoni).* These native fishes are paramount to tribal cultures, economies and the region (CBFWA, 1990) and (CRITFC, 1995). Beginning in the late 1800's, fish populations started to

decline with sockeye and coho extirpated in the early 1900's. The abundance of Chinook, steelhead, bull trout, and other fish species has also been dramatically reduced (NPCCa, 2004) and (NPCCb, 2004). With declining fish populations, Tribal governments and State agencies were obligated to eliminate or significantly reduce subsistence and sport fisheries by the mid 1970's. By the early 1990's, Snake River spring-summer Chinook and summer steelhead populations were suppressed to the point of triggering Federal ESA listings (spring-summer Chinook in 1992 and summer steelhead in 1997, and bull trout in 1998). Other native fish, including Pacific lamprey populations are also highly suppressed and with possible future ESA listing. The following tables illustrate estimated historic and current spring Chinook salmon and summer steelhead returns to the Grande Ronde Subbasin (NPCCa, 2004). Of particular note is an 87 percent decrease in spring Chinook and 70 percent decrease in summer steelhead populations from estimated historic levels.

Summary of estimated historic and current Grande Ronde spring Chinook salmon returns by population (data provided by B. Jonnasson, ODFW pers. comm. 2004).

Population	Estimated Historic Returns count	Estimated Historic Returns % of total	Estimated Current Returns count	Estimated Current Returns % of total	Miles of spawning habitat	Adults /Mile Template	Adults /Mile Current	% Decrease Historic to Current
Wenaha Spring Chinook	1,800	15%	453	30%	*45.60*	39.48	9.94	75%
Minam Spring Chinook	1,800	15%	347	23%	*42.54*	42.31	8.16	94%
Wallowa-Lostine Spring Chinook	3,600	30%	211	14%	*56.10*	64.17	3.76	95%
Lookingglass Spring Chinook	1,200	10%	190	12%	*29.82*	40.24	6.37	81%
Catherine Creek Spring Chinook	1,200	10%	188	12%	*29.82*	40.24	6.30	84%
Upper Grande Ronde Spring Chinook	2,400	20%	132	9%	*79.11*	30.34	1.67	84%
Total	**12,000**		**1,521**		***283.00***	**42.4**	**5.37**	**87%**

Summary of estimated historic and current Grande Ronde summer steelhead returns by population (data provided by B. Jonnasson, ODFW pers. comm. 2004).

Population	Estimated Historic Returns count	Estimated Historic Returns % of total	Estimated Current Returns count	Estimated Current Returns % of total	Miles of spawning habitat	Adults /Mile Template	Adults /Mile Current	% Decrease Historic to Current
Lower Grande Ronde	2,400	16%	608	14%	253.84	9.45	2.39	75%
Joseph Creek	3,600	24%	945	21%	223.10	16.14	4.24	74%
Wallowa River	3,750	25%	1,193	27%	173.45	21.62	6.88	68%
Upper Grande Ronde	5,250	35%	1,755	39%	613.96	8.55	2.86	67%
Total	**15,000**		**4,500**		1,264.35			**70%**

The **CTUIR Grande Ronde Subbasin Restoration Project** (199608300), funded by Bonneville Power Administration (BPA) through the Northwest Power Planning Council Fish and Wildlife Program (NPPC), is an ongoing effort initiated in 1996 to protect, enhance, and restore fish habitat in the Grande Ronde River Subbasin. The project focuses on the mainstem Grande Ronde and major tributaries that provide spawning and rearing habitat for Threatened Snake River

spring-summer Chinook salmon, summer steelhead, and bull trout. The project also provides benefits to other resident fish and wildlife.

The project is an integral component of Subbasin Plan implementation and is well integrated into the framework of the Grande Ronde Model Watershed (GRMW) established by the NPCC in 1992 to coordinate restoration work in the Subbasin. As a co-resource manager in the Subbasin, the CTUIR contributes to the identification, development, and implementation of habitat protection and restoration in cooperation with Federal, State, and local agencies. The CTUIR, ODFW, GRMW, and other participating agencies and organizations have made significant progress towards addressing habitat loss and degradation in the Subbasin (see http://www.grmw.org/).

The project was initiated in 1996 under the NPCC-BPA Early Action Project process. The project was proposed through the GRMW and NPCC program to provide the basis from which to pursue partnerships and habitat grant funds to develop and implement watershed and fish habitat enhancement activities in the Subbasin. Annual project budgets have averaged about $136,000 and ranged from a high of $200,000 in 1999. Annual operating budgets and associated tributary habitat efforts by the CTUIR were increased as a result of the CTUIR-BPA Accord Agreement with an annual average budget of $589,500. The project has historically administered multiple grants from various agencies, including Natural Resource Conservation Service (NRCS) Wetland Reserve Program (WRP), CREP, WHIP, and EQIP, OWEB, EPA-ODEQ 319, GRMW-BPA, CRITFC, NMFS, USFWS, ODOT, and NAWCA and developed an effective working relationship with multiple agencies and organizations.

The project has been successful in the development and implementation of several large-scale, partnership habitat enhancement projects and has developed effective interagency partnerships, working at the policy and technical levels with the Grande Ronde Model Watershed Program (GRMWP), federal and state agencies, and private landowners. A complete project overview and technical approach is described in the 2013 NPPC Project Proposal for the CTUIR Watershed Restoration Project (199608300) incorporated here by reference.

During the 19-year project history, the CTUIR has helped administer and implement a number of projects, enhancing nearly 50 miles of instream habitat. Conservation easements totaling about 1,900 acres on six large ranches/farms have been secured through a combination of NRCS WRP, CREP, and BPA programs. The project has constructed 18 miles of fence, 18 off-channel water developments, and installed over 160,000 trees, shrubs, sedge/rush plugs, and seeded over 800 acres with native/native-like grass seed. Improving habitat trends and biological response can be readily observed at a number of projects. A combination of both passive and active strategies have been developed and implemented and although project areas are in an early stage of recovery. However, restoration efforts including: conservation easements, riparian/wetland enclosures, development of off-channel water sources, removal of livestock, re-vegetation, channel restoration, large wood additions and removal of dikes, old roadbeds and railroad prisms have resulted in improving trends.

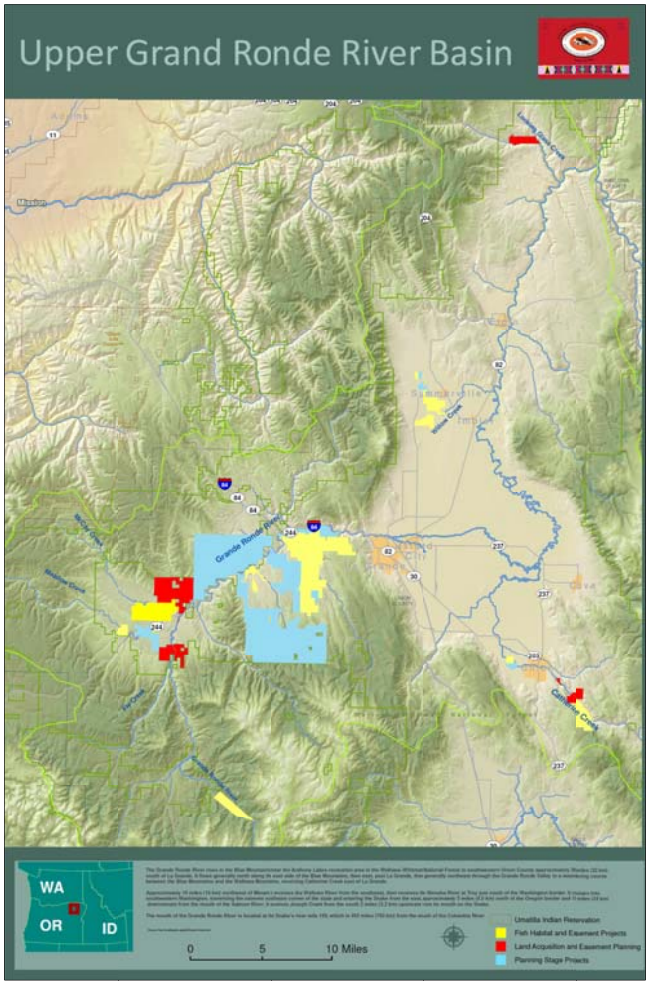
Project results are reported in various forms including Pisces status reports, project completion reports, and annual reports. The GRMW maintains a complete database on project implementation and results through development of project completion reports.

Description of Project Area

The project is located in the Grande Ronde Subbasin, located in the southwest portion of the Blue Mountain Ecological province. The Subbasin encompasses about 4,000 square miles in northeastern Oregon and southeastern Washington. The headwaters of the Grande Ronde River originate near Anthony Lakes in the Elkhorn Mountains and flows northeast for about 212 miles before joining the Snake River in Washington at river-mile (RM) 169.

The Subbasin is divided into three watershed areas—the Lower Grande Ronde, Upper Grande Ronde, and Wallowa watersheds. Approximately 46 percent of the Subbasin is under federal ownership. Historic land uses include timber harvest, livestock grazing, mining, agriculture and recreation.

FIGURE 1 UPPER GRANDE RONDE SUBBASIN VICINITY AND PROJECT LOCATIONS



A comprehensive overview of the Subbasin is contained in the Grande Ronde Subbasin Plan (NPPC, 2004). The CTUIR Grande Ronde Subbasin Restoration Project focuses primarily on the Upper Grande Ronde portion of the Subbasin, which includes approximately 1,650 square miles with 917 miles of stream network (about 221 miles of salmon habitat). However, past project development and success of the program in terms of the types of project that have been developed and the partnerships that have formed, are leading to watershed restoration project opportunities throughout the Subbasin. Figure 1 illustrates the vicinity of the Grande Ronde Subbasin within the Blue Mountain Province and key projects that have been completed, are underway, or planned under the CTUIR's Grande Ronde Subbasin Restoration Project.

The Subbasin historically supported viable and harvestable populations of spring-summer and fall Chinook salmon (*Oncorhynchus tshawytscha)*, coho salmon (*O. kisutch*), sockeye salmon (*O. nerka),* summer steelhead *(O. mykiss),* Pacific lamprey (*Entosphenus tridentatus*), bull trout (*Salvelinus confluentus*), rainbow/redband *(O. mykiss sp.)*, and mountain whitefish (*Prosopium williamsoni).* These native fishes were an important part of tribal cultures and economies (CBFWA, 1990 and CRITFC, 1995) and European settlers as well.

Beginning in the late 1800's, fish populations started to decline with sockeye and coho extirpated in the early 1900's. The abundance of Chinook, steelhead, bull trout, and other fish species has also been dramatically reduced (NPCC 2004 a, and b). With declining fish populations, Tribal governments and State agencies were obligated to eliminate or significantly reduce subsistence and sport fisheries by the mid 1970's.

Grande Ronde Subbasin fish populations have declined and habitat degradation is widespread in tributary streams. Mainstem Columbia River harvest, development of Columbia and Snake River hydroelectric projects, and habitat degradation has played an important role in the demise of Grande Ronde Subbasin fisheries (NPCC 2004a and b).

With declining populations, the Federal government listed spring/summer Chinook salmon, summer steelhead, and bull trout as threatened species under the Endangered Species Act in 1992, 1997, and 1998, respectively. The status of Pacific lamprey is unclear at this time and may have been extirpated from the Subbasin.

Although hatchery programs currently support subsistence and sport fishing opportunities for steelhead and limited Chinook salmon, there remains significant need to re-build viable and harvestable fish stocks throughout the Subbasin.

The following tables illustrate estimated historic and current spring Chinook salmon and summer steelhead returns to the Grande Ronde Subbasin (NPCC 2004a). Of particular note is an 87 percent decrease in spring Chinook and 70 percent decrease in summer steelhead populations from estimated historic levels.

TABLE 1 SUMMARY OF ESTIMATED HISTORIC AND CURRENT GRANDE RONDE SPRING CHINOOK SALMON RETURNS BY POPULATION (DATA PROVIDED BY B. JONNASSON, ODFW PERS. COMM. 2004)

Population	Estimated Historic Returns count	% of total	Estimated Current Returns count	% of total	Miles of spawning habitat	Adults /Mile Template	Adults /Mile Current	% Decrease Historic to Current
Wenaha Spring Chinook	1,800	15%	453	30%	*45.60*	39.48	9.94	75%
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Total	**12,000**		**1,521**		***283.00***	**42.4**	**5.37**	**87%**

TABLE 2 SUMMARY OF ESTIMATED HISTORIC AND CURRENT GRANDE RONDE SUMMER STEELHEAD RETURNS BY POPULATION (DATA PROVIDED BY B. JONNASSON, ODFW PERS. COMM. 2004)

Population	Estimated Historic Returns count	% of total	Estimated Current Returns count	% of total	Miles of spawning habitat	Adults /Mile Template	Adults /Mile Current	% Decrease Historic to Current
Lower Grande Ronde	2,400	16%	608	14%	253.84	9.45	2.39	75%
Joseph Creek	3,600	24%	945	21%	223.10	16.14	4.24	74%
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Upper Grande Ronde	5,250	35%	1,755	39%	613.96	8.55	2.86	67%
Total	**15,000**		**4,500**		1,264.35			**70%**

Figures 2 and 3 display estimates of historic and current abundance, productivity, and life history diversity predicted through the Ecosystem Diagnosis and Treatment (EDT) Method for Grande Ronde Subbasin Chinook salmon and summer steelhead, respectively (NPCC, 2004a and Mobrand, 2003). Graphs illustrate that current abundance, productivity, and life history diversity for spring Chinook and summer steelhead has been reduced from estimated historic levels.

Chinook and steelhead populations furthest from historic potential are in geographic areas that have experienced the highest levels of anthropogenic influence with significant declines illustrated for Wallowa-Lostine, Catherine Creek, Lookingglass, and Upper Grande Ronde spring Chinook and Upper Grande Ronde, Wallowa, and Joseph Creek summer steelhead. Current productivity and life history diversity for spring Chinook in the Wenaha and Minam watersheds (primarily designated wilderness areas) is similar to estimated historic conditions (NPPC, 2004a).

FIGURE 2 **EDT ESTIMATES OF ABUNDANCE, PRODUCTIVITY, AND LIFE HISTORY DIVERSITY COMPARED TO THE ESTIMATED HISTORIC POTENTIAL FOR GRANDE RONDE SUBBASIN CHINOOK SALMON (NPCC 2004A, FIGURE 8, PG. 54)**

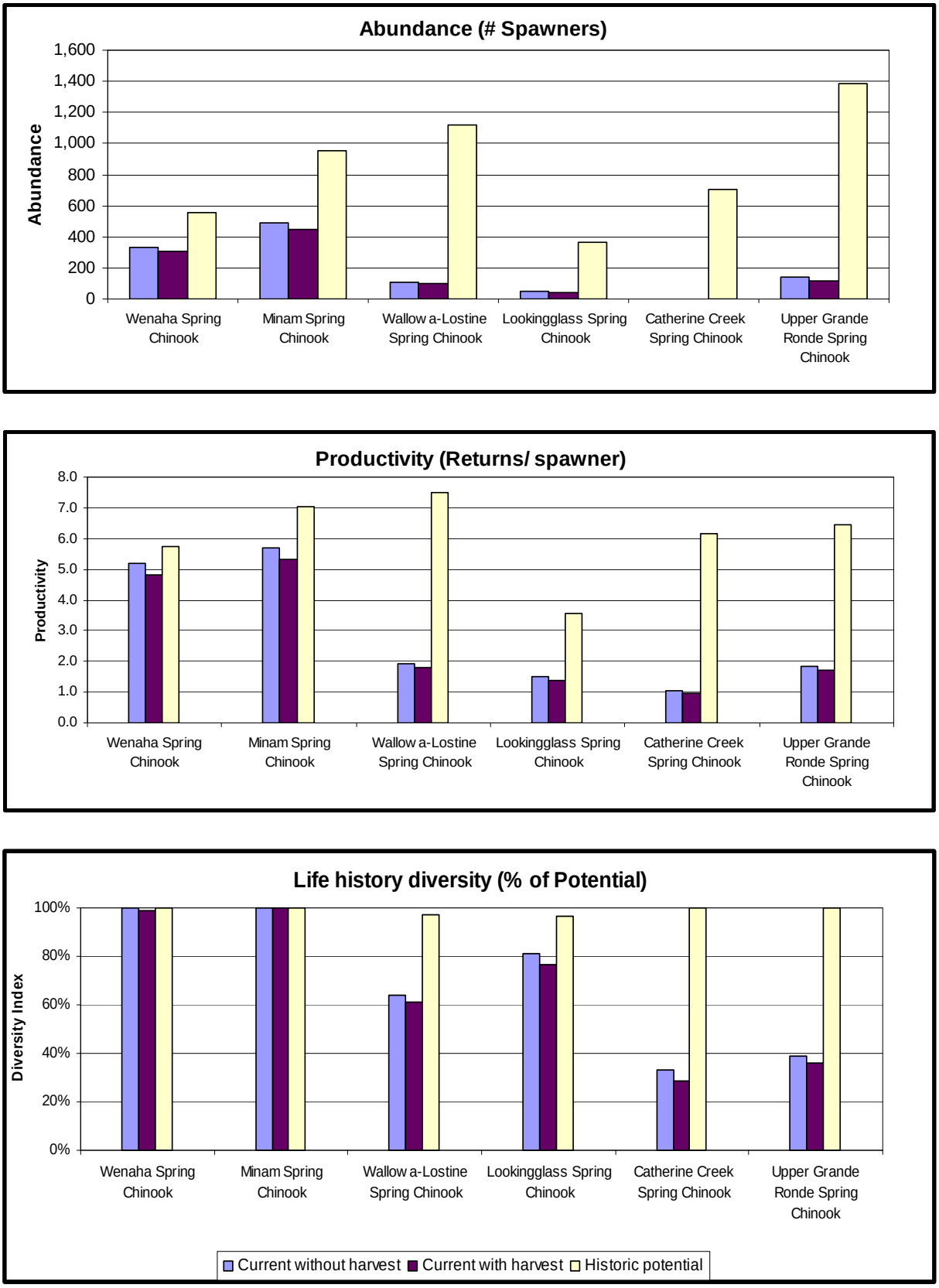
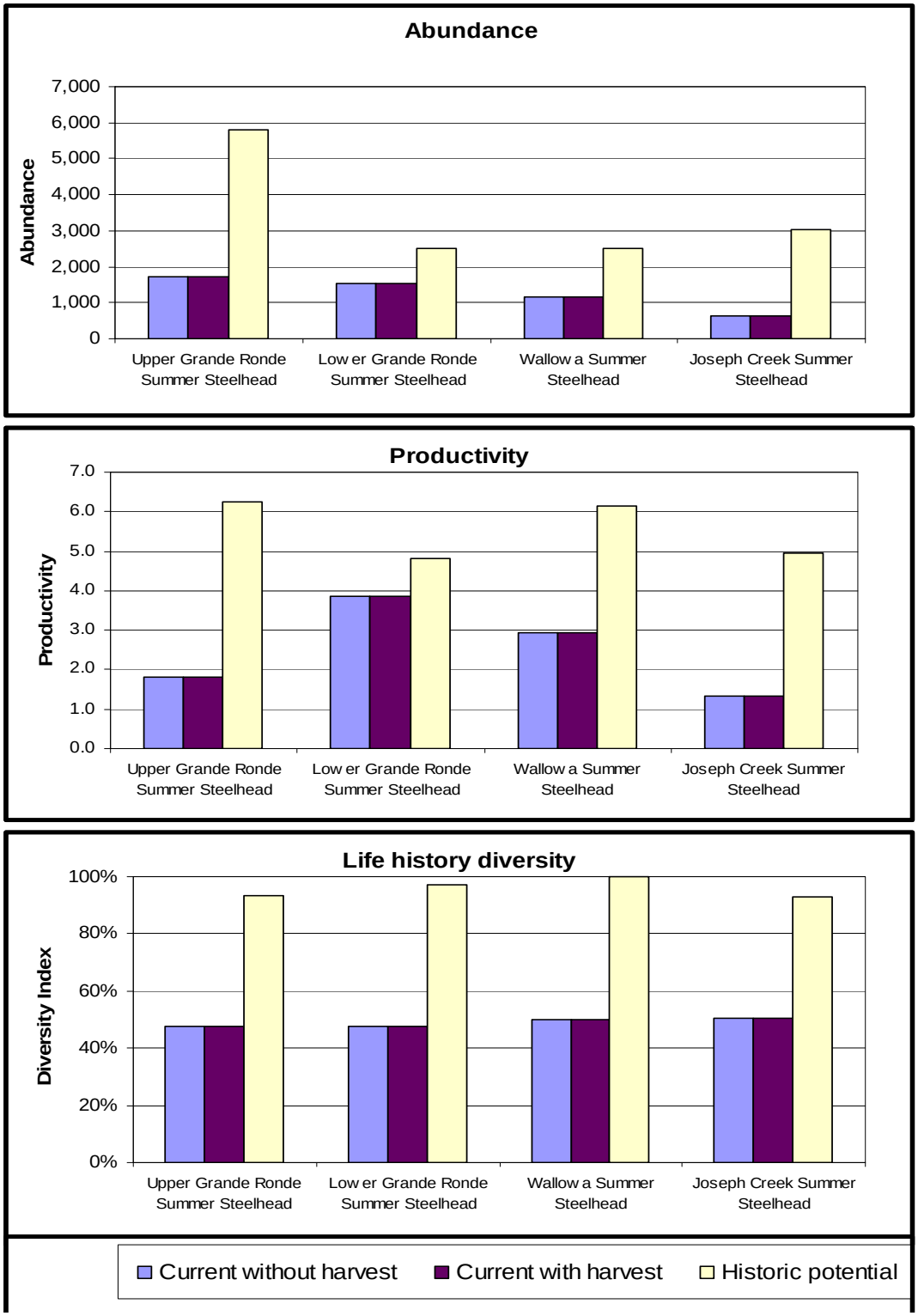


FIGURE 3 **EDT ESTIMATES OF ABUNDANCE, PRODUCTIVITY, AND LIFE HISTORY DIVERSITY COMPARED TO ESTIMATED HISTORIC POTENTIAL FOR GRANDE RONDE SUBBASIN SUMMER STEELHEAD (NPCC 2004A, FIGURE 22, PG. 72)**



Degradation of instream and riparian habitat in the Subbasin has been the dominant cause of salmon and steelhead decline (NPCC, 2004). The adverse effects of poorly managed logging, grazing, mining, dams, irrigation withdrawals, urbanization, exotic species introductions, and other human activities have been documented in all of Columbia River tributaries (ISG 1996). Riparian and instream habitat degradation has most severely impacted spring Chinook production potential in the Grande Ronde Subbasin (ODFW and CTUIR 1990, NPCC 2004a) and habitat loss and degradation has been widespread with the exception of road-less and wilderness areas (Anderson et al. 1992; CTUIR 1983; Henjum et al.1994; McIntosh et al. 1994).

Approximately 379 miles of degraded stream miles have been identified in the Subbasin (ODFW et al. 1990), with an estimated 80 percent of anadromous fish habitat in a degraded condition (Anderson et al. 1992). McIntosh (1994) documented a 70 percent loss of large pool habitat in the Upper Grande Ronde River since 1941. Riparian shade on low gradient streams was found to be less than 30 percent (Huntington, 1993). Stream channelization, diking, wetland drainage, and use of splash dams was a common and widespread practice until the 1970's and resulted in severe channel incision and degradation in some locations. The Oregon Department of Environmental Quality (ODEQ) listed over 60 stream reaches in the Subbasin on the State's list of water quality limited water bodies 303 (d). Of these stream segments, 24 are listed for habitat modification, 27 for sediment, and 49 for temperature. Table 3 illustrates priority areas for water quality treatment in the Subbasin (ODEQ, 2000).

TABLE 3 GEOGRAPHIC PRIORITY AREAS FOR WATER QUALITY TREATMENT IN THE UPPER GRANDE RONDE WATERSHED DEVELOPED THOURSOUGH TMDL PROCESS (H=HIGH, M=MEDIUM, L=LOW) (NPCC 2004A, TABLE 18, ODEQ, 2000)

Watershed	Temperature	Sediment	Flow
Lookingglass	L[1]	L	L
Lower Grande Ronde	L	L	L
Willow/Philips	H	H	H
Indian/Clark	M	M[2]	M
Catherine Creek	H	H	H
Beaver	M	M	L[3]
GRR Valley	H	H	H
Ladd Creek	H	H	H
Upper Grande Ronde	H	H	H[4]
Meadow Creek	H	H	H[4]
Spring/Five Pts.	H	M	M

Watershed analysis through the EDT (NPCC, 2004a and Mobrand, 2003) and synthesis through the Subbasin Plan Management Plan development process, identified instream habitat condition, high water temperature, sediment loads, and flow modification as primary limiting factors for Chinook and steelhead (pg. 11 NPCC 2004c, pg. 3 NPCC 2004d). Primary habitat degradation includes:

- **Channel Habitat Conditions** – Channel instability associated with removal of streamside cover and channelization has resulted in channel incision/down cutting, increased gradient, reduced channel length, elevated erosion, increased width-to-depth ratios, and loss of channel complexity. The quality of instream

habitat has correspondingly been altered throughout much of the Subbasin.

- **Sediment** – Loss of upland and streamside vegetative cover has increased the rates of erosion. Soils lost from upland areas has overwhelmed hydraulic processes resulting in decreased availability of large pool habitat, spawning areas, riffle food production, and hiding cover.
- **Riparian Function** – Riparian habitat degradation is the most serious habitat problem in the subbasin for fish (McIntosh 1994, ICBEMP 2000). Loss of flooplain connectivity by roads, dikes, and channel incision, and in many streams reduced habitat suitability for beaver has altered dynamically stable floodplain environments which has contributed to degradation and limited habitat recovery. This loss leads to secondary effects that are equally harmful and limiting, including increased water temperature, low summer flows, excessive winter runoff, and sedimentation.
- **Low Flow** – Water resources in many streams have been over over-appropriated resulting in limited summer and fall base flow, development of fish passage barriers, and increased summer water temperatures.

Table 4 illustrates key habitat limiting factors by geographic priority area. The table has been edited from the Subbasin plan to depict only those geographic areas addressed under this proposal. These geographic priority watersheds have been identified as the three highest priority areas to conduct habitat restoration with the greatest response in Chinook salmon and steelhead production potential (NPCC, 2004a, Supplement, Pgs 49-50, Table 5-6).

