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CTUIR GRANDE RONDE SUBBASIN RESTORATION PROJECT

A Columbia River Basin Fish Habitat Project

Annual Report

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Project Overview

The **CTUIR Grande Ronde Subbasin Restoration Project**, initiated by the Confederated Tribes of the Umatilla Indian Reservation in 1996, is an ongoing effort to protect, enhance, and restore riparian and instream habitat for natural production of anadromous salmonids in the Grande Ronde River Subbasin. Project activities focus on improving juvenile rearing habitat with emphasis on restoring natural channel morphology and floodplain function, cold water refuge and complex aquatic habitat.

During 2009, the CTUIR implemented two stream restoration projects. The upper Grande Ronde River Mine Tailings Restoration Project was implemented in cooperation within the USDA Forest Service in the Upper Grande Ronde Subbasin and consisted of extensive floodplain restoration within a historic mining district that provide critical spawning and rearing habitat for Snake River Basin spring chinook salmon. Additionally, the CTUIR implemented a habitat project along an approximate 1 mile reach of mainstem Meadow Creek on private land to enhance habitat complexity and improve spawning and rearing habitat for primarily summer steelhead and rearing habitat for spring chinook. Additional detail is provided later in this report.

The project also continued monitoring and evaluation efforts associated with several project areas, including photo points, groundwater measurements, water temperature, and vegetation. Ongoing project maintenance, including fence repair, vegetation management, and monitoring for trespass livestock was accomplished. The project leader participated as a board member of the GRMW and on several subcommittees associated with ESA recovery planning, BiOp/Remand project planning, and development in preparation for implementation during FY 2010-11.

BACKGROUND

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 www.grmw.org/grmwp-project-page.html and www.grmw.org/project_inventory.html.).

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 administered multiple grants from various agencies, including NRCS WRP, CREP, WHIP, and EQUIP, 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 thoroughly described in the 2006 NPPC Project Proposal for the CTUIR Watershed Restoration Project (199608300) incorporated here by reference.

During the 14-year project history, the CTUIR has helped administer and implement a number of projects, enhancing 26 miles of instream habitat. Conservation easements totaling about 1,400 acres on three large ranches/farms have been secured through a combination of NRCS WRP, CREP, and BPA programs. The project has constructed 12 miles of fence, eight off-channel water developments, and installed over 150,000 trees, shrubs, sedge/rush plugs, and seeded over 600 acres with native/native-like grass seed. Improving habitat trends and biological response can be readily observed at previously implemented projects (McCoy Meadows, Longley Meadow, Wallowa River, and End Creek projects) where existing channelized stream reaches have been replaced with restoration channels. A combination of both passive and active strategies have been developed and implemented and although project areas are in an early stage of recovery, establishment of conservation easements, construction of riparian/wetland enclosure fencing, development of off-channel water sources, removal of livestock, re-vegetation efforts, instream work such as restoration channel construction and large wood additions, and removal of dikes and old roadbeds and railroad prisms have resulted in improving trends including:

- Improved stream channel stability with early succession dimension, pattern and profile
- Decreased channel width to depth ratios, gradient, entrenchment and increased channel sinuosity, length, floodplain connection, and enhanced pool habitat,
- Increased availability of instream habitat, including backwater and off channel rearing areas
- Increased groundwater elevations and available cold water refuge provided by hyporheic flow through interconnected floodplains and gravel bars,
- Increasing riparian and wetland plant communities, particularly carex/juncas and salix in meadow system projects,
- Increased instream habitat complexity and diversity (improved pool-riffle sequences associated with dynamically stable channel morphology and large wood additions to forested riparian system historically impacted by logging and decreased wood recruitment),
- Increased diversity and abundance of macroinvertebrate communities in restoration channels compared to channelized reaches (ODEQ, Personal communication with Rick Hafele, 319 Monitoring Program Leader, 2005),
- Increased spotted frog reproduction associated with floodplain ponds on McCoy Creek Project 5-fold increase in reproduction associated with floodplain ponds in McCoy Creek meadow floodplain (Laura Marht, Eastern Oregon University, 2003, personal communication).

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.

Noteworthy accomplishments for the CTUIR Grande Ronde Subbasin Restoration Project during FY2009

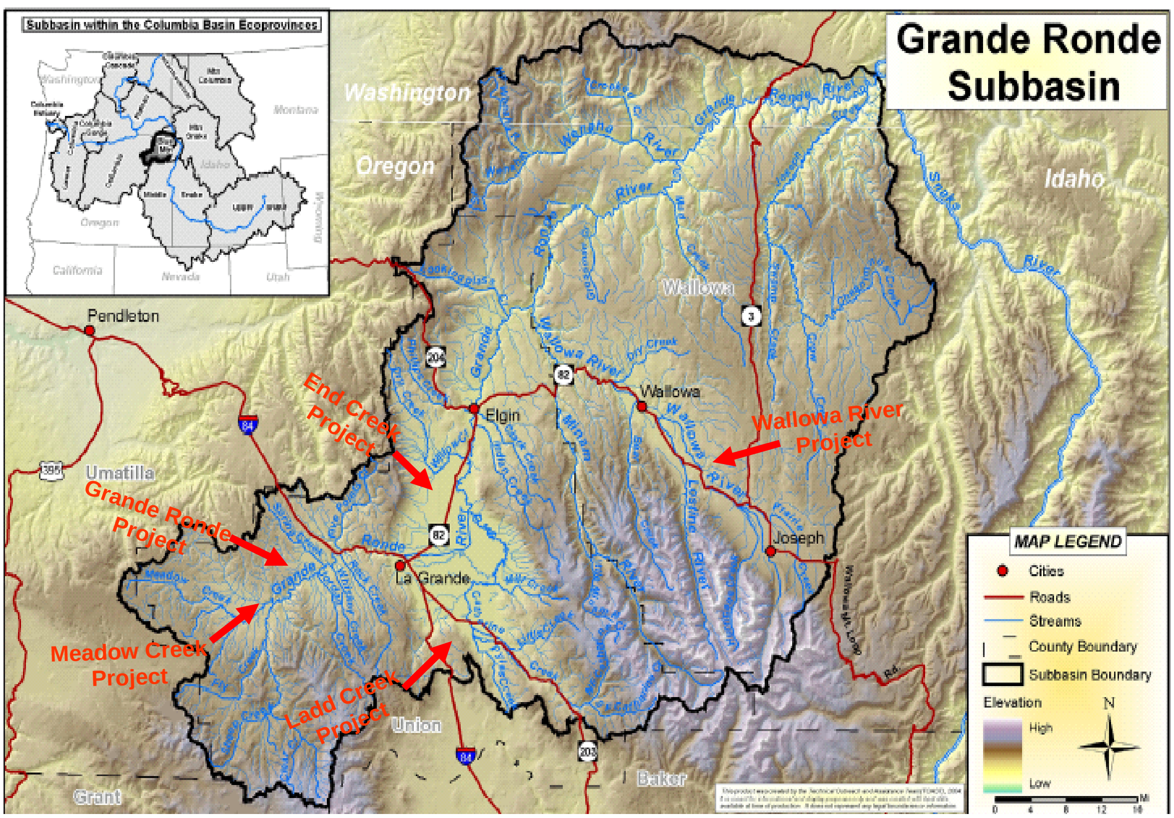
- Implemented phase 1 of the Upper Grande Ronde River Tailings project involving removal of approximately 60,000 cubic yards of mine tailings and re-contouring floodplain habitat in cooperation with the U.S. Forest Service, La Grande Ranger District, Wallowa-Whitman National Forest.
- Implemented habitat enhancement along a 1 mile reach of Meadow Creek on the Habberstad property, including instream placement of approximately 100 whole trees in log jams to increase habitat complexity.
- Conducted project planning and environmental permitting for the Dark Canyon/Meadow Creek (Cunha) Fish Habitat Enhancement Project and the McCoy Meadows Enhancement Project which are planned for construction in 2010. CTUIR staff also assisted ODFW and GRMW on planning and permitting for the Ladd Marsh Project.
- Participated on the Grande Ronde Model Watershed Program and Foundation (Board and Technical Review Committee participation), including review and development of Biop/Remand Projects
- Participated on the Snake River Salmon and Steelhead Recovery Team (Habitat)
- Conducted project maintenance activities
- Conducted monitoring and evaluation activities on project areas.

INTRODUCTION and DESCRIPTION OF THE 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.

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.

FIGURE 1: GRANDE RONDE SUBBASIN VICINITY AND PROJECT LOCATIONS



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	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%**

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	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%**

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)

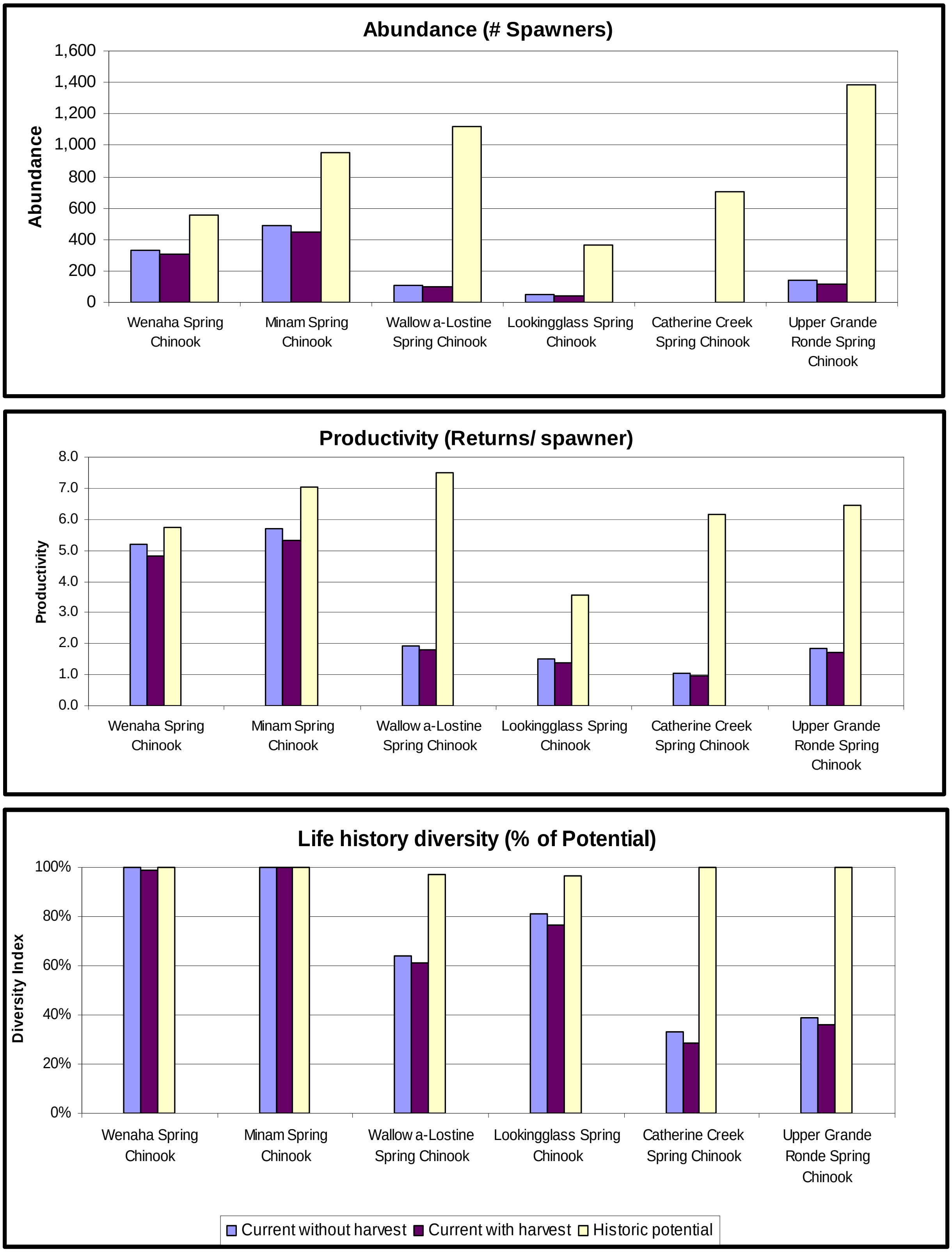
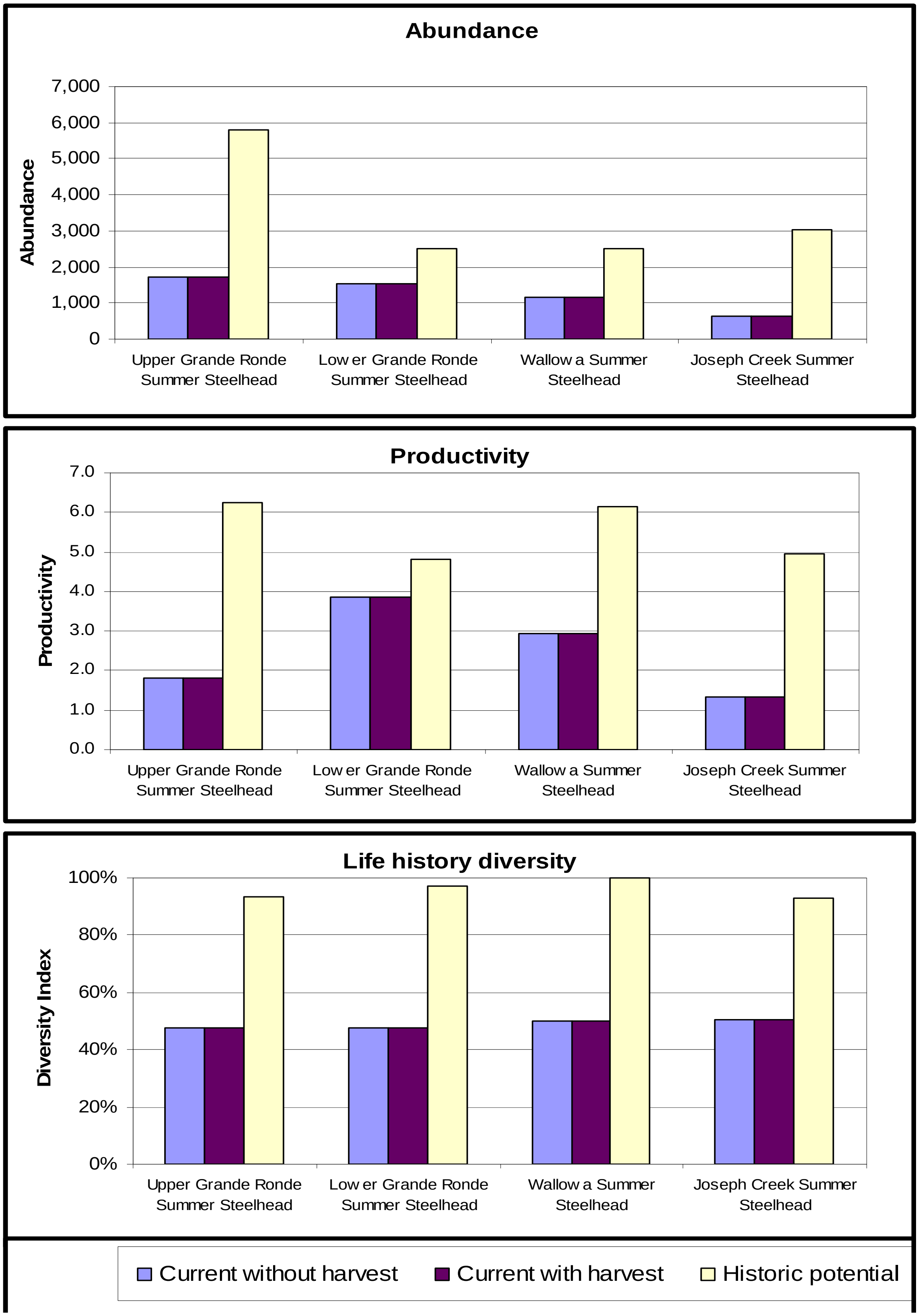


FIGURE 3: EDT ESTIMATES OF ABUNDANCE, PRODUCTIVITY, AND LIFE HISTORY DIVERSITY COMPARED TO ESTIMATED HISTORIC POTENTIAL FOR GRANDE RONDE SUBBASIN SUMMER STEELHEAD (NPCC 2004A, FIGURE 22, PG. 72)



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 THROUGH 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 baseflow, 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 et. al. 1990, Wallowa-Whitman et.al. 1992, Huntington (1993), GRMWP (1994), Mobrand and Lestelle (1997), NPCC 2001, and NPCC 2004a). 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, 1995). 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.

METHODS, RESULTS, AND DISCUSSION

The following sections present work elements, milestones, and milestone descriptions 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 coordinated with GRMW and ODFW staff in the development of construction contract documents and by providing subcontracting template documents for use in developing contract bid documentation for the Ladd Creek Restoration Project which was implemented in 2009. Additionally, CTUIR staff contributed technical services on the UGRR Tailings Project, including project layout, staking, and construction subcontract inspection. Project leader supervised 3 permanent and 5 seasonal employees to accomplish project activities. Major purchases during the reporting period included:

- 650cc Arctic Cat TBX ATV
- 13 foot ATV/Utility trailer
- Dell computer, docking station and accessories for project biologist
- 2 inch trash pump with fittings and intake and discharge hoses
- 2 Dry suits and snorkeling accessories for assistant biologist and senior technician
- 2 Stihl chainsaw auger bit assemblies for planting
- 1 truck tool box for GSA project vehicle
- HP Business 2800 Inkjet printer
- Waders, wading boots and personnel field gear (vests, waterproof outerwear)
- Laser rangefinder
- Binoculars (3 pair)
- ATV seeder/spreader
- 40 Onset HOBO Pendant Water/Air Temperature Probes, software, and shuttle
- Computer Software
    - Rivermorph
    - AutoCad annual subscription
    - JMP Statistical Analysis package
    - Adobe Pro

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. CTUIR staff assisted USFS personnel on the Upper Grande Ronde Mine Tailings Restoration Project in preparing project designs and plans which were incorporated into environmental planning documentation and permits. CTUIR staff completed ESA and cultural resource documentation and consultation in cooperation with BPA as well as DSL and USCOE fill removal permits for the Meadow Creek (Habberstad) Fish Habitat Enhancement Project. CTUIR staff provided assistance on permitting and monitoring protocols on the Ladd Marsh Project with ODFW staff and provided wetlands assessment for use in the DSL/USCOE permit process. Additionally, CTUIR staff initiated environmental planning for the Dark Canyon/Meadow Creek (Cunha) Project and McCoy Meadows Project.

Coordination and Public Outreach/Education

Coordination and public education are 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. Project leader coordinates regularly with GRMW staff to discuss policy and technical issues, brainstorms project development, strategizes near term and long term subbasin restoration activities, and participates in project tours scheduled by GRMW. In addition, staff continues participation in various recovery planning activities through the NMFS technical teams for ESA-listed salmon and steelhead stocks in the Grande Ronde Subbasin.

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. Channel construction projects warrant special consideration since construction disturbance creates bare soil conditions and potential for weed infestations. Locally adapted native species are utilized as available, although some cultivars have been utilized in grass seed mixes in conjunction with available native seed. A variety of re-vegetation methods are employed and are designed to meet specific project objectives and site conditions.

Techniques include a combination of manual and/or mechanical practices and can include installation of conditioned live whips (collected dormant, soaked in water until root nodule development for 2-3 weeks prior to out planting), containerized plant stock, whole tree/shrub transplants/salvage, and broadcast seeding. Locally adaptive species of the appropriate elevation band are used to facilitate vegetation establishment. Planting efforts are usually constrained to late fall/early spring dormancy periods to minimize plant stress and optimize survival. Noxious and/or undesirable weeds are present on several project areas. Landowner agreements include strategies to address weeds and are either completed by the landowner, CTUIR, subcontractor, and/or through the local weed control board. CTUIR staff provides assistance to landowners by coordinating with County Weed Board, securing funding, and developing treatment strategies. Manual, biological, and chemical treatment options may be employed consistent with existing standards for these practices. Key weed species prioritized for treatment in the basin include leafy spurge, spotted knapweed, and Canada thistle.

Staff efforts associated with plant protection during the reporting period included installation of 10 large enclosures and multiple single plant protective devices along McCoy and Meadow Creek in order to exclude wild ungulates. Our initial enclosures ranged in size from single plant protective devices, about 3'x 5', to larger 16'x16' or 48'x60', placed at strategic locations containing patches of regenerating willow (both planted and natural) communities. Large enclosures consisted of 10 foot t-posts and 4'x16' hog panels and woven fence and t-posts for smaller single units. Employing the use of enclosures at McCoy Meadows has been prompted by significant and chronic damage and mortality to shrubs, primarily from elk browsing. A stocking survey conducted by CTUIR in 2008 revealed that 100% of planted units that were not protected by enclosures were damaged and experienced nearly 100% mortality compared with 70%+ survival on protected plants. The objective of these structures is to eliminate wildlife depredation and protect regenerating willow communities that are lacking within the historic wetland complex. Additional enclosures and planting is planned for 2010.

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 include, but are not limited to, maintaining communications and good standing with landowners, repairing fences, water gaps, instream structures, or other developments, and monitoring project sites regularly to assess presence of trespass livestock or potential problems as they may develop. During the reporting period, project impacts from trespass livestock were minimized by conducting bi-weekly project visits and working with private landowners to remove problem livestock. Approximately 12 miles of fence are maintained at McCoy Meadows and Longley Meadows.

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

Water Quality Monitoring

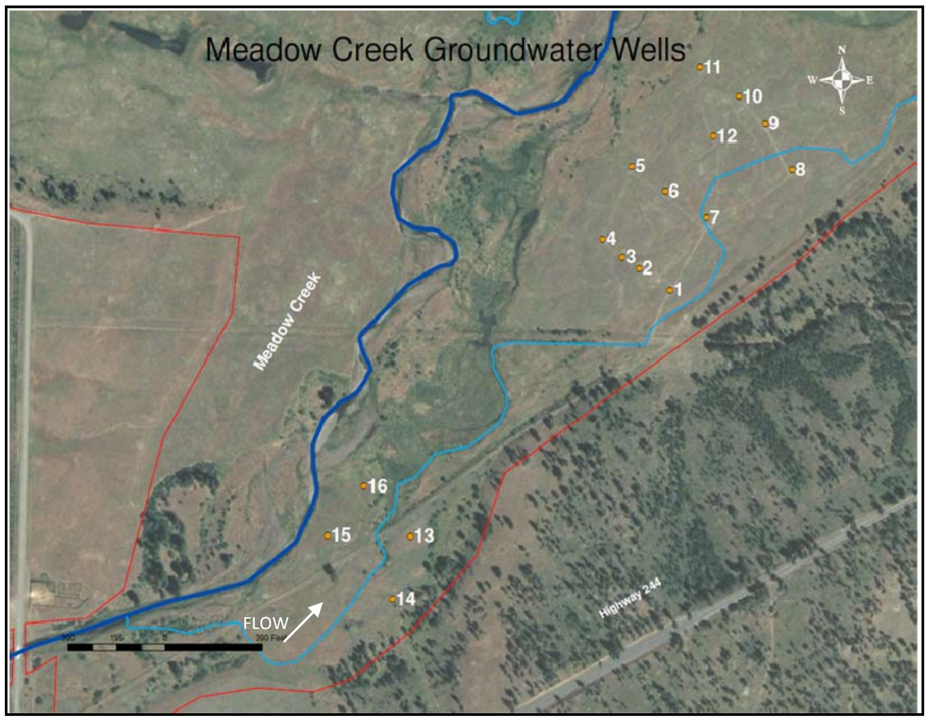
Groundwater Analysis

Meadow Creek

The following figures illustrate groundwater elevation data for 16 monitoring wells (Figure 4) within the Meadow Creek portion of the McCoy Meadows project between the monitoring period 2005 (pre-project baseline) through 2009. Following construction and activation of the wetland restoration channel network during late summer 2006, all 16 wells have exhibited an increase in average annual groundwater above that of the 2005 pre-project level and an increase in minimum groundwater levels.

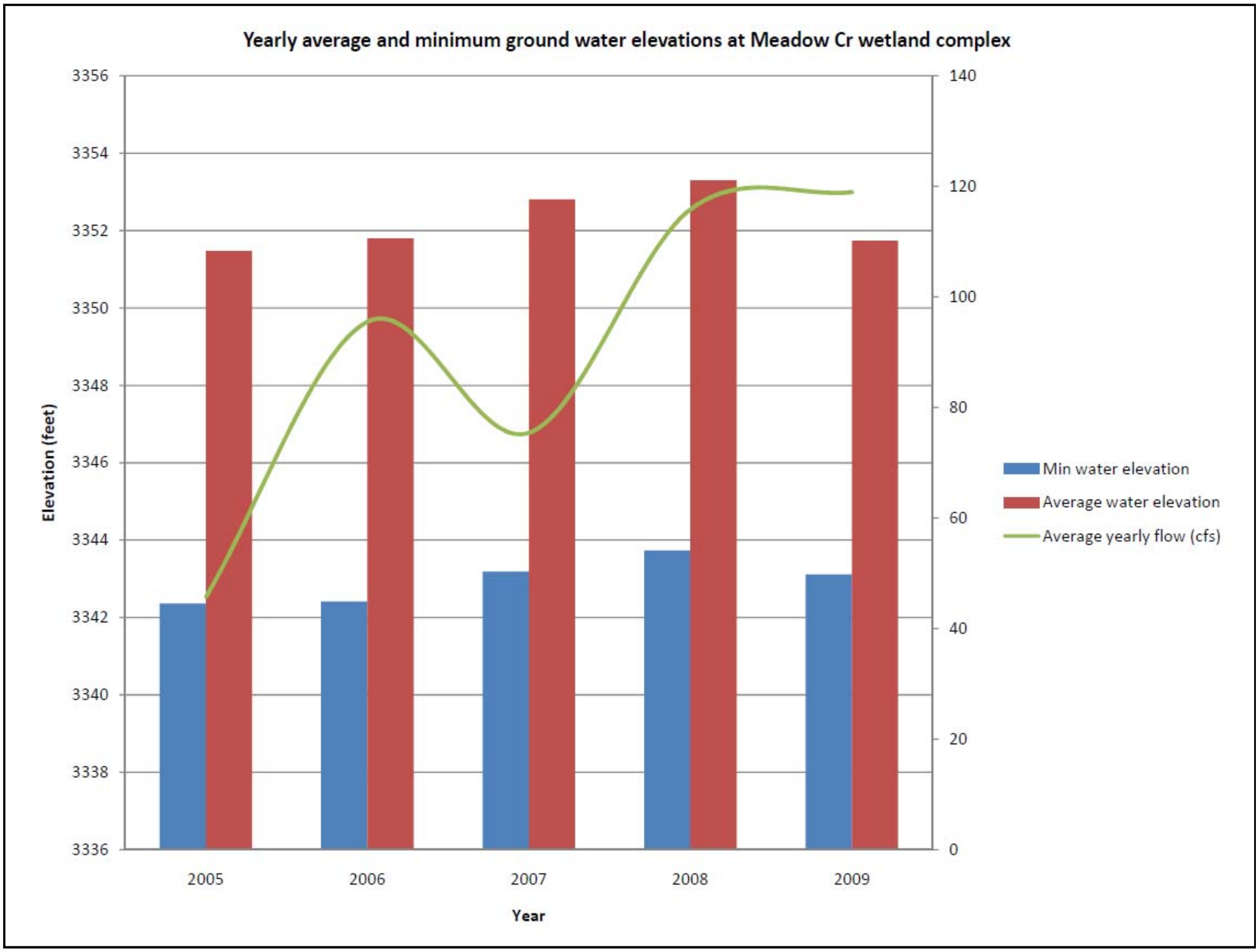
During the period July 2005 through December 2005 nine of the sixteen wells had at least one record of being dry (49 dry samples of 159 collected). This trend in low groundwater continued through 2006 when 2 wells were recorded as dry (well #'s 2 and 8) during the period May to July. However, following activation of the wetland complex channel in late summer 2006 and continuing through to December 2009 there have been no records of dry wells.

FIGURE 4: MEADOW CREEK GROUNDWATER WELLS



Annual averages of groundwater levels can be useful when looking for broad trends (Figure 5); however, this approach is subject to the influences of high water events and is not therefore specific enough to provide information during critical low water periods. Minimum groundwater levels within the Grande Ronde Basin typically occur during the late summer/early fall and are an important gauge in determining the influence a restoration project has on the local sub-surface water table, which in turn affects the sustainability and/or recruitment of hydrophytic vegetation and potential for cold water storage/re-charge. Below is a summary of sub-surface groundwater levels within the Meadow creek wetland complex restoration project. Data is plotted in relation to the meadow surface elevations at each monitoring well site in order to evaluate seasonal groundwater depths. Wells are grouped for these plots into 5 units that represent their position within the meadow system, with group 1 being at the upstream portion of the project and group 5 being the most downstream group (see Figure 4). The following discussion will be broken down into these group categories and covers the months of July through October each year, this being typically the lowest groundwater period.

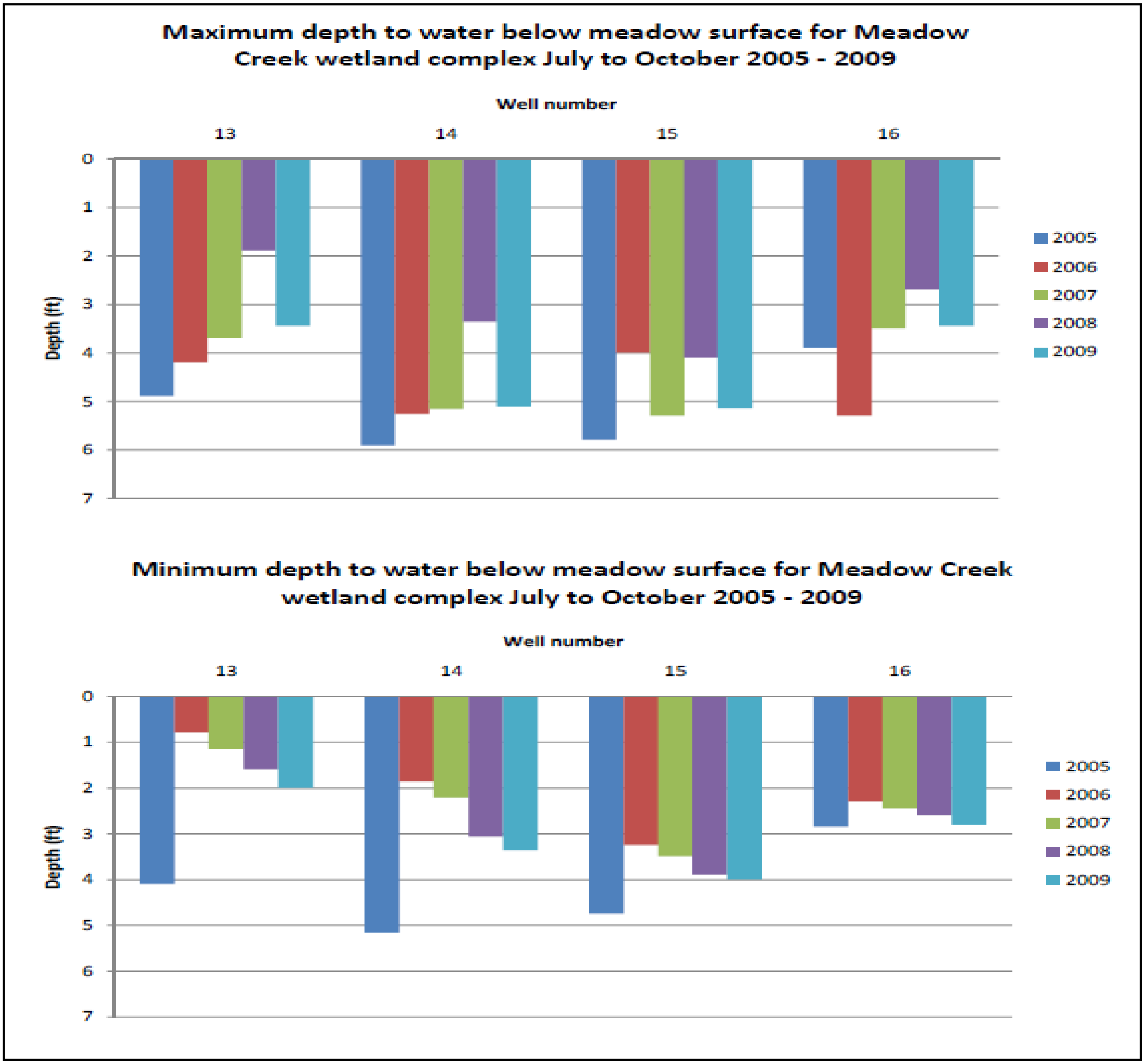
FIGURE 5: YEARLY AVERAGES OF GROUNDWATER ELEVATIONS ACROSS MONITORING WELLS WITHIN THE MEADOW CREEK WETLAND WELL NETWORK, PLOTTED AGAINST YEARLY AVERAGE FLOWS WITHIN THE MAIN CHANNEL



Plot also depicts yearly average minimum groundwater elevations and shows an increase in groundwater levels post project (2006 onwards) compared to the pre-project (2005) levels.

Group 1. The most upstream well cluster comprising well numbers 13 through 16 (Figure 6). For the low groundwater period (July – Oct) each year (2005 – 2009) there were no records of dry wells in this group. Mean annual groundwater within this group has been higher than the 2005 level in all years. The maximum depth of groundwater was recorded as 5.9 feet below the meadow surface (well # 14 in 2005) with the minimum depth of ground water being <1ft below the meadow surface (well # 13 in 2006 after the wetland channel was activated). The maximum depth below the surface post project was 5.2 feet (well # 16 in 2006) with a mean depth across this group 1.1 to 2.2 ft higher than the 2005 level bringing the groundwater level on average to 2.6 - 3.6 ft below the meadow surface during the driest period of the year.

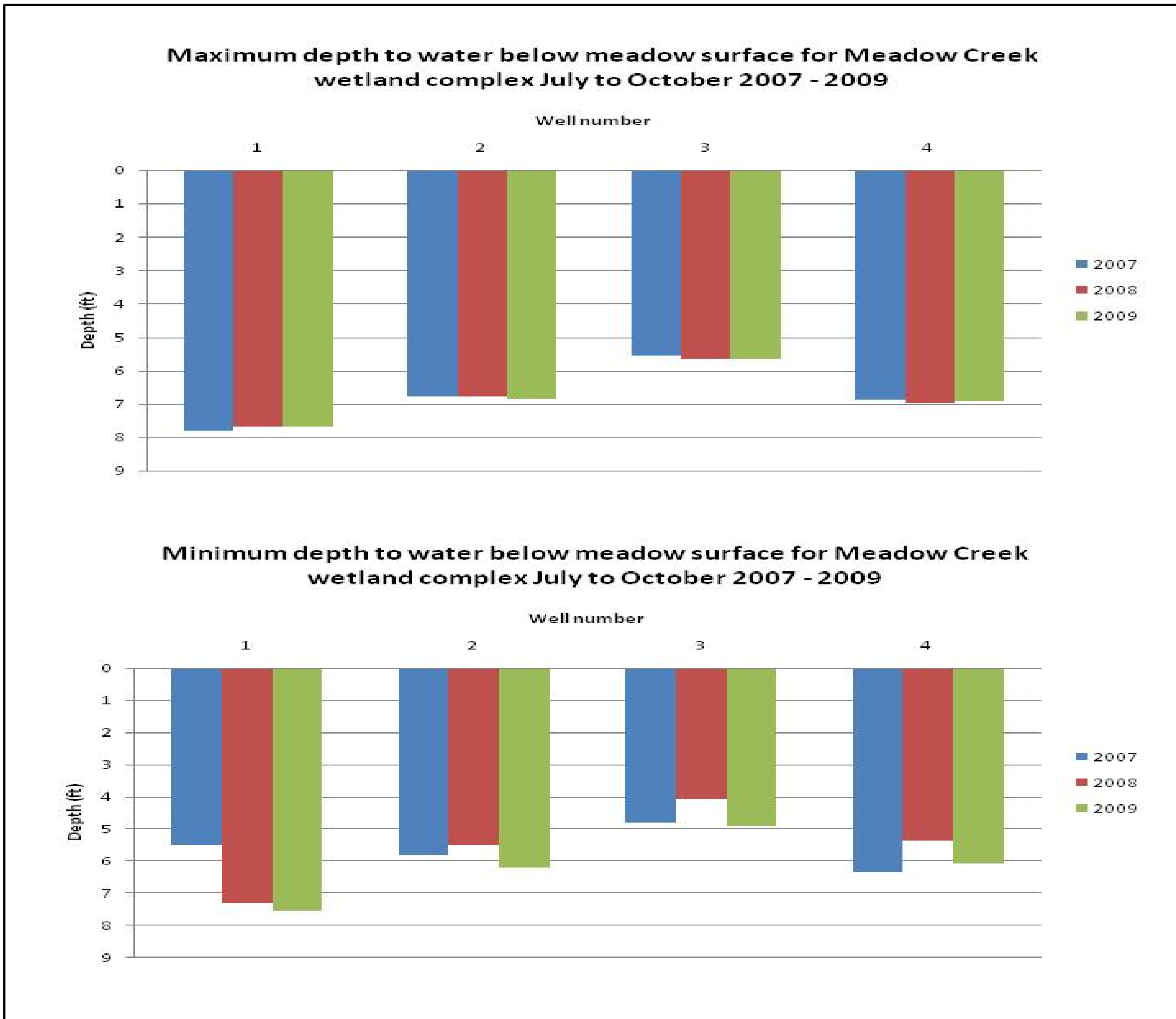
FIGURE 6: MAXIMUM AND MINIMUM DEPTH TO GROUNDWATER AT GROUP 1 WELLS WITHIN THE MEADOW CREEK WETLAND COMPLEX



Zero represents the ground elevation at each well with the bars showing the depth that water levels were recorded below the surface during July - October, 2005 to 2009.