TABLE 4 GRANDE RONDE SUBBASIN PRIORITY GEOGRAPHIC AREAS AND HABITAT LIMITING FACTORS (NPCC, 2004A)

Watershed	Fish Population(s)	EDT Priority Geographic Area(s) highlighted areas are priorities for multiple pops.	Habitat Limiting Factors
Wallowa River (including Lostine River)	Wallowa Steelhead Wallowa-Lostine Chinook Lostine/ Bear Ck Bull Trout	**Steelhead Priorities** Prairie Creek Upper Wallowa River –Wallowa Chinook Hurricane Ck , Whiskey Ck Lower Wallowa (1-3) -Minam Steelhead **Chinook Priorities** Lower Lostine – Wallowa Steelhead Mid-Wallowa – Wallowa Steelhead	➢ Key Habitat Quantity (reduced wetted widths) ➢ Habitat Diversity (reduced wood, riparian function) ➢ Sediment ➢ Temperature ➢ Flows
Upper Grande Ronde	Upper GR Steelhead Upper GR Chinook Upper GR Complex Bull Trout	Mid GR 4 (GR 37 - 44) - Chinook Mid GR Tribs 4 (Whiskey, Spring, Jordan, Bear, Beaver, Hoodoo…) Phillips Creek Upper GR Ronde 1 (45-48) - Chinook Mid GR 3 (GR – 34-36) Valley Sheep Ck, Fly Ck, Lower Meadow Ck - Chinook	➢ Sediment ➢ Flow ➢ Temperature ➢ Key Habitat Quantity (reduced wetted widths)
Catherine Creek/ Middle Grande Ronde	Upper GR Steelhead Catherine Ck Chinook Catherine Ck Bull Trout Indian Ck Bull Trout	Mid Catherine Creek (2-9) – UGR Sthd SF, NF Catherine Creek Lower Grande Ronde R. 2	➢ Key Habitat Quantity (reduced wetted widths) ➢ Habitat Diversity (reduced wood, riparian function) ➢ Sediment ➢ Flow ➢ Temperature

Habitat protection and restoration needs in the Subbasin have been recognized in numerous reviews, planning processes, and reports (CTUIR, 1983), Noll and Boyce 1988, (ODFW, 1990),

Wallowa-Whitman et.al. 1992, (Huntington, 1993) GRMWP (1994), (Mobrand, 2003), (NPCC, 2009), and (NPCCa, 2004). NPCC (2004a) Appendix 5 (pg 254) provides a relatively complete list of habitat protection and restoration strategies that can be applied to achieve goals and objectives. The NMFS proposed recovery plan for Snake River Chinook salmon recognized the importance of tributary habitat restoration and protection of habitat on both federal and private lands to Chinook an steelhead recovery (NMFS, 1997). NMFS has recently restarted the recovery planning effort for Chinook salmon and steelhead and tributary habitat restoration and is expected to play a prominent role in the final NMFS recovery plan. (NRC, 1996) also noted the importance of protecting and rehabilitating freshwater habitat as part of salmon recovery. They specifically note the importance of riparian areas and recommend that habitat reclamation or enhancement should emphasize rehabilitation of ecological processes and function. The USFWS draft bull trout recovery plan recognized the importance of habitat protection and restoration as well (USFWS, 2002), specifically noting the need to improve water quality, reduce or eliminate fish passage barriers, and restoring impaired instream and riparian habitat.

Noteworthy Accomplishments during FY2015

- Implemented fish habitat enhancement activities on the Catherine Creek (CC 44) Southern Cross Phase III project.
- Constructed approximately 4,200 linear feet of new main channel, approximately 955 linear feet of perennial side channel, and approximately 425 linear feet of new ephemeral side channel on the Catherine Creek (CC 44) Southern Cross Phase III project.
- Constructed approximately 1,425 linear feet of alcoves and spring channels and approximately 9,200 linear feet of floodplain swale complexes on the Catherine Creek (CC 44) Southern Cross Phase III project.
- Constructed approximately 570 linear feet of edge roughness, constructed approximately 1,075 feet of brush mattress, placed 336 floodplain roughness features (primarily large and small wood structures and whole trees), and excavated over 50,000 cubic yards of material.
- Planted approximately 8,000 native trees and shrubs and seeded disturbed riparian and floodplain areas on the Catherine Creek (CC 44) Southern Cross Phase III project.
- Conducted pre-construction fish salvage operations on the Phase II Catherine Creek (CC44) Creek Fish Habitat Enhancement Project.
- Maintained and monitored conservation easements on Catherine Creek, Rock Creek, Meadow Creek and Dark Canyon Creek.
- Conducted baseline and post project morphological surveys along 2 miles of Catherine Creek.
- Initiated planning, field surveys, and design on projects planned for construction during 2015 through 2017 including:
    - Catherine Creek (CC44) Project in cooperation with the Union Soil and Water Conservation District (USWCD), Bureau of Reclamation (BOR), and Oregon Department of Fish and Wildlife (ODFW). Project covers 4 miles of mainstem Catherine Creek.
    - Continued planning and design on Rock Creek Phase 3 project.
    - Bird Track Springs Project in cooperation with the Bureau of Reclamation (BOR) and the U.S. Forest Service, covering over 4 miles of the mainstem Grande Ronde River and several side channel habitats.

    - Dry Creek (Aiwohi property) in cooperation with UCSWCD, covering approximately 0.6 miles of stream contiguous with the Oregon Ag Foundation Willow Creek Project implemented in 2012.
- Continued the Land Acquisition Planning process for several properties, securing a permanent conservation easement on the 2,928 acre Cunha ranch, acquisition of the 545 acre Southern Cross Ranch, and acquisition of the 666 acre Lookingglass Creek ranch.
- Signed riparian conservation easement for the Kinsley property (CC44), protecting approximately 7.5 acres of riparian areas and approximately .5 miles of Catherine Creek.
- Prepared fence construction specifications and construction solicitation for Cunha ranch conservation easement to install fences along Dark Canyon Creek and Meadow Creek.
- Project Leader participated on the Grande Ronde Model Watershed Board of Directors and Technical Team to review and develop projects, including BiOp/Remand Projects.
- Project Leader participated on the Snake River Salmon and Steelhead Recovery Team (Habitat).
- Project Leader and Assistant Biologist participated in the Technical Advisor Committee for the Atlas Process.
- Project Leader and Assistant Biologist participated in NRCS Local Working Group and Regional conservation Partnership Program planning.
- Project Staff attended relevant trainings and classes (River Restoration Northwest, CHAMPS snorkel training, PSU River Restoration Environmental Professional Program).
- Staff conducted monitoring and evaluation activities on project areas.
- Pursued future restoration efforts by continuing discussions with both state and private landowners about restoration opportunities along Catherine Creek, Grande Ronde River, Dry Creek, Whiskey Creek, Indian Creek, and Rock Creek.
- Project staff coordinated with landowners, NRCS, and UCSWCD to provide technical assistance for restoration project enrollment in EQUIP, CREP, and OWEB small grants. This work included:
    Rock Creek (For the Girls LLC)
    Bird Track Springs (Jordan Creek Ranch)
    Catherine Creek CC42
- Project staff participated in public outreach activities including:
    - Newspaper article about the CC44 Project for the Grande Ronde Model Watershed Ripples newsletter.
    - Newspaper article about the Southern Cross Project for the East Oregonian.

Discussion of Completed Work

Catherine Creek RM 44 Southern Cross

The project is located along Catherine Creek with the Atlas Biological Significant Reach (BSR) CCCC3b1 which is identified as a high priority BSR with Tier 1 (highest priority) actions. The Phase 3, Parcel 3 Reach is located on the Southern Cross Ranch, recently conserved by fee acquisition through the CTUIR's Accord agreement with BPA. The purpose of the acquisition is to protect the property in perpetuity for the conservation and restoration of salmon and steelhead habitat. The property includes about ¾ of a mile of Catherine Creek and 68 acres of historic floodplain which was channelized and confined valley left in the early 1940's.

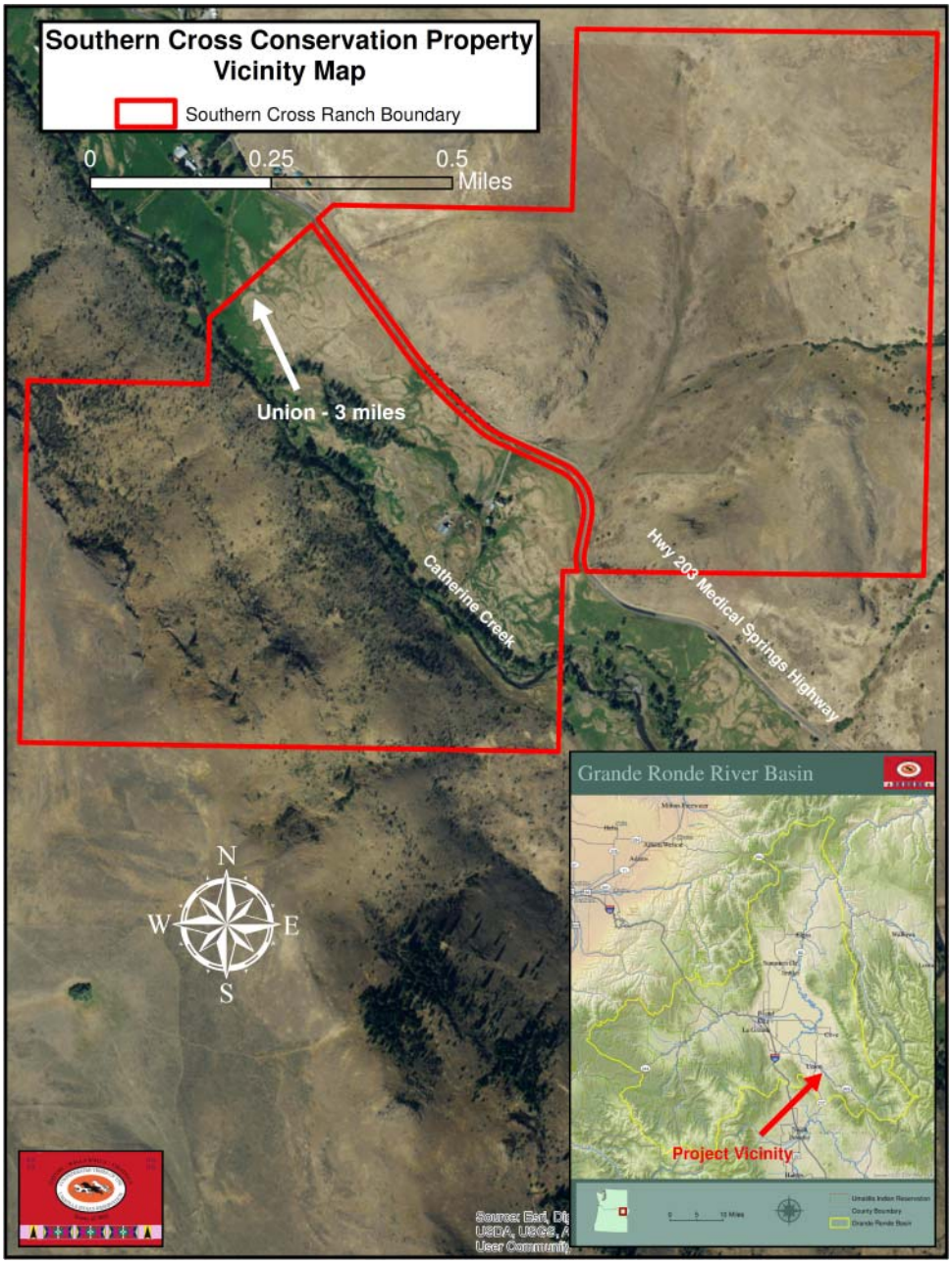
The project is located approximately 3 miles southeast of the City of Union, Oregon along Highway 203 (Medical Springs Highway) (T5SR40E, Sections 28 and 33) at RM44, 59716 Highway 203, Union, OR 97883.

The project includes construction of approximately 4,200 linear feet of new main channel (including four confluences with the existing channel); construction/excavation of approximately 955 linear feet of perennial side channel; construction of approximately 425 linear feet of new ephemeral side channel; construction of approximately 1,425 linear feet of alcoves and spring channels; construction of approximately 9,200 linear feet of floodplain swale complexes; construction of 15 riffles in the main channel; construction of 142 main channel wood structure components; construction of approximately 570 linear feet of edge roughness; construction of approximately 1,075 feet of brush mattress; construction/placement of 336 floodplain roughness features (primarily large and small wood structures and whole trees); and the excavation of over 50,000 cubic yards of material (design quantity) over a two year construction period.

Design changes from 75% design to 100% design on the CC44, Parcel 3, Southern Cross parcel were incorporated to maximize adult spawning and juvenile rearing habitat uplift along an approximate 0.78 mile reach of mainstem Catherine Creek which was acquired in fee title through the CTUIR-BPA Accord for fish conservation purposes. The property presents the largest and most significant opportunity to expand, create, and enhance core spawning and rearing habitat for ESA spring-summer Chinook salmon and summer steelhead within the Catherine Creek Atlas Tier 1 Biological Significant Reach, CCC3a1.

The Construction Design Drawings and Technical Specifications can be accessed at Web Address: http://data.ctuir.org/fisheries/.

FIGURE 4 PROJECT VICINITY MAP



Project Vision

The vision of the project is to restore degraded riparian and floodplain habitat, improve instream habitat diversity, and improve water quality for adult and juvenile summer steelhead and juvenile Chinook salmon. This vision follows the Tribes "First Foods" concept, which manages the ecosystem based on protection of water, fish, deer and elk, roots, and berries. The First Foods provide clear linkages to treaty rights and natural resources and defines direction and goals that relate to the community culture. In conjunction with the First Food principle, the CTUIR DNR

developed the River Vision (Jones et. al., 2008) that describes and organizes ecological processes and functions that provide the First Foods.

The River Vision outlines physical and biological processes encompassing 5 touchstones: Hydrology, Geomorphology, Connectivity, Riparian Vegetation, and Aquatic biota which together with the First Foods, provide an overall framework for guiding tribal programs in regards to protecting and restoring ecological processes and functions. Healthy watershed processes and functions are the fundamental elements that create diversity, resiliency, and the ability of our river systems to provide sustenance and natural resources to support our culture and heritage.

Project Goals and Objectives

- Restore and Conserve Salmonid Spawning and Rearing Habitat
- Improve passage for all life stages and season's
- Increase flow and groundwater
- Improve water quality
- Restore natural channel and floodplain processes
- Increase habitat and hydraulic complexity and diversity
- Restore riparian and wetland habitat
- Control Noxious Weeds

FIGURE 5 ORTHOMOSAIC AND THE CORRESPONDING SPARSE DIGITAL SURFACE MODEL (DSM).

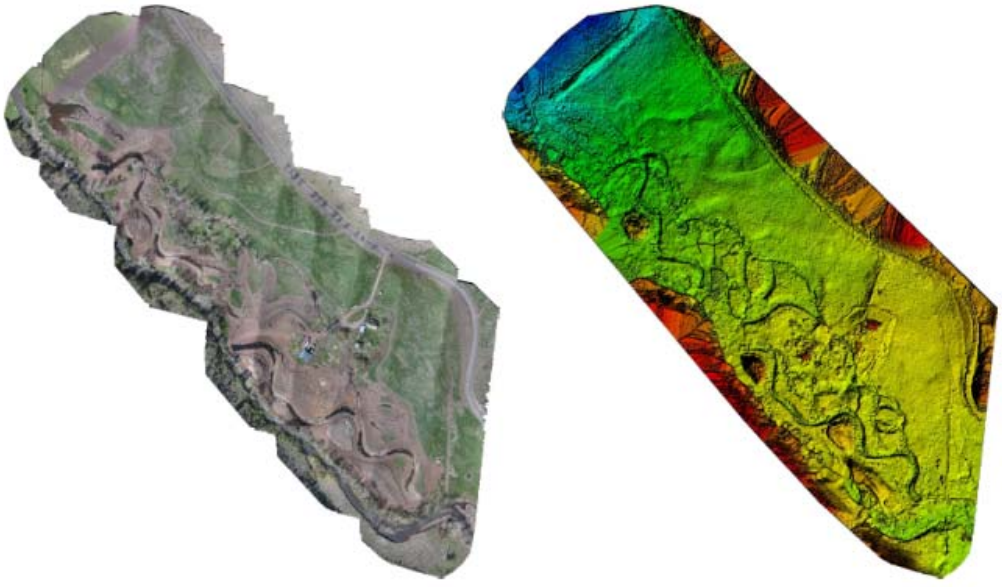
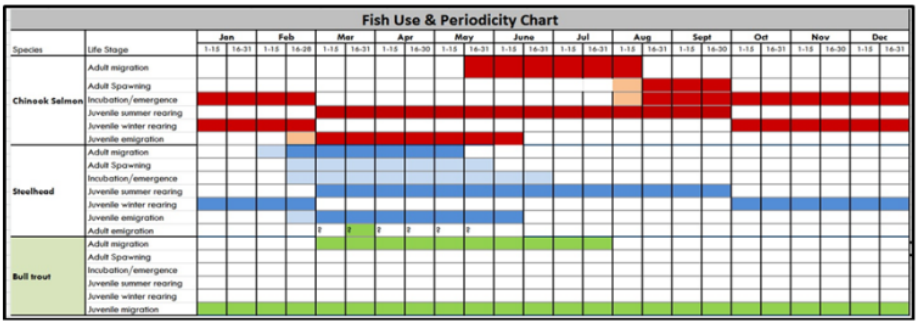


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

FIGURE 6 CATHERINE CREEK CC44 FISH HABITAT RESTORATION COMPLEX ATLAS STRATEGIC IMPLEMENTATION PLAN.

CATHERINE CREEK CC44 FISH HABITAT RESTORATION COMPLEX
Biological Significant Reach CCC3b1 (Atlas Strategic Implementation Plan)



Fish Use & Life Stage Utilization		
Fish Utilization	**Score**	**Comments**
Adult Migration	H	No complete barriers, flow likely not affecting migration. However, there are three partial barriers (push up dams) that will be addressed in 2014. Revisit ranking once addressed. Holding habitat is limited.
Juvenile Outmigration	H	No complete barriers, but juvenile outmigration being affected due to unknown causes. Potential flow, hydrology, fitness affects.
Holding/Spawning /	M	Spawning occurring, but not the critical need due to density dependence needing to be addressed 1st
Summer Rearing	H	Critical summer rearing to help address density dependance
Winter Rearing	M	Winter/Summer rearing overlap.

Limiting Factors				
EP Weight		**Description**	**Score**	**Comments**
2%	1.1	Habitat Quantity: Anthropogenic Barriers	H	Limited barriers, however addressing would increase summer rearing habitat/capacity.
7%	4.1	Riparian Condition: Riparian Condition	H	Beneficial to address, but restoration benefit will be realized into future, combine with other LF to be most effective
7%	4.2	Riparian Condition: LWD Recruitment	H	Beneficial to address, but restoration benefit will be realized into future, combine with other LF to be most effective
15%	5.1	Peripheral and Transitional Habitats: Side Channel and Wetland Conditions	H	Important for summer rearing during spring run offperiod
10%	5.2	Peripheral and Transitional Habitats: Floodplain Condition	H	Important for rearing during spring run offperiod. Erosion reduction, healthy floodplain contributes to ground water recharge, delayed release of cool water.
10%	6.1	Channel Structure and Form: Bed and Channel Form	H	Improved channel form needed to benefit summer rearing and density dependance
15%	6.2	Channel Structure and Form: Instream Structural Complexity	H	Improved complexity needed to benefit summer rearing and density dependance
5%	7.2	Sediment Conditions: Increased Sediment Quantity	L	Limited sediment input
10%	8.1	Water Quality: Temperature	H	High temps affect summer rearing
20%	9.2	Water Quantity: Decreased Water Quantity	H	Flow affecting summer rearing habitat
Source (above data): Expert Panel [X] Sub-Basin [ ] Recovery Plan [ ]				

Key Habitat Elements

- Incorporation of channel design criteria to facilitate stable channel form with decreased width to depth ratios, riffle cross sectional area, increased sinuosity with right radius pools and profile conducive to improving floodplain connectivity with activation of peripheral juvenile rearing habitat
- An increase in large wood complexes related to incorporation of different structures types along outside meander pools (Original BO and 75% counted meander wood as single units where 100% counts them as multiple units on each bend)
- Incorporation of floodplain roughness to encourage sediment deposition and riparian vegetation response
- Incorporation of edge roughness and brush mattress to maintain channel dimension and decrease streambank erosion and sediment delivery and provide rapid vegetation regrowth and bank cover
- Incorporation of peripheral habitat (floodplain complexes and side channels) to increase juvenile rearing habitat, wetland development and hyporheic connectivity
- No additional incidental take predicted associated with channel activation and decommissioning

CC-44 Parcel 3 Southern Cross Habitat Feature Comparison			
	30% Design	75% Design	100% Design
Main Channel (LF)	4900	5000	5000
Perennial Side Channel (LF)	2562	2575	2317
Ephemeral Side Channel (LF)	1228	0	425
Floodplain Swale Complexes (LF)	0	9219	9200
Alcoves and Spring Channels (LF)	1551	264	1425
Large Wood Complexes (EA)	50	25	142
Floodplain and Side Channel Wood Complexes (EA)	42	44	336
Channel Margin Roughness (LF)	Undecided	Undecided	570
Channel Bank Live Brush Bank (LF)	Undecided	Undecided	1075
Constructed Riffles (EA)	13	13	16
Boulder Complexes (EA)	4	4	4

Habitat uplift associated with the 100% design compared to the 30% design is expected to be significant. A combination of an increase in the planned Catherine Creek channel length, incorporation of additional large wood complexes in into meander pools, point bars, channel transitions, side channels and floodplain swales, increased peripheral habitat, and an increase in channel margin complexity are expected to more fully address habitat limiting factors and increase the overall capacity for spawning and summer-winter rearing habitat within the project area.

FIGURE 7 SOUTHERN CROSS GRADING PLAN AT STATION 33+00 TO 50+00.

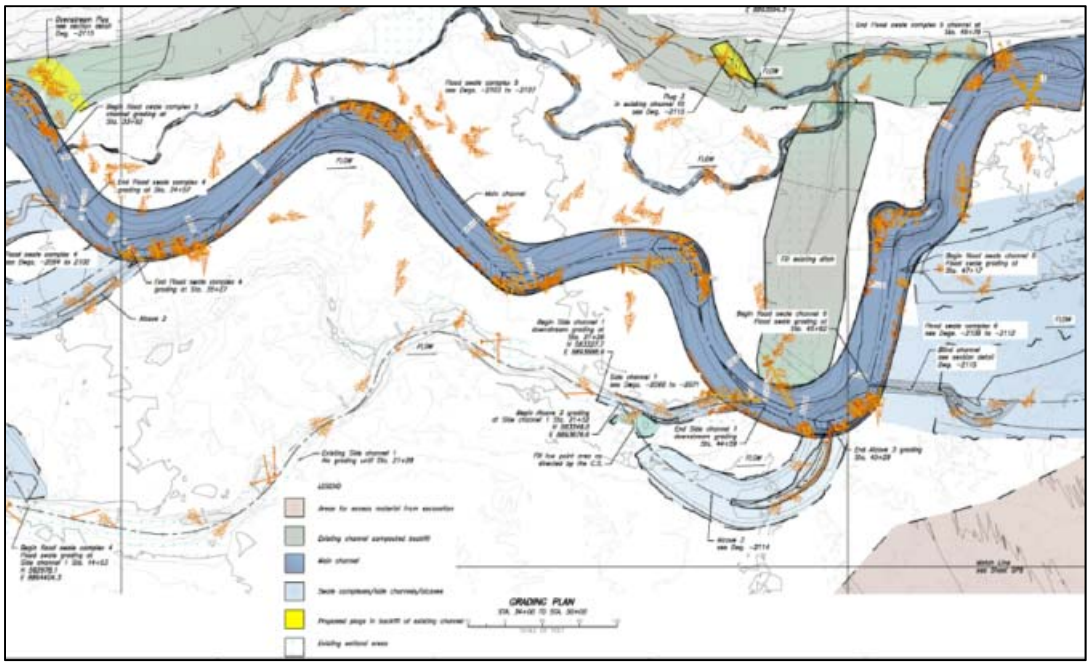


TABLE 5 CC44 SUMMARY TABLE

Project Name	Streams	Year	Assessment Unit steelhead	Assessment Unit Chinook	River Vision Touchstones	BiOP Limiting Factor ID	Snake River Basin Draft Recovery Plan/BiOP Identified Limiting Factors	Eco Concern Sub-Cat ID	Ecological Concern-Sub Category	Project Goals	Project Objectives	Implementation Actions/Metrics	Monitoring Metrics
Catherine Creek RM44 Fish Habitat Enhancement Project (Project in planning stage)	Catherine Creek	2014 2017	UGS10B	CCC3B	Biota-Connectivity	1	Habitat Quantity	1.1	Anthropogenic Barriers	Improve diversion structures. Subbasin Plan Reference: Channel Conditions. (page 260)	**Protect Habitat:** Develop riparian easement with 8 landowners (CTUIR/BPA/ODFW easement and/or CREP). **Enhance riparian habitat conditions:** Increase riparian plant communities through planting and seeding and natural recruitment. **Enhance Floodplain Connectivity:** Remove channel confinement structures. **Enhance in-stream structural diversity and complexity:** Re-activate historic channel meanders to increase sinuosity and place large wood within active channel. **Reduce excessive sediment:** Manage riparian grazing with exclusion fences, stabilize existing erosion sites with wood structures and re-establishment of vegetation. **Decrease summer peak temperatures:** Improve/increase vegetative cover/shade to decrease summer stream temperatures and increase winter temperatures. **Decreased Water Quantity;** Consolidate points of diversion. Purchase water rights.	Conceptually includes: 2 miles restoration channel, 3-4 miles of side channel habitat, 5.5 miles habitat complexity. Removal of irrigation push up dams (4) Planting within riparian area. Seeding disturbed ground. Construct riparian fence. Off-channel water to be developed	**Enhance Floodplain Connectivity:** Topographical GPS points collected pre project using Trimble R8 GPS. **Enhance in-stream structural diversity and complexity:** Longitudinal profile and cross-sections pre project surveyed using Trimble R8 GPS. **Reduce excessive sediment:** Pebble counts at permanent cross-sections pre project. **Decrease summer peak temperatures:** Water temperature - hourly data - Hobo Pendant loggers - April to November starting 2012.
					Riparian Vegetation	4	Riparian Condition	4.1	Riparian Condition	Protect Habitat. Subbasin Plan Reference: Habitat Protection (page 258).			
										Enhance riparian habitat conditions. Subbasin Plan Reference: Riparian Conditions (page 262).			
								4.2	LWD Recruitment				
					Connectivity	5	Peripheral and Transitional Habitats	5.1	Side Channel and Wetland Conditions	Enhance Floodplain Connectivity. Subbasin Plan Reference: Channel Conditions (page 260).			
								5.2	Floodplain Condition				
					Geomorphology	6	Channel Structure and Form	6.1	Bed and Channel Form	Enhance in-stream structural diversity and complexity. Subbasin Plan Reference: Channel Conditions (page 260).			
								6.2	Instream Structural Complexity				
						7	Sediment Conditions	7.2	Increased Sediment Quantity	Reduce excessive sediment. Subbasin Plan Reference: Sediment Conditions (page 261).			
					Hydrology	8	Water Quality	8.1	Temperature	Decrease summer peak temperatures. Subbasin Plan Reference: Riparian Conditions (page 262).			
						9	Water Quantity	9.2	Decreased Water Quantity	Increase summer water quantity. Subbasin Plan Reference: Low Flow Conditions (page 263).			

FIGURE 8 SOUTHERN CROSS GRADING PLAN OVERVIEW

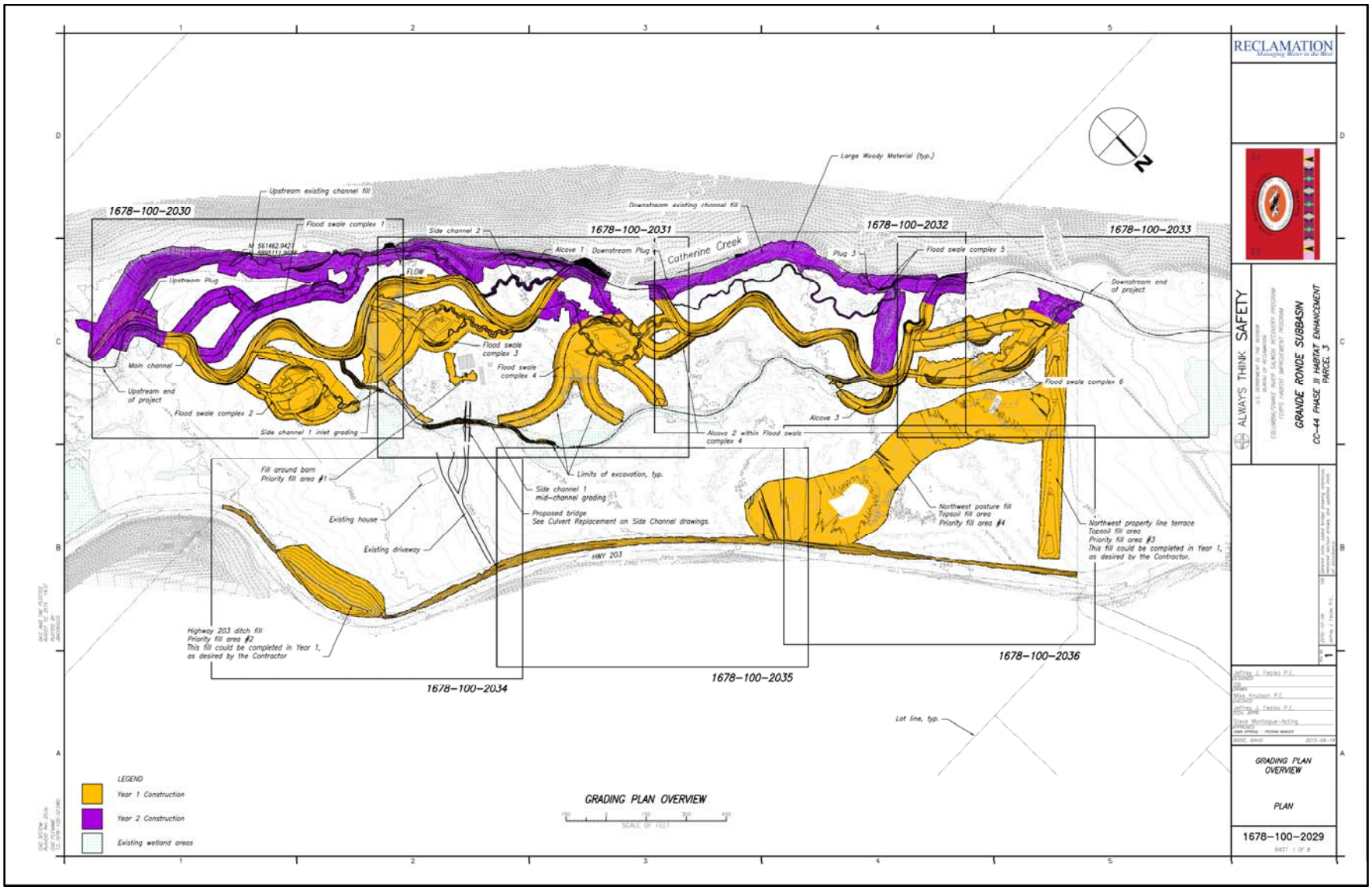


FIGURE 9 TWO PHOTOGRAPHS OF SOUTHERN CROSS CONSTRUCTION AT THE UPPER AND MID PROJECT AREAS.

FIGURE 10 CONSTRUCTION OF SIDE CHANNEL 1 INLET AT STATION 17+50.

FIGURE 11 CONSTRUCTION OF DOWNSTREAM BEND STRUCTURE AT STATION 46+50.

FIGURE 12 TWO AERIAL PHOTOPOINTS OF THE SOUTHERN CROSS PROPERTY MID-PROJECT AREA. THE UPPER PHOTO WAS TAKEN IN APRIL, 2009 AND THE LOWER PHOTO WAS TAKEN IN MARCH 2016.

Southern Cross Planting Plan

The long-term goal of the Southern Cross Planting Plan is to restore natural riparian and wetland plant communities. Black cottonwood, Alder, and River birch dominated riparian forests and native sedge communities currently exist on the Property, but have been suppressed or modified from historical conditions. Tree and shrub species to be planted within the project area include: Mountain alder, Serviceberry, Water birch, Red osier dogwood, Black hawthorn, Cascara, Mock orange, Ninebark, Black cottonwood, Chokecherry, Golden currant, Woods and Nutka rose, Booth willow, Coyote willow, Blue elderberry, Snowberry, and Ponderosa pine. Upland areas, access roads, and disturbed areas will be planted with locally-adapted grass species which include Idaho fescue, Bluebunch wheatgrass, Basin wildrye, and Tufted hairgrass. Swale complexes and side channels will be planted with sedges which include Nebraska sedge and Beaked sedge. The planting plan is divided into 6 zones, with each zone having different species composition, planting methods, and locations.

- Zone 1 is composed of live willow cuttings and willow clumps, with 4' variable width spacing, located on point bars within inside meander bends.
- Zone 2 is composed of 1-gallon containerized trees and shrubs, with 8' variable width spacing, located above bank full elevation on outside meander bends and within areas of the 1.25 year flood inundation level.
- Zone 3 is composed of 1-gallon containerized trees and shrubs, with 8' variable width spacing, primarily Mountain alder, Red osier dogwood, Black cottonwood, and Water Birch located above the bank full elevation along riffles.
- Zone 4 is composed of 1-gallon upland containerized trees and shrubs, primarily Ponderosa Pine, Ninebark, and Snowberry located on filled upland areas.
- Zone 5 is composed of 1-gallon containerized trees and shrubs and live willow cuttings, located above bank full elevation within the 1.25 year flood inundation level. Trees will be planted on the north and west sides of installed floodplain trees to provide shade.
- Zone 6 is composed of live willow cuttings, with 2' to 4' variable width spacing, located within large wood structures, side channels, and swale channels.

Planting on the Southern Cross Property began in March, 2016, with approximately 8,000 trees and shrubs planted March-May, and another 8,000 to 10,000 scheduled to be planted in fall 2016. Trees and shrubs will be planted using hand augers, a mini-excavator (trenching), and a 9" diameter hydraulic auger attached to a skid steer. Grass seeding will be conducted by hand seeding or by an ATV mounted spreader, and will be harrowed post-seeding. An irrigation system was installed after spring planting and plants will be irrigated throughout the summer. Plants will likely be hand watered 2017 and beyond due the instream transfer of the water right in 2016.

FIGURE 13 SOUTHERN CROSS PLANTING PLAN MAP 1

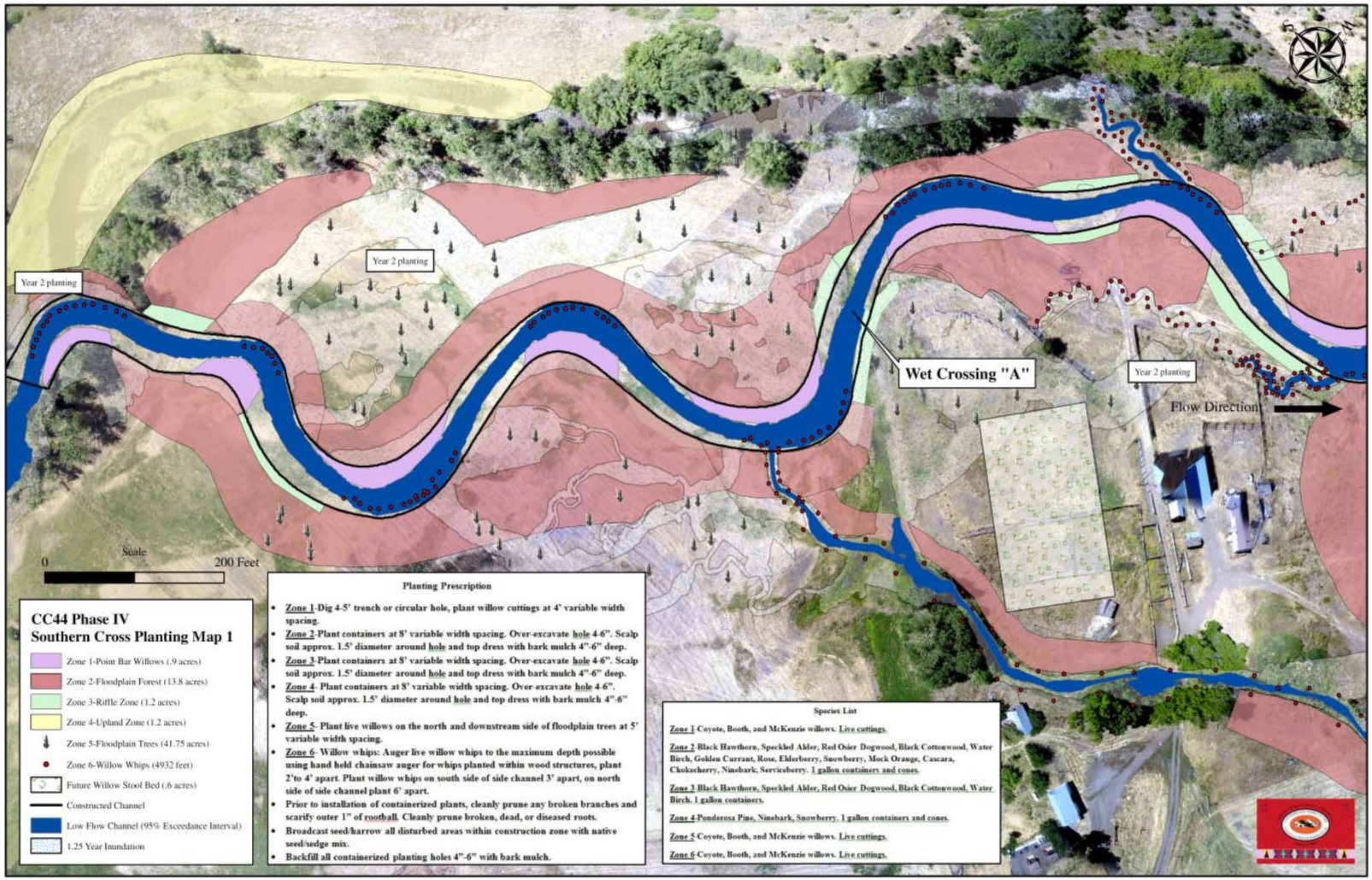


FIGURE 14 SOUTHERN CROSS PLANTING PLAN MAP 2

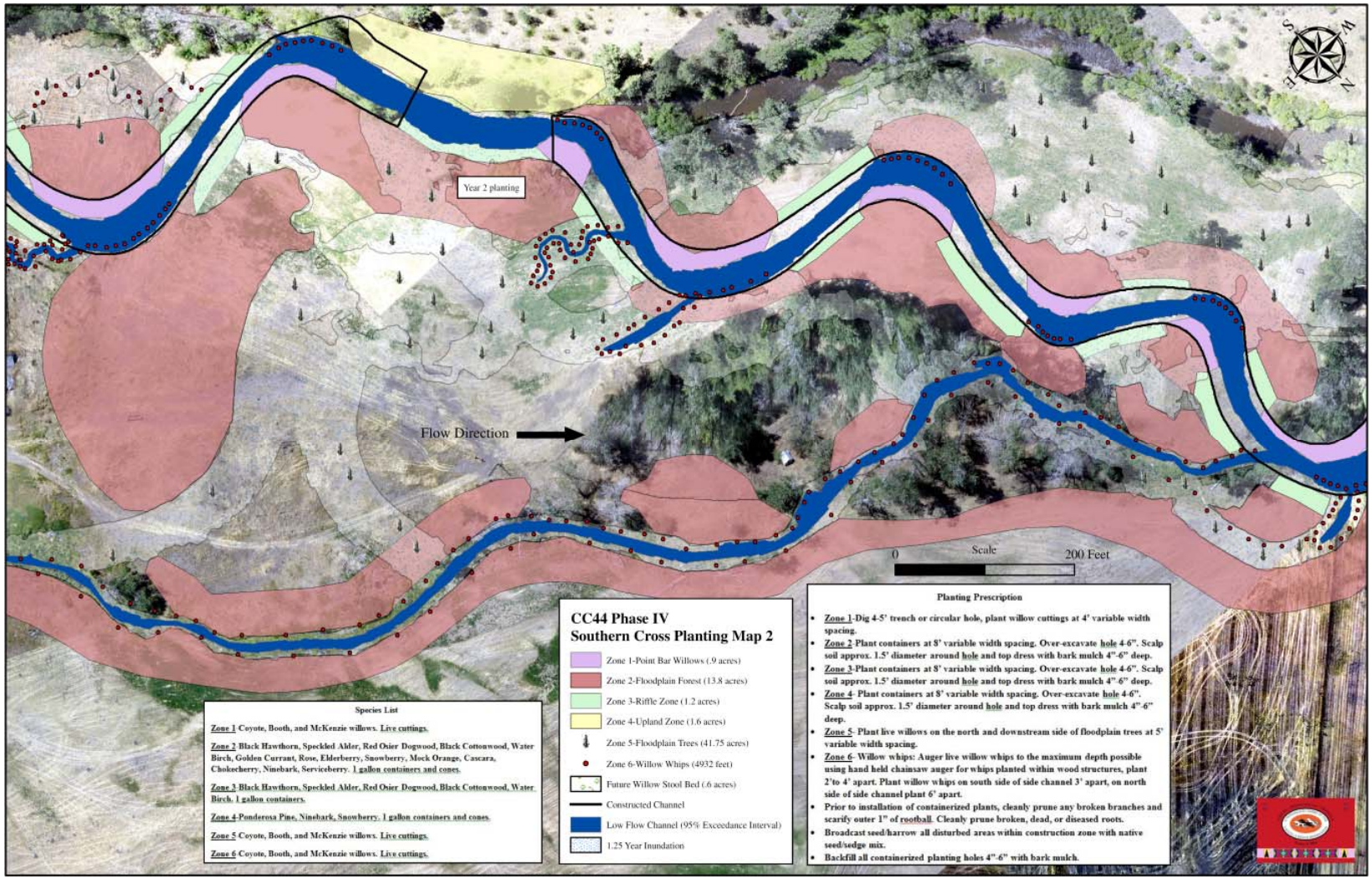
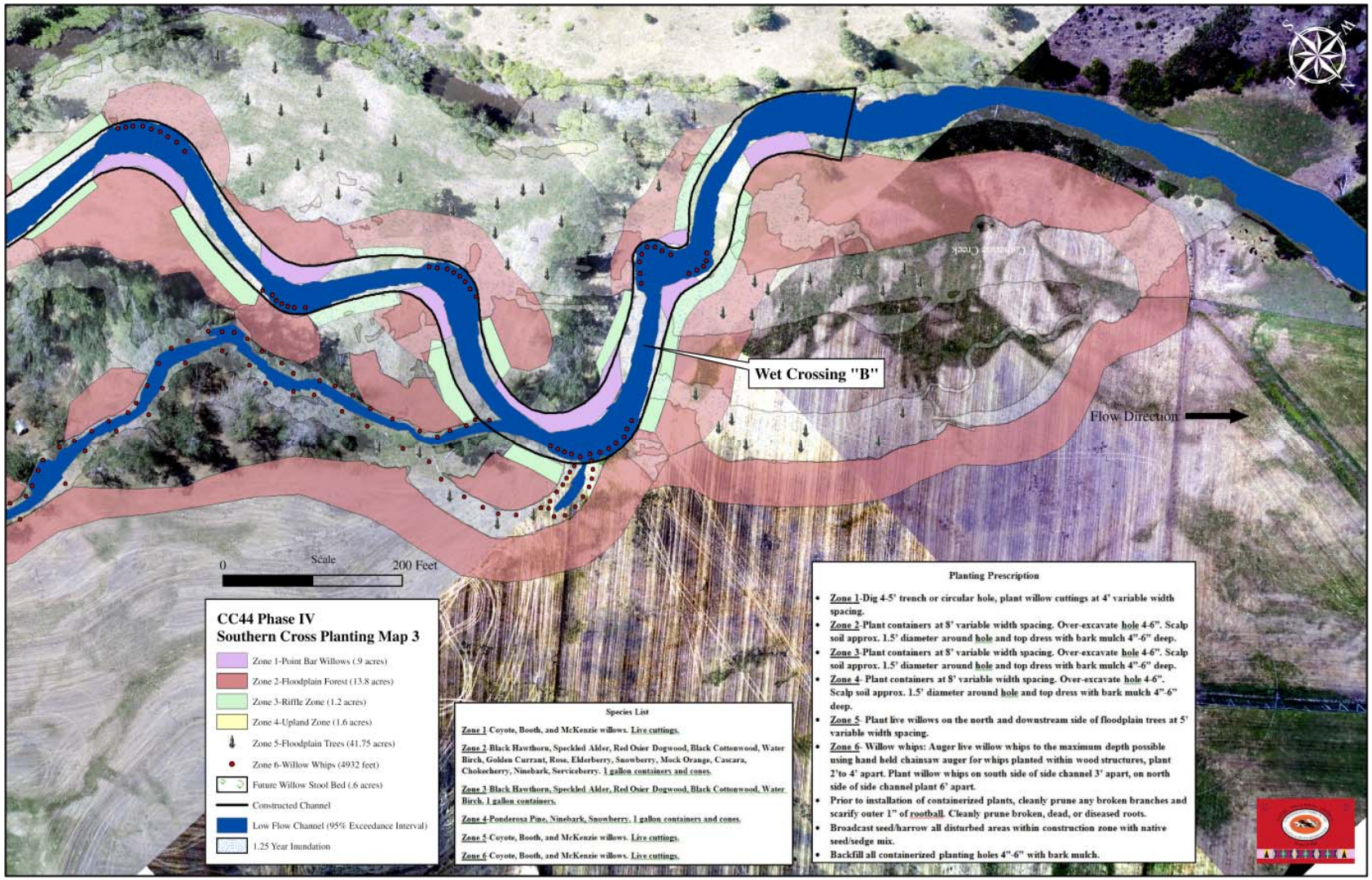


FIGURE 15 SOUTHERN CROSS PLANTING PLAN MAP 3



CC44 Phase III Fish Salvage 2015

From July 1 to August 10, 2015, fish salvage operations were conducted on Phase III of the Catherine Creek 44 (Smith) Fish Habitat Enhancement Project by staff from CTUIR, ODFW, BOR, UCSWCD, and the Grande Ronde Model Watershed. Salvage operations were conducted on sites that had been isolated from the main channel of Catherine Creek in preparation for channel and engineered large wood structure construction. Sites were isolated by placing eco-blocks around the perimeter of the site and allowing an opening at the downstream end of the site, which was then blocked by a seine net on the day of the salvage. Two bypass channels were constructed to divert flow away from construction areas on main channel Catherine Creek. Additionally, 2 side channels were similarly used so that all wood sites within each bypassed reach of the main channel could be salvaged at once, eliminating the need to create individual eco-block isolation barriers for every wood site. A total of 30 large wood sites, 2 bypass channels, and 2 side channels were salvaged using Smith-Root electrofishers and beach seines. The National Marine Fisheries Service "Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act" document was used as a guideline for salvage.

Salvage work was generally done in the morning when stream temperatures were less than 18º C, and sites were salvaged until depletion was achieved or temperatures reach 18º C. Sites were considered depleted when 2 consecutive passes with the electrofisher were made with zero salmonid spp. captured on each pass. The number of passes that individual sites or bypassed reaches needed to meet depletion criteria (using both sein nets and/or electro-fisher) ranged from a minimum of 3 passes in one day to a maximum of 7 in one day. Efforts to deplete the larger bypassed reaches occasionally required crew to halt salvage once stream temperature reached 18º C and resume again the next morning when temperatures were cooler.

TABLE 6 TOTAL NUMBERS OF SALVAGED FISH-CC44 2013-2015

				Fish Salvage CC44 Phase I-III						
CC44 salvage year	Area (m2)	Area (ft2)	O.mykiss salvaged	Chinook salvaged	O.mykiss morts	Chinook morts	%O.mykiss morts	%Chinook morts	O.mykiss/m2	Chinook/m2
2013	295.8	3184	298	529	4	3	1.34%	0.57%	**1.01**	**1.79**
2014	3639.9	39179.6	1275	357	67	4	5.25%	1.12%	**0.35**	**0.10**
2015	7199.8	77498	4204	1476	47	21	1.12%	1.42%	**0.58**	**0.21**
Total 2013-2015	**11135.5**	**119861.6**	**5777**	**2362**	**118**	**28**	**Average=2.57%**	**Average=1.04%**		

FIGURE 16 CC44 PHASE III (SMITH) FISH SALVAGE MAP

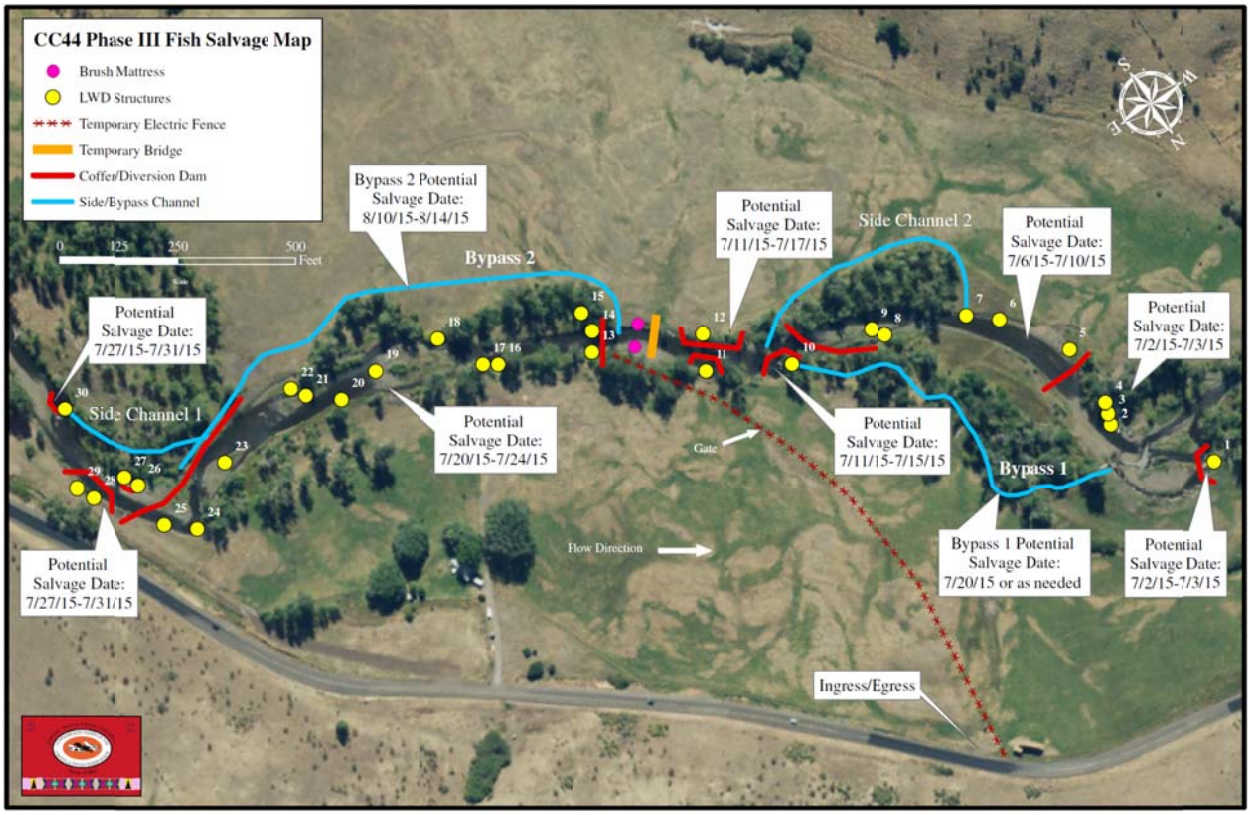


FIGURE 17 FISH SALVAGE AT CC 44 PHASE III (SMITH) BELOW ENTRANCE OF BYPASS CHANNEL 1.

Ongoing Work Elements

The following sections present work elements followed by discussion of accomplishments for the project during the contract period.

Manage and Administer Projects

This work element includes a suite of management actions required to administer the project, including preparation of annual operations and maintenance budgets, managing and preparing statements of work and budgets, and milestone and metrics reporting in Pisces, supervising and directing staff activities, conducting vehicle and equipment maintenance and management, payroll, purchasing, subcontracting for services, and administering/inspecting habitat enhancement activities. CTUIR staff administered the CC44 Southern Cross Project and assisted with the Catherine Creek CC44 Project, including construction subcontract solicitation, field stakeout, and observation and inspection. CTUIR administered all aspects of construction subcontracting, materials acquisition, and administration for the CC44 Southern Cross Project during 2015-2016.

The Project Leader supervised 4 permanent employees and a seasonal crew of 2 90-day e-hire employees to accomplish fish salvage and riparian planting project activities. Staff training included 2015 River Restoration Northwest Symposium (Project Leader and Biologists).

Environmental Compliance and Permits

Environmental compliance methods include development of appropriate documentation under various federal and state laws and regulations governing federally funded project work. Methods involve coordination with various federal and state agencies and development, oversight, and submittal of permit applications, biological assessments, cultural resource surveys, etc.

Primary accomplishments during the reporting period included coordination with BPA environmental compliance personnel to prepare supplemental documentation and reporting for ongoing and planned management actions.

Additionally, CTUIR staff continued EC compliance on projects planned for implementation beginning in 2015 including the Rock Creek Project Phase III and Bird Track Springs Project. Activities included preparation of maps illustrating the Area of Potential Effect (APE) to initiate cultural resource investigations and compilation of ESA species information for incorporation into ESA compliance documentation. EC compliance activities will be ongoing for the Rock Creek Project III in FY2015 with completion scheduled for late summer in preparation to construction initiation.