Group 2. Is comprised of well numbers 1 through 4 (Figure 7). Located closest to the downstream edge of the historic beaver complex. Dry wells were recorded within this group during 2005 July to October at well # 1 (5 out of 7 records) and well # 2 (7 out of 7 records), then again in 2006 at well # 2 (1 out of 6 records), with the 2006 dry well being recorded in July pre-wetland channel activation. Because of these instances of dry wells it is not possible to make inference about the level of groundwater during these periods; therefore the following discussion will focus on the years 2007 through 2009 where no records of dry wells occurred. Maximum groundwater depth ranged from 7. 7 ft to 5.5 ft below the meadow surface, with well # 1 having the deepest water level. Groundwater in 2009 was on average within 0.6ft of 2007 and 2008 levels with water being closest to the surface at well # 3 (4ft below the surface in 2008). Mean depth of groundwater was 0.5 to 2.3 ft closer to the surface than the wetted 2005 levels.

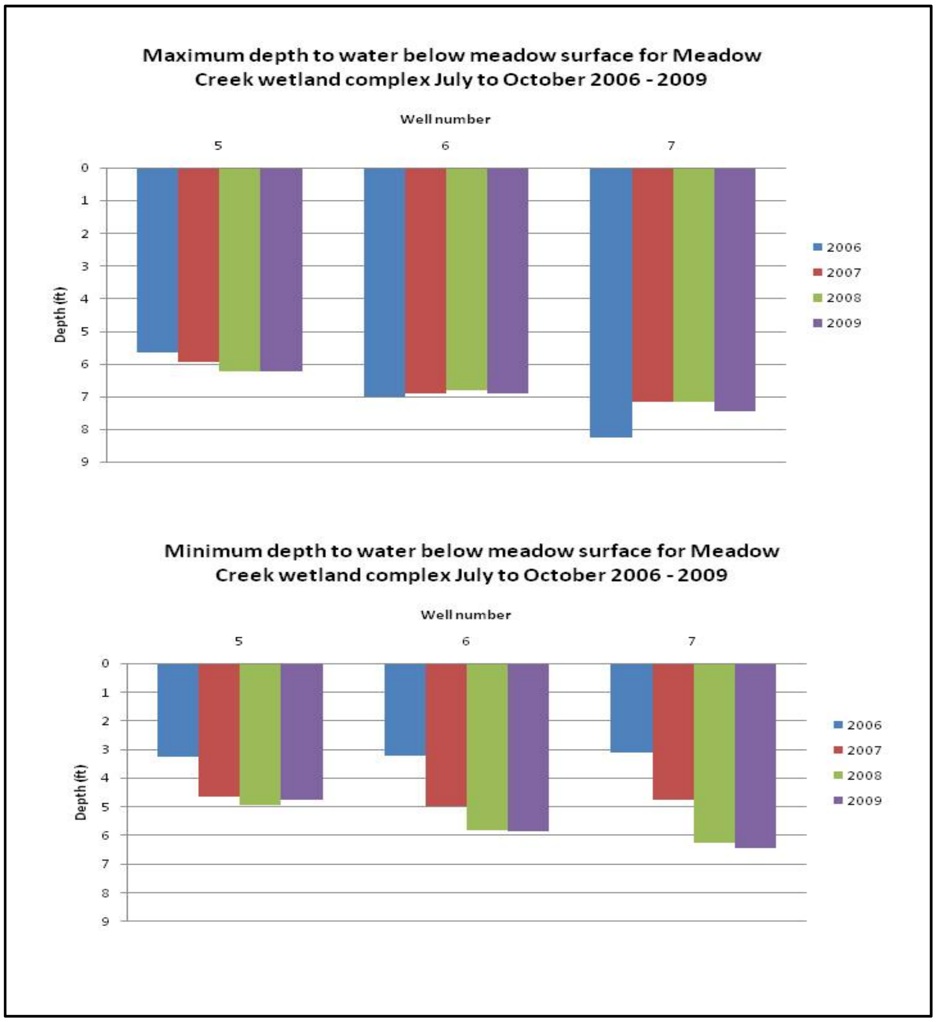
FIGURE 7: MAXIMUM AND MINIMUM DEPTH OF GROUNDWATER AT GROUP 2 WELLS WITHIN THE MEADOW CREEK WETLAND COMPLEX



Zero represents the ground elevation at each well with the bars showing the depth that water levels recorded below the surface during July - October, 2007 to 2009. Dry wells were recorded in 2005 and 2006 (pre-project) and are not represented.

Group 3. Is comprised of well numbers 5 through 7 (Figure 8). Dry wells were recorded in September and October 2005 for wells 5 and 7 respectively, but no dry wells were recorded in this group in subsequent years. Groundwater levels were above the 2005 wetted level consistently for 2006 through 2009, with the maximum depth from the meadow surface being recorded for well # 7 at 8.7 ft during 2006. This depth is within .2 feet of the well being dry and was recorded in July pre-wetland channel activation. For post channel activation years 2006 through 2009 during the months July – October the deepest groundwater measurements ranged between 8.2 ft to 5.6 ft below the meadow surface (for wells 7 and 5 respectively, both in 2006). The deepest groundwater measurements for each well between years (2006 to 2009) were within a range of 0.2ft to 0.6ft of each other for wells 5 and 6. There was a greater difference between years for well # 7 where the 2006 level was 1.1ft deeper than both 2007 and 2008 and 0.8ft deeper than during 2009. When comparing the years 2006 through 2009 the groundwater was closest to the surface in late summer/early fall of 2006 when it ranged between 3.1 ft and 3.2 ft below the meadow. The plots of minimum groundwater depths show levels to be deeper in 2009 compared to the other post project years. However, it should also be noted that the maximum groundwater distance to the meadow surface has remained (with the exception of well # 7) within < 1ft of prior years. This demonstrates that although the 2009 levels were less than earlier years the groundwater is still not receding to a point where the well dries up (as seen in 2005).

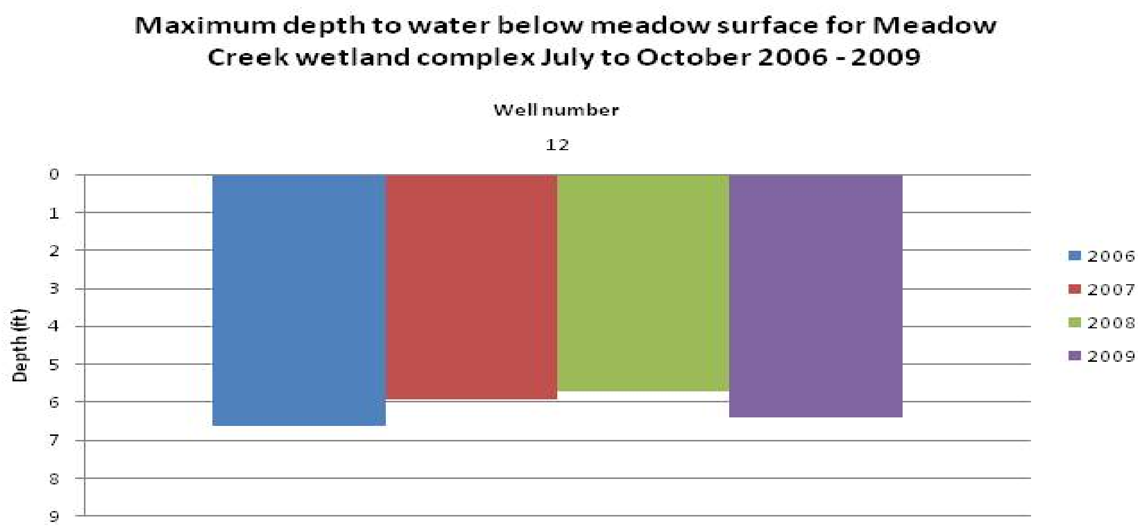
FIGURE 8: MAXIMUM AND MINIMUM DEPTH OF GROUNDWATER AT GROUP 3 WELLS WITHIN THE MEADOW CREEK WETLAND COMPLEX

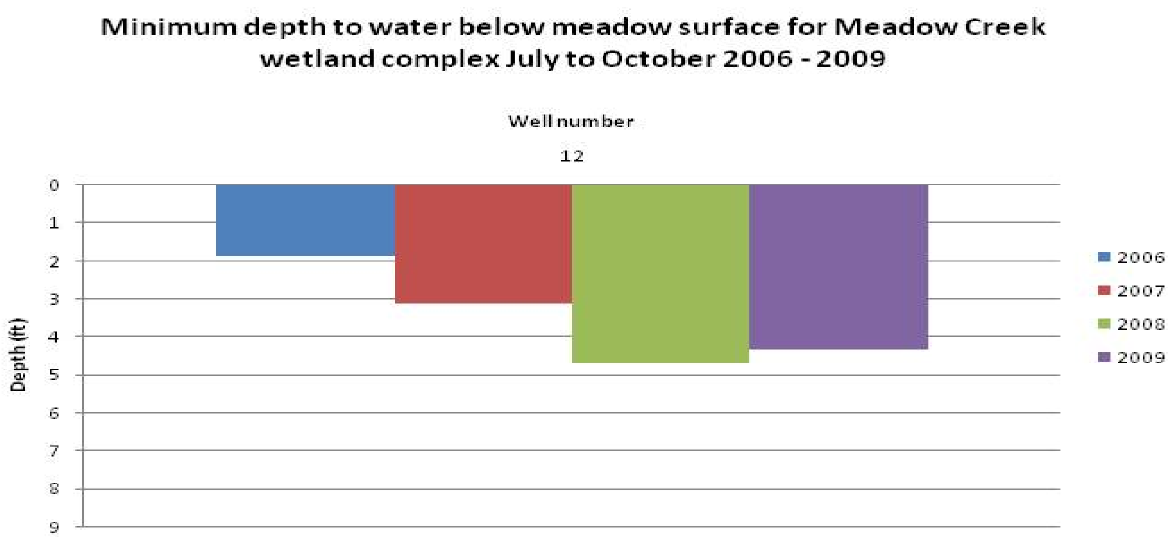


Zero represents the ground elevation at each well with the bars showing the depth that water levels were recorded below the surface during July - October, 2006 to 2009. Dry wells were recorded in 2005 and are not represented.

Group 4. This group has one well (#12), which had one "dry" record for 2005 (in October) (Figure 9). There were no dry records in subsequent years. The deepest recording of groundwater post project was at 6.6 ft below the meadow surface during 2006, with a range between that and 5.7 ft for the following years. The highest groundwater elevations were recorded again in 2006 (1.8 ft below the meadow), with subsequent years ranging between this and 4.7 ft below the meadow surface.

FIGURE 9: MAXIMUM AND MINIMUM DEPTH OF GROUNDWATER AT GROUP 4 (WELL #12) WITH THE MEADOW CREEK WETLAND COMPLEX

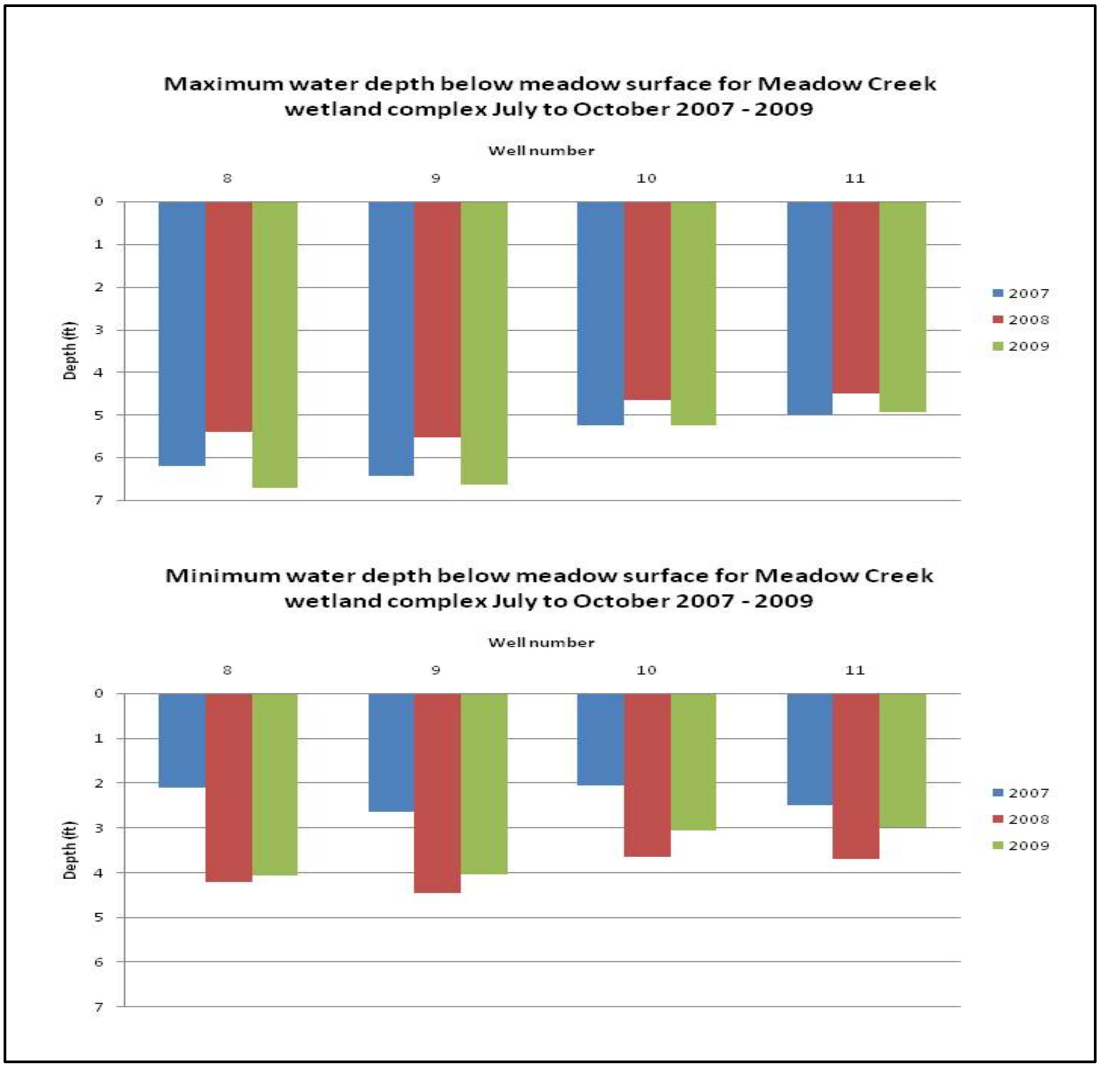




Zero represents the ground elevation at the well with the bars showing the depth that water levels were recorded below the surface during July - October, 2006 to 2009. Dry records were recorded in 2005 and are not represented.

Group 5. Comprising well numbers 8 through 11 (Figure 10). This group is the most downstream luster of wells within the Meadow creek network. Well # 8 was recorded as "dry" in 2005 for July through October (7 out of 7 records) and again in July 2006. Well # 9 was also dry in 2005 for 5 of the 7 records with the dry wells being in August through October. This well was not recorded as dry in subsequent years. During 2007 through 2009 the maximum depth of groundwater was 6.7ft below the surface (for well # 8 in 2009), which was 0.5 to 1.3ft deeper than the 2007 and 2008 levels respectively. The highest groundwater level was within 2ft of the meadow surface (well # 10 in 2007). Within this group the average groundwater elevation during the driest part of the year was deeper in 2009 compared to 2007 and 2008 (differences of 1.6ft and 0.8ft respectively) and was approximately 5.2ft below the meadow surface.

FIGURE 10: MAXIMUM AND MINIMUM DEPTH OF GROUNDWATER AT GROUP 5 WITHIN THE MEADOW CREEK WETLAND COMPLEX



Zero represents the ground elevation at each well with the bars showing the depth that water levels were recorded below the surface during July - October, 2007 to 2009. Dry wells were recorded in 2005 and 2006 and are not represented.

McCoy Creek

During 2009 there were 35 groundwater wells actively monitored along McCoy Creek within the McCoy Meadows Restoration Project area (Figures 11 and 12), 13 above the McIntyre road bridge and 22 below it. Of these wells 18 did not go dry during 2009, with 4 of these being above the bridge and 14 below, making 30% of the wells above the bridge staying wet all year compared to 63% below the bridge. The percentage of wells staying wet both above and below the bridge in 2009 was greater than each year since 2005 (Table 5 below).

FIGURE 11: UPPER MCCOY MEADOWS GROUNDWATER WELL LOCATIONS

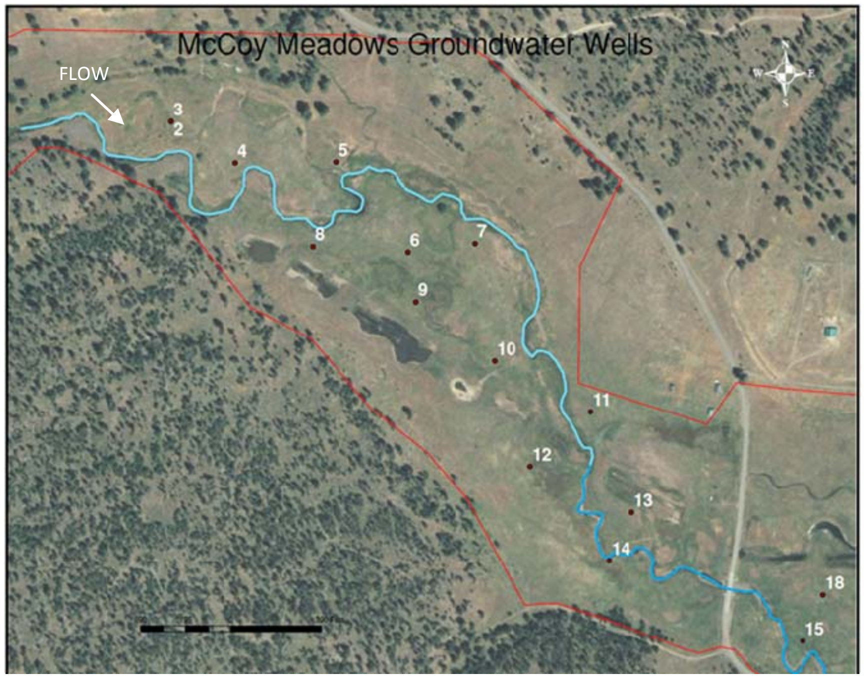
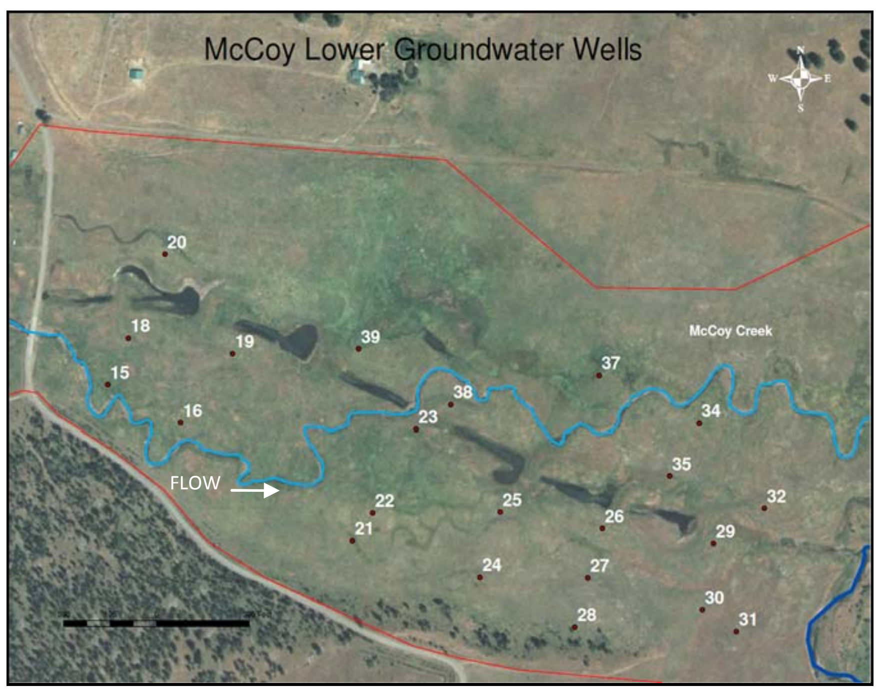


FIGURE 12: LOWER MCCOY MEADOWS GROUNDWATER WELL LOCATIONS



Data were plotted, where available, for each year between 1997 and 2009 to display the percentage of 'wet' records compared to those of 'dry' well records (Figure 13). From these plots it appears that the overall percent of dry well records has steadily decreased since 2001. However, when these data are divided into wells above and those below the road and bridge it is possible to see that above the bridge the percentage of dry wells is increasing, indicating a drop in sub-surface water at these well sites since 2002 (Figure 14). Earlier restoration records from the McCoy Meadows Project indicated some entrenchment of the constructed channel during the winter of 2002/2003 which possibly contributed to a drop in sub-surface water above the road prism.