Coordination and Public Outreach/Education

Coordination and public education were undertaken to facilitate development of habitat restoration and enhancement on private lands, participate in subbasin planning, ESA recovery planning, BiOp/Remand project development and selection processes, and assist with providing watershed restoration education. CTUIR technical staff coordinates through the GRMW on the Board of Directors and Technical Committee to help facilitate development of management

policies and strategies, project development, project selection, and priorities for available funding resources.

The Project Biologist participates in multiple basin programs and processes associated with project prioritization and selection, funding, and technical review. Focus during FY2015 included work on the Catherine Creek Atlas process, initiation of the Upper Grande Ronde Atlas, and participation on the GRMW technical review team to evaluate and select projects for funding recommendations through the GRMW Step-Wise Process. Additionally, CTUIR staff continued working on look forward projects with close coordination between BPA and BOR to develop core project complexes and initiate concept planning in conjunction with CTUIR-BPA Accord land acquisition strategies.

CTUIR staff also participated in a several educational and public outreach activities which included a newspaper article about the CC44 Project for the Grande Ronde Model Watershed Ripples newsletter, a newspaper article about the Southern Cross Project for the East Oregonian, and several tours of the Southern Cross project with OWEB, BOR, CTUIR, and BPA staff.

Planting and Maintenance of Vegetation

The CTUIR habitat program annually participates and/or assumes the lead role in re-vegetation activities on individual habitat restoration and enhancement projects. Planting and seeding methods are developed to address site specific conditions and vegetation objectives. Natural colonization and manual techniques are utilized.

Staff efforts associated with planting during the reporting period included installation of approximately 10,000 containerized trees (Black Cottonwood, Hawthorne, Ponderosa Pine, Douglas Fir, Elderberry, Salmonberry, and Red-Osier Dogwood) and live willow whips on point bars, riffle margins, side channels, and floodplains of the CC44 Southern Cross Project. Disturbed areas were also seeded and mulched with a native grass seed mix consisting of Basin Wild Rye (33.06%), Rosanna Western Wheat Grass (19.07%), Snake River Wheat Grass (9.34%), Tufted Hairgrass (10.41%), Idaho Fescue (16.51%), Big Blue Grass (9.94%). Plants were installed using hand-held augers, a mini-excavator, and a compact tracked loader with an auger attachment.

Identify and Select Projects

Habitat protection, restoration and enhancement project opportunities were identified and developed during FY 2015. Activities included land and easement acquisition project identification and planning (Southern Cross Land Acquisition, Tsiatsos Ranch Conservation Easement, and Cunha Ranch Conservation Easement, and the Lookingglass Neilson Property), coordination and planning with State, Federal, local partners, and private landowners, and participation on Grande Ronde Model Watershed (GRMW) Board and Technical Committee to evaluate projects for BPA funding through the Step-Wise Process.

Project staff continued contact with landowners on 5 miles of Rock Creek (a contiguous section upstream of the current Rock Creek Project), and 1 mile of Dry Creek (a contiguous section

upstream of the Willow Creek Oregon Ag Foundation Property) to discuss fish habitat restoration projects.

Operate and Maintain Habitat & Structures

Project maintenance includes conducting custodial responsibilities on individual projects to ensure that developments remain in functioning repair and habitat recovery is progressing towards meeting projects goals and objectives. Activities included maintenance of plant enclosures and riparian fence along McCoy Meadows Project area, water gaps on Meadow Creek (Habberstad) and Catherine Creek (CC37), and repairs to fences along the Catherine Creek (CC37) Project, the Rock Creek Project, and the Catherine Creek (CC44) Project.

Monitoring & Evaluation

Monitoring and evaluation (M&E) of individual projects is conducted either independently by the CTUIR or jointly with project partners depending on the project. Monitoring and evaluation efforts include annual photo-points, installation of water and air temperature probes, stream channel cross sections and longitudinal profiles, pebble counts, juvenile fish population and habitat surveys, stocking/census surveys on re-vegetation efforts, and groundwater monitoring. Public tours, workshops, and presentations of individual projects will continue to be conducted. These activities provide for the discussion of various approaches, restoration techniques, successes, failures, and ultimately adaptive management.

Project staff conducted presence/absence snorkel surveys on side channels as part of the pre-project data collection efforts for the Bird-Track Springs Project.

Following are descriptions of the various M&E components of the project followed by project specific monitoring results.

Steelhead Spawning – McCoy Creek

CTUIR Grande Ronde Fish Habitat Program conducted steelhead spawning surveys in 2015 on 2.9 miles of McCoy Creek within the project area property boundary. Surveys began on 3/9/15 and finished on 5/11/15. Within that time McCoy Creek was surveyed on 4 occasions and a total of 9 redds were identified. The average distribution of redds for 2015 on McCoy Creek was approximately 3 redds per mile of stream surveyed. The majority of redds (8) were observed during a single survey on 4/16/15. It was noted that the 9th and final redd observed on 5/11/15 was recorded while habitat crew were performing routine maintenance within the project area, and not conducting an official spawning survey.

McCoy Creek ‘B’ Channel was surveyed once on 3/9/15. No redds were observed at this time.

Meadow Creek – McCoy Meadows project area

CTUIR Grande Ronde Fish Habitat Program conducted 3 steelhead spawning surveys in 2015 on 1.6 miles of Meadow Creek within McCoy Meadows project area. Between 3/9/15 and 5/11/15 a total of 2 redds were observed. During the first survey a test dig was noted, and then later

determined to have been a redd on 5/11/15 while crew was performing routine maintenance, not during an official spawning survey.

The Meadow Creek Wetland channel that flows 1.2 miles within the project area was not surveyed in 2015 due to insufficient flows resulting from a low water year and below average snowfall in the headwaters.

Meadow Creek – Habberstad

CTUIR Grande Ronde Fish Habitat Program conducted 4 steelhead spawning surveys in 2015 on 0.85 miles of Meadow Creek within the project property boundary. The surveys began on 4/2/15 and concluded on 5/11/15. Within this spawning season window a total of 5 redds were observed, making the average distribution 5.8 redds per mile.

Catherine Creek – Southern Cross

In 2015 the Southern Cross Ranch property was acquired by CTUIR and 4 steelhead spawning surveys were conducted between 4/7/15 and 5/19/15. During this time 1 redd was observed and documented on 5/5/15.

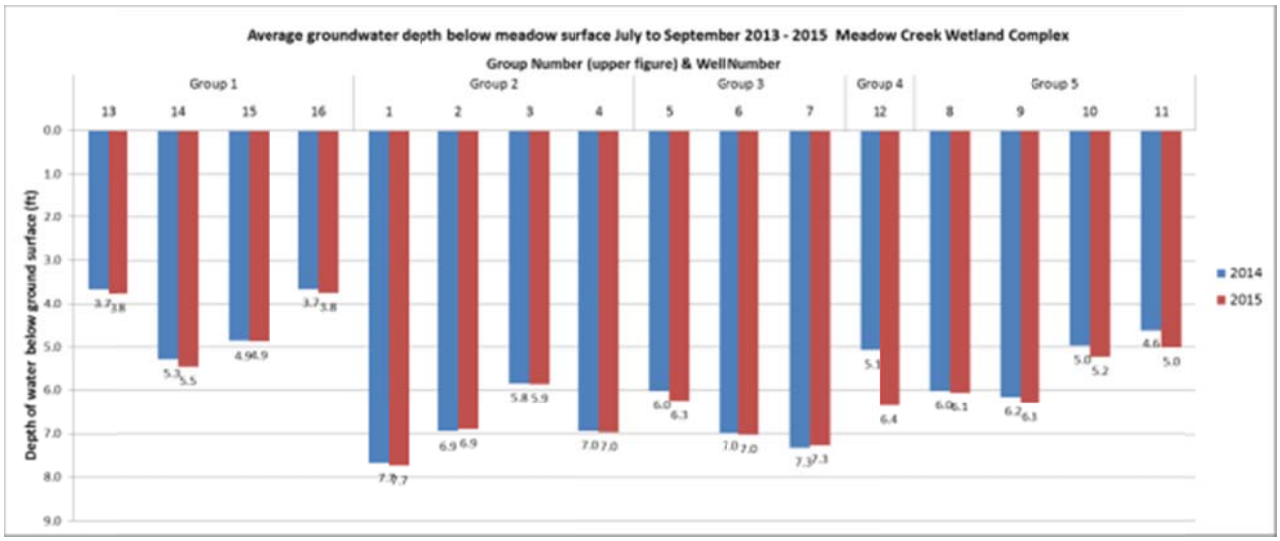
Groundwater Monitoring

Meadow Creek Groundwater

There were 16 shallow groundwater wells monitored in 2015 by CTUIR along the Meadow Creek Wetland complex on the McCoy Meadows Ranch. Data is plotted in relation to the meadow surface elevations at each monitoring well site in order to evaluate seasonal and annual changes in groundwater depths. Wells are grouped for these plots into 5 units that represent their position within the meadow system, with Group 1 located at the most upstream portion of the project (wells 13 to 16) and Group 5 being the most downstream group (wells 8 to 11).

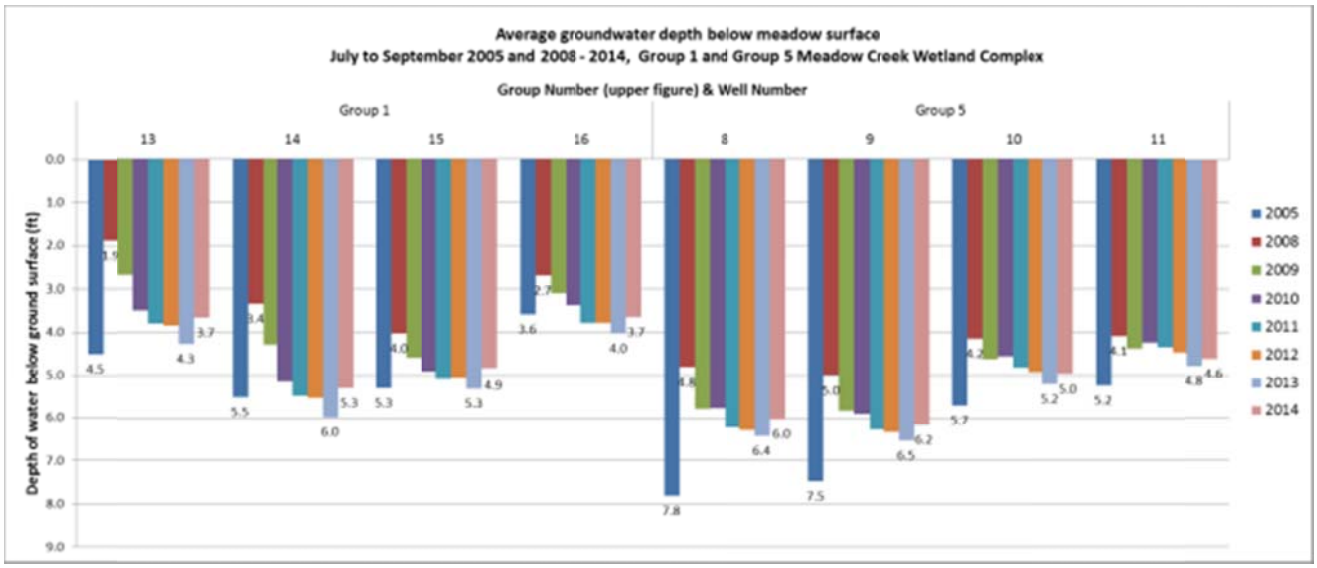
When comparing average groundwater elevations from depths measured in months July to September 2013 with records from July to September 2014 it appears that the shallow groundwater was closer to the meadow surface in 2014 for all wells except for those in Group 2 and wells 6 and 7 from Group 3 which didn't change (see Figure 30). The most significant change in average groundwater depth in 2014 compared to 2013 levels was seen in well 12 from Group 4 which increased 1.3 feet closer to the meadow surface.

FIGURE 18 AVERAGE GROUNDWATER ELEVATIONS ALONG MEADOW CREEK WITHIN THE MCCOY MEADOWS RANCH.



Average summer groundwater depths from months July to September 2008 to 2014 for the most upstream wells (Group 1) and most downstream wells (Group 5) were graphed (see Figure 19). In addition, pre-project measurements taken in 2005 during the same months are also shown for comparison. There is a six-year trend in decreasing groundwater elevation from 2008 to 2013. Groundwater records from 2013 are the furthest below meadow surface since 2005 pre-project levels. It is possible that sediment build up at the Meadow Wetland Intake prevented desired flows from main channel Meadow Creek to access the wetland channel and contributed to this drop in groundwater elevation. A possible down-cutting of Meadow Creek, and coinciding dropping of the water table, may also have been a factor in these groundwater differences. Groundwater depth measurements taken in 2014 indicate a consistent increase in groundwater elevation when comparing to summer seasonal average depths recorded from 2013 for Group 1 and Group 5 wells. The average increase in groundwater elevation in 2014 for these eight well sites was +0.4 feet. A possible explanation for the increase in groundwater elevation could be that mainstream Meadow Creek flows were allowed more access to floodplain and side channels, or that high flow diversion from the main channel persisted longer in these areas. All but one of the 8 wells (well #16) from Groups 1 and 5 retained water below pre-project levels. The average increase in groundwater elevation in 2014 compared to 2005 pre-project levels was +0.7 feet, which could be the result from seasonal high flows accessing the constructed Meadow Creek Wetland side channel.

FIGURE 19 2005 (PRE-PROJECT), 2008-2014 AVERAGE GROUNDWATER ELEVATIONS ALONG MEADOW CREEK WITHIN THE MCCOY MEADOWS RANCH.



McCoy Creek Groundwater

Groundwater well data was collected every two weeks beginning April 22, 2015 and ending December 9, 2015. A total of 17 surveys were conducted to measure the groundwater depth below meadow surface during these months. There were 34 groundwater wells monitored along the McCoy Creek restoration project in 2015. The percent of well measurements when wet versus when dry were recorded and plotted (see Figure 20) and shows a trend in increased groundwater within the project area from 2007 to 2011, a decrease from 2011 to 2012, and no significant change from 2012 through 2014. Records from 2015 show a 5% decrease in wet well measurements compared to the previous year. Of the 577 samples taken during 2015 60% occurred when wells contained water (wet)

FIGURE 20 PLOT OF WET VERSUS DRY WELL MEASUREMENTS ALONG MCCOY CREEK 1997 TO 2015.

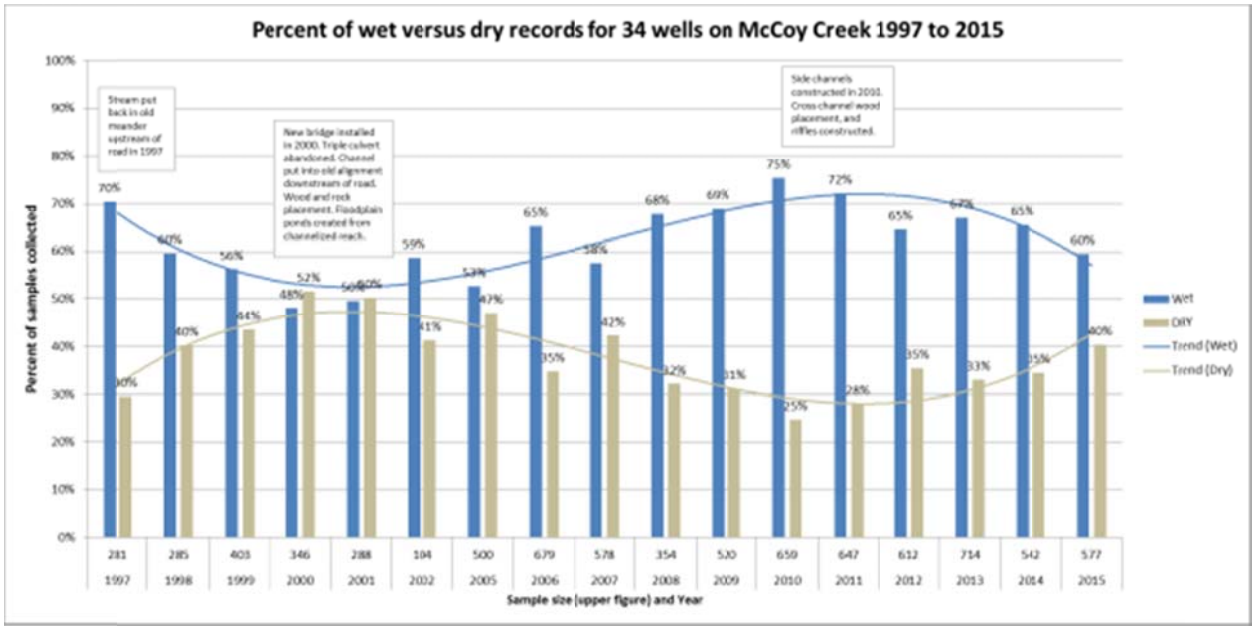
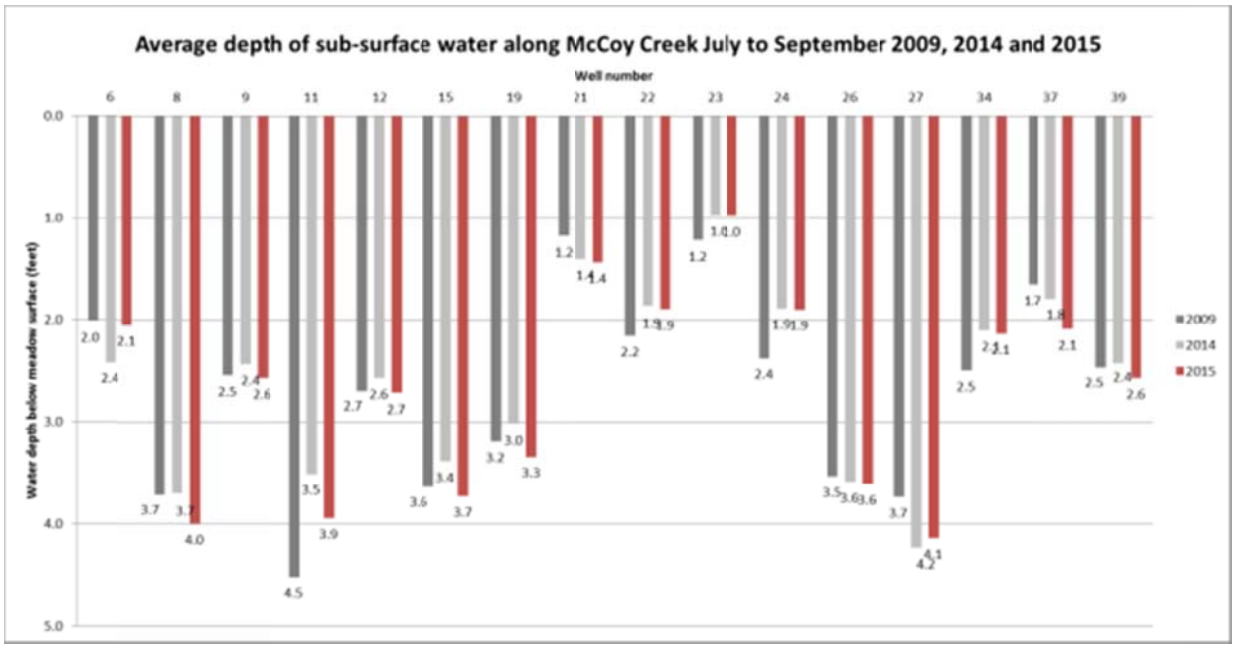


Figure 20 shows that sub-surface water is closer to the meadow surface post restoration effort in 2 of the 16 wells plotted from 2015 compared to measurements taken in 2014, and 4 wells held more water compared to 2009 groundwater conditions. 8 wells sampled in 2015 show an average decrease in groundwater compared to the year before, and 6 wells had groundwater levels identical to 2014 measurements.

Figure 21 shows 16 wells that remained wet for at least 3 surveys during the months July through September in 2009, 2014, and 2015. Locations where water table levels dropped below the bottom of the well during July through September were not considered for annual comparison. 10 of the 16 wells sampled for these years contained average summer groundwater at a level that never dropped below 3 feet of the meadow surface, and 7 of these wells did not get below the preferred max target depth of 2.5 feet below of the meadow surface from July through September 2015. Only one of these wells measured in 2015 recorded an average summer groundwater depth of below 4 feet from the meadow surface.

FIGURE 21 PLOT OF AVERAGE SUB-SURFACE WATER ELEVATIONS JULY TO SEPTEMBER FOR 2009, 2012, 2013, AND 2014 ALONG MCCOY CREEK



Groundwater Summary

Following the restoration efforts there appears to be some increase in the average sub-surface water elevation within the project area. Increased groundwater elevations are most evident near the upstream log structure (above the McIntyre road bridge), but is also evident within all the wells. There is a widespread increase in sub-surface water and the rising trend seen after 2000 is continuing. This trend of a sudden increase in sub-surface water followed by a gradual 'settling' has also been recorded along Meadow Creek. It is anticipated that with the activation of the McCoy Creek side channels, greater floodplain access at high flows, and the backing up of water within proximity to the log and riffle structures the sub-surface water within the well network will continue to be at a level greater than the lows of 2000 and 2001.

In contrast to McCoy Creek the sub-surface water within the Meadow Creek Wetland Complex has continued to decrease and is further down from the meadow surface in 2013 than any year since the activation of the wetland channel network. This reduction has reached the pre-project levels seen in 2005 at wells 4, 5, 14, 15 and 16 and is within 2 – 3 tenths of a foot of those levels for 3 other wells when comparing summer groundwater depths July – September.

Dark Canyon Creek - Summary of CTUIR stream monitoring within the lower 2 miles of 2009 to 2015

In late July 2010, fish habitat enhancements were implemented by CTUIR along 1.9 miles of Dark Canyon Creek and 1 mile of Meadow Creek within the boundaries of the Cunha Ranch. The project area is located near Starkey, Oregon in the Upper Grande Ronde Subbasin. The project legal description is Township 3 South, Range 35 East, portions of Sections 24, 25, and

36, Willamette Meridian, Union County Tax Lot 500. Approximately 150 pieces of large wood was added to Dark Canyon Creek and Meadow Creek in existing pools, or placed in a manner to create pool habitat and provide in-stream habitat complexity. The objective of the large wood additions was to contribute to floodplain formation and stability by increasing roughness, slowing water velocities, and trapping sediment. Furthermore, large wood was used in order to increase pool habitat quality and quantity and to provide thermal and predatory refuge for aquatic species including the aforementioned ESA listed fish species.

In 2012 CTUIR, in cooperation with the landowner and NRCS, developed four off-channel springs for livestock watering, and constructed 3.6 miles of pasture fence. Additional riparian corridor fencing is scheduled for fall/winter 2016-2017 along Dark Canyon Creek and Meadow Creek to exclude livestock and protect riparian habitat. The 3,000 acre ranch, along with 2 miles of Dark Canyon Creek and 1 mile of Meadow Creek was protected under a permanent conservation easement in 2015 under the CTUIR-BPA Accord in cooperation with Blue Mountain Land Trust.

Since August 2009, the CTUIR Grande Ronde Fish Habitat program has monitored water temperature at two locations within Dark Canyon Creek – an upper probe site (DC2) at river mile 1.9 and a lower probe site (DC1) at river mile 0.06. Temperatures at these two sites are, with the exception of 2009, monitored from April to October each year.

Temperature probes deployed are Onset HOBO© Pendant 64k loggers set to record at 1-hour intervals. Probes are housed in a metal tube that is anchored to the streambed and cabled to a post or tree on the bank. The same location for each probe has been used from 2009 to 2015 and the same probes deployed to each site during this period. Each year prior to deployment probes are calibrated using a NIST certified thermometer.

Diurnal fluctuations in water temperature are less in 2015 than those recorded in 2009 (pre-project) at the lower probe site (river mile 0.06), but are similar at the upper probe site (river mile 1.9). This may indicate a possible cooling effect through the project area seen in 2015 that is not present in 2009 (see Figure 22 & 23).

A possible cooling trend is also evident when exploring summary values for stream temperatures in Table 7. In 2010 the 308 records of temperatures >=20°C were recorded with similar distribution of values at both upper and lower sites with 52.6% of those records recorded at the upper site compared to 47.4% at the lower. This similarity is not present by 2015 where the upper site records 89.1% of the 318 >=20°C records.

From the temperature data collected since 2009, it is evident that water entering the project area has been increasing in the number of >=20°C records (see Figure 24). However, it is beyond the scope of this monitoring effort and these data to explain why this is occurring. The scope of inference for these data is restricted to the project area (the lower 1.9 miles of Dark Canyon Creek), but within that scope it can be demonstrated that following fish habitat restoration actions there is a cooling trend through the project area.

FIGURE 22 **PLOT OF DIURNAL FLUCTUATIONS IN WATER TEMPERATURE AT THE UPPER PROBE SITE (RIVER MILE 1.9) FOR 2009 AND 2015. ALTHOUGH THERE IS A SLIGHT SKEW IN TIMING OF PEAK TEMPERATURES THE DIURNAL FLUCTUATION ARE VERY SIMILAR FOR THESE TWO YEARS.**

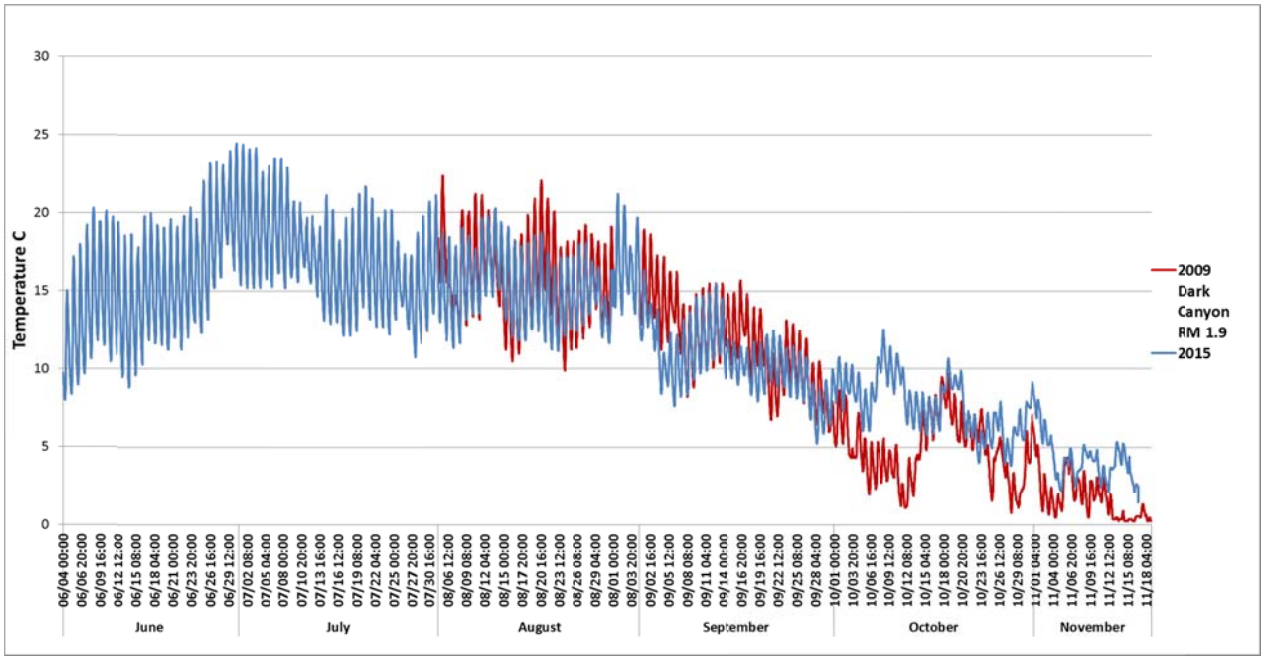


FIGURE 23 **PLOT OF THE DIURNAL FLUCTUATION IN WATER TEMPERATURE AT THE LOWER PROJECT SITE (RIVER MILE 0.06) FOR 2009 AND 2014. PLOT SHOWS THE REDUCTION IN DIURNAL FLUCTUATIONS OF WATER TEMPERATURE RECORDED AT THIS SITE IN 2015 COMPARED TO THE PRE-PROJECT DATA OF 2009.**

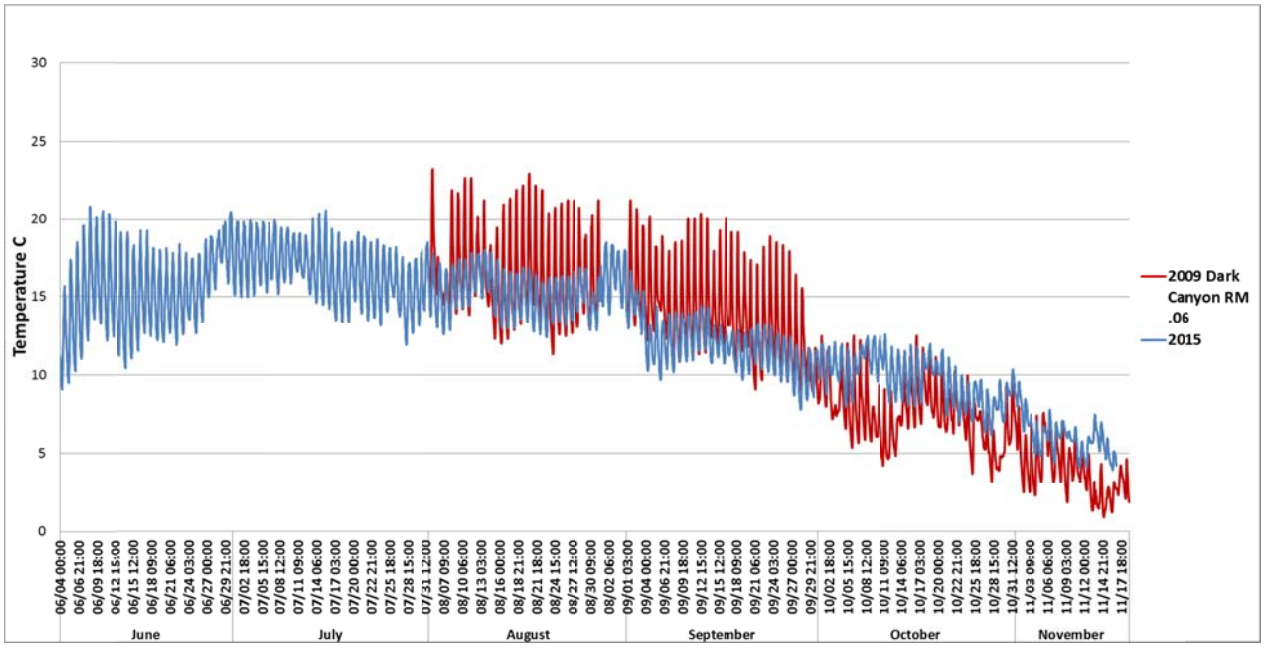


TABLE 7 **SUMMARY METRIC FOR WATER TEMPERATURE PROBES AT TWO SITES ALONG DARK CANYON CREEK FROM 2010 TO 2015. SHADED AREA IS THE LOWER PROJECT SITE.**

Stream	Location Name	River mile	Year	# of Days Deployed	# of Hours for Analysis	Max Temperature (° C)	Hours >=25 ° C	Hours >=20 ° C	Hrs. at 10 - 15.6 ° C	% at 10 - 15.6 ° C	Mean daily >=17.8 ° C (# days)	% of deployment when Mean daily >=17.8 ° C
Dark Canyon Creek	DC1	0.06	2009	106	2544	23.1	0	93	874	34.4	1	0.94
Dark Canyon Creek	DC1	0.06	2010	226	5398	22	0	146	2156	39.9	0	0.0
Dark Canyon Creek	DC1	0.06	2011	145	3480	20.9	0	36	2120	60.9	0	0.0
Dark Canyon Creek	DC1	0.06	2012	191	4536	24.2	0	75	2204	48.6	2	1.0
Dark Canyon Creek	DC1	0.06	2013	215	5161	24.4	0	154	1988	38.5	5	2.3
Dark Canyon Creek	DC1	0.06	2014	217	5184	20.3	0	11	2345	45.2	3	1.4
Dark Canyon Creek	DC1	0.06	2015	165	3984	20.8	0	22	1969	49.4	3	1.8
Dark Canyon Creek	DC2	1.9	2009	106	2544	22.3	0	43	789	31.0	2	1.89
Dark Canyon Creek	DC2	1.9	2010	226	5399	22.7	0	162	1761	32.6	6	2.7
Dark Canyon Creek	DC2	1.9	2011	145	3480	22.0	0	85	1618	46.5	4	2.8
Dark Canyon Creek	DC2	1.9	2012	191	4535	23.8	0	227	1702	37.5	20	10.5
Dark Canyon Creek	DC2	1.9	2013	215	5161	24.9	0	257	1632	31.6	17	7.9
Dark Canyon Creek	DC2	1.9	2014	217	5184	24.7	0	307	1704	32.9	29	13.4
Dark Canyon Creek	DC2	1.9	2015	165	3984	24.4	0	180	1460	36.6	14	8.5

FIGURE 24 **PLOT OF THE NUMBER OF WATER TEMPERATURES >=20°C ON DARK CANYON CREEK. PLOTTED TREND LINE DEMONSTRATES THAT OVERALL WARMER WATERS ARE ENTERING THE PROJECT AREA EACH YEAR (RED BARS), BUT THIS WATER IS COOLING AS IT MOVES THROUGH THE PROJECT AREA TO THE LOWER PROBE SITE (BLUE BARS).**

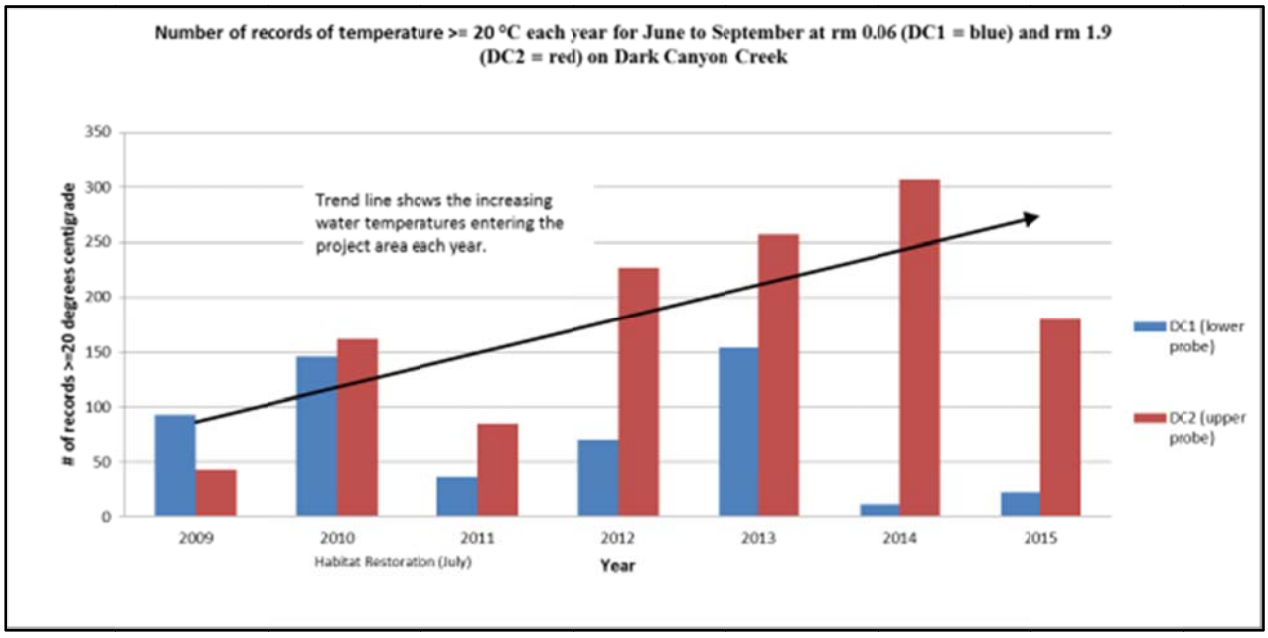


Photo Point Monitoring

Photo points are an effective monitoring method used to document morphological changes on restoration projects. Representative photos are taken at intervals throughout each project, the number being determined by the project size and complexity. A master photo point notebook is used to align each subsequent year's photo with the image taken the previous year. Ideally, images are captured in the exact location as the earlier image, with landmarks (trees, hillsides, etc.) used to align the photo. Images are taken during midday for optimal lighting conditions with a Nikon D3100 camera and jpeg images are saved into a master photo point file. Aerial photos are also taken at varying intervals along several project locations.

During 2015 photo points were taken at 8 separate projects. A total of 91 photos were taken, and GPS coordinates were recorded at each photo point site. Each photo point site is marked with a green T-133 post or a 1 foot rebar stake. Photo points are located at sites along project reaches with good visibility of stream-bank vegetation areas where morphological changes are likely to occur. Photo points are typically taken every year; however, some project photo points are taken every other year.

FIGURE 25 PRE AND POST PROJECT PHOTO POINTS.

Rock Creek Pre Project

Rock Creek Post Project

Catherine Creek (CC44) Pre Project

Catherine Creek (CC44) Post Project

Catherine Creek (CC37) Pre Project

Catherine Creek (CC37) Post Project

Biomonitoring

Steelhead spawning surveys were conducted by the CTUIR Biomonitoring Project during spring 2016 (Project Number 2007-083-00, BPA contract 64017). Following is a discussion of methods and results from the CTUIR Biomonitoring Project FY15 annual report:

Introduction

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Biomonitoring Project is a monitoring component of a comprehensive strategy and framework for natural resource management developed by the CTUIR utilizing traditional First Foods concepts (Jones, 2008). A major component of preserving First Foods is protecting and enhancing the habitats that sustain them, therefore CTUIR Department of Natural Resource Fisheries and Wildlife Programs are implementing habitat enhancement actions in the Umatilla, Walla Walla, Tucannon, Grande Ronde and John Day basins in NE Oregon and SE Washington.

The Biomonitoring Project is tasked with evaluating the effectiveness of these habitat enhancement efforts by physical and biological sampling using regionally standardized habitat and biotic monitoring protocols and methods, (CHaMP, 2015), (Stillwater Sciences, 2012). Study sites and data collected are coordinated through the CHaMP Program and data are uploaded to the CHaMP database and are available for use by other researchers.

Monitoring data are used to:

1) Determine the biological benefits of aquatic habitat improvements;

2) Establish relationships between physical habitat conditions and biological responses to improved habitat;

3) Inform manager's decisions for modifying existing habitat work and implementing new watershed restoration plans for achieving desired future conditions.

Within the Grande Ronde Basin, the CTUIR Grande Ronde RM&E Project assists the Biomonitoring Project with data collection at five monitoring sites (Bird Track Springs – 1 site, Rock Creek – two sites, and Catherine Creek – 2 sites) by providing snorkel and spawning ground survey crews. Biomonitoring site sizes are determined using the CHaMP protocol of approximately 20 times the bankfull width of the channel (CHaMP, 2015).

In 2015, a partnership of agencies within the Grande Ronde Basin including Bonneville Power Administration (BPA), Bureau of Reclamation (BOR), the Columbia River Inter-Tribal Fish Commission (CRITFC), CTUIR, the Grande Ronde Model Watershed (GRMW), and the Oregon Department of Fish and Wildlife (ODFW) began investigating using a larger scale restoration action monitoring approach for action effectiveness monitoring.

This approach has a basis within the Physical Habitat Monitoring Strategy (PHaMS) developed by the USDA Geological Survey (USGS), Northwest Marine Fisheries Service (NMFS), and CTUIR in 2013 (2013). The goal of the PHaMS is to outline methods that are useful for capturing reach-scale changes in surface and groundwater hydrology, geomorphology,

hydrologic connectivity, and riparian vegetation at restoration projects. The Physical Habitat Monitoring Strategy aims to avoid duplication with existing regional effectiveness monitoring protocols by identifying complimentary reach-scale metrics and methods that may improve the ability to detect instream and riparian changes at large restoration projects. Surveyed reaches under this approach are dependent upon the size of the restoration project (stream length treated) not the bankfull width, with a target of a minimum of 40% of the restoration project being surveyed. These monitored reaches are extensions of the existing CHaMP sites and are each 400 to 600 meters in length, with contiguous sites added as needed to cover the restoration project area.

By following existing standardized protocols for data collection, it will be possible to compare/contrast information on fish use and habitat changes gathered at the project scale by the PHaMS effort with those of the wider basin scale CHaMP data. Such comparisons can then be used to evaluate the effectiveness of the restoration project and the suitability of the CHaMP monitoring network of sites at estimating fish responses to restoration actions at the sub-watershed scale.

The focus of this effort is on restoration projects that:

- Identify water temperature as a limiting factor in ESA fish recovery,
- That specifically intend to improve thermal refugia,
- Have floodplain and/or side channel activation planned,
- Have or intend to construct new channel alignments,
- Have in-stream habitat complexity as a restoration action,
- Are within stream reaches that allow long term monitoring access, such as sites that are on Federal/State/Tribal lands, or that have long term/permanent conservation easements.

In 2015 data collection for PHaMS sites on Catherine Creek, Rock Creek, and McCoy Creek was carried out by BOR, CRITFC, CTUIR Biomonitoring project, CTUIR Grande Ronde RM&E, and GRMW. ODFW conducted surveys for the PHaMS sites within the Grande Ronde River – Bird Track Springs project.

In 2015, as an addition to initiating the PHaMS approach, the Grande Ronde RM&E Project conducted juvenile fish presence/absence surveys and spawning ground surveys on planning stage restoration projects. These surveys provide information to restoration managers on existing fish use of project areas and will be used when designing habitat-enhancing projects. These data will also be used as a baseline for comparison with post-restoration surveys when evaluating the effectiveness of projects in meeting their objectives. The RM&E project also assisted the CTUIR Fish Habitat project and its basin partners with fish salvage operations as part of restoration actions. In 2014 and 2015, this occurred on the Catherine Creek River Mile 44 (CC44) Phase II and III habitat restoration project. Results for salvage operations are reported in (Childs, et al., 2014) – (and 2015) - under Northwest Power Planning Council Project (NPPC) No.199608300.

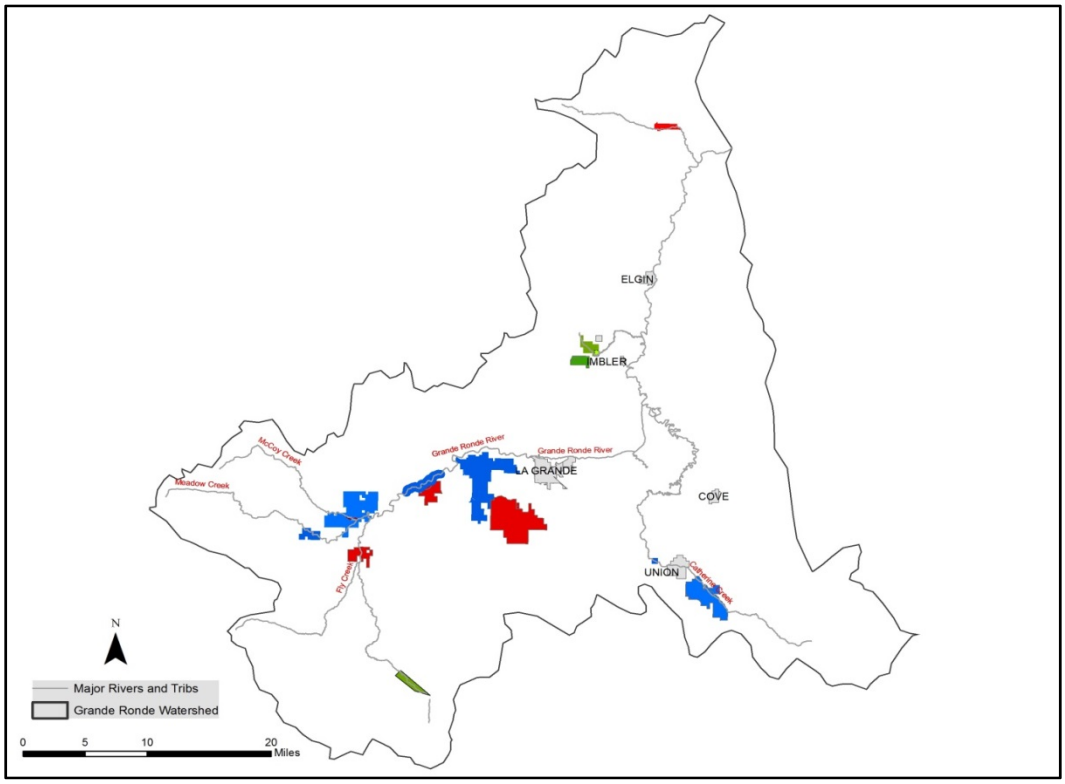
The RM&E project assists the Biomonitoring project with implementing Action Effectiveness Monitoring at 5 sites within the basin (two on Rock Creek, one on the Grande Ronde River – Bird Track Springs, and two on Catherine Creek – Southern Cross treatment and control), and currently carries out steelhead spawning ground surveys on 35 miles of restoration project streams. CTUIR staff also conducts Chinook spawning ground surveys on 4 miles of Catherine Creek where ODFW does not have access permission, and assists ODFW with surveys on other sections of Catherine Creek and the Grande Ronde River. These

data are passed to ODFW for inclusion in basin wide status and trend monitoring reported under ODFW Grande Ronde Basin Chinook Salmon Captive Brood and Conventional Supplementation Programs Annual Reports, NPPC Project No.199801006. Chinook spawning ground surveys on Lookingglass Creek are reported annually under a separate contract for Lower Snake River Compensation Plan (LSRCP) Project No. 475, FWS Agreement F13AC00030.

Methods

The focus of this monitoring effort is the Grande Ronde Basin. There are sixteen restoration projects implemented by CTUIR Fish Habitat within the basin and seven more in the planning stage (figure 26).

FIGURE 26 BLUE AREAS SHOW LOCATIONS OF RESTORATION PROJECTS WITHIN THE GRANDE RONDE BASIN (PROJECTS WITH SPAWNING GROUND SURVEYS, SNORKEL SURVEYS, AND THE CHAMP/PHAMS REACHES). GREEN AREAS ARE RESTORATION PROJECTS NOT CURRENTLY MONITORED. RED AREAS ARE RESTORATION PLANNING STAGE PROJECTS THAT HAVE PRESENCE/ABSENCE SNORKEL AND SPAWNING SURVEYS.



Habitat and morphology surveys follow those protocols detailed in the CHaMP methodology (CHaMP, 2015).

Steelhead spawning surveys are conducted from March to June and are typically carried out 4 to 5 days per week, with returns to survey sites every 10 to 14 days. Chinook spawning surveys are carried out August through September. Spawning ground surveys follow existing protocols outlined by - (Gallagher, Hahn, & Johnson, 2007) and (Johnson, et al., 2007).

Streams and miles surveyed for steelhead spawning are:

- Dark Canyon Creek: 1.9 miles
- Graves Creek: 6 miles

- Little Graves Creek: 1 mile
- Little Rock Creek: 4.5 miles
- McCoy Creek: 4.3 miles
- Meadow Creek: 3.6 miles
- Rock Creek: 10.4 miles
- Sheep Creek: 3 miles
- Catherine Creek – Southern Cross biomonitoring treatment site: 0.1 miles
- Catherine Creek – Control site: 0.1 miles
- Grande Ronde River – Bird Track Springs biomonitoring site: 0.3 miles

The Rock Creek sub-watershed had been surveyed by the CTUIR Fish Habitat Project from 2011 with an average of 12.1 miles of stream surveyed each season. In 2015, this was increased to 23.6 miles of survey due to additional restoration opportunities requiring pre-project data. From 2010 to 2015, the Meadow Creek sub-watershed had an average of 9.8 miles of steelhead spawning surveys conducted. Between 2012 and 2013, there were approximately 1.9 miles of steelhead spawning survey carried out in the Willow Creek sub-watershed. These Willow Creek surveys were not continued past 2013 as restoration project priorities were focused on the Upper Grande Ronde sub-watersheds of Rock Creek, Meadow Creek, Upper Grande Ronde, and Beaver Creek.

Juvenile snorkel surveys are conducted June to October for Biomonitoring sites and pre-restoration project presence/absence information. Protocols for snorkel surveys follow those of - (White, Justice, & McCullough, 2011) and (Johnson, et al., 2007).

In 2015, CTUIR RM&E and CRITFC staff conducted snorkel surveys within the biomonitoring sites and within suitable habitat along 8.1 miles of restoration reaches. For these surveys, all pool habitat and 25% of fast water within the reach were snorkeled. These snorkel surveys are part of 1) the PHaMS monitoring approach, 2) a continuation of action effectiveness monitoring, and 3) pre-restoration presence/absence surveys. Areas covered were:

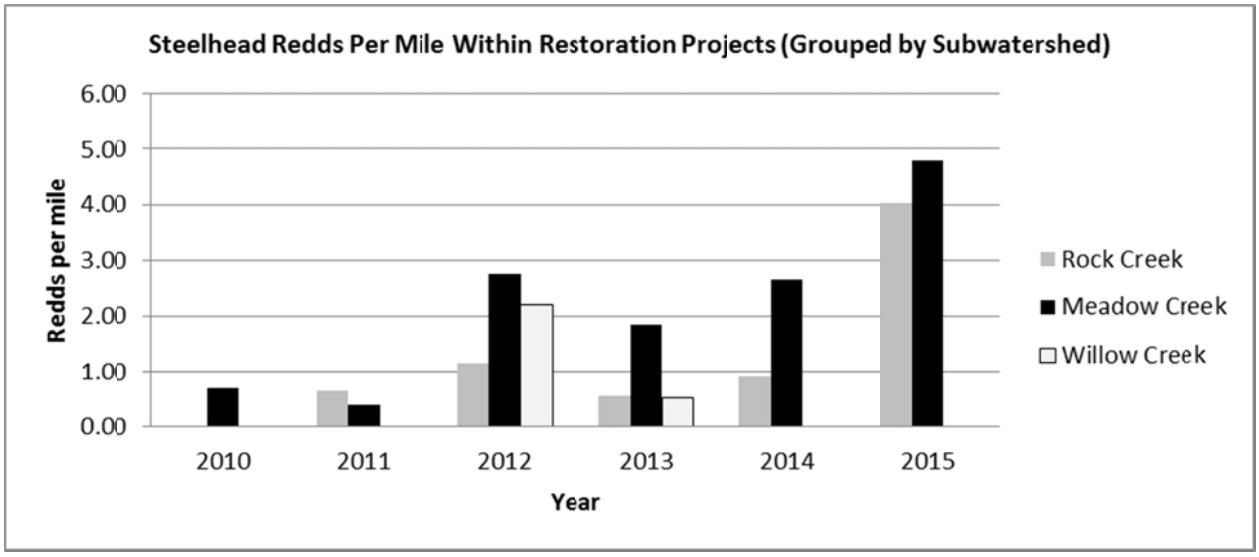
- 1 mile (1,679 meters) of Rock Creek within the Phase III pre-restoration project area (PHaMS and CHAMP sites) – Reach 1;
- 0.5 miles (813 meters) of Rock Creek Phase II restoration project area (restoration implemented in 2014) – Reach 2;
- 1.4 miles (2,255 meters) of McCoy Creek (PHaMS and CHAMP sites - restoration implemented in 2010/2011);
- 0.5 miles (805 meters) of Dark Canyon Creek (restoration implemented in 2010);
- 3.75 miles (6,038 meters) of pre-project presence/absence survey on Rock Creek – Elk Song Ranch;
- 1 mile (1,600 meters) of Catherine Creek – Southern Cross pre-restoration project (PHaMS and CHAMP);

Results

There was a considerable increase in the number of steelhead redds observed in 2015 compared to other years, with 131 redds observed between 2010 and 2014 compared to 158 in 2015. This also increased the density of redds (redds/mile of survey) - for example, the Rock Creek sub-watershed went from an average of approximately one redd/mile to four redds/mile. Similarly, the Meadow Creek sub-watershed went from 2.6 redds/mile in 2014 to 4.8 redds/mile in 2015 (figure 27) within the same survey area.

There were no steelhead redds within biomonitoring reaches of the Grande Ronde River, or Catherine Creek in 2014. However, there was one redd in 2015 on the Grande Ronde River – Bird Track Springs reach, one on Catherine Creek – Southern Cross treatment site and one on the control site. Because of the relatively short distance of stream miles surveyed for the biomonitoring sites each year on Catherine Creek and the Grande Ronde River the number of redds/mile were not calculated. For Rock Creek, there were no redds in 2014 in both biomonitoring sites, but three in the treatment site (downstream of the cabin), and one in the upstream reach (below the confluence with Sheep Creek) in 2015.

FIGURE 27 STEELHEAD REDD DENSITY PER MILE OF SURVEYED STREAM GROUPED BY SUB-WATERSHED 2010 TO 2015. SURVEYED REACHES ARE ALL WITHIN CTUIR HABITAT RESTORATION PROJECTS.