In addition, a thriving beaver colony in the upper reaches appears to have declined at about the same time. The eventual disrepair and loss of the beaver dams was probably an additional confounding factor in the lowering of sub-surface water. In contrast to the upper reach the sub-surface water below the bridge appears to have steadily increased since 2001, with the lowest number of 'dry' well records since 1997 being in 2009 when 76% of the 325 well measurements that year recorded water in the well pipes (see Figure 15).

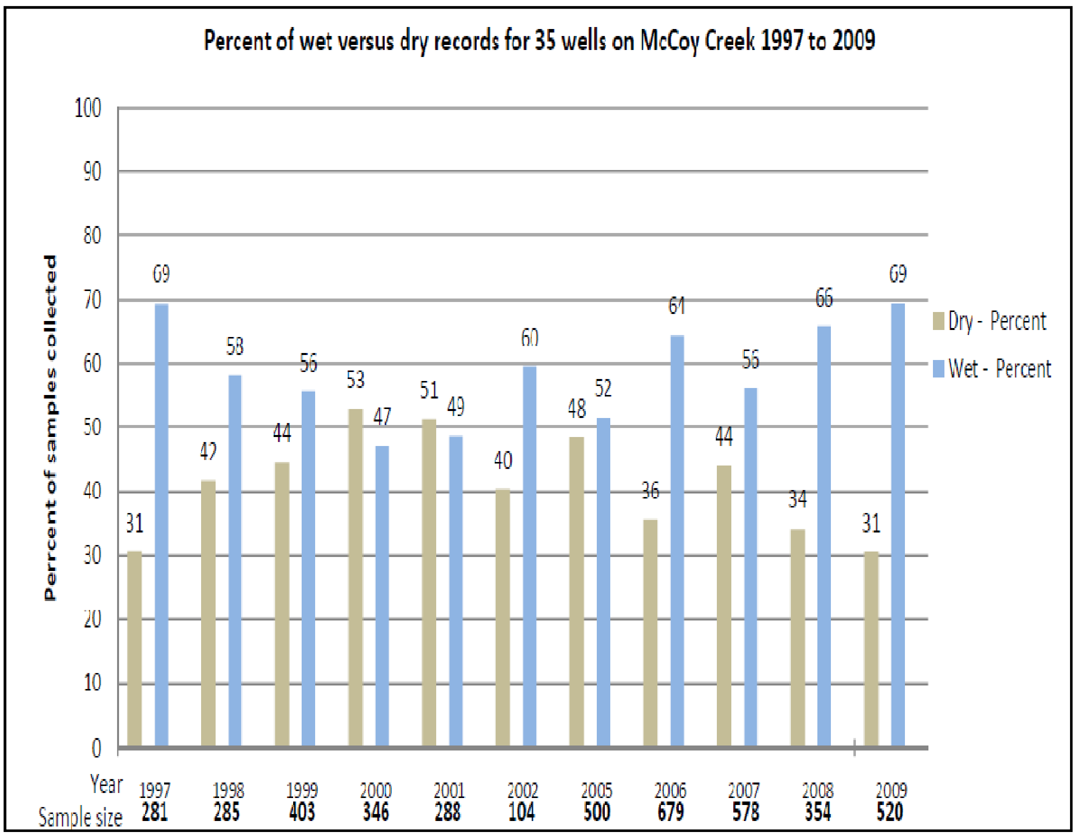
TABLE 5: PERCENT OF WELLS STAYING WET BOTH ABOVE AND BELOW THE MCINTYRE ROAD BRIDGE

	2005	2006	2007	2008	2009	# of wells
Above bridge	15%	23%	15%	23%	30%	13
Below bridge	45%	27%	40%	45%	63%	22

Table shows an increase in the percent of wells staying wet in 2009 compared to previous years.

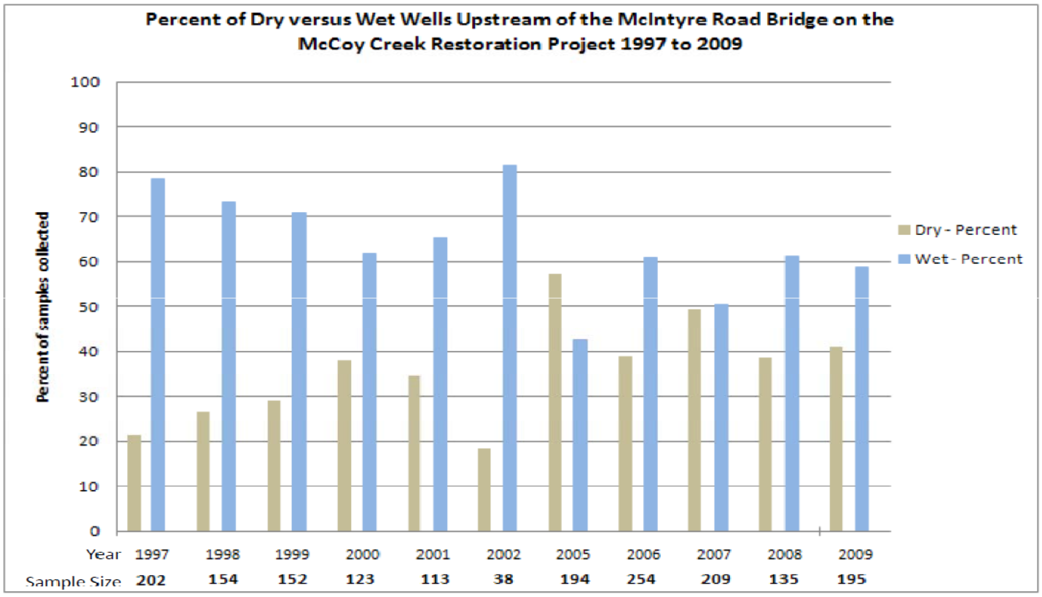
To investigate any trends in sub-surface water elevations we selected data between 2005 and 2009 where wells did not have a record of going dry during the year. These criteria limited the available data to that from 7 wells out of the 35 in the project area. Of these 7 there was only one well (# 9) above the bridge that fit the criteria and wells 15, 21, 23, 24, 26, and 39 below the bridge. The maximum water depth below the meadow surface at each of these wells was then plotted for each year (Figures 16 through 19) as a means of providing information on how much the sub-surface water receded without the well going dry.

FIGURE 13: PLOT OF THE PERCENT OF WET VERSUS DRY RECORDS FOR 35 WELLS ALONG MCCOY CREEK FROM 1997 TO 2009.



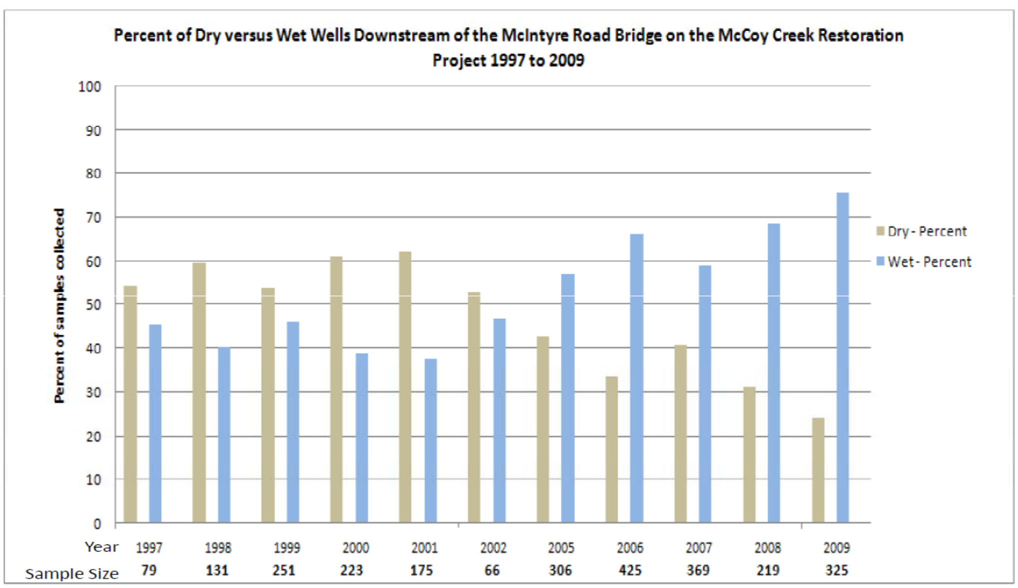
The plots show a decline in the percent of water within the well pipes from 1997 to 2001, then an increase from 2002 to 2009.

FIGURE 14: PLOTS OF THE PERCENT OF WET VERSUS DRY WELL RECORDS ALONG MCCOY CREEK ABOVE THE MCINTYRE ROAD BRIDGE FOR 1997 THROUGH 2009



Plots indicate a decline in the percent of records of sub-surface water within the well pipes since 1997. A spike in sub-surface water is shown during 2002 after activation of the new channel and the fill of the channelized reach.

FIGURE 15: PLOTS OF THE PERCENT OF WET VERSUS DRY WELL RECORDS ALONG MCCOY CREEK BELOW THE MCINTYRE ROAD BRIDGE FOR 1997 THROUGH 2009



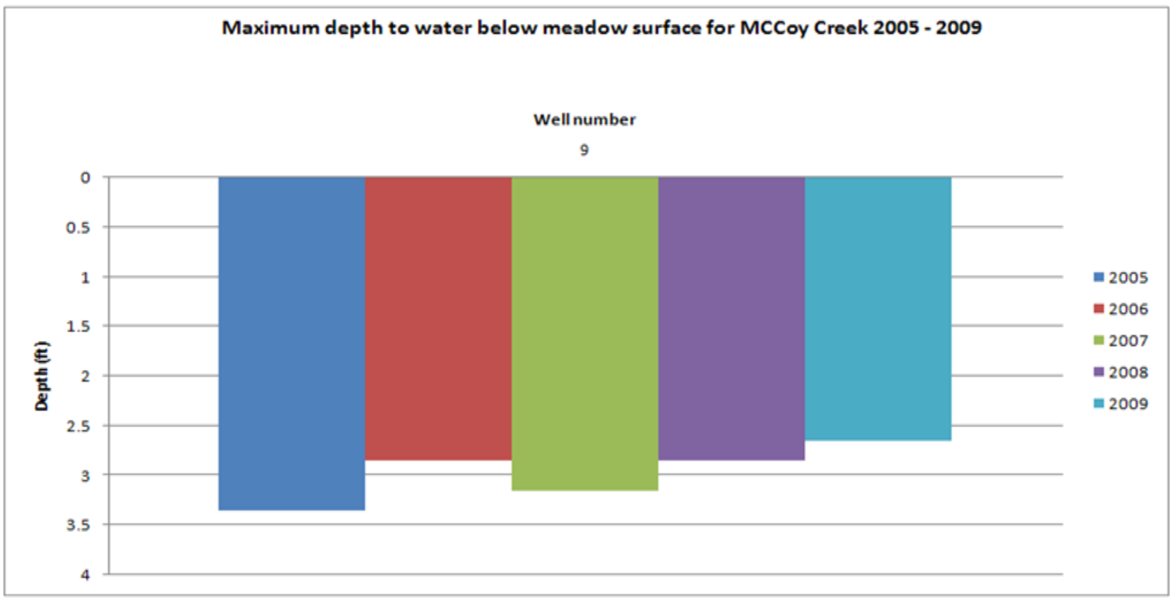
Plots indicate an increase in the percent of records of sub-surface water since 1997; the greatest of which is for 2009 when approximately 76% of wells were wet.

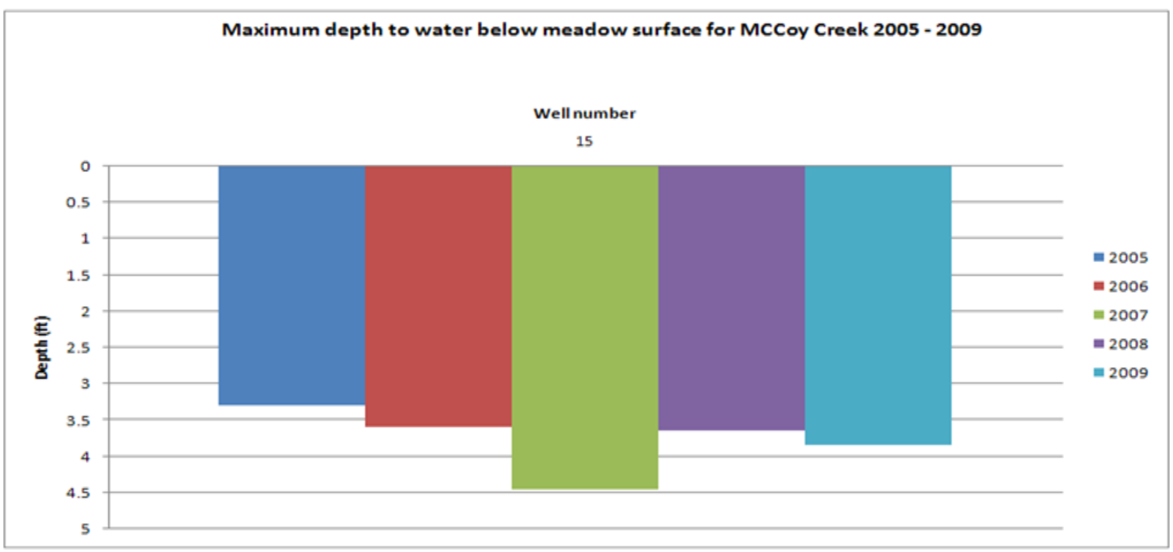
Summary of wells retaining water each year since 2005

Of the 35 wells monitored along the McCoy Creek project only 7 remained inundated with water each year between 2005 through to 2009. Set out below is a summary for each of those wells.

Well #'s 9 (above the bridge) and 15 (below the bridge) (Figure 16):
Well # 9 had sub-surface water at a maximum depth below the meadow surface between 3.2 feet in 2005 to 2.6 feet in 2009. Sub-surface water at this location appears to have increased 0.6 feet since 2005. Well # 15 had a maximum water depth below the meadow at approximately 4.5 feet in 2007, which is 1.2 feet lower than the 2005 maximum of 3.3 feet. The 2009 maximum was approximately 3.8 feet below the meadow surface, which is 0.5 feet deeper than the 2005 record. It appears from these data that this location has experience a decrease in sub-surface water elevations since 2005. This may be a function of a local section of stream becoming entrenched since its activation in 2001/2002.

FIGURE 16: PLOTS OF THE MAXIMUM DEPTH OF SUB-SURFACE WATER BELOW THE MEADOW AT WELL #9 AND WELL # 15 FROM 2005 THROUGH 2009

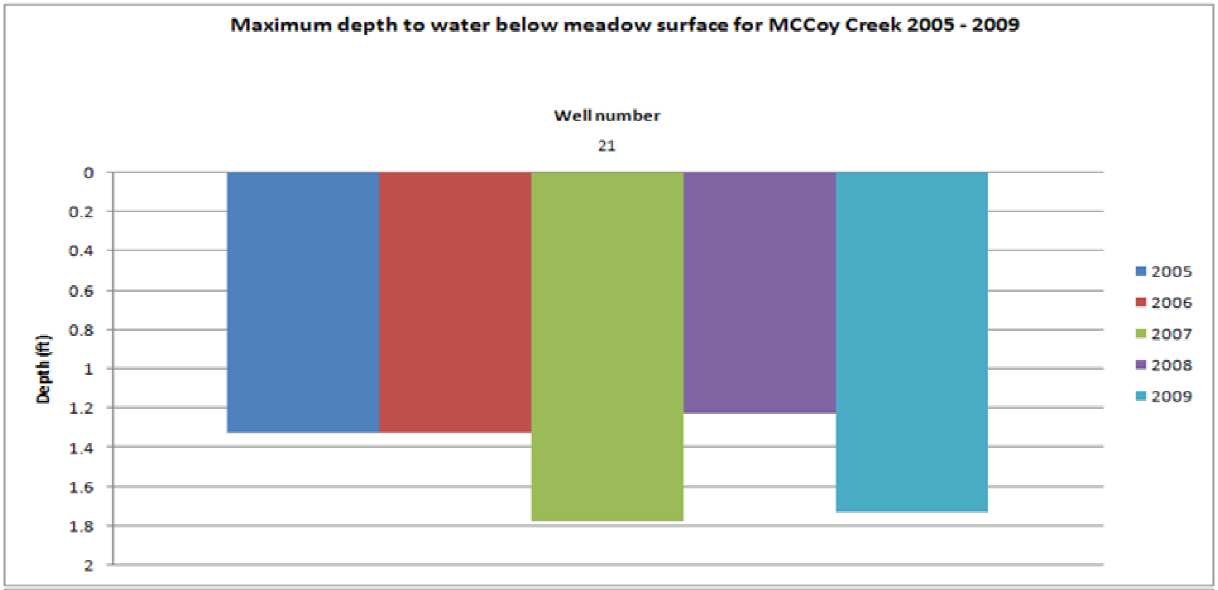


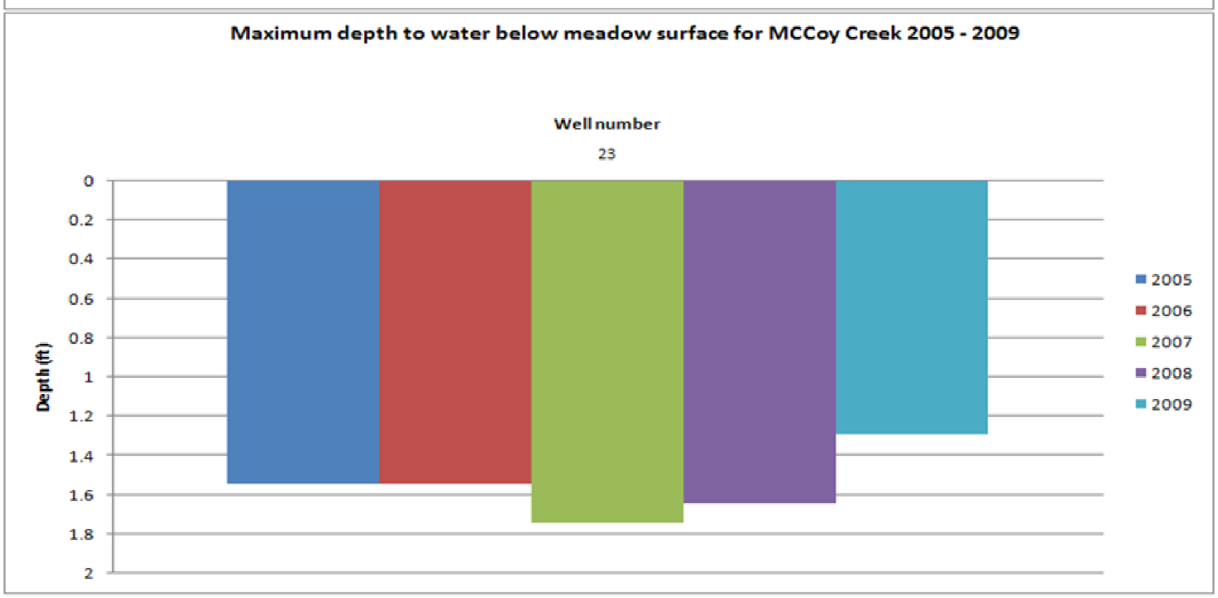


The plots indicate an increase in sub-surface water elevation at well # 9 and a decrease at well # 15. For these plots zero on the Y axis indicates the meadow surface.