Redd numbers and stream miles surveyed in 2015:

- Dark Canyon Creek: 36 redds in 1.9 miles
- Graves Creek: 0 redds in 6 miles
- Little Graves Creek: 0 redds in 1 mile
- Little Rock Creek: 11 redds in 4.5 miles
- McCoy Creek: 9 redds in 4.3 miles
- Meadow Creek: 7 redds in 3.6 miles
- Rock Creek: 95 redds in 10.4 miles
- Sheep Creek: 0 redds in 3 miles

- Catherine Creek – Southern Cross biomonitoring treatment site: 1 redd in 0.1 miles
- Catherine Creek – Control site: 1 redd in 0.1 miles
- Grande Ronde River – Bird Track Springs biomonitoring site: 1 redd in 0.3 miles

The spatial distribution of steelhead redds within some restoration projects has also altered considerably when compared to pre-project data. For example within the 1.9 mile (3,057 meter) Dark Canyon project pre-restoration redds were grouped within the upper 0.3 miles (600 meters) of the project area and have progressed downstream each year to cover the entire length of the restoration area (Figure 28). Similar results were seen within the 3.1-mile (5,000 meter) Rock Creek Phase II restoration area by 2015 (30 redds) in Figure 16. The additional survey miles on the Elk Song Ranch produced 65 redds for Rock Creek. There were few redds observed on the smaller tributaries such as Graves Creek (zero) and Sheep Creek, but Little Rock Creek produced 11 redds upstream of the Phase II restoration sites on the Elk Song Ranch (Figure 29).

FIGURE 28 SPATIAL DISTRIBUTION OF STEELHEAD READS WITHIN THE 1.9-MILE (3,057 METER) DARK CANYON FISH HABITAT RESTORATION PROJECT HAS INCREASED EACH SEASON POST PROJECT TO COVER THE ENTIRE PROJECT AREA.

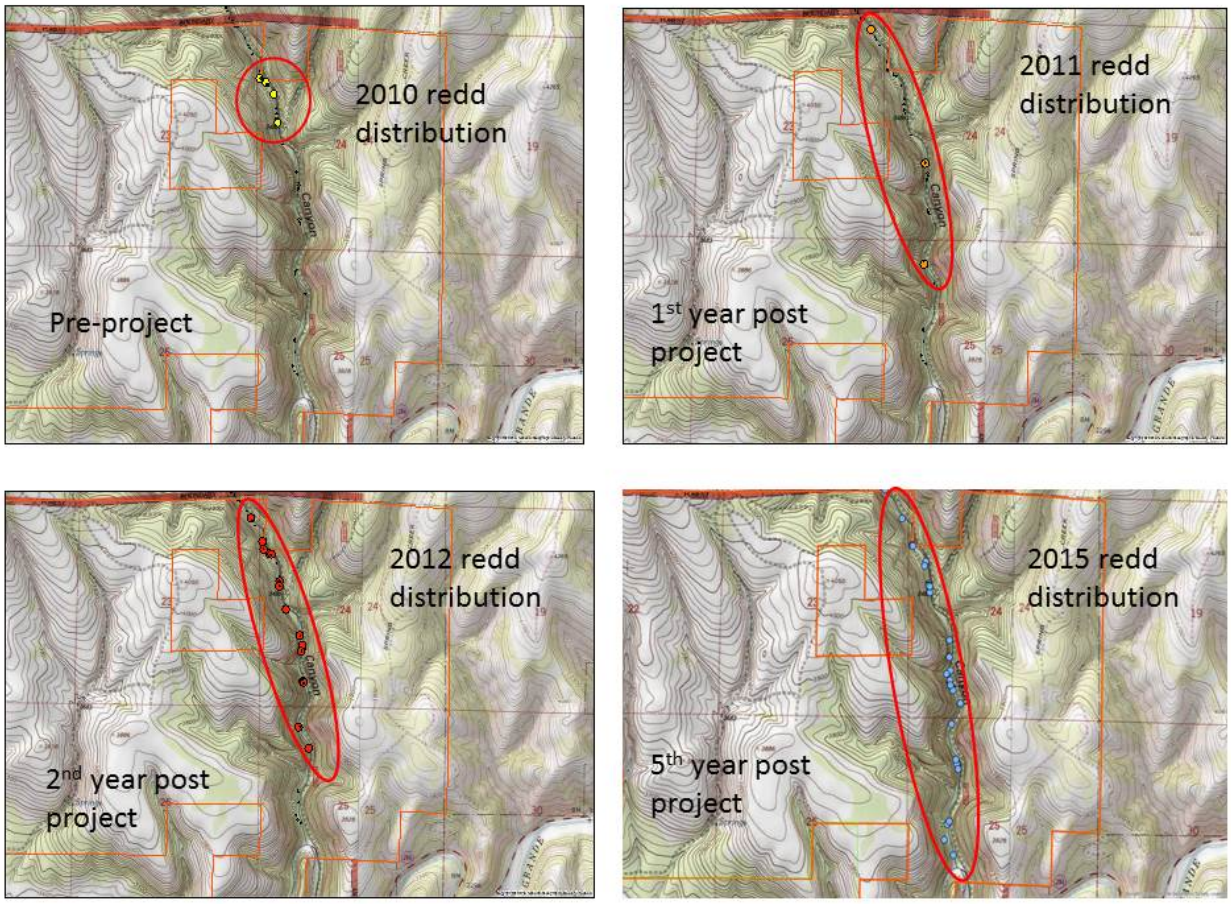


FIGURE 29 STEELHEAD REDD DISTRIBUTION DURING ROCK CREEK 2015 SURVEYS ON THE FOR THE GIRLS LLC RANCH.

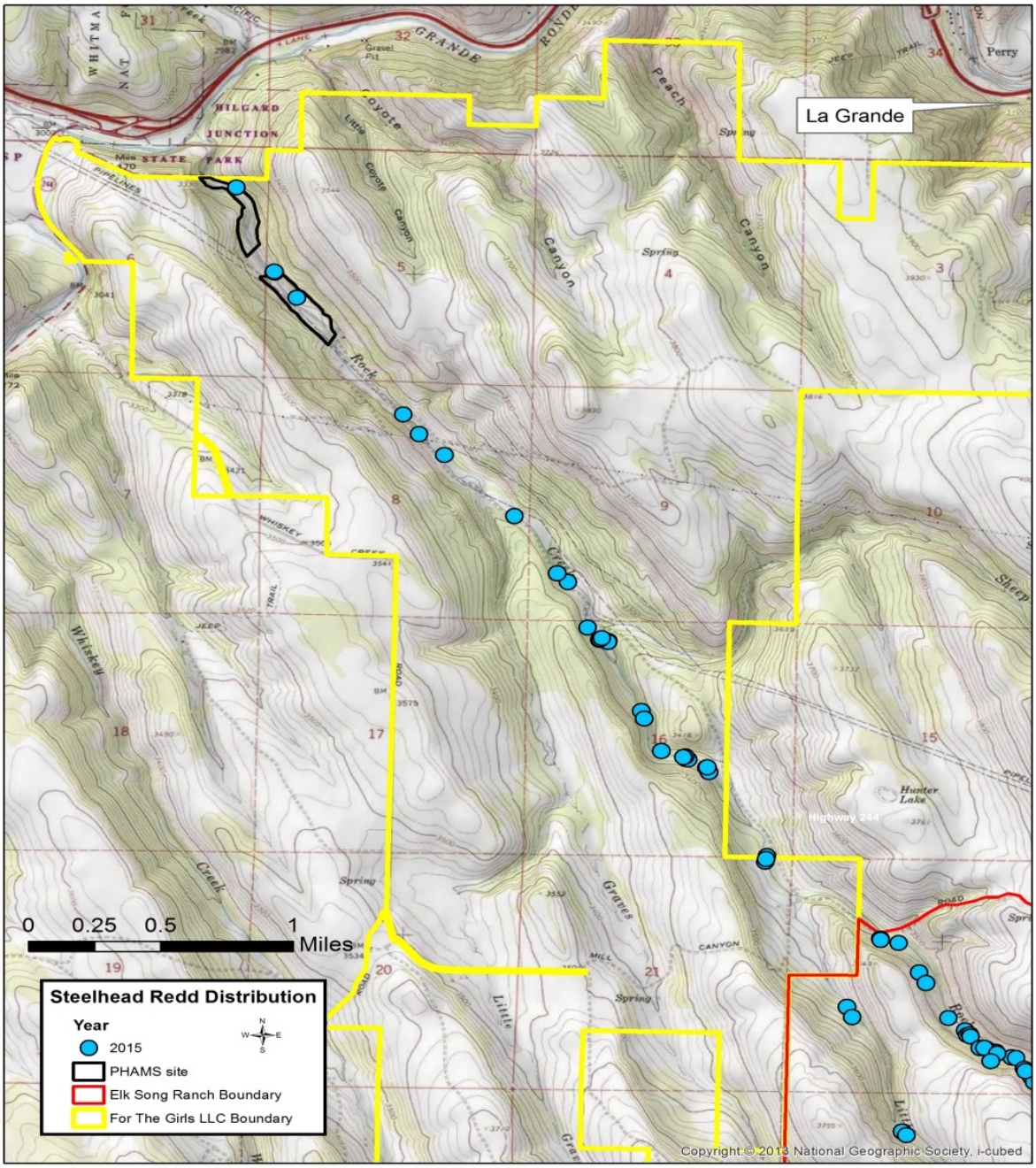
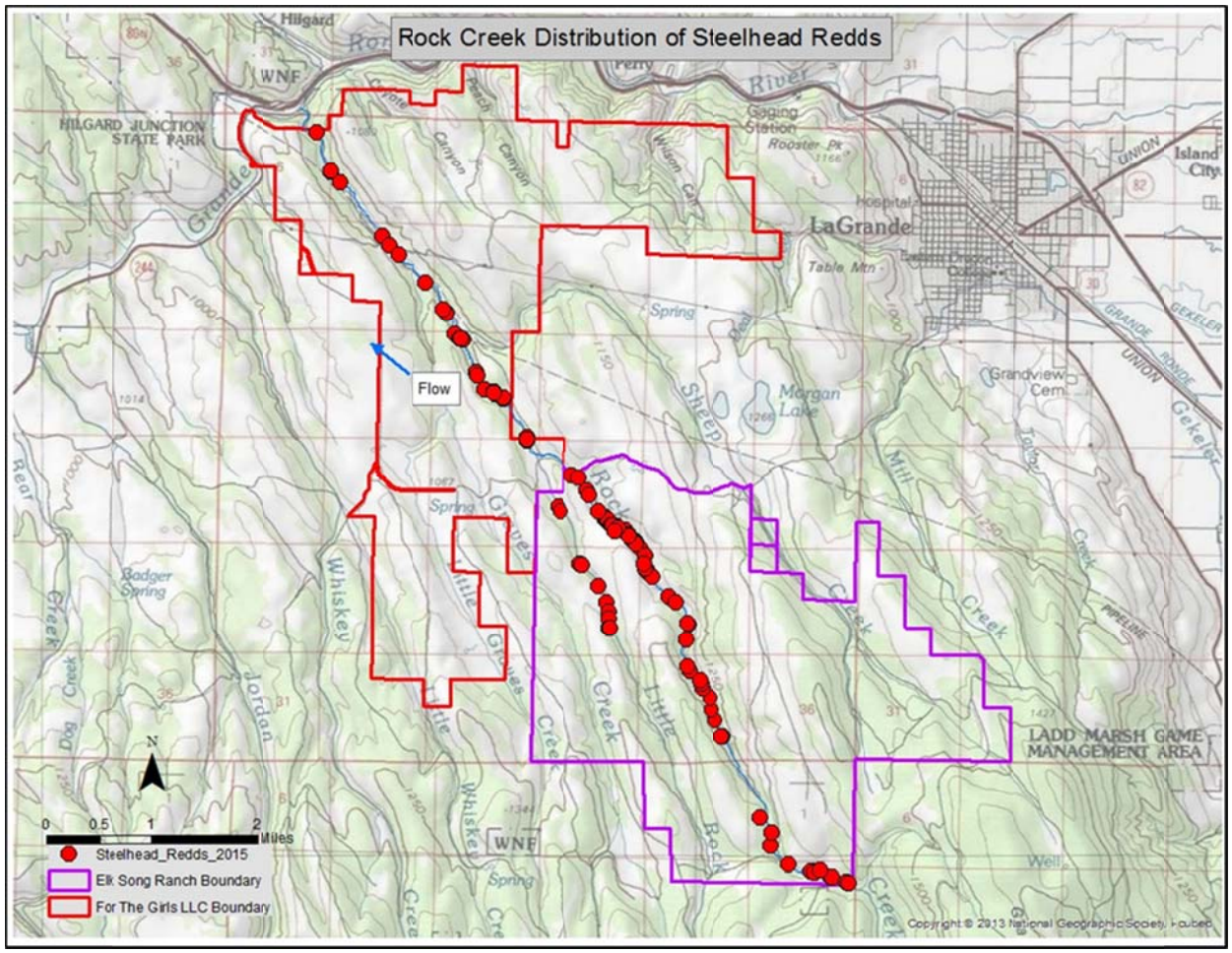


FIGURE 30 STEELHEAD REDD DISTRIBUTIONS IN 2015 ON THE FOR THE GIRLS LLC RANCH (ROCK CREEK PHASE 2 AND 3 PROJECT AREAS) AND THE ELK SONG RANCH.



Chinook spawning

There was no Chinook spawning within the Grande Ronde River – (Bird Track Springs) biomonitoring site in 2014 or 2015. One adult male Chinook with an intact adipose fin was observed in 2015 upstream of the Rock Creek upper biomonitoring site (Figure 30), but none observed elsewhere and no redds found. This was the first record of an adult Chinook since CTUIR began monitoring 2010.

In 2014, there were three adult Chinook and one confirmed redd observed on McCoy Creek within the restoration reach (a PHaMS monitoring site), the first confirmed redd within the stream this decade, but no adult fish or redds were observed in 2015.

Catherine Creek (Southern Cross) treatment site had one Chinook redd in 2015 (none in 2014) and 3 total within the PHAMS reach (1,100 meter pre-restoration reach). There were 11 Chinook redds within the control reach in 2015.

Snorkel surveys

Rock Creek –Phase III (Reach 1) – A total of 43 pools and fast water habitat sections were snorkeled in 2015 for both reaches combined (27 in Reach 1 and 16 in Reach 2). Reach 1 was surveyed on 7/15/2015 and Reach 2 on 7/28/2015. There were 78 juvenile *O.mykiss* and zero Chinook observed in Reach 1, giving a density of 10.4 salmonids per $100m^2$ of snorkeled habitat. Mean temperature for all snorkeled pools/fast water in Reach 1 was 21.7 °C with a minimum of 16 °C.

Size compositions of *O.mykiss* were:

- <80 mm = 11 fish (14% of total)
- 80 mm – 129 mm = 43 fish (55% of total)
- 130 mm to 199 mm = 20 fish (25.5% of total)
- >200 mm = 4 fish (5.5% of total)

Rock Creek Phase II (Reach 2) – Twenty Three (23) wood structures were installed in 2014 within this 0.5-mile (813 meter) reach as part of a larger restoration project on the property. There were 40 O.mykiss and 2 Chinook in this reach, giving a salmonid density of 9.4 fish per $100m^2$ of snorkeled habitat. Mean temperature of all snorkeled pools/fast water was 14.3 °C with a minimum of 11 °C.

Wood placement was either "soft" with no excavation of bank or bed material, and "excavated" where pools were enlarged or constructed and wood was buried into the streambank. We snorkeled sixteen (16) sites in July 2015 – three (3) 'soft' sites, five (5) 'excavated' wood sites and eight (8) sites with no restoration action. We snorkeled all pools and 25% of riffles/fast water-non turbulent. Low flows meant we were not able to snorkel 15 of the wood placement sites (11 'soft' placement sites and 4 'excavated' wood sites).

Size compositions of salmonids by habitat structure were:

Soft wood sites: = 3 sites – with 4 *O.mykiss* (3 @ <80mm, and 1 @ 80mm-129mm). One of the three snorkeled soft wood placement sites had no salmonids.

Excavated wood sites = 5 sites – with 28 *O.mykiss* and 2 Chinook (*O.mykiss* were 16 @ <80mm, 1 @ 80mm – 129mm, and 11 @ 130mm to 199mm). Two juvenile Chinook were both >100mm. One of the five buried wood sites had no salmonids.

No-wood sites = 8 sites – with 8 *O.mykiss* (all <80mm). Two of the eight no-wood sites snorkeled had no salmonids.

Over all types of site (soft/excavated/no action) size composition for Reach 2 was:

- <80 mm = 27 *O.mykiss* (67.5% of total)
- 80 mm – 129 mm = 2 *O.mykiss* (5% of total)
- 130 mm to 199 mm = 11 *O.mykiss* (27.5% of total)
- >200 mm = 0 *O.mykiss* (0% of total)
- Chinook >100mm = 2

Approximately 21% of the "soft" wood sites within Reach 2 still held water by July 2015 compared to 55% of the "excavated" sites. Salmonid abundance was greatest in the excavated sites and lowest on the soft wood placement site. No action sites (no wood placement) held more *O.mykiss* compared to the soft wood placement sites.

Rock Creek – Elk Song Ranch – A restoration opportunity developed in 2015 along 5.32 miles of Rock Creek that is contiguous with the Rock Creek Phase II restoration work. The Fish Habitat project required information on fish distribution, densities, and age composition for the planning stage of their work, therefore the RM&E project conducted presence/absence snorkel surveys to provide these data between 9/28/2015 and 10/1/2015. Based on the logistics of access for the purpose of these surveys Rock Creek was divided into three contiguous reaches with Reach 1 being the most downstream (2,524 meters), moving upstream to Reach 2 (4,661 meters), and then to Reach 3 (1,376 meters) (Figure 19). There were 20 juvenile Chinook and 85 juvenile *O.mykiss* observed in the presence/absence surveys on the Elk Song Ranch. All Chinook were <100mm in length with their distribution extending to the upper property boundary at approx. river kilometer 14.4 (river mile 9) (Figure 19). Juvenile Chinook and *O.*mykiss were observed throughout Reach 2 but low water did not allow for snorkel surveys of the majority of the reach. Mean water temperature for all snorkeled pools/fast water was 8.3 °C with a minimum of 4 °C.

Age distribution for *O.mykiss* was mostly young-of-the-year:

- <80mm = 48 fish (56% of total),
- 80-129mm = 26 fish (31% of total),
- 130-199mm = 6 fish (7% of total),
- >200mm = 5 fish (6% of total),

Densities of Chinook were averaged between the two reaches and estimated as 5.5 fish/100m^2 and *O.mykiss* were estimated as 24.7 fish/100m^2.

Dark Canyon Creek – The 0.5-mile (805 meter) survey reach for Dark Canyon Creek had 545 juvenile Chinook and 425 *O.mykiss* on 8/19/2015. Size class and total observed each year 2010 to 2015 for Chinook and *O.mykiss* are shown in Table 8, and the percent of fish by size class is in Table 9. Size class for *O.*mykiss has been predominantly young-of-the-year (<80mm) each year of survey. Juvenile *O.mykiss* densities in 2015 were 40.9/100m^2 and were above those seen pre-restoration in 2010, but below those of 2012 and 2013 (49.1/100m^2 and 46.5/100m^2 respectively). Mean water temperature for the survey was 18.3 °C.

Chinook were not observed in 2010 (pre-project) and were at the highest density in 2015 compared with 2011 to 2014 data, with an estimate of 55.2 Chinook/100m^2. Chinook densities in 2015 were higher than that recorded for *O.*mykiss for the first time since 2011. Densities of Chinook for 2014 were the lowest post-restoration, with 1.1 Chinook/100m^2 compared to 23/100m^2 in 2011, 20.8/100m^2 in 2012, and 29.8/100m^2 in 2013 (Table 10). There were nine Chinook observed in 2015 that were greater than 100mm in length. This size of Chinook had not been observed on Dark Canyon Creek in prior surveys.

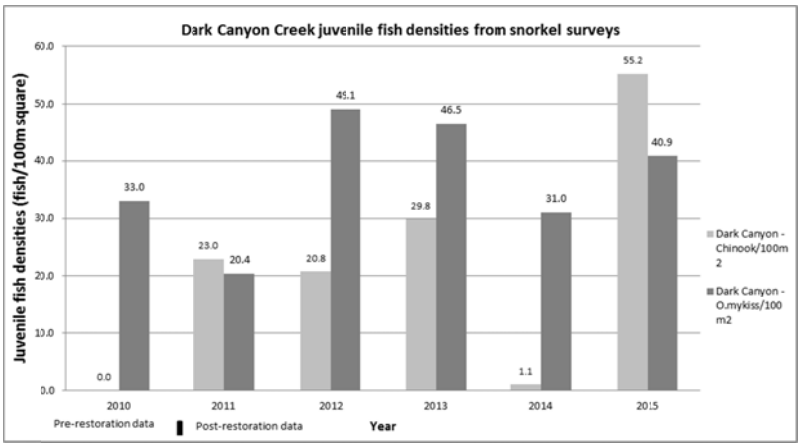
TABLE 8 DISTRIBUTION AND NUMBER BY SIZE CLASS FOR JUVENILE O.MYKISS AND CHINOOK IN DARK CANYON CREEK 2010 (PRE-PROJECT) TO 2015.

	O.mykiss					Chinook		
Year	<80mm	80-129mm	130-199mm	>200mm	Total	<100mm	>100mm	Total
Pre-restoration 2010	286	23	5	2	316	0	0	0
Post-restoration 2011	146	45	4	2	197	207	0	207
2012	297	158	40	2	497	178	0	178
2013	281	113	16	3	413	237	0	237
2014	177	30	3.5	0	211	7	0	7
2015	330	40	48	7	425	536	9	545

TABLE 9 DISTRIBUTION AND NUMBER BY SIZE CLASS FOR JUVENILE O.MYKISS AND CHINOOK IN DARK CANYON CREEK 2010 (PRE-PROJECT) TO 2015.

Dark Canyon Creek *O.mykiss*				
Year	**<80mm**	**80-129mm**	**130-199mm**	**>200mm**
2010	91%	7%	2%	1%
2011	74%	23%	2%	1%
2012	60%	32%	8%	0%
2013	68%	27%	4%	1%
2014	84%	14%	2%	0%
2015	78%	9%	11%	2%

TABLE 10 DENSITY OF JUVENILE SALMONID SPECIES WITHIN AN 803-METER SECTION OF DARK CANYON CREEK 2010 TO 2015.



McCoy Creek McCoy Meadows – The McCoy Creek restoration project area is divided into three contiguous 751-meter reaches with Reach 1 being the most downstream and Reach 3 the upstream. There were 21 juvenile Chinook and 44 *O.mykiss* observed in snorkel surveys on McCoy Creek in 2015. The number of Chinook was the highest recorded (four being observed in 2011) and all observed Chinook were <100mm in length. There were 7 Chinook in Reach 2 and 14 in Reach 3. Densities were estimated as 1.4 fish/100m^2.

There were no snorkel surveys in 2012, and data for 2014 was incomplete so was excluded from this summary. For *O.mykiss,* 2015 had the fewest observed juveniles compared to 2011 and 2013 (79, and 112 total respectively) and the lowest density (3.1 *O.mykiss*/100m^2) compared to 2011 (18.4/100m^2) and 2013 (7.7/100m^2). Reach 1 (the most downstream reach) had one *O.*mykiss and no Chinook in 2015. This reach has had the lowest number of fish observed each survey compared to the other two reaches (16 in 2011, and 18 in 2013) and has been predominantly 80-129mm fish. Size distribution and percent of total for each size class for McCoy Creek is displayed in Table 11. McCoy Creek snorkel surveys in 2011 and 2013 had 80-129mm and 130-199mm as the dominant size class, however, the 2015 data shows young-of-the-year (<80mm) to be the most abundant size class (concentrated in Reach 3).

TABLE 11 SIZE CLASS OF JUVENILE *O.MYKISS* ON MCCOY CREEK FOR THREE SURVEYS. NUMBERS IN COLUMNS SHOW SAMPLES SIZES WITH PERCENT OF TOTAL SALMONIDS OBSERVED FOR THAT YEAR IN BRACKETS.

McCoy O.mykiss				
Year	**<80mm**	**80-129mm**	**130-199mm**	**>200mm**
2011	0 (0%)	42 (53%)	33 (42%)	4 (5%)
2013	7 (6%)	48 (43%)	48 (43%)	9 (8%)
2015	18 (41%)	11 (25%)	11 (25%)	4 (9%)

Catherine Creek – Southern Cross - CRITFC conducted the spawning survey for the entire stream length (1,600 meters) of the Southern Cross property on 8/3/2015. There were 560 juvenile Chinook and five adults observed in the survey. The majority of juvenile Chinook were <100mm, with five being >100mm. There were 556 juvenile *O.mykiss* observed. Mean water temperature was 19.3 °C for the survey.

Age distribution for *O.mykiss* was mostly young-of-the-year:

- <80mm = 491 fish (88.3% of total),
- 80-129mm = 40 fish (7.2% of total),
- 130-199mm = 22 fish (4% of total),
- >200mm = 3 fish (0.5% of total)

Discussion

Rock Creek-sub watershed:

For the Rock Creek sub-watershed, although there were definitely spatial improvements in the distribution and abundance of steelhead redds within two streams of the restoration project, 2015 data should be viewed in the context of the comparatively larger numbers of adult returns within the Basin and the high detectability of redds, not necessarily viewed as a direct outcome of the restoration actions. Certainly steelhead were seen spawning in areas not previously recorded since surveys began in 2011, but whether this is the result of an anomalous spawning season or not is unclear from the current data. Should the pattern of expansion of redds into previously unoccupied areas continue in future surveys with moderate adult returns then inference about the outcomes of restoration actions may be drawn providing the exploration of changes in spawning habitat suitability is also investigated. The lack of redds within some of the tributaries such as Graves Creek, which had seen six redds in 2012 and one in 2014, may be due to a low flow year rendering these tributaries less suitable at the time of spawning.

Documenting the distribution and abundance of steelhead redds within the Elk Song Ranch, even in a high adult return year, was an important step in the planning of restoration actions. The property had changed ownership in 2014 and the new owner has a great deal of interest in conservation measures on the ranch. By allowing access to CTUIR staff to document adult spawning and juvenile rearing the landowner has enabled a data gap on ESA fish distribution, size class, and abundance to be filled within this sub-watershed. The presence of juvenile Chinook up to river mile 9 had not been documented before, and these data along with the densities/distribution of juvenile *O.mykiss* will provide spatial reference to allow for targeted habitat improvement actions.

The presence of an adult male Chinook on Rock Creek, discovered by CRITFC in one of their CHAMP sites, is an unusual occurrence in recent history for this stream. At the time of discovery, flows within rifles were possibly too low to allow the adult to move from the pool beneath the excavated wood structure. Spawning surveys within biomonitoring reaches will be expanded to cover the Phase II and Phase III project areas, although at the time of writing it seems unlikely that Rock Creek will be a frequent Chinook spawning area due to the flow conditions.

Meadow Creek sub-watershed (McCoy Creek and Dark Canyon Creek):

Dark canyon creek has continued on a trend of increasing the distribution of steelhead redds since the habitat restoration work in 2010. Allowing for the comparatively large number of adult returns in 2015 and only comparing 2010 to 2014 data the spatial changes of redds to cover the entire restoration area is still evident. The presence of juvenile Chinook in the survey reach has increased each year (with the exception of 2014) to a point in 2015 where more Chinook were observed than *O.mykiss* in any season of survey. When examining water temperature for Dark Canyon Creek compared to those of the Grande Ronde River upstream of Meadow Creek confluence it appears that water temperature in June was colder in the Grande Ronde River for 2014 (the low juvenile Chinook season), but not for the other years of survey.

Low flow conditions will likely prevent this stream from having Chinook spawning; however, it appears to be an increasingly important rearing area. The presence of a small number of larger (>100mm) juvenile Chinook is worth noting, as this size class had not been observed in the prior 5 seasons of survey. Whether these were precocial fish, young-of-the-year that had reared higher up in the Grande Ronde River and moved into the tributary by August is unknown. However, the increasing use of Dark Canyon Creek by juvenile Chinook may warrant further investigation to understand the movement patterns and rearing preferences being displayed, compared to that of main stem Grande Ronde juveniles, and the affect Chinook numbers might have on steelhead rearing distribution. In 2015 there were 36 steelhead redds within the restoration project area (the largest number recorded since surveys began in 2010), it is therefore not unreasonable to assume that young-of-the-year steelhead will be in great abundance in summer 2016. Repeat snorkel surveys should be carried out to quantify both species density and distribution. In addition there could be presence/absence snorkel surveys conducted upstream of the existing survey section to determine the upstream extent of Chinook distribution within the project area. The capture, collection of genetic samples, and pit tagging of juvenile Chinook could be used to determine their genetic origin, track fish to Lower Granite Dam and then use these data to compare with survival rates and arrival timing of juveniles tagged in the Upper Grande Ronde screw trap.

McCoy Creek had the lowest abundance of juvenile steelhead since 2011, even though there were five redds within the snorkeled PHaMS reach in 2015 compared to zero in 2011 and 2013. Chinook spawning in 2014 is a likely source for the juvenile Chinook seen in 2015, and possibly the source for some of the Dark Canyon Creek juveniles. However, Dark Canyon Creek surveys have recorded juvenile Chinook each year since 2011 when there has been no known spawning in nearby McCoy Creek or Meadow Creek. The spatial distribution of ESA fish within the McCoy survey area has consistently favored the upper two reaches. Although there were 21 juvenile Chinook and 44 *O.mykiss* observed in the 2015, their distribution was within the upper two reaches with only one *O.mykiss* observed in the downstream reach (Reach 1). Current data for this project does not explain why a third of the restoration project area is not being used by salmonid species. This section of McCoy Creek is included in the PHaMS sites and is scheduled for survey in summer 2016. Data from these surveys will be used to determine if there are significant differences in habitat characteristics/availability between the three reaches.

Catherine Creek – Southern Cross:

The data from 2015 on fish distribution, densities, and size classes along 1,600 meters of Catherine Creek within the boundaries of the Southern Cross property will be used as the baseline data for comparison with post-restoration fish abundance in the new channel alignment. Morphological data collected by the Biomonitoring project crew will also be used for similar comparisons.

The largest size class of *O.mykiss* being young-of-the-year is not surprising for this section of stream. Data from the Fish Habitat Project's fish salvage operations in July 2015 300 meters upstream from the upper property boundary had 4,204 *O.mykiss* of which 3,596 were <80mm (85%). The salvage operation upstream in July 2015 recovered 1,476 Chinook. There were 560 juvenile Chinook observed in the snorkel survey conducted by CRITFC, with five being >100mm.

Adaptive Management

Intensive habitat monitoring efforts in the Grande Ronde Basin are undertaken by the Columbia Habitat Monitoring Program (CHaMP), and CTUIR Biomonitoring Project. The goal of CHaMP is to generate and implement a standard set of fish habitat monitoring (status and trend) methods in 26 watersheds throughout the Columbia River Basin. However, these efforts may not be at an appropriate spatial scale to make inferences about specific restoration project effectiveness at meeting objectives. For example, there are approximately 131 CHaMP sites within the Upper Grande Ronde with an average stream length surveyed of 200 - 300 meters for each site (stream length surveyed is dependent upon bank full width). The CHaMP sites are randomly selected and therefore do not specifically target restoration areas. Those sites that do fall into the boundary of fish habitat projects generally only cover 7% to 20% of the actual restoration projects treated stream length. While the metrics gathered by the CHaMP program produce much needed baseline data, are in a standardized format, and can provide trend data over a large geographic area, the direct comparison of fish response to habitat restoration actions needs further investigation.

Adaptive management requires the exploration of alternative ways to meet management objectives. Through partnerships, shared knowledge, pooling of resources, and dissemination of monitoring data it is possible (and necessary) to examine the effects restoration projects have on ESA species at an appropriate scale. By providing this information to restoration planners in a timely manner their actions can be guided by what benefits there are to the target species, and what actions meet the objectives of the project. By implementing an adaptive management strategy, the Grande Ronde Basin partners have been able to examine the scale of action effectiveness monitoring within the Basin and adopt an existing approach (PHaMS) (Jones, O'Daniel, Beechie, Zakrajsek, & Webster, 2013) that fits with the size and scope of current trends in restoration work. It has been an important aspect of this management strategy that the partnership uses the established protocols of the CHaMP program. Field crews and biologists operating in the Grande Ronde Basin are already familiar with implementing the CHaMP protocols, albeit not at the scale of PHaMS, and will therefore be able to integrate their existing skill sets and experience with this whole restoration reach approach to monitoring and evaluation.

2015 Water Temperature Monitoring

Water Temperature 2015 Summary

During 2015, thirty two temperature probes were deployed within the Grande Ronde Basin, all recording at 1-hour intervals. Three of these loggers were new deployments for 2015 at the upstream and downstream boundaries of the Southern Cross project on Catherine Creek and one was placed in the headwaters of Rock Creek. The primary objectives of monitoring stream temperatures are to track changes at existing or proposed habitat restoration projects before and after work are completed.

Summary statistics were calculated for each probe that included the number of records when temperatures were at or exceeded the DEQ lethal limit of 25ºC, the number of records when temperatures were at or exceeded 20ºC, and when temperatures were within a range of 10ºC to 15.6ºC (the preferred temperature range of juvenile Chinook salmon – as cited by Yanke et. al. 2003). The number of days when the mean temperature was at or exceeded the DEQ standard of 17.8ºC was also calculated. Diurnal fluctuations in water temperature were also plotted.

The following summary of water temperature data will be broken down into an overview of each sub-watershed area which includes: the Upper Grande Ronde River, Meadow Creek, McCoy Creek, Dark Canyon Creek, Rock Creek, and Catherine Creek. A summary of temperature metrics for the Upper Grande Ronde and sub-watersheds can be seen in Table 14.

Grande Ronde Watershed

Eight probes were deployed along the Upper Grande Ronde River from Hilgard State Park to Starkey Meadows. During 2015 these probes recorded data for 59-186 days (between 4/17/2015 and 10/20/2015). There were 1089 records removed from the dataset due to either a probe being out of the water or similar reported problems, leaving 30,039 hours logged for analysis. During 2015 there were 0 records at the lower site below Vey Meadows (GR4) for temperatures >= 25°C. There were 43 records of temperatures >= 20°C. Although it should be noted that there were only 1382 records at the GR4 site from April 17th to June 15th.

- The probe below the Vey Ranch (GR4) had 0 hours of lethal limits recorded compared to 1 at the probe above the acclimation facility (GR5). There were 43 records of temperatures >=20°C at GR4 and 60 records at GR5. Approximately 39.9% of the deployment period at GR4 site was in 10-15.6 °C range compared to 37.2% at GR5, and GR4 had 1 days recorded with a mean >= 17.8 °C compared to 0 at GR5.
- Comparisons with other years show:
    1. GR4 had the lowest number of lethal limit and temperature >=20ºC since 2010 (highest was in 2013). GR4 had the second highest percent of time in the 10-15.6ºC range (lowest was in 2013), and the lowest number of days with a mean daily temperature >=17.8ºC since 2010 (highest was in 2013), although is also had the lowest number of records over the same time period (1392).
    2. GR5 had 60 hours with temperatures >=20ºC in 2015 compared to 6 hours in 2014 and 0-9 in other years. The percentage of time in the 10-15.6ºC range was second lowest in 2015 than all other years since records began in 2010.

Meadow Creek Watershed

The CTUIR Fish Habitat Project had 11 probes deployed in 2015 within the Meadow Creek Watershed covering 4 streams – Battle Creek, Meadow Creek, McCoy Creek, and Dark Canyon Creek. The probe data was then grouped by project for this report. The projects were:

- Dark Canyon (landowner Joe Cunha), with 2 probes – DC1 and 2 at river miles 0.06 and 1.9 respectively.
- McCoy Meadows Ranch (landowner Mark and Lorna Tipperman) McCoy Creek, with 3 probes – MCCOY1, 6, 7 at river miles 2.7, 1.5, and 0.1 respectively.
- McCoy Meadows Ranch (landowner Mark and Lorna Tipperman) Meadow Creek and the Wetland Complex, with 2 probes – MEADOW1 and 2 on mainstem Meadow Cr at river mile 2.9 and 1.5 respectively.
- Meadow Creek Habberstad (landowner John Habberstad), with 3 probes – MEADOW5 and 6 at river mile 7.53 and 6.77 respectively and BATTLE1 on Battle Creek at river mile 0.04.

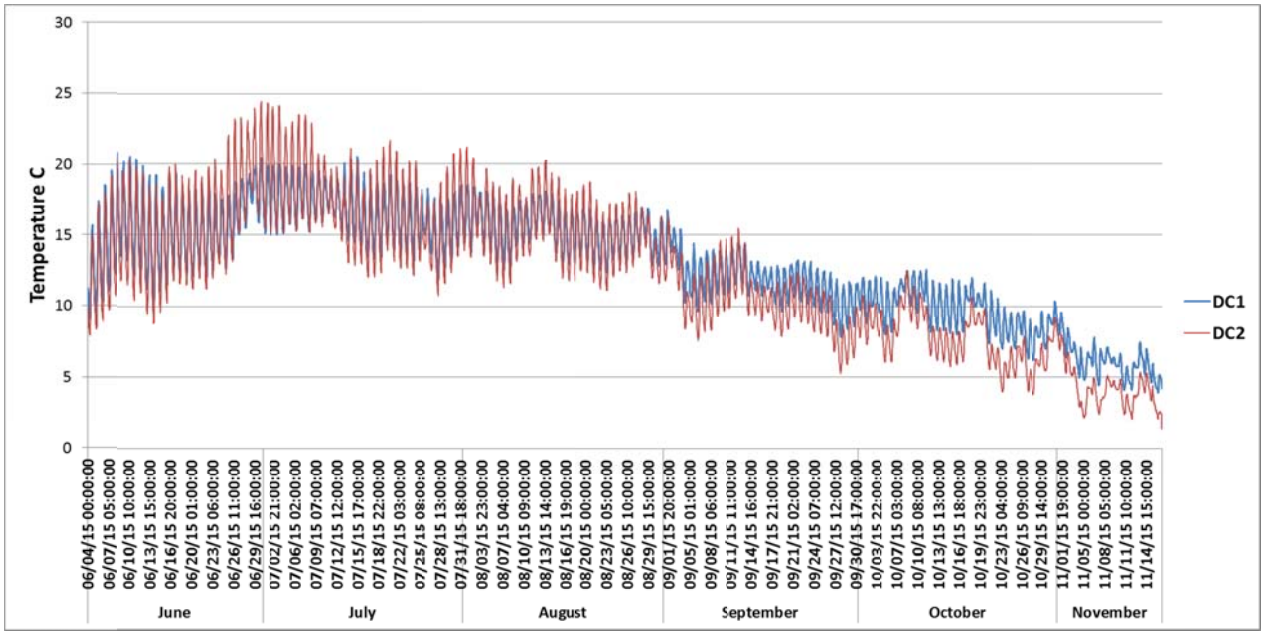
Dark Canyon Creek

The two probes along Dark Canyon Creek were deployed from 6/3/2015 to 11/17/2015 and logged a combined total of 7,968 hours of water temperature. There was a combined total of

3,429 records where water temperature was between 10ºC and 15.6ºC (an average of 43.0% of all logged temperatures for these two sites).

- No records of lethal limits (>= 25ºC). There were 202 records of temperatures >= 20°C.
- The upper site had 14 days and the lower site had 3 days where the mean daily was >=17.8ºC.
- The upper site had 36.6% of its logged temperatures between 10ºC and 15.6ºC (1,460 hours) compared to 49.4% for the lower site (1,969 hours).
- The upper site had fewer hours >=20 °C in 2015 compared to previous 3 years (180 hrs).
- The lower site had the second lowest hours >=20 °C in 2015 compared to previous 3 years (22 hrs).
- The upper site had a maximum temperature of 24.4ºC compared to 20.8ºC at the lower site, recorded 6/8/2015.

FIGURE 31 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ALONG DARK CANYON CREEK DURING 2015.



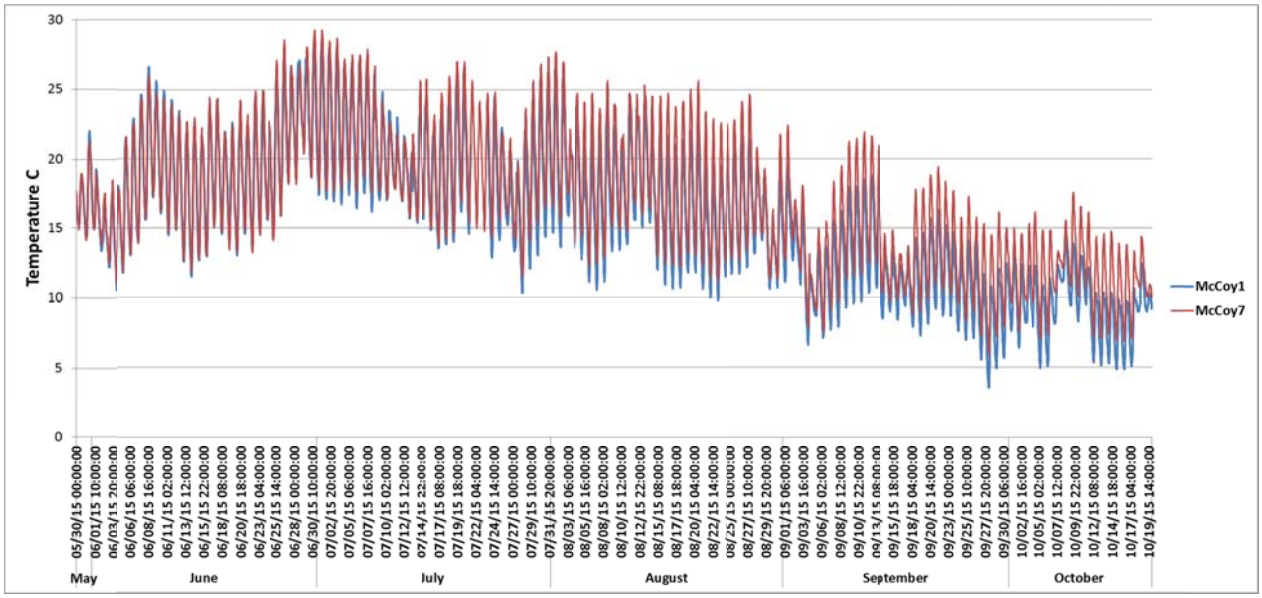
McCoy Creek

There were a total of 10,092 hours of data from 3 probes for the analysis collected between 5/29/2015 and 10/20/2015. Combining the data for the probes gave a total of 3,663 hours when water temperature was between 10ºC and 15.6ºC (an average of 35.6% of the data).

- A total of 447 hours logged when temperatures reached 25ºC or higher.
    - The upper site on McCoy Creek in 2015 had the highest maximum temperature (30.1 ºC), while the lowest site had the greatest number of records at lethal limits (171 hrs), greatest number of records where temperatures were >=20 °C (997 hrs) and the middle site had the greatest percent time in 10-15.6 °C range compared to the other 2 sites (37.8%).

    - All 3 sites had the second highest maximum temperature since 2010 (2013 being the one year that was warmer).
    - The most downstream site had the second highest number of temperature records >=20ºC and the third highest >=25ºC since 2010 (2013 being the one year that lower and middle sites respectively had a higher number of records).
    - The mid property site was tied for the highest percent time in 10-15.6ºC range compared to records from that site since 2010.
    - The upper site had the highest number of days with a daily mean >=17.8ºC, while the middle and lower sites had the second highest number of days with a daily mean >=17.8°C since 2010
- There were a total of 2,675 records of temperatures >= 20°C,
    - MCCOY1 recording 840 hours,
    - MCCOY6 recording 838 hours,
    - MCCOY7 recording 997 hours.
- Mean daily temperatures were >=17.8ºC on a maximum of 71 days at river mile 0.1 (see Table 14).

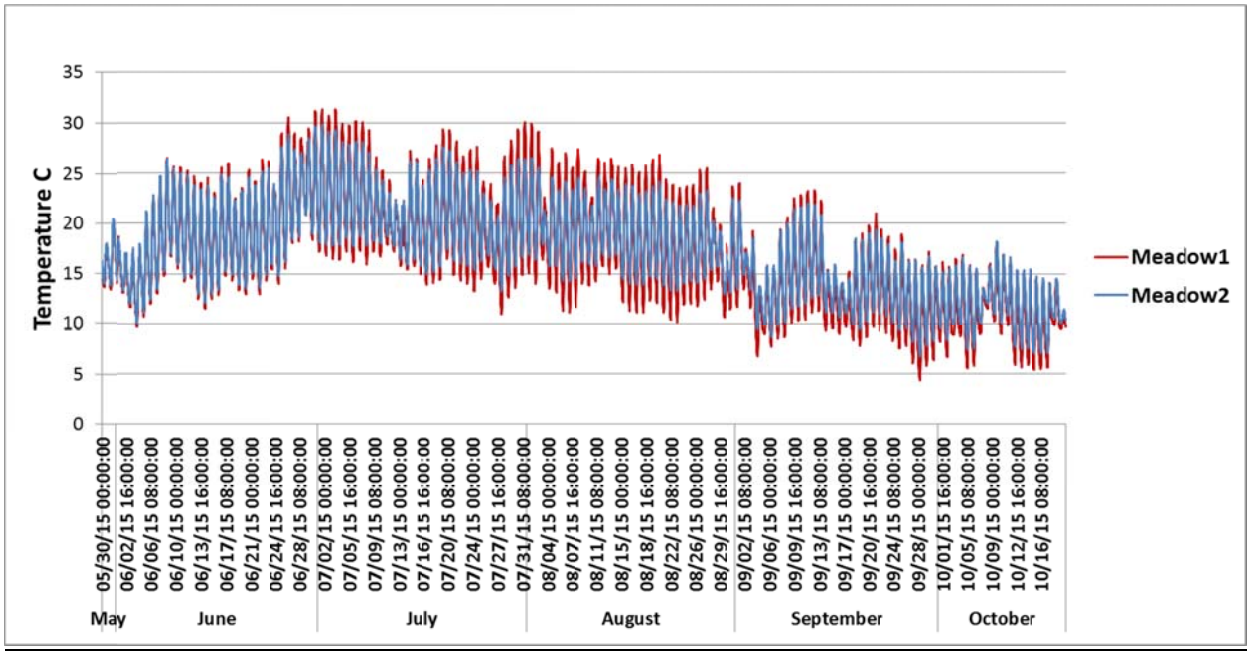
FIGURE 32 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ALONG MCCOY CREEK DURING 2015.



Meadow Creek

The probe at river mile 2.9 (MEADOW1) was deployed for 144 days between 5/29/2015 and 10/20/2015 and the probe at river mile 1.5 (MEADOW2) was deployed for 144 days between 5/29/2015 and 10/20/2015. They recorded a total 6,864 hours of data for the analysis.

FIGURE 33 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ALONG MEADOW CREEK DURING 2015.

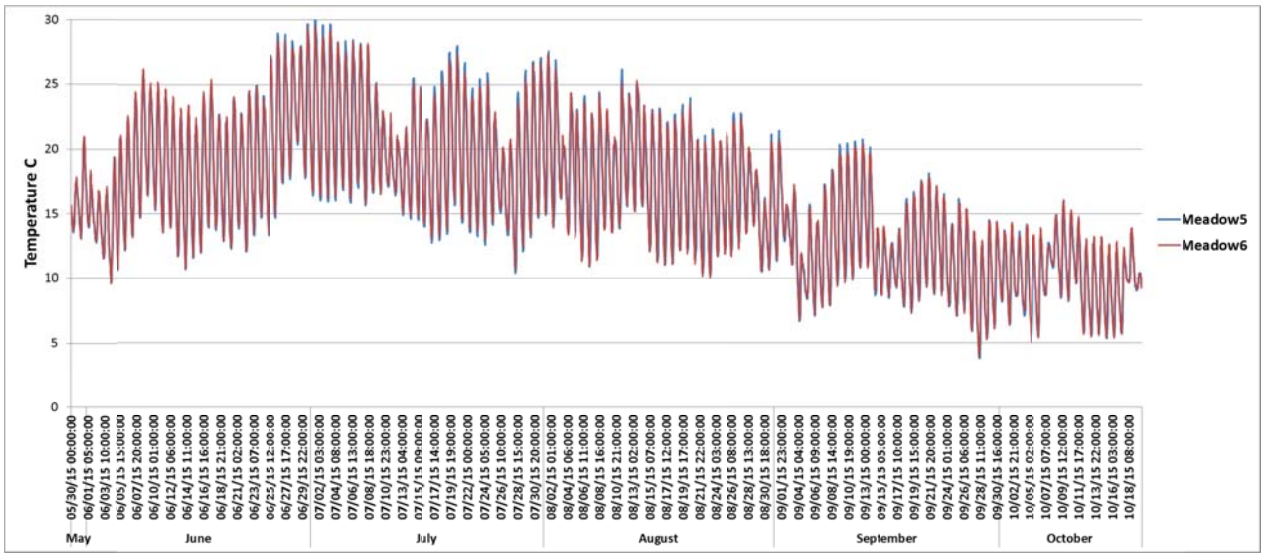


Meadow Creek Habberstad Property

Meadow Creek - Habberstad

Two probes were deployed on Meadow Creek within the Habberstad restoration project. These probes were at river mile 7.53 (MEADOW5), and 6.77 (MEADOW6) and were deployed for 144 days from 5/29/2015 to 10/20/2015 for a total of 6,865 hours for analysis.

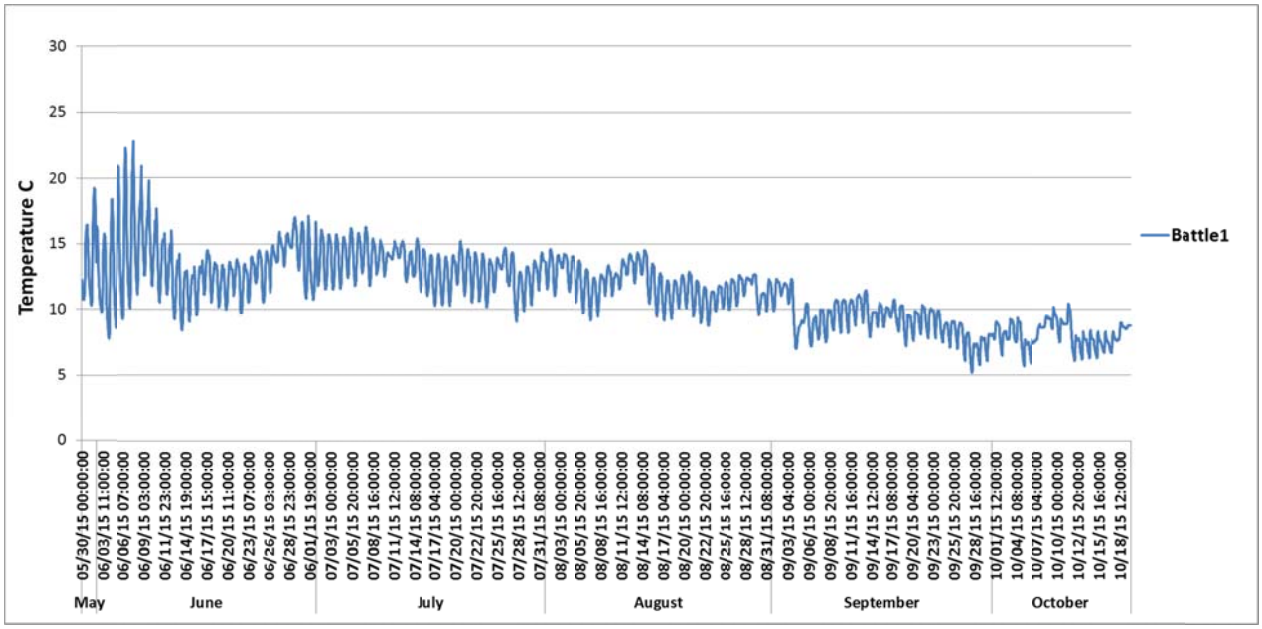
FIGURE 34 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE AT TWO LOCATIONS ON MEADOW CREEK DURING 2015 WITHIN THE HABBERSTAD PROJECT AREA.



Battle Creek - Habberstad

There was one probe deployed on Battle Creek during 2015 at river mile 0.04 between 5/29/2015 and 10/26/2015 for a total of 3,432 hours for analysis.

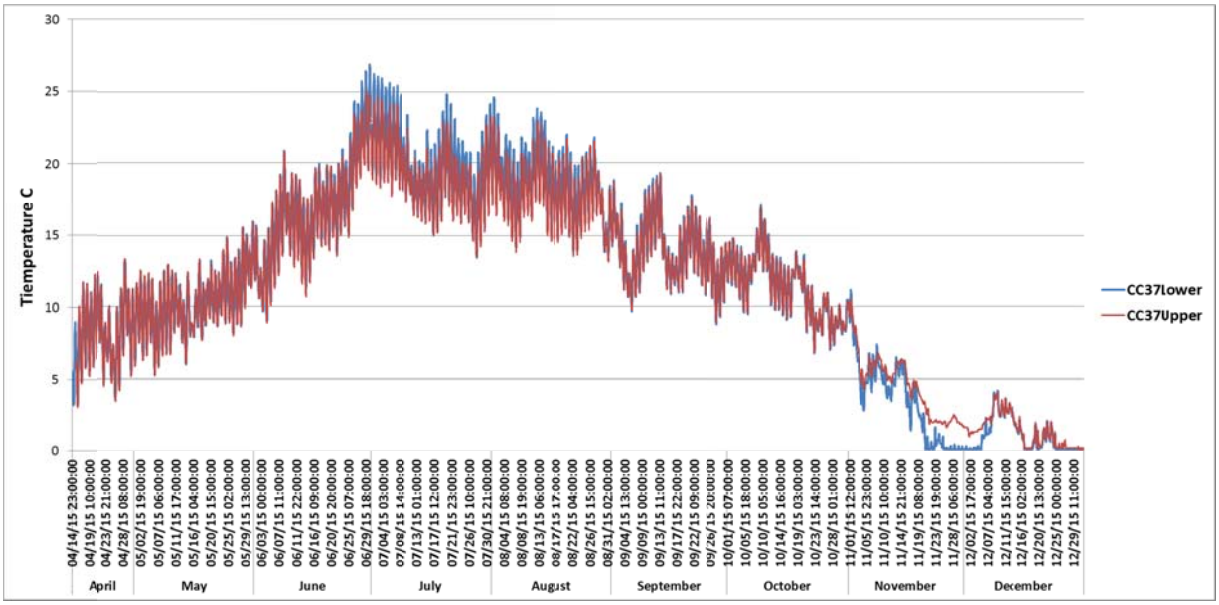
FIGURE 35 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ON BATTLE CREEK DURING 2015 WITHIN THE HABBERSTAD PROJECT AREA.