Well #'s 21 and 23 (Figure 17):
Both these well had a maximum depth of sub-surface water within 1.8 feet of the meadow surface from 2005 – 2009 and both had the deepest level of water recorded in 2007. Well # 21 appears to have a decrease in water elevation in 2009 compared to 2005 with a difference of approximately 0.4 feet. Water elevations for well # 23 in 2005 and 2009 were within 0.2 feet of each other with 2009 being the higher water year.

FIGURE 17: PLOTS OF MAXIMUM SUB-SURFACE WATER DEPTHS FOR TWO LOCATIONS BELOW THE MCCOY CREEK BRIDGE FROM 2005 TO 2009



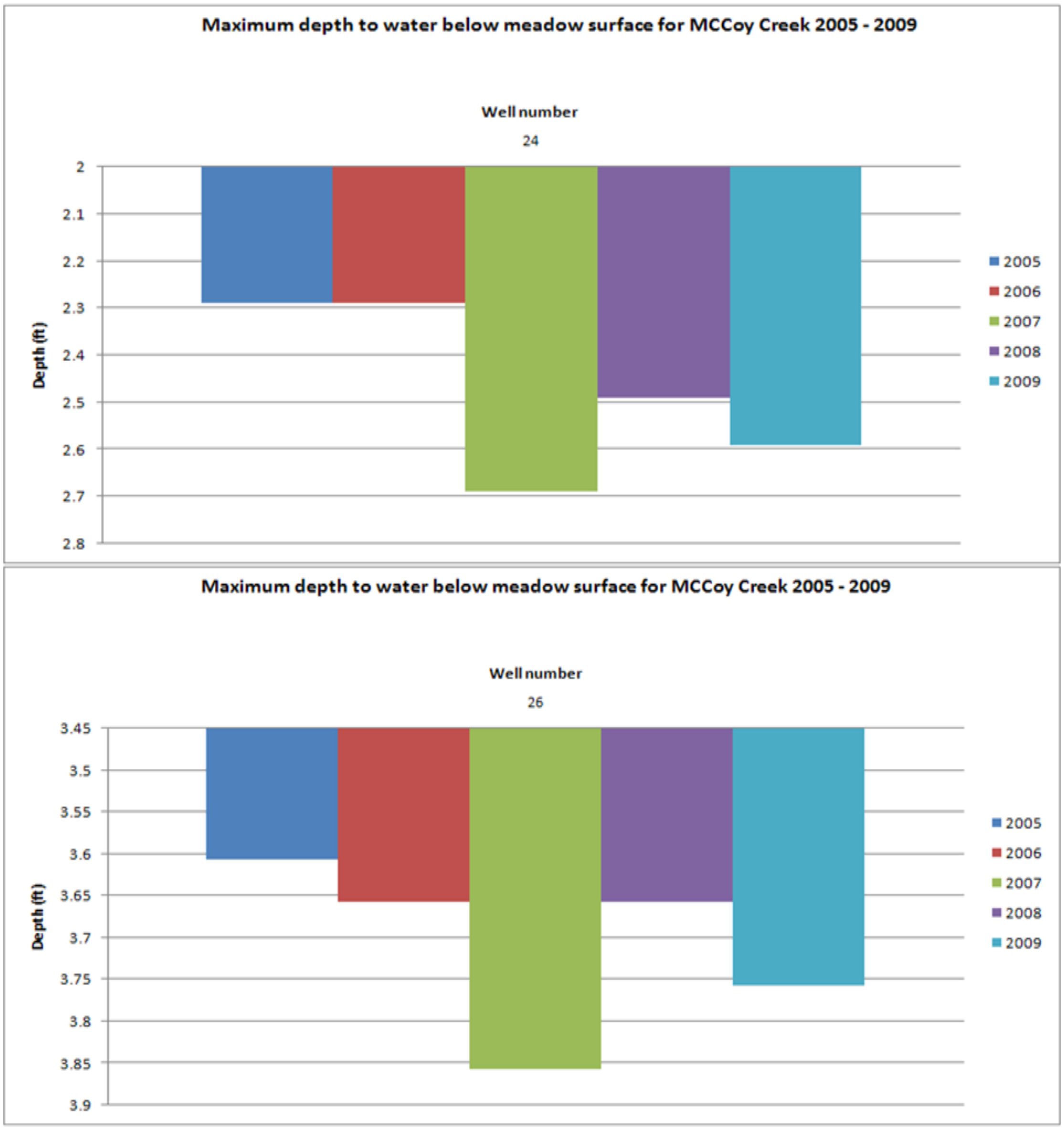


Plots show sub-surface water to within 1.8 feet of the meadow surface for each year and a difference between 2005 and 2009 of 0.4 ft for well #21 and 0.2 ft for well # 23. For these plots zero on the Y axis indicates the meadow surface.

Well #'s 24 and 26 (Figure 18):
Well # 24 had a maximum depth of sub-surface water within 2.7 feet of the meadow surface each year from 2005 to 2009 with the highest water level recorded in 2005 at >2.3 feet below the surface and the deepest level of >2.7 feet recorded in 2007. The water level at this location appears to be receding each year since 2005.

Well # 26 had a maximum depth of sub-surface water within 3.8 feet of the meadow surface between 2005 and 2009, with the deepest measurements again recorded in 2007. As with well # 24 this location is experiencing a decrease in water elevations each year since 2005.

FIGURE 18: PLOTS OF MAXIMUM SUB-SURFACE WATER DEPTHS AT TWO LOCATIONS ALONG MCCOY CREEK BELOW THE BRIDGE BETWEEN 2005 AND 2009.

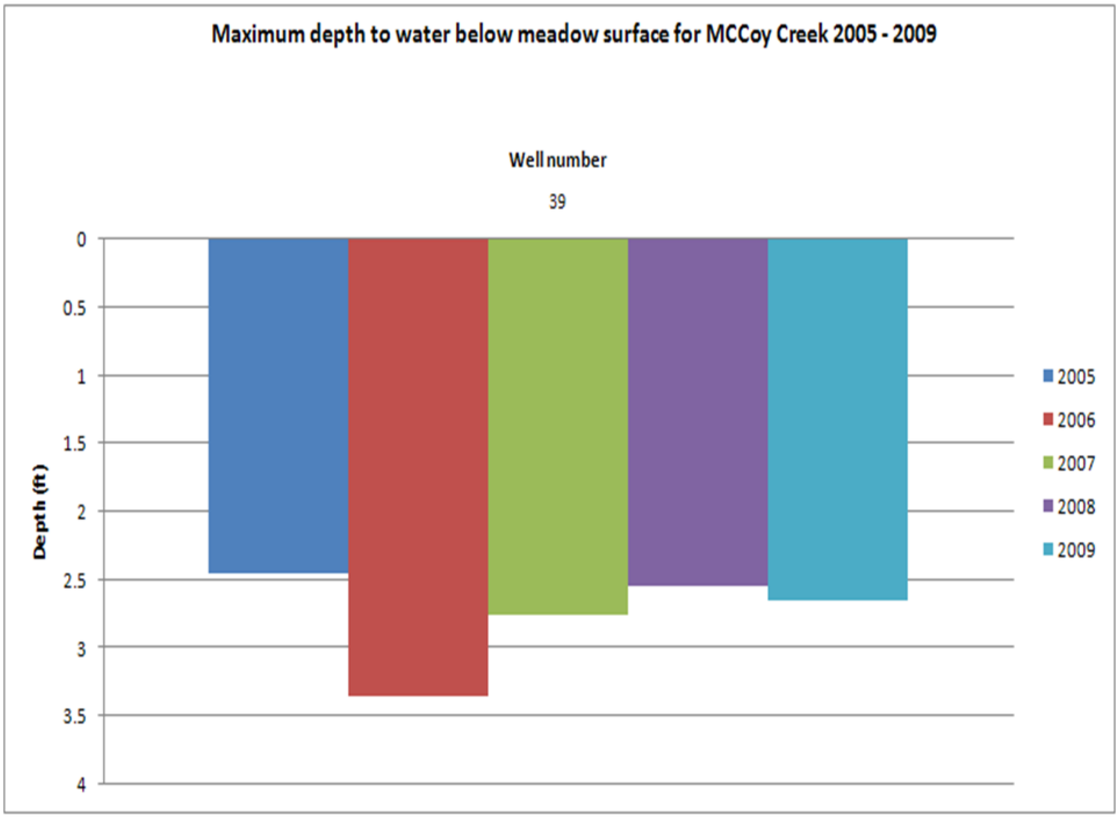


Plots show the depth of water below the meadow surface within 2.7 feet for well #24 and 3.8 feet for well # 26. Each indicates an increase in water depth since 2005. For these plots zero on the Y axis indicates the meadow surface.

Well # 39 (Figure 19):

This location had a maximum water depth within 3.4 feet of the meadow surface between 2005 and 2009. The greatest water depth was recorded in 2006 and the lowest in 2005 (at >2.5 feet). The 2009 maximum depth was within 0.1 feet of the 2005 level. Despite the increase in depth to water for 2006 this location has had water elevations within 0.2 – 0.3 feet each year since 2005.

FIGURE 19: PLOTS OF MAXIMUM WATER DEPTHS FROM 2005 TO 2009 FOR WELL # 39 AT THE MCCOY CREEK RESTORATION PROJECT



Plots show water depths below the meadow surface at a maximum of >3.5 feet in 2006 to >2.5 feet in 2005. For these plots zero on the Y axis indicates the meadow surface.

Overview of McCoy Groundwater

Overall the sub-surface water above the road bridge appears to be decreasing while that below the bridge increases. Those wells that retained water each year since 2005 showed differences between years of water below the meadow surface that ranged from 1.5 to 0.1 feet. Some of the difference can be attributed to the entrenchment of the channel above or in close proximity to the bridge after 2002, while some of the smaller differences may be more a function of differences in precipitation events between years rather than a reflection of long term trends in groundwater. The proposed restoration actions scheduled for 2010 include cross channel engineered log jams at approximately 12 locations, constructed riffle weirs in 16 locations, bank shaping, bank stabilization, and construction of 2 side channels. It is anticipated that these actions will remedy the drop in water elevations near the bridge and continue to enhance those below it by backing up and retaining water for longer in the season and by providing water access to the floodplain during high flows. Further analysis of groundwater data following the 2010 actions will be conducted to assess the short and long term effects on the local sub-surface water.

Water Temperature Analysis

Updating Hardware

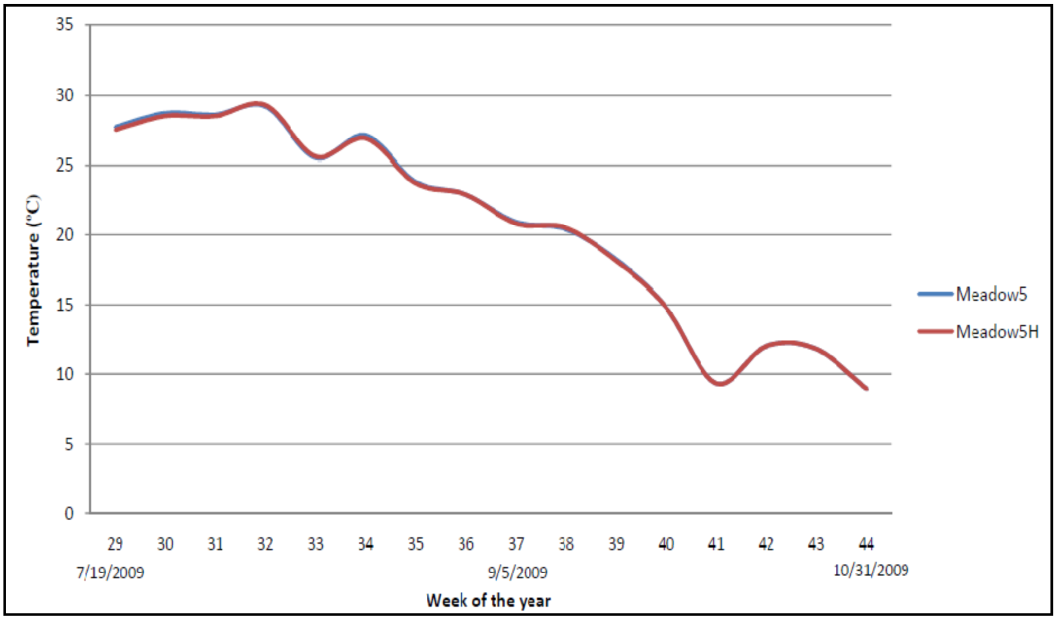
During 2009 twenty four (24) temperature probes were deployed over 22 sites within the Grande Ronde Basin by the Fish Habitat Project, all associated with restoration activities and all recording at 1-hour intervals.

Eleven of the probes were the Onset Hobo type first deployed in 1997, two were the Starlogger probes deployed in 2007 on Meadow Creek (see Table 6 for probe locations) and 11 were the newly purchased Onset Hobo Pendant 64kb loggers. The Pendant and Hobo loggers have similar operating ranges, for example: the Pendant measurement range is -20° to 70°C compared to -40° to 70°C for the Hobo, and the accuracy for temperature ranges of 0° to 50°C is +/- 0.5°C for the Pendant and +/- 0.2°C for the Hobo, however the Pendant has some cost and logistic advantages. Pendants are cheaper than the original Hobo probes and have a user replaceable battery that eliminates the need to return probes to the Onset Corporation every couple of years. The data from up to 64 Pendant loggers can also be frequently downloaded in the field using a waterproof 'shuttle'. Pendant loggers were ordered in late winter but deliver was not until spring, therefore, the deployment for the new probes was mid July 2009. The Pendant logger's accuracy was tested in the field during 2009 by deploying two probes next to original Hobo probes. Both types were set to record at 1-hour intervals with the same start and end times. Both probes recorded similar water temperatures for these time periods (Figures 20 and 21).

There were 11 new probe sites used in 2009 compared to 2008. Of the 22 deployment locations in 2009 there were some probe failures – the Hobo probes on End Creek and the South Fork Willow Creek (3 probes) lost data when their batteries died mid season, the Starlogger data from Meadow Creek (2 probes) had corrupted date/times during download leaving data for 17 locations for this report. Summary statistics were calculated for each probe and restoration project that included the number of records when temperatures were at or exceeded the DEQ lethal limit of 25ºC, 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 and compared between probe locations within a restoration project area and with historical data from the same location when available.

Future analysis of temperature data will focus on the number of records when temperatures are at or exceed both the DEQ standard lethal limit of 25ºC and a lower potentially lethal limit of 23ºC (as indicated by McCullough 1999). This approach will reduce the chances of an oversimplification of biologically significant temperatures that may arise when using mean values (either daily or 7-day moving average). For example if temperatures are focused on one reading per day (the maximum) then averaged over several days it is unclear if that maximum temperature occurred once in that 24-hour period or spanned several hours. The potential for negative biological effects of higher temperatures on salmonid species would be greater if they occurred for consecutive hours or a number of times per day compared to once per day, assuming these species had cooler less-than-lethal pockets of water to seek refuge in and were not confined to lethal limit waters

FIGURE 20: WATER TEMPERATURE ON MEADOW CREEK AT RIVER MILE 7.53 DURING 2009.



Plot is 7-day maximum temperature for two types of probe at the same location – an Onset Hobo (red line) and an Onset Pendant logger (blue line). Plot shows the similarity in temperature recording between the probes.