Catherine Creek 37

Two probes were deployed within the boundaries of the Catherine Creek (RM37) project in order to monitor the CC37 Fish Habitat Enhancement Project, constructed July-August, 2012. The upper probe at river mile 24 had 6,240 hours for analysis compared to the lower probe at river mile 37 (6,265 hours). Lethal limits were recorded for 1 hour at the upper probe and 48 hours at the lower probe.

FIGURE 36 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ON CATHERINE CREEK (CC37) DURING 2015.



Catherine Creek 44

To monitor water quality (temperature) within the Catherine Creek River Mile 44 (CC44) Project area CTUIR deployed 3 Hobo Pendant temperature probes within the boundaries of several property owners. All 3 probes deployed from 4/14/2015 to 11/02/2015 for a total of 202 days with a total of 14,449 hours recorded for analysis. The most downstream probe (CC44 Ricker- river mile 38) had the highest number of lethal limits recorded at 28 hours, followed by the CC44 lower probe , river mile 40 (16 hours) and 5 hours for the CC44 Upper probe (river mile 44).

FIGURE 37 DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ON CATHERINE CREEK (CC44) DURING 2015.

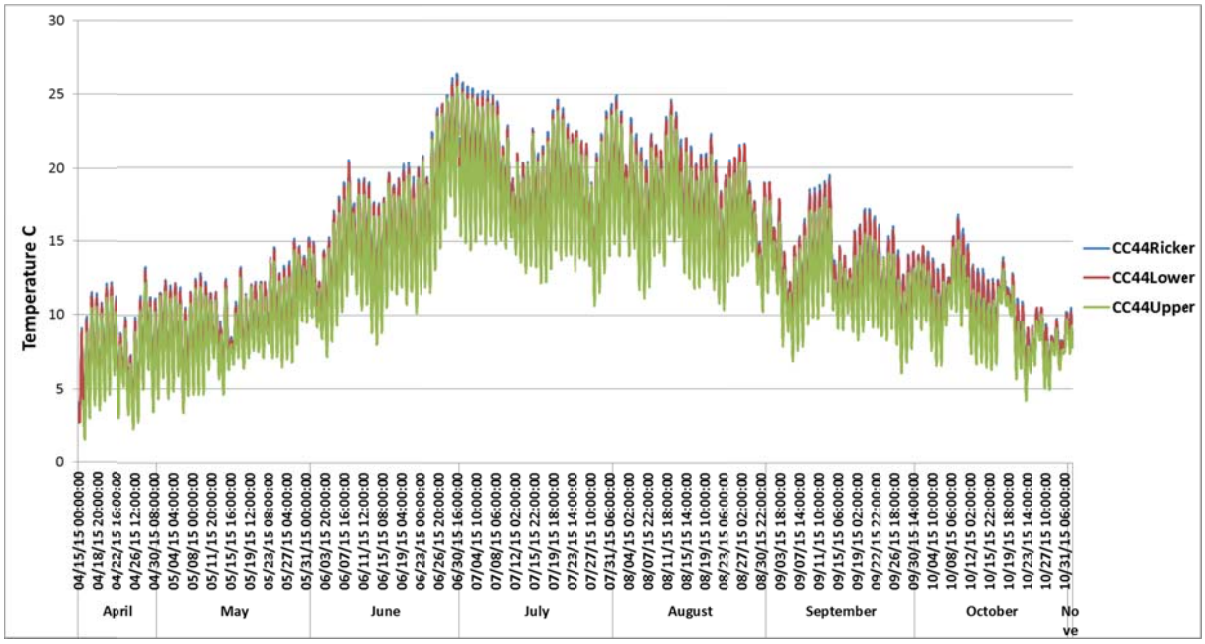


TABLE 12 WATER TEMPERATURE PROBE METRICS FOR 32 SITES IN THE UPPER GRANDE RONDE, MAINSTEM GRANDE RONDE, ROCK CREEK, MEADOW CREEK, DARK CANYON CREEK, MCCOY CREEK, AND CATHERINE CREEK SUB-WATERSHEDS DURING 2015.

Stream	Location Name	River mile	Date Start	Date End	# of Days Deployed	# of Hours in Deployment Period	# of Hours For Analysis	Max Temperature (°C)	Hours >=25 ºC	Hours >=20 °C	Hours at 10-15.6 °C	% at 10-15.6 °C	Daily temp >= 17.8 (# days)
Dark Canyon Creek	DC1	0.06	6/3/2015	11/16/2015	166	3984	3984	20.8	0	22	1969	49.4	3
Dark Canyon Creek	DC2	1.90	6/3/2015	11/16/2015	166	3984	3984	24.4	0	180	1460	36.6	14
Battle Creek	BATTLE1	0.04	5/29/2015	10/26/2015	150	3600	3432	22.8	0	0	2173	63.3	0
Grande Ronde River	GR1	176.20	4/21/2015	10/20/2015	182	4368	4344	30.2	508	2092	3557	81.9	77
Grande Ronde River	GR3	174.70	4/21/2015	10/20/2015	182	4368	4344	30.1	504	2210	3383	77.9	78
Grande Ronde River	GR4	194.23	4/18/2015	6/15/2015	58	1392	1392	23.1	0	43	556	39.9	1
Grande Ronde River	GR5	199.70	4/18/2015	10/19/2015	184	4416	4440	22.0	0	60	1651	37.2	0
Grande Ronde River	GR9	182.50	4/22/2015	10/19/2015	180	4320	3423	29.5	166	819	1774	51.8	60
Grande Ronde River	GR10	169.60	4/22/2015	10/19/2015	180	4320	4344	30.0	300	1175	1777	40.9	80
Grande Ronde River	GR11	186.60	5/29/2015	10/20/2015	144	3456	3432	27.8	83	589	1427	41.6	38
Grande Ronde River	GR12	186.00	4/23/2015	10/20/2015	180	4320	4320	28.2	115	667	1827	42.3	44
Graves Creek	GRAVES1	0.50	4/10/2015	8/12/2015	124	2976	2952	27.2	124	2746	0	0.0	123

McCoy Creek	MCCOY1	2.70	5/29/2015	10/20/2015	144	3456	3428	30.1	165	840	1141	33.3	58
McCoy Creek	MCCOY6	1.50	5/29/2015	10/20/2015	144	3456	3432	28.5	111	838	1297	37.8	60
McCoy Creek	MCCOY7	0.10	5/29/2015	10/20/2015	144	3456	3432	29.3	171	997	1225	35.7	71
Meadow Creek	MEADOW1	2.90	5/29/2015	10/20/2015	144	3456	3432	31.4	315	997	1169	34.1	72
Meadow Creek	MEADOW2	1.50	5/29/2015	10/20/2015	144	3456	3432	29.9	185	1033	1116	32.5	79
Meadow Creek	MEADOW5	7.53	5/29/2015	10/20/2015	144	3456	3433	30.1	186	858	1243	36.2	58
Meadow Creek	MEADOW6	6.77	5/29/2015	10/20/2015	144	3456	3432	29.5	183	919	1210	35.3	61
Rock Creek	ROCK1	0.23	4/10/2015	11/19/2015	223	5352	5328	37.8	449	972	1783	33.5	64
Rock Creek	ROCK2	1.70	4/15/2015	8/2/2015	109	2616	2568	25.5	6	510	872	34.0	43
Rock Creek	ROCK3	3.00	4/15/2015	6/27/2015	73	1752	1728	26.1	12	160	831	48.1	6
Rock Creek	ROCK4	4.50	5/29/2015	11/23/2015	178	4272	4056	24.5	0	208	2092	51.6	9
Rock Creek	RockAllen	7.00	4/10/2015	9/30/2015	173	4152	3744	31.5	246	778	1434	38.3	40
Catherine Creek	CC37LOWER	36.00	4/14/2015	12/31/2015	261	6264	6265	26.9	48	659	1909	30.5	61
Catherine Creek	CC37UPPER	37.00	4/14/2015	12/31/2015	261	6264	6240	25.1	1	459	2012	32.2	47
Catherine Creek	CC44LOWER	40.00	4/14/2015	11/2/2015	202	4848	4824	25.9	16	530	1955	40.5	42
Catherine Creek	CC44RICKER1	38.00	4/14/2015	11/2/2015	202	4848	4825	26.4	28	588	1941	40.2	48
Catherine Creek	CC44UPPER	44.00	4/14/2015	11/2/2015	202	4848	4800	25.5	5	357	1986	41.4	25
Catherine Creek	SOCROWLOWER	40.86	6/26/2015	11/2/2015	129	3096	3048	25.8	6	458	1257	41.2	36
Catherine Creek	SOCROWUPPER	41.56	6/26/2015	11/2/2015	129	3096	3072	25.6	8	433	1284	41.8	35

Land Acquisition Planning

Staff continued land acquisition planning under the CTUIR-BPA Accord Land Acquisition Project to identify and develop opportunities to protect key spawning and rearing habitat for Chinook and steelhead in the Upper Grande Ronde Subbasin.
Work consisted of:

- Communicating with real estate agents to identify land parcels currently and prospective on the market along the main stem Grande Ronde River, Meadow Creek, Catherine Creek, and Lookingglass Creek.
- Documentation of limiting factors, and preparation of prioritization criteria checklists consistent with the land acquisition strategy developed by the CTUIR and reviewed by the ISRP.
    - Several project prospects were identified and screened through the prioritization criteria. Internal coordination within the CTUIR government and fisheries program as well as coordination with BPA, landowners, and real estate agents is ongoing prior to development of a final list of projects that will be proposed for further assessment and prioritization. Several land acquisitions/perpetual easements were completed in FY 2105.

  Following is a list of land/easement acquisition projects that have been completed or are currently under review.

Joseph Cunha Ranch, LLC Perpetual Conservation Easement

Project staff worked with ODFW and the Rocky Mountain Elk Foundation (RMEF) on the planning and acquisition justification document for the Joseph Cunha Ranch, LLC Perpetual Conservation Easement. The RMEF were not able to continue with acquisition of the easement, therefore CTUIR engaged the Blue Mountain Land Trust (BMLT) to continue the process.

The project is located near Starkey, Oregon in Township 3 South, Range 35 East of the Willamette Meridian on portions of Sections 24, 25, and 36, Union County Tax Lot 500. The project encompasses approximately 2,928 acres of mixed coniferous forest, native grasslands, forested and shrub-scrub wetlands and riparian habitat along approximately 2.0 miles of Dark Canyon Creek and 1.0 mile of Meadow Creek. The project proposal is to purchase a perpetual conservation easement (CE) on the Joseph Cunha Ranch, LLC in the Upper Grande Ronde Subbasin. The CE will permanently protect 3 miles of critical habitat for Threatened Snake River Basin spring-summer Chinook salmon and summer steelhead along Meadow Creek and Dark Canyon Creek. Nearly 3,000 acres of critical big game winter range and a significant big game migration corridor in Oregon's Starkey Big Game Management Unit will be protected from future development and subdivision while providing opportunities to restore and enhance high quality instream, riparian, wetland, and upland forest and native grasslands. The property provides habitat for at least 20 Oregon listed sensitive species and one federal candidate wildlife species. An estimated half a million dollars (one third of the market value) is needed to secure the easement. Multiple funding sources were utilized by project sponsors to secure the conservation values of the property with cost sharing between the CTUIR Ceded Area Priority Stream Corridor Conservation and Protection Project/CTUIR-BPA Accord, Blue Mountain Land Trust and other conservation and user groups. The Cunha Ranch easement was finalized in late spring 2015.

Southern Cross Ranch

This 545-acre ranch includes .75 miles of Catherine Creek, approximately 78 acres of pasture/floodplain adjacent to Catherine Creek, and 3.78 acres of Palustrine Emergent wetlands. The majority of the Property has been in agricultural production throughout the ranch's history. The lower floodplain/riparian has been grazed by livestock and been used in hay production, the uplands have been grazed by livestock. The property has important conservation values for potential non-structural storage of floodwater, improved wetland and riparian habitats, increased hyporheic groundwater exchange, increased juvenile Chinook and Steelhead rearing habitat, improved adult Chinook and Steelhead spawning habitat, and improved upland deer and elk habitat. In 2013, Western Rivers purchased the ranch. The CTUIR Ceded Area Priority Stream Corridor Conservation and Protection Project/CTUIR-BPA Accord completed the purchase of the Ranch from Western Rivers in spring 2015 for the CC44 Southern Cross Phase III Project implementation.

Vey Ranch

The Vey Ranch is a key property in the Upper Grande Ronde Subbasin that has long been sought to restore spring-summer Chinook in the Grande Ronde. The property includes 36.75 miles of spawning and rearing habitat and 13,567 acres. All life stages of Threatened Snake River ESU spring-summer Chinook salmon, summer steelhead, and fluvial Bull Trout occur on the property. Limiting factors include excess fine sediment; water quantity (low summer flow); water quality (high summer water temperatures, pH); lack of habitat quantity/diversity (pools and large wood); degraded riparian conditions; winter icing, and fish passage. The likelihood of a potential project is very low.

Several attempts to communicate with landowner and initiate discussions to secure an easement or fee title acquisition have been unsuccessful. For the near term, this potential conservation property is uncertain and no further actions are planned until owner indicates an interest.

Lookingglass Creek

This property includes 2.34 miles of main stem Lookingglass Creek upstream from the Lookingglass fish hatchery. The property includes mixed conifer forest, native grasslands, and riparian/wetland (forest/scrub-scrub/emergent) (123 acres). All life stages of Threatened Snake River ESU spring-summer Chinook salmon (functionally extirpated, efforts underway to reintroduce natural populations), summer steelhead and bull trout. Limiting factors include fish passage/habitat access, habitat quantity/diversity (low pool frequency, lack of diversity, substandard stream-bank conditions), excess fine sediment, water quantity (especially low summer flows), channelization, degraded riparian condition, lack of floodplain connectivity, lack of spawning gravels, predation, poor water quality (high summer temperatures). The property was secured by the CTUIR under the Accord in late spring 2015.

Main stem Grande Ronde River (Starkey Reach)

This property includes 0.31 miles of main stem Grande Ronde River and 10.4 acres near Starkey, Oregon. Estimated land acquisition cost would be $70,000. Property includes habitat for all life stages of Threatened Snake River ESU spring-summer Chinook salmon and summer steelhead. Passage and overwinter habitat for Threatened fluvial Bull Trout is also present within the property. Limiting factors include excess fine sediment, water quantity (low summer flow), water quality (high summer water temperatures), lack of habitat quantity/diversity (pools and large wood), and degraded riparian conditions.

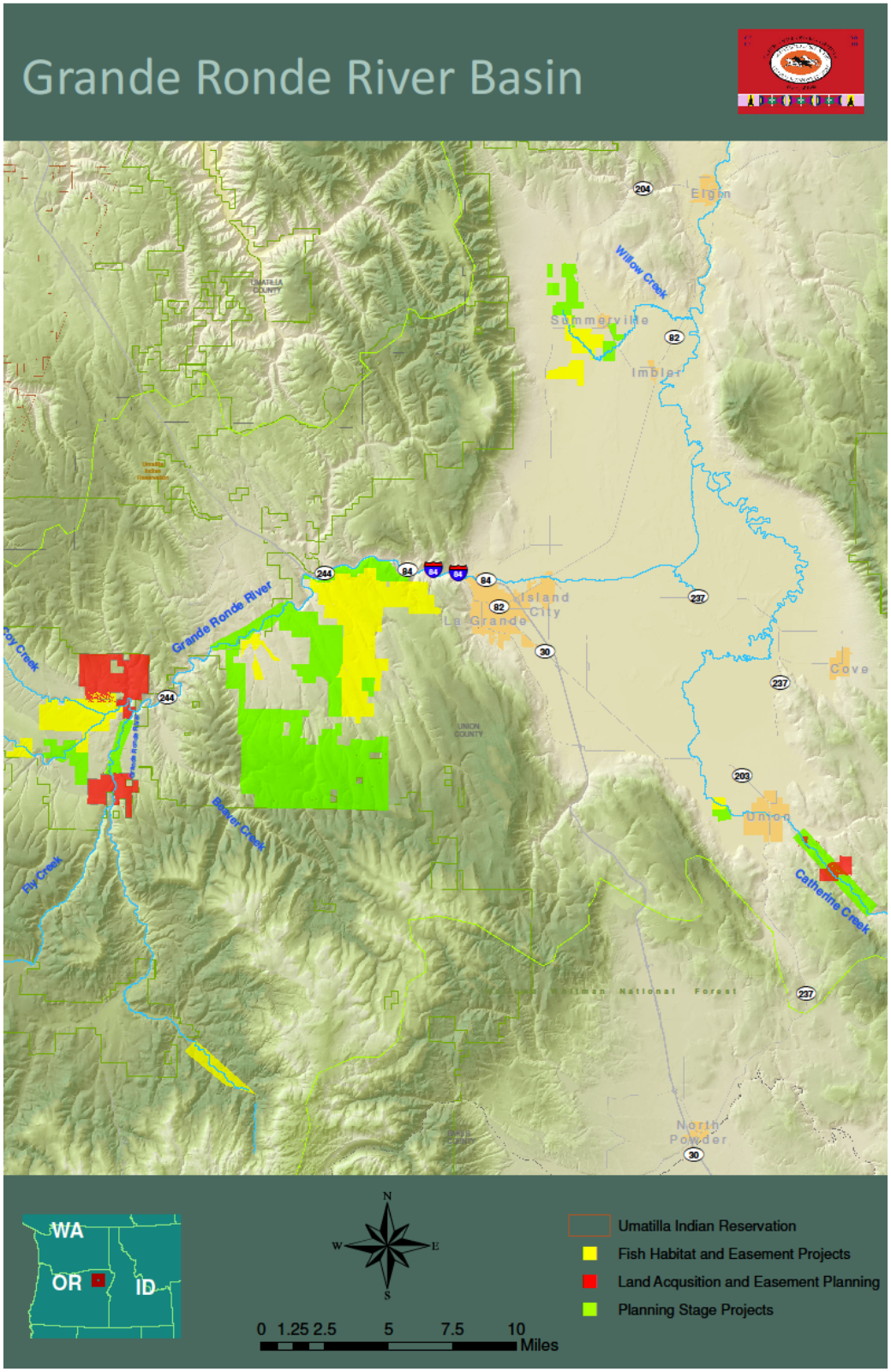
Property has been appraised, but landowner has elected to not accept the valuation. No further pre-acquisition activities are planned until the landowner re-engages. Property is currently listed for sale for value greater than appraised value.

Main stem Grande Ronde River and Warm Springs Creek

Property includes 0.76 miles of main stem Grande Ronde River and 1 mile of Warm Springs Creek and a total of 1,266 acres upstream from Starkey, Oregon. Property provides habitat for all life stages of Threatened Snake River ESU spring-summer Chinook salmon and summer steelhead with passage and overwinter habitat for fluvial Bull Trout. Limiting factors include excess fine sediment, water quantity (low summer flow), water quality (high summer water temperatures), lack of habitat quantity/diversity (pools and large wood), and degraded riparian conditions.

Property has been appraised, but landowner has elected to not accept the valuation. No further pre-acquisition activities are planned until the landowner re-engages. CTUIR staff continues to work with landowner on conservation and habitat restoration planning utilizing NRCS CREP program easements and Accord fish habitat funds.

FIGURE 38 CTUIR GRANDE RONDE SUBBASIN LAND ACQUISITION PLANNING OVERVIEW MAP.



Summary of Expenditures

The following figure illustrates the budget for the project during the period May 1, 2013 through April 30, 2015. The final budget is pending close out of all invoices and billings and will be updated by the CTUIR accounting department following contract closure within 30 days of the contract end data.

FIGURE 39 EXPENDITURES FOR FY 2015

Confederated Tribes of the Umatilla Indian Reservation
R & E with Comm - Grant Period
Fiscal year thru period ending April 30, 2016

488 015 - BPA Grande Ronde Subbasin Restoration 5/01/15 - 4/30/16	Current Month Actual	Year to Date Actual	Open Purchase Orders	Total Committed	Total Budget	Variance	% Used
Revenues							
488 015 4010 Grant/Contract Income	614,666.22	614,666.22	0.00	614,666.22	2,864,148.64	(2,249,482.42)	-21.50
Total Revenues	**614,666.22**	**614,666.22**	**0.00**	**614,666.22**	**2,864,148.64**	**(2,249,482.42)**	**-21.50**
Direct Expenses							
488 015 5000 Salaries & Wages	236,244.11	236,244.11	0.00	236,244.11	362,626.29	126,382.18	65.10
488 015 5010 Fringe Benefits	71,882.06	71,882.06	0.00	71,882.06	120,757.01	48,874.95	59.50
488 015 5101 Travel-Per Diem	2,653.60	2,653.60	0.00	2,653.60	5,538.00	2,884.40	47.90
488 015 5150 Training	1,750.00	1,750.00	0.00	1,750.00	5,570.00	3,820.00	31.40
488 015 5160 Auto Insurance	2,472.65	2,472.65	0.00	2,472.65	2,154.00	(318.65)	114.80
488 015 5190 Vehicle Expense	15,413.16	15,413.16	0.00	15,413.16	11,918.19	(3,494.97)	129.30
488 015 5210 Supplies	0.00	0.00	179.08	179.08	1,105.00	925.92	16.20
488 015 5225 Materials	9,283.90	9,283.90	3,262.41	12,546.31	39,576.42	27,030.11	31.70
488 015 5226 Books/Journals	0.00	0.00	0.00	0.00	836.00	836.00	0.00
488 015 5250 Non Capital Equipment	2,450.00	2,450.00	559.94	3,009.94	5,562.00	2,552.06	54.10
488 015 5400 Communications	1,247.18	1,247.18	561.19	1,808.37	9,067.34	7,258.97	19.90
488 015 5410 Postage & Freight	461.54	461.54	0.00	461.54	474.04	12.50	97.40
488 015 5430 Dues & Subscriptions	975.03	975.03	0.00	975.03	602.97	(372.06)	161.70
488 015 5432 Permits & Lisc.	0.00	0.00	0.00	0.00	154.00	154.00	0.00
488 015 5440 Equipment Rental	5,742.00	5,742.00	0.00	5,742.00	9,894.00	4,152.00	58.00
488 015 5441 Computer Lease	2,237.03	2,237.03	0.00	2,237.03	4,628.77	2,391.74	48.30
488 015 5450 Printing & Duplication	0.00	0.00	0.00	0.00	836.00	836.00	0.00
488 015 5460 Insurance	379.00	379.00	0.00	379.00	0.00	(379.00)	0.00
488 015 5470 Repairs & Maintenance	5,859.42	5,859.42	0.00	5,859.42	8,948.35	3,088.93	65.50
488 015 5480 Advertising	348.13	348.13	0.00	348.13	315.87	(32.26)	110.20
488 015 5770 Professional Services	0.00	0.00	0.00	0.00	4,500.00	4,500.00	0.00
Sub-Total	**359,398.81**	**359,398.81**	**4,562.62**	**363,961.43**	**595,064.25**	**231,102.82**	**61.20**
Pass-through Expenses							
488 015 6100 Subcontract fees	78,733.10	78,733.10	148,548.97	227,282.07	1,460,722.64	1,233,440.57	15.60
488 015 6300 Capital Equip-Gov't Funds	8,439.99	8,439.99	0.00	8,439.99	5,888.01	(2,551.98)	143.30
488 015 6350 Construct in Progress - Grant	11,278.00	11,278.00	0.00	11,278.00	0.00	(11,278.00)	0.00
488 015 6510 Utilities	95.05	95.05	0.00	95.05	4,404.95	4,309.90	2.20
Sub-Total	**98,546.14**	**98,546.14**	**148,548.97**	**247,095.11**	**1,471,015.60**	**1,223,920.49**	**16.80**
Cost of Goods Sold							
488 015 8500 Indirect	156,721.27	156,721.27	0.00	156,721.27	261,816.79	105,095.52	59.90
Total Expenses	**614,666.22**	**614,666.22**	**153,111.59**	**767,777.81**	**2,327,896.64**	**1,560,118.83**	**33.00**
Net Difference	0.00	0.00	(153,111.59)	(153,111.59)	536,252.00	(689,363.59)	28.60

Lessons Learned/Adaptive Management

The Grande Ronde Subbasin is one example of efforts to learn and adapt management programs through time. Historically, basin partners developed projects in an opportunistic approach. Projects were largely identified and developed with willing landowners based on course scale planning established through the Grande Ronde Subbasin plan completed in 2004. In 2013, basin partners initiated a strategic planning process (ATLAS) for Catherine Creek and the upper Grande Ronde watershed based on salmon and steelhead life history requirements to stratify the watersheds by biological significant reaches, assign relative importance of limiting factors, define key actions to address limiting factors, and develop a ranking and prioritization system to clearly identify geographic and reach priorities and both short and long term strategies to focus watershed restoration actions in areas with the most biological need and the highest probability of benefit. The process engaged multiple basin partners and leveraged the best available science and local expertise available to develop a road map that all partners can utilize to identify, develop, and implement strategic watershed and fish habitat restoration and enhancement projects. Transitioning opportunistic to strategic planning may be one of the most important adaptive management changes employed in the basin for prioritizing and strategizing work in Catherine Creek and the Grande Ronde river to address survival gaps for Snake River Spring-Summer Chinook and Summer Steelhead populations in the Grande Ronde Subbasin.

Additionally, the CTUIR Grande Ronde Fish Habitat Project continues to monitor and evaluate performance of projects and conservation measures developed to improve watershed and fishery resources in the Grande Ronde Subbasin. Post project construction and monitoring data, along with staff experience and collaboration with basin partners, collectively informs and helps improve our understanding of how different techniques and approaches to watershed and habitat restoration respond as well as develop new and innovative approaches to addressing habitat limiting factors for salmon and steelhead populations.

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