FIGURE 21: PLOT OF HOURLY WATER TEMPERATURE FOR AUGUST 30TH 2009 FROM AN ONSET HOBO PROBE (RED LINE) COMPARED TO AN ONSET PENDANT LOGGER (BLUE LINE) AT THE SAME LOCATION ON MEADOW CREEK AT (RIVER MILE 7.53)

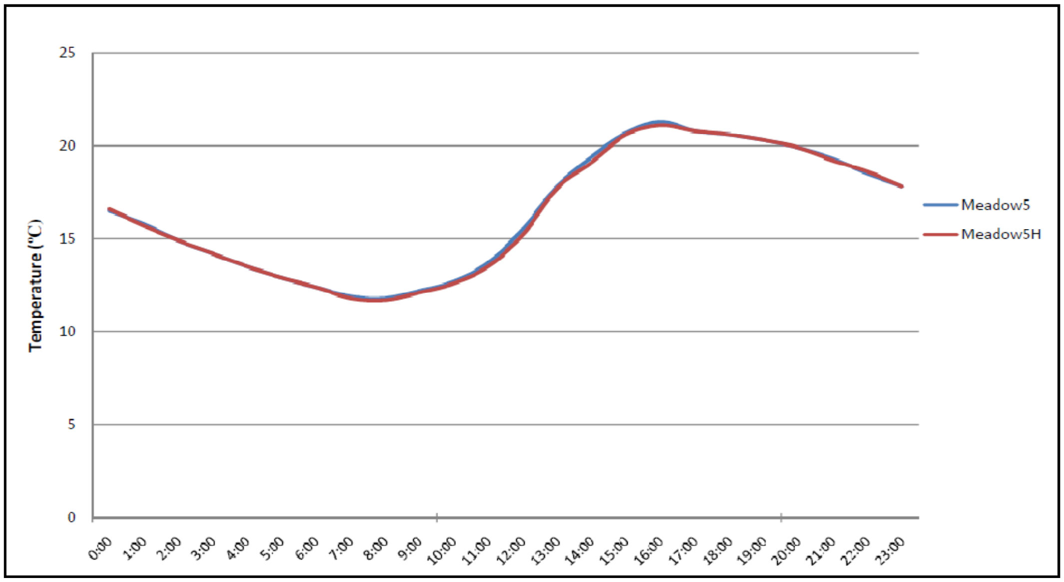


TABLE 6: TEMPERATURE PROBE COORDINATES AND RIVER MILES AS DEPLOYED IN 2009

ID_Field	Longname	Y_PROJ	X_PROJ	Stream	River_Miles	Watershed	Subbasin
BATTLE1	Battle Creek	5011010.4257000	384714.6446690	Battle Creek	0.04	Meadow Creek	Upper Grande Ronde
CLC1	Clear Creek lower	4990708.7416900	396830.6945400	Clear Creek	0.06	Upper Grande Ronde	Upper Grande Ronde
DC1	Dark Canyon lower	5014171.8805100	391585.4286930	Dark Canyon	0.06	Meadow Creek	Upper Grande Ronde
DC2	Dark Canyon upper	5016873.1877500	391028.2364710	Dark Canyon	1.90	Meadow Creek	Upper Grande Ronde
END1H	End Creek Davidson	5035238.9691600	418706.5004150	End Creek	1.40	Willow Creek	Lower Grande Ronde
END2H	End Creek Lower	5035119.0009900	420141.5912880	End Creek	0.02	Willow Creek	Lower Grande Ronde
GR4	Grande Ronde River lower Vey	4996948.2088600	392879.9178900	Grande Ronde River	194.23	Upper Grande Ronde	Upper Grande Ronde
GR5	Grande Ronde Acclimation Facility	4992447.4606800	395395.5331050	Grande Ronde River	199.75	Upper Grande Ronde	Upper Grande Ronde
GR6	Grande Ronde River Mid	4989951.7956000	397816.1688870	Grande Ronde River	202.30	Upper Grande Ronde	Upper Grande Ronde
GR7	East Fork Grande Ronde River	4989473.3022100	398779.4718930	Grande Ronde River	0.05	Upper Grande Ronde	Upper Grande Ronde
GR8	Grand Ronde River upper	4989390.7918500	398767.4001640	Grande Ronde River	203.02	Upper Grande Ronde	Upper Grande Ronde
MCCOY1	McCoythermo1	5013924.6234800	388127.8997030	McCoy Creek	2.70	Meadow Creek	Upper Grande Ronde
MCCOY5H	McCoythermo5	5013306.4703500	389041.3789450	McCoy Creek	1.90	Meadow Creek	Upper Grande Ronde
MCCOY7	McCoythermo7	5013240.8980800	390466.4828800	McCoy Creek	0.10	Meadow Creek	Upper Grande Ronde
MEADOW1ST	Meadowstarlogger1	5012392.8301000	389614.0434090	Meadow Creek	2.90	Meadow Creek	Upper Grande Ronde
MEADOW2ST	Meadowstarlogger2	5013175.3258200	390427.1395200	Meadow Creek	1.50	Meadow Creek	Upper Grande Ronde
MEADOW3	Meadowwetlandchannel1	5012357.5328700	389875.8902170	Meadow Creek	1.06	Meadow Creek	Upper Grande Ronde
MEADOW4	Meadowwetlandchannel2	5013155.6541400	390741.8864010	Meadow Creek	0.17	Meadow Creek	Upper Grande Ronde
MEADOW5	Meadow Creek Habberstad1 Upper	5011105.1496200	384372.9385270	Meadow Creek	7.53	Meadow Creek	Upper Grande Ronde
MEADOW6	Meadow Creek Habberstad2 Lower	5010609.2714400	385358.6228960	Meadow Creek	6.77	Meadow Creek	Upper Grande Ronde
SFW1H	South Fork Willow1	5033817.4638500	419907.0313420	South Fork Willow Creek	1.51	Willow Creek	Lower Grande Ronde
SFW2H	South Fork Willow2	5035085.6669900	420229.3487510	South Fork Willow Creek	0.1	Willow Creek	Lower Grande Ronde

Upper Grande Ronde River and Clear Creek

Five probes were deployed along the Upper Grande Ronde River (including the East Fork) to encompass the mine tailings removal project and downstream of Vey Meadows Ranch. There was an additional probe added to the Clear Creek drainage at river mile 0.06 to capture temperature influences from this tributary (see Figure 22 for upper Grande Ronde probe locations).

During 2009 these probes recorded data for 89 days (between 7/22/2009 and 10/18/2009). Including the Clear Creek probe there was a total of 12,790 hrs logged for analysis. Twenty six records between the 6 probes were removed from the dataset due to either the probes being out of the water or similar reported problems. Of the 12,790 hrs logged the probe below the Vey Ranch (GR4) was the only probe to have temperatures at or above the DEQ lethal limit of 25°C, with 31 hrs logged spread over 11 days when this probe recorded these lethal temperatures. There was 5,863 hrs logged where temperature ranges were between 10° - 15.6°C. Mean daily temperatures did not exceed 17.8°C at any of the probe locations.

Diurnal fluctuations in water temperatures were plotted for each location and a sample of these data are displayed below in Figures 23 - 33. These plots show considerable fluctuations in water temperature below the Vey Ranch (river mile 194.23) compared to the next upstream probe at the CTUIR acclimation facility on the Forest service boundary (river mile 199.75). They also demonstrate the relatively cooler temperatures in the upper reaches of the mine tailings project (GR8 – river mile 203.02) below Tanner Gulch and in the East Fork of the Grande Ronde River (GR7 – river mile 0.05). Temperatures were also similar for the probes located at the mid tailings site below the 5125 rd and 5138 rd junction and those of Clear Creek, where temperatures did not exceed 17.8ºC.

FIGURE 22: UPPER GRANDE RONDE RIVER TEMPERATURE PROBE LOCATIONS

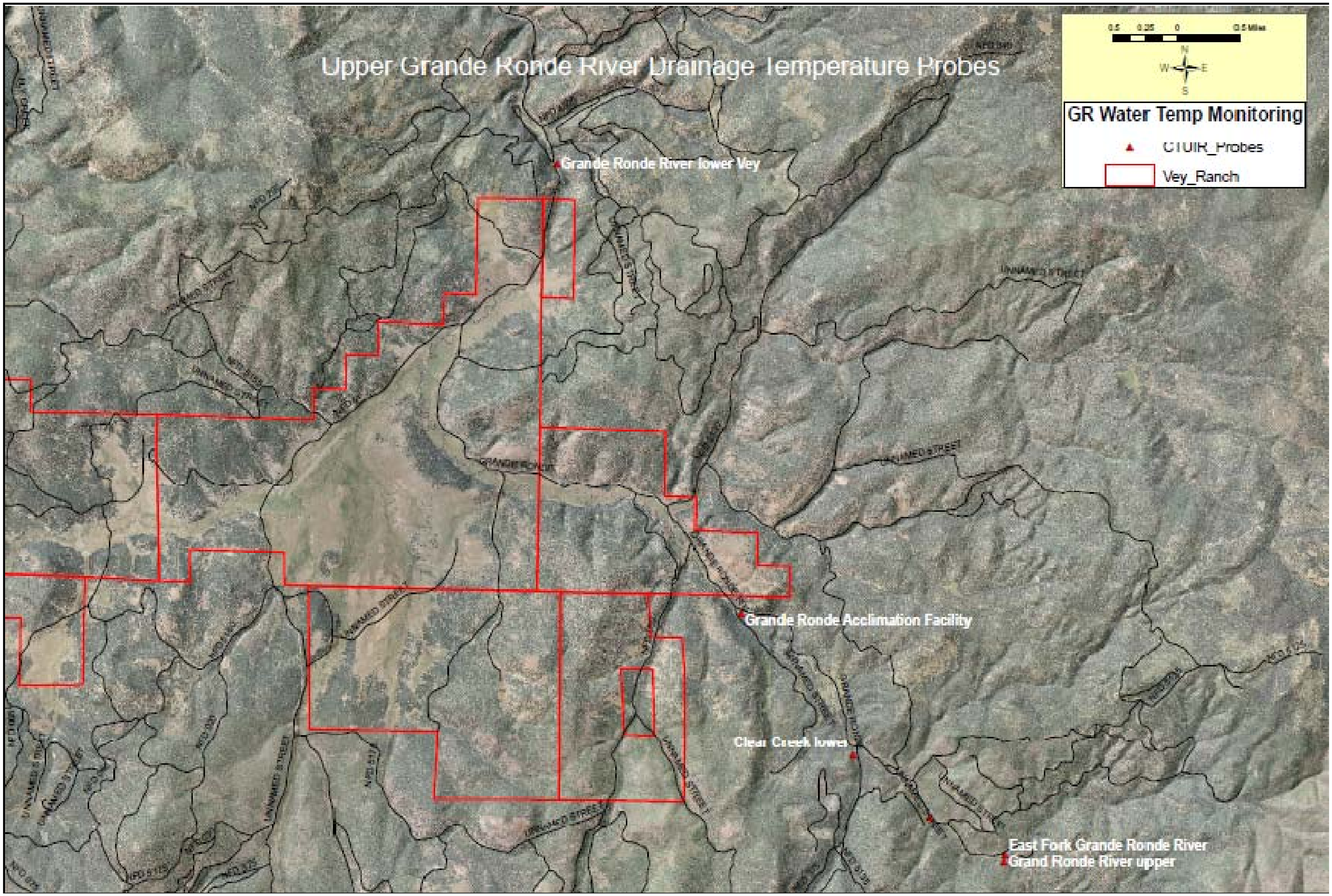
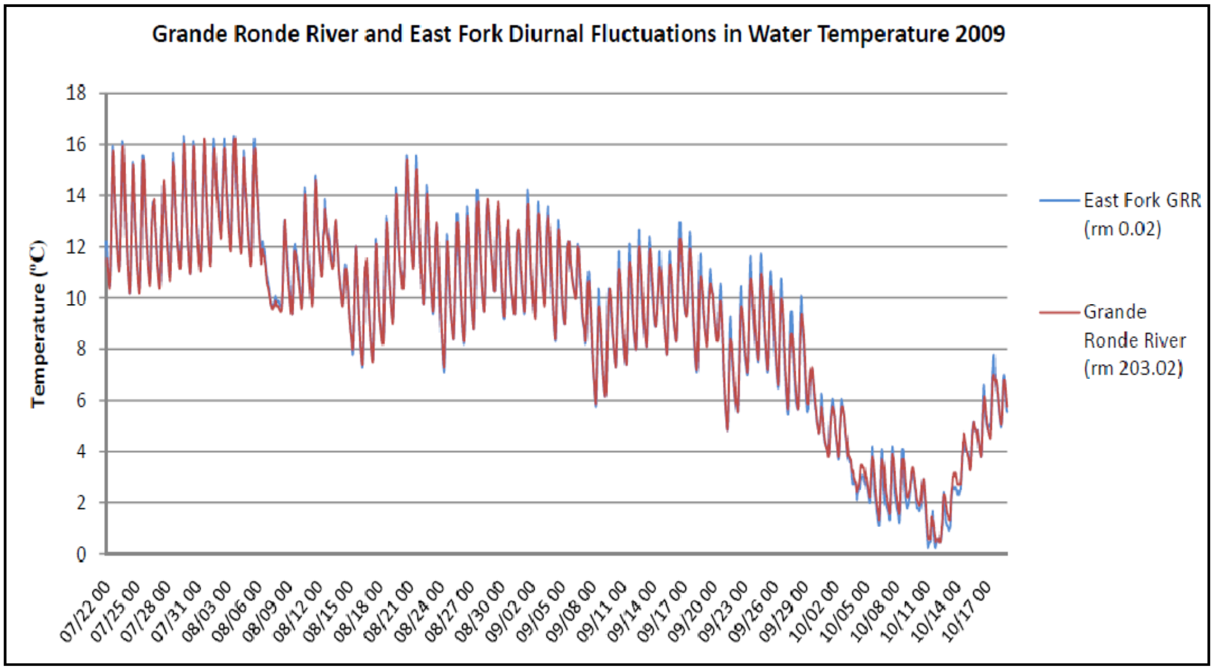
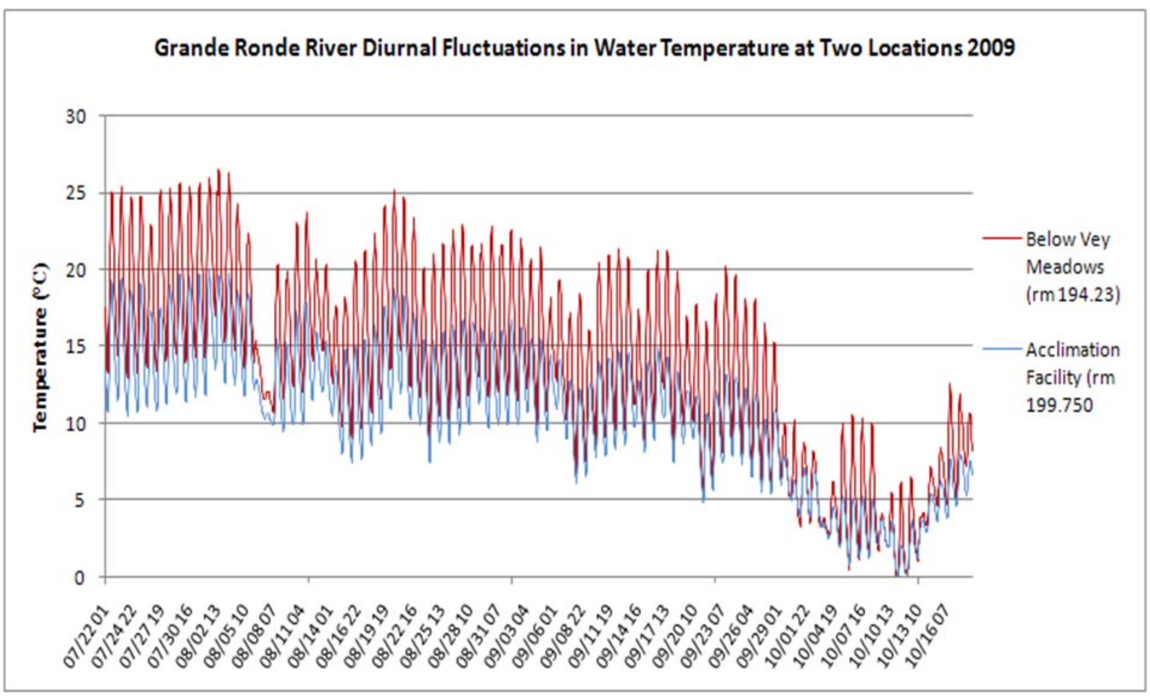


FIGURE 23: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE AT TWO LOCATIONS WITHIN THE UPPER GRANDE RONDE



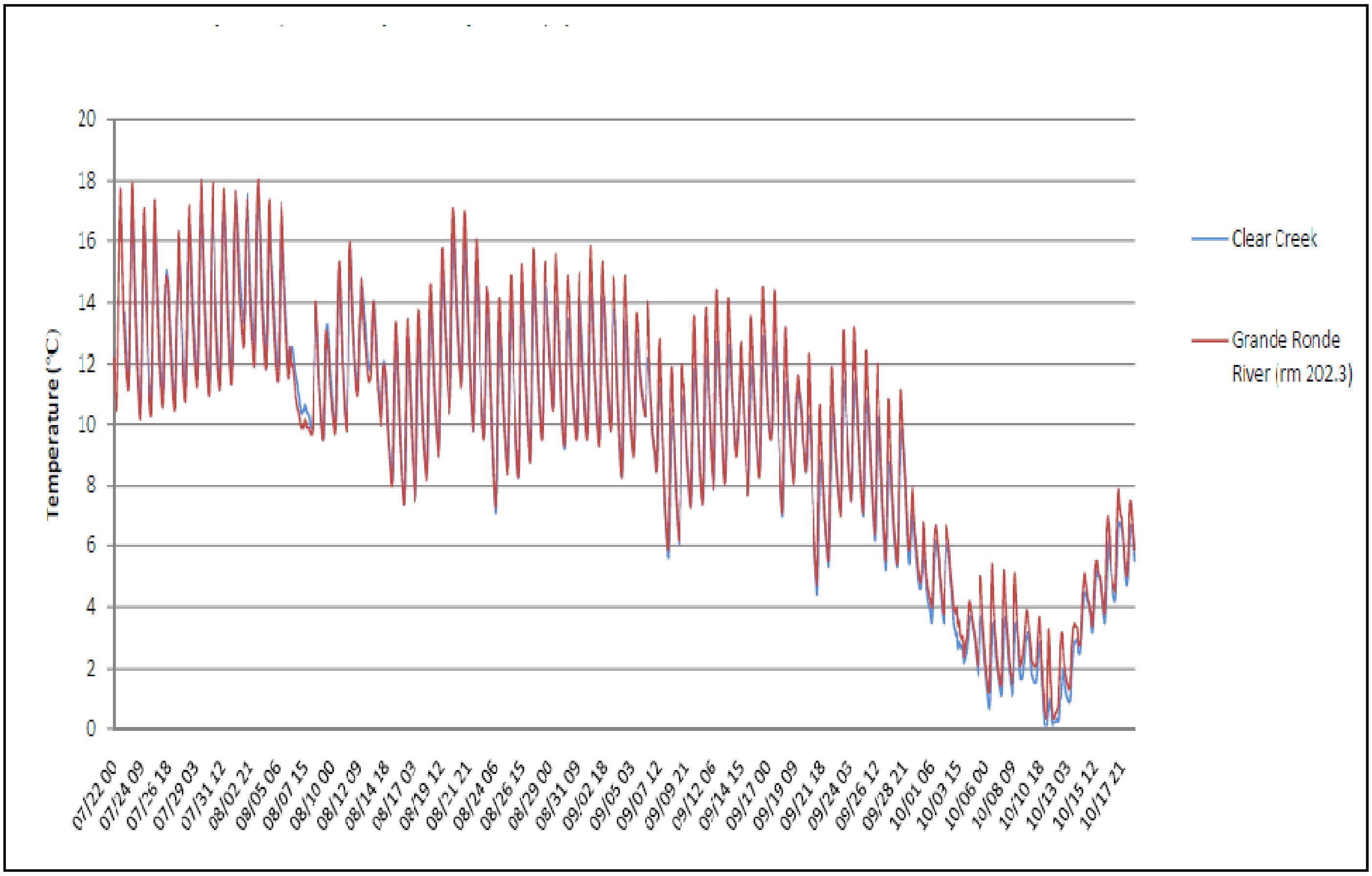
Temperatures were at or below 16ºC for the recording period of 7/22/2009 – 10/18/2009.

FIGURE 24: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE ALONG THE GRANDE RONDE RIVER DURING 2009.



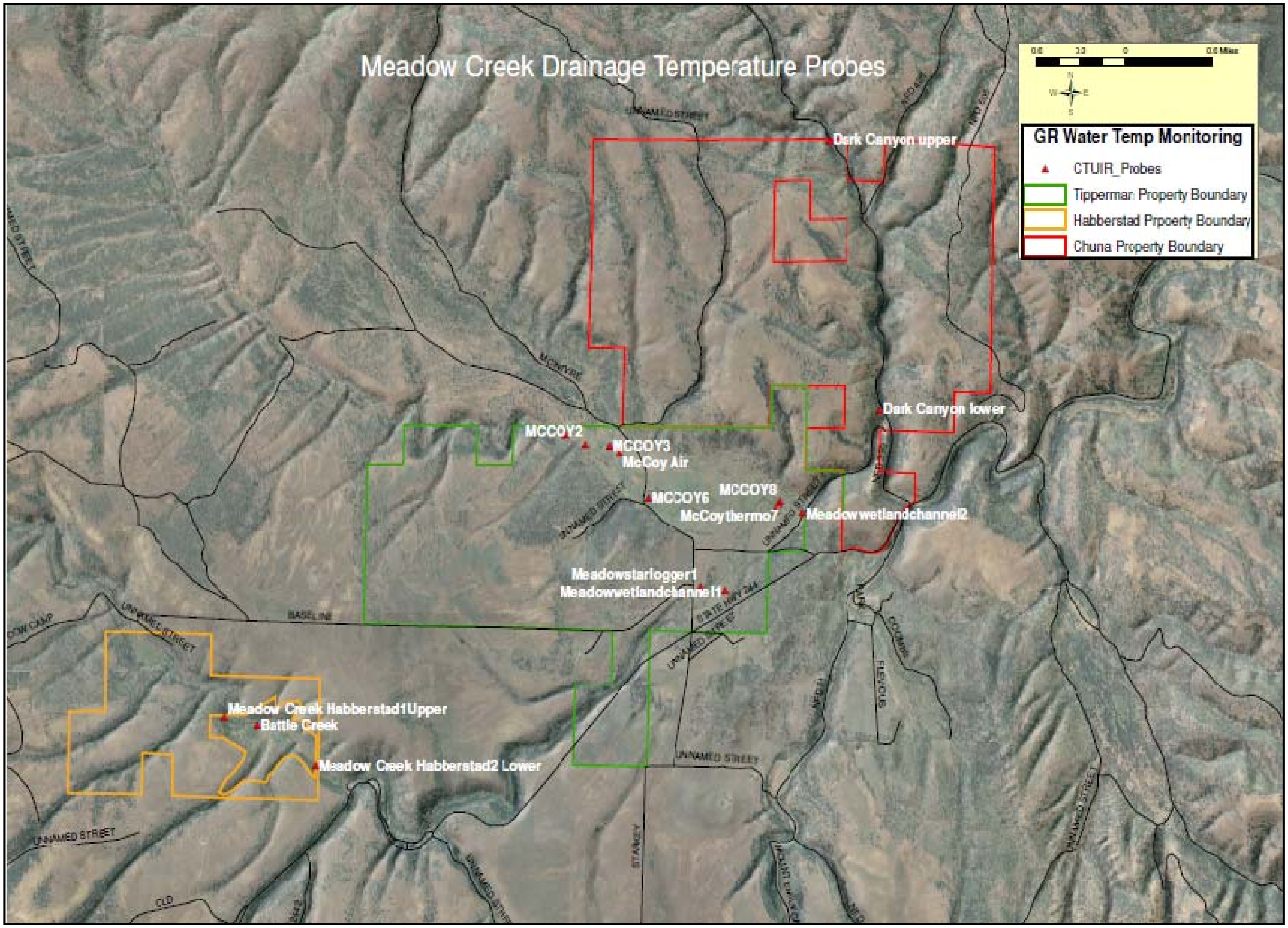
The blue line is for a probe located above the CTUIR acclimation facility and the red line is for the probe located below the Vey Ranch. These plots show the thermal loading within the river as it passes through the 5.5 miles of private property as well as the differences in diurnal fluctuations, with the upper site having a tighter temperature gradient.

FIGURE 25: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE FOR CLEAR CREEK AND THE GRANDE RONDE RIVER (MID TAILINGS PROJECT) JUST UPSTREAM OF CLEAR CREEK



Plots show that during the record period of 7/21/2009 – 10/18/2009 temperatures did not exceed 17.8ºC. Plots also show the similarity of water temperature for both locations.

FIGURE 26: MEADOW CREEK DRAINAGE TEMPERATURE PROBE LOCATIONS



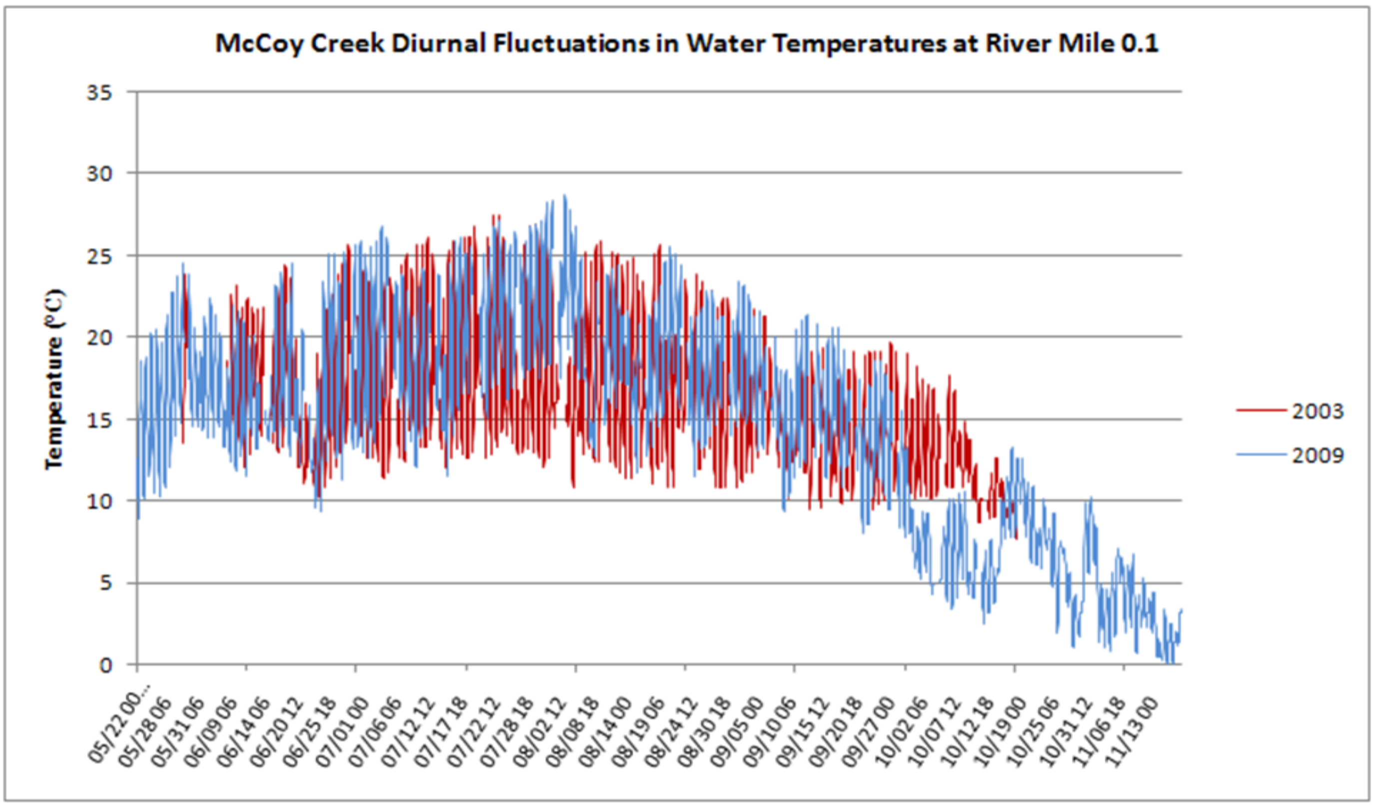
McCoy Creek (Figure 27)

For the 2009 field season due to additional commitment of resources (additional project monitoring) temperature probes along McCoy Creek were reduced to 3 locations (upper, mid, lower; Figure 26). There were a total of 180 days of data recorded during 2009 between 5/22/2009 and 11/17/2009, with 72 records having to be removed from the analysis due to probe issues (out of water, low battery etc) leaving 12,888 hrs logged between 3 probes.

There were 404 hrs of temperatures logged that were >= 25ºC, with these temperatures occurring on 63 hrs over 18 days at river mile 2.7 (McCoy1 – the upper probe), for 178 hrs over 30 days at river mile 1.9 (McCoy5 – mid project probe), and for 164 hrs over 33 days for river mile 0.10 (McCoy7 – lower probe).

Temperatures within the range of 10ºC to 15.6ºC occurred in 1,056 hrs of the 12,888 hrs logged. Mean daily temperatures were at or exceeded 17.8ºC on 61 of the 180 days recorded during 2009. Diurnal fluctuations in water temperature were plotted for each probe. From these plots it is evident that these fluctuations are narrower when compared to previous years, indicating that although temperatures do reach a potential lethal limit within the project area the fluctuations in stream temperatures are becoming less pronounced (see Figure 27 below).

FIGURE 27: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE FOR THE LOWER MCCOY CREEK PROBE (RIVER MILE 0.10) IN 2009 COMPARED TO 2003



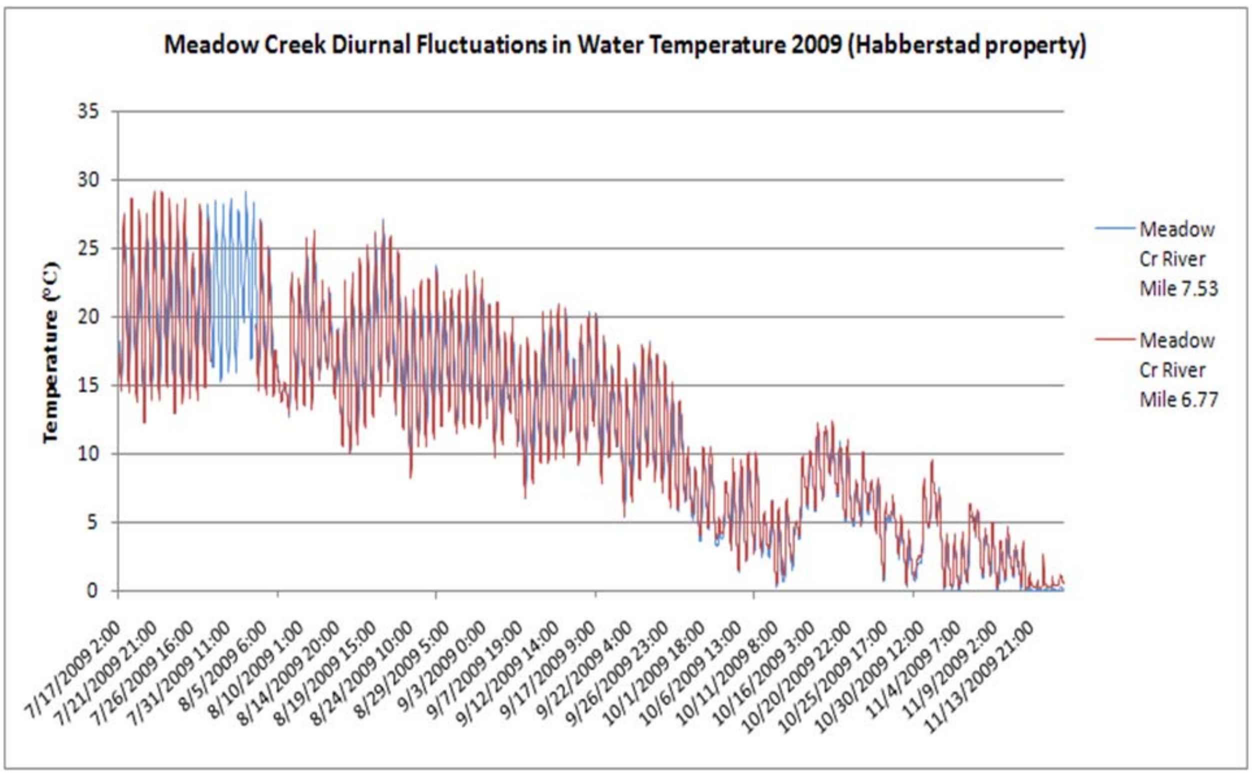
The plot shows less fluctuation in temperature during the 2009 record period of 5/22 to 11/17 compared to the 2003 data for the same dates. This trend was also evident when comparing 2009 data with other years up to 2007, but not as evident when compared to 2008.

Meadow Creek and Battle Creek (Figures 28 and 29)

The following summary is for probes located on Meadow Creek on John Habberstad's property (Figure 26), a restoration project implemented in 2009, and for Battle Creek – a tributary that enters mid project. There were two probe locations on Meadow Creek (Meadow5 and Meadow6) at river mile 7.53 and 6.77 respectively and one on Battle Creek at river mile 0.04.
For Meadow Creek the probes were deployed for approximately 124 days between 7/17/2009 and 11/17/2009. There were 148 records deleted due to one or more probes being out of the water leaving 5,804 hrs logged between the two probes. There were 219 records of water temperature being at or greater than 25ºC and 1,366 records of temperatures between 10ºC and 15.6ºC. The mean daily temperatures within the project area were at or exceeded 17.8ºC for 30 days.

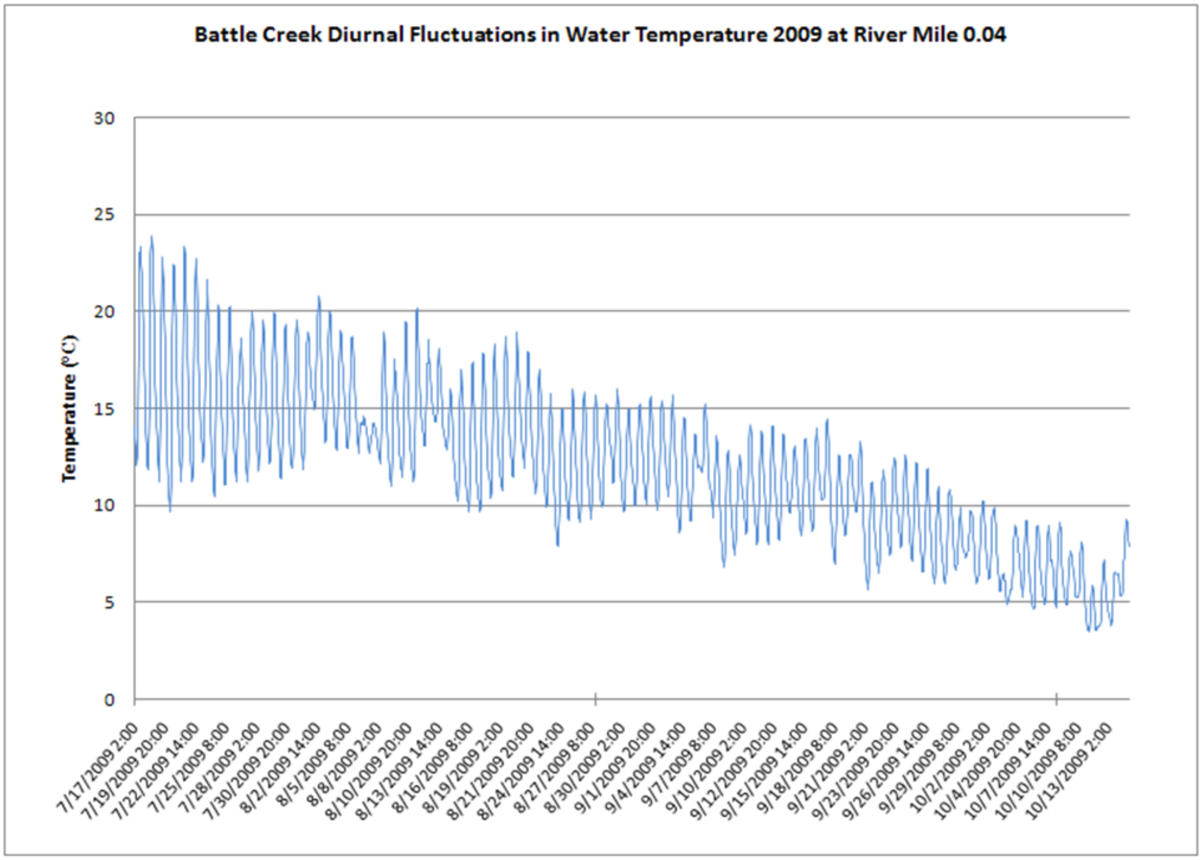
For Battle Creek one probe was recording data for approximately 90 days between 7/17/2009 and 10/14/2009 (Battle1). There were no records of water temperature exceeding 25ºC or of a mean daily value >= 17.8ºC during this period. There was 1,110 hrs logged of the 2,158 hrs total when temperatures were within the range of 10ºC to 15.6ºC.

FIGURE 28: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE FOR MEADOW CREEK AT RIVER MILES 6.77 AND 7.53 FOR 2009



The plot shows high temperatures in July through early September and a similarity between the upper and lower probes.

FIGURE 29: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE DURING 2009 FOR BATTLE CREEK AT RIVER MILE 0.04 NEAR ITS CONFLUENCE WITH MEADOW CREEK



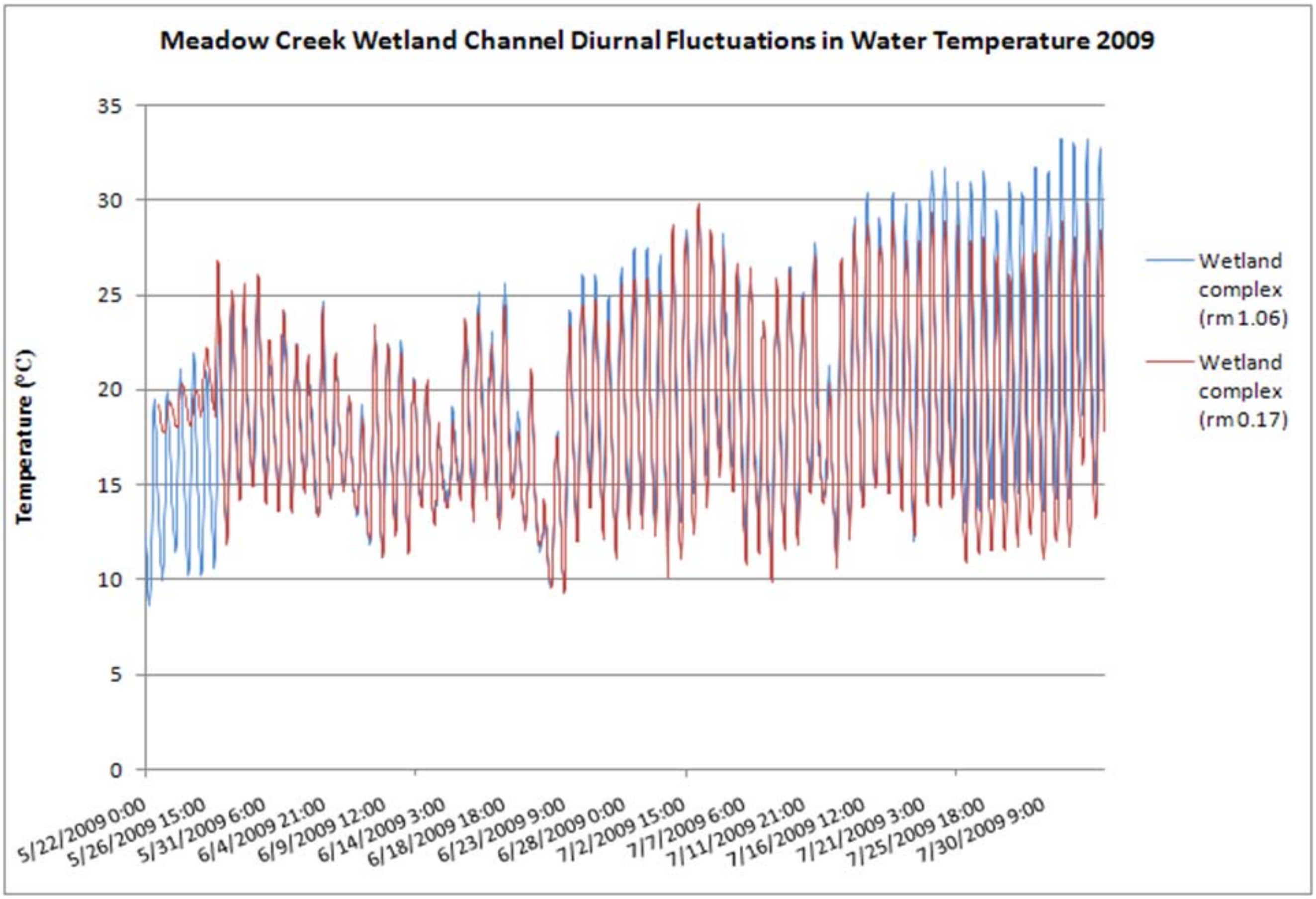
The plot is for the recording period of 7/17/2009 through 10/18/2009 and demonstrates that temperatures did not approach the DEQ standard lethal limit of 25ºC. There is also evidence of a narrower diurnal fluctuation in stream temperature compared to Meadow Creek.

Meadow Creek Wetland Complex (Figure 30)

Two probes were deployed within the Meadow Creek wetland complex at river miles 0.17 and 1.06 (Meadow4 and Meadow3 respectively; Figure 26). The wetland channel typically goes dry at the probe locations for a brief period in mid August through to the fall. The probes are pulled at the first dry channel event and not re-deployed.

The wetland complex probes were deployed between 5/22/2009 and 8/3/2009 and recorded for approximately 74 days. There were 23 records removed from the dataset when the probes were detected out of the water leaving 3,529 records for the analysis. There were 460 hrs logged when the temperatures was at or above the DEQ lethal limit of 25ºC, and 1,112 hrs logged when the range was between 10ºC and 15.6ºC. Mean daily temperatures exceeded 17.8ºC during 51 of the 74 days of the record period.

FIGURE 30: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE AT TWO LOCATIONS WITHIN THE MEADOW CREEK WETLAND COMPLEX DURING 2009

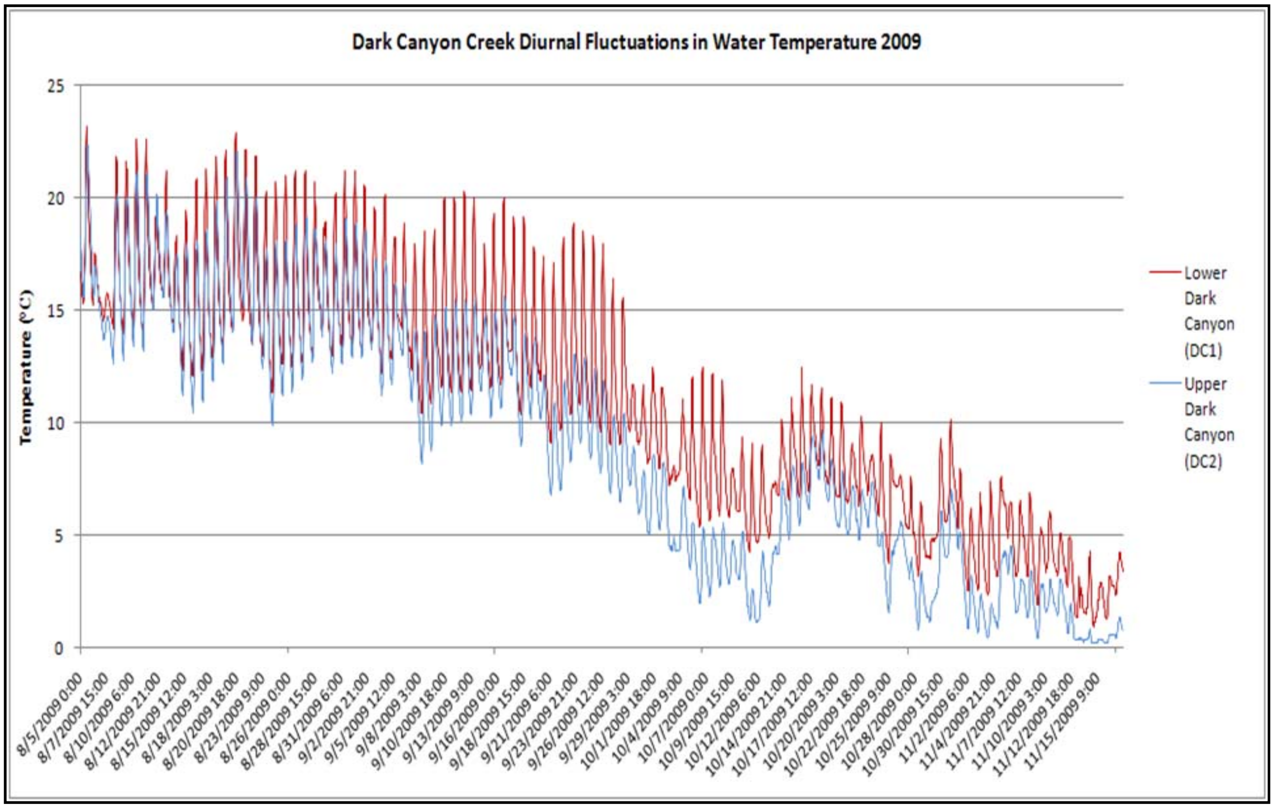


Plots show high temperatures for most of the record period (5/22/2009 to 8/3/2009) before the channel went dry.

Dark Canyon Creek (Figure 31)

Restoration activity along Dark Canyon Creek within the Cunha Ranch was due to start in 2010; therefore it was beneficial to take advantage of an opportunity to collect as much pre-project data as possible. Two probes were deployed between 8/5/2009 and 11/17/2009 (105 days) at river miles 0.06 (DC1) and 1.9 (DC2) (Figure 26). There were no records of water temperature at or above 25ºC during the 2009 deployment, 1,663 hrs of the 5,040 hrs logged were of temperatures between 10ºC and 15.6ºC, and only 1 day where daily mean temperature was at or exceeded 17.8ºC. Diurnal fluctuations were less and overall temperature lower at the upper probe (DC2) compared to the lower one.

FIGURE 31: DIURNAL FLUCTUATIONS OF WATER TEMPERATURE ALONG DARK CANYON CREEK BETWEEN 8/5/2009 AND 11/17/2009



The blue line is for the upper probe at river mile 1.9 (DC2) and shows an overall narrow diurnal fluctuation and generally lower temperatures compared to the red line for the lower probe at river mile 0.06 (DC1) near the confluence with Meadow Creek.

<u>End Creek (Figure 33)</u>

Four probes were deployed in 2009 within the End Creek restoration project (3 on Joel Rice's property and 1 on Dan Davidson's property) (Figure 32) and as indicated earlier three of these probes lost data when their batteries failed mid season. The following results are from the upper probe on End Creek within Dan Davidson's property at river mile 1.4 (End1).

This probe was deployed for 186 days between 5/13/2009 and 11/14/2009. There were 74 hrs of the 4,464 hrs logged that were at or exceeded 25ºC and 1,754 hrs when temperatures were between 10ºC and 15.6ºC. Mean daily temperatures were recorded at or above 17.8ºC on 19 days of the deployment period. There were noticeably higher temperatures during late July to early August when, although the probe was not out of the water, there was very little flow at the probes location. These temperatures may therefore be more a function of the probes position within the water column than that of the overall water temperature. A more suitable site will be used for 2010.

FIGURE 32: END CREEK AND SOUTH FORK WILLOW CREEK TEMPERATURE PROBE LOCATIONS

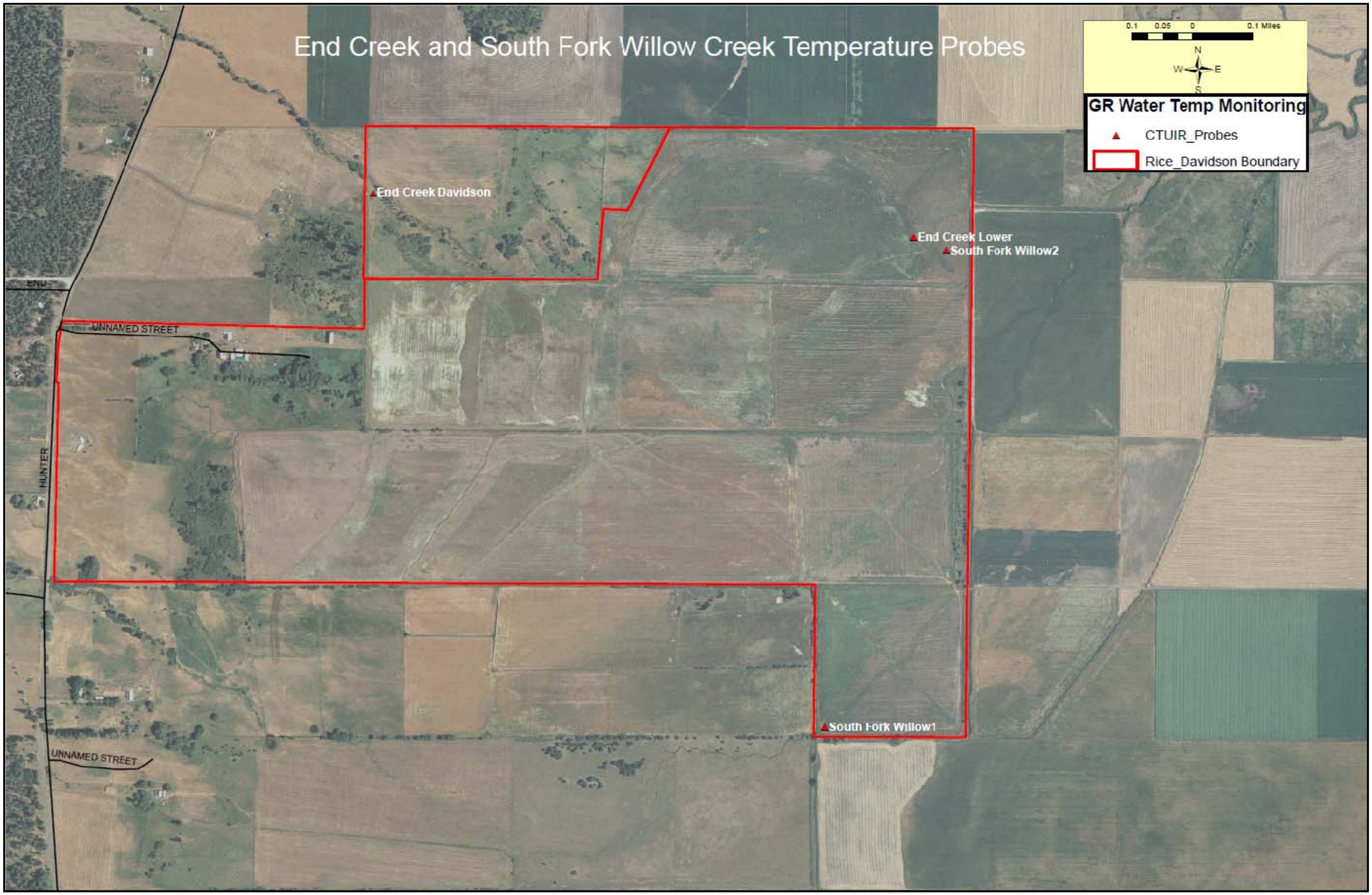
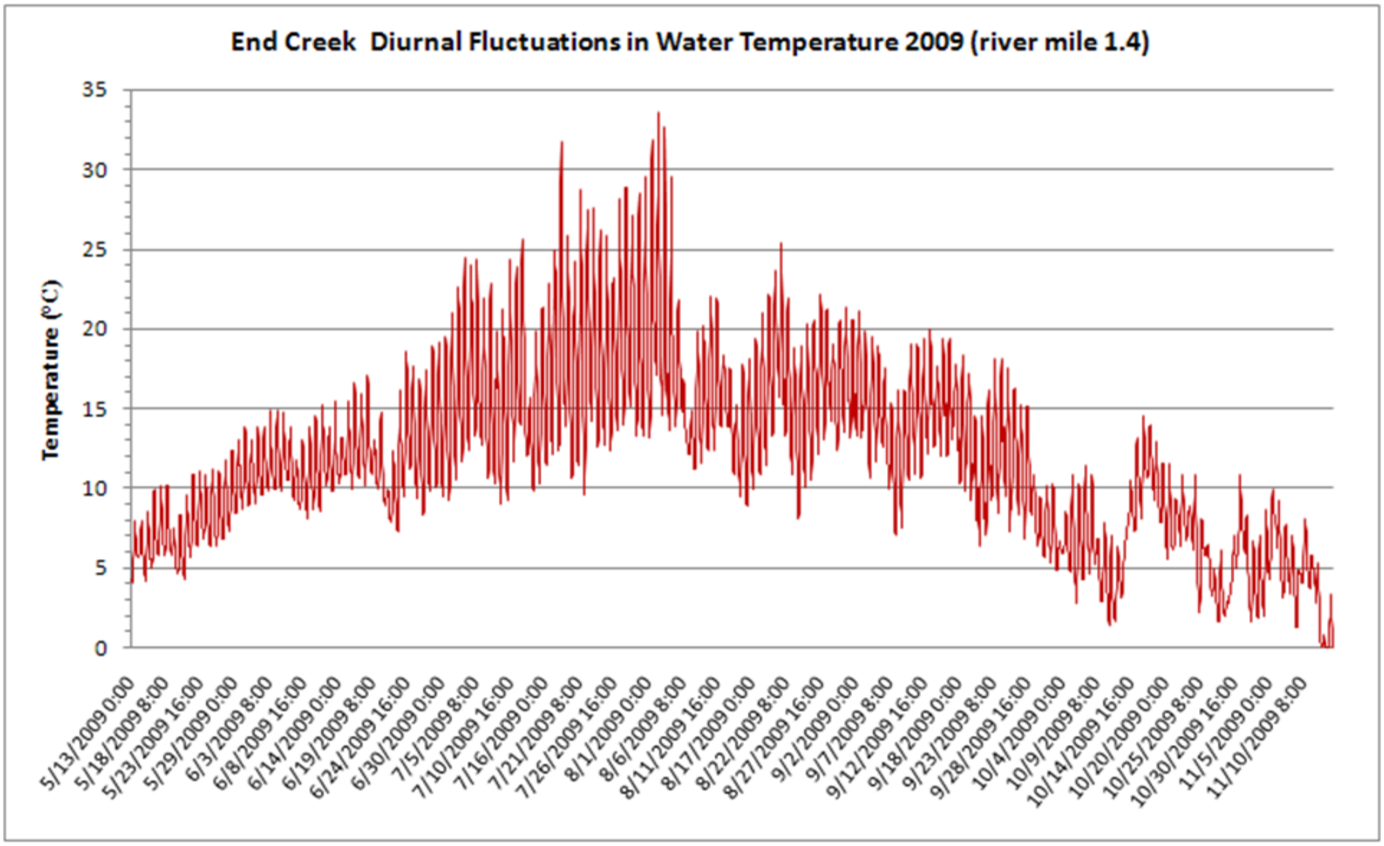


FIGURE 33: DIURNAL FLUCTUATIONS IN WATER TEMPERATURE FOR END CREEK AT RIVER MILE 1.4 BETWEEN 5/13/2009 AND 11/14/2009



The probe location experienced low flows during late July/Early August that came close to the probe being out of the water and resulted in those peaks in temperature at this time. Data for this time period was not removed, but should be viewed more as a function of probe location within the water column than overall stream temperatures.

Fish Population Monitoring

End Creek

CTUIR staff initiated juvenile fish monitoring at the End Creek Restoration Project in 2005 to establish a baseline from which to evaluate project goals and objectives associated with restoring and enhancing summer steelhead spawning and juvenile rearing habitat. ODFW has been conducting adult redd surveys in the project area since 2005 as part of the project monitoring effort. Specific objectives of the salmonid monitoring and evaluation effort include estimating the abundance and age class for summer steelhead/rainbow trout and subsequent responses to project actions.

As part of the baseline assessment, the CTUIR surveyed 15 randomized juvenile fish population index sites along End Creek, South Fork Willow, and McDonald Creek including sampling of control sites for reference outside the influence of project activities. The initial sample was completed in late July, 2005. Spring-fed tributaries within the project area were also sampled to determine fish presence/absence. Baseline data indicated that summer distribution of summer steelhead/ rainbow trout (STS) is limited to upper reaches of project area streams. In 2007, the sampling design was modified to align with literature from the ISRP regarding sampling design and methodologies. A closed model Petersen mark-recapture estimator was employed (adapted from Johnson et al. 2007; Salmonid Field Protocols Handbook).

Since the initial pre-project sample in 2005, sampling has occurred from 2007-2009 at an initial control reach (upstream of project influence) and a reach in the upper portion of the End Creek restoration channel, which is in a similar location as the pre-project implementation reach that was sampled in 2005 (see Figure 35 for current sampling locations). Juvenile STS populations per 100m^2 have been highly variable within the project reach with density estimates ranging from 10.85-339.17 fish/100m^2. The control reach has been mildly variable when compared to the project reach, with density estimates ranging from 12.20-55.20 fish/100m^2 (Table 7 and Figure 34 below). 2007 appears to have been a strong recruitment year for STS juveniles in the End Creek system, especially for the 0+ age class. The reach within the project has contained a much greater density of juvenile STS than the control reach, with 2009 being the only exception; it is unclear as to why the density was so low for that year when compared to previous years and why densities appear to be declining in successive years. Additional sampling and data analysis will help better understand these trends.

TABLE 7: POPULATION ESTIMATES OF AGE CLASSES FOR SUMMER STEELHEAD/RAINBOW TROUT (STS) (FISH/100M2) BY SITE LOCATION FOR END CREEK, SURVEYED IN JULY EACH YEAR

Site ID	Year	Area (m^2)	STS 0+	STS juv.	STS 2+	Total
Control	2005	180.00	0.55	11.10	0.00	12.20
	2007	460.00	22.43	32.00	0.77	55.20
	2008	165.60	0.60	19.30	0.00	19.90
	2009	137.34	3.64	14.56	10.19	28.40
Upper-Mid	2005	90.00	84.40	13.30	0.00	93.30
	2007	308.00	316.40	22.75	0.00	339.17
	2008	69.30	96.70	15.90	0.00	114.00
	2009	101.40	8.88	0.99	0.99	10.85

FIGURE 34: JUVENILE SUMMER STEELHEAD/RAINBOW TROUT DENSITIES FOR END CREEK AT A CONTROL (ABOVE THE PROJECT AREA) VERSUS A PROJECT LOCATION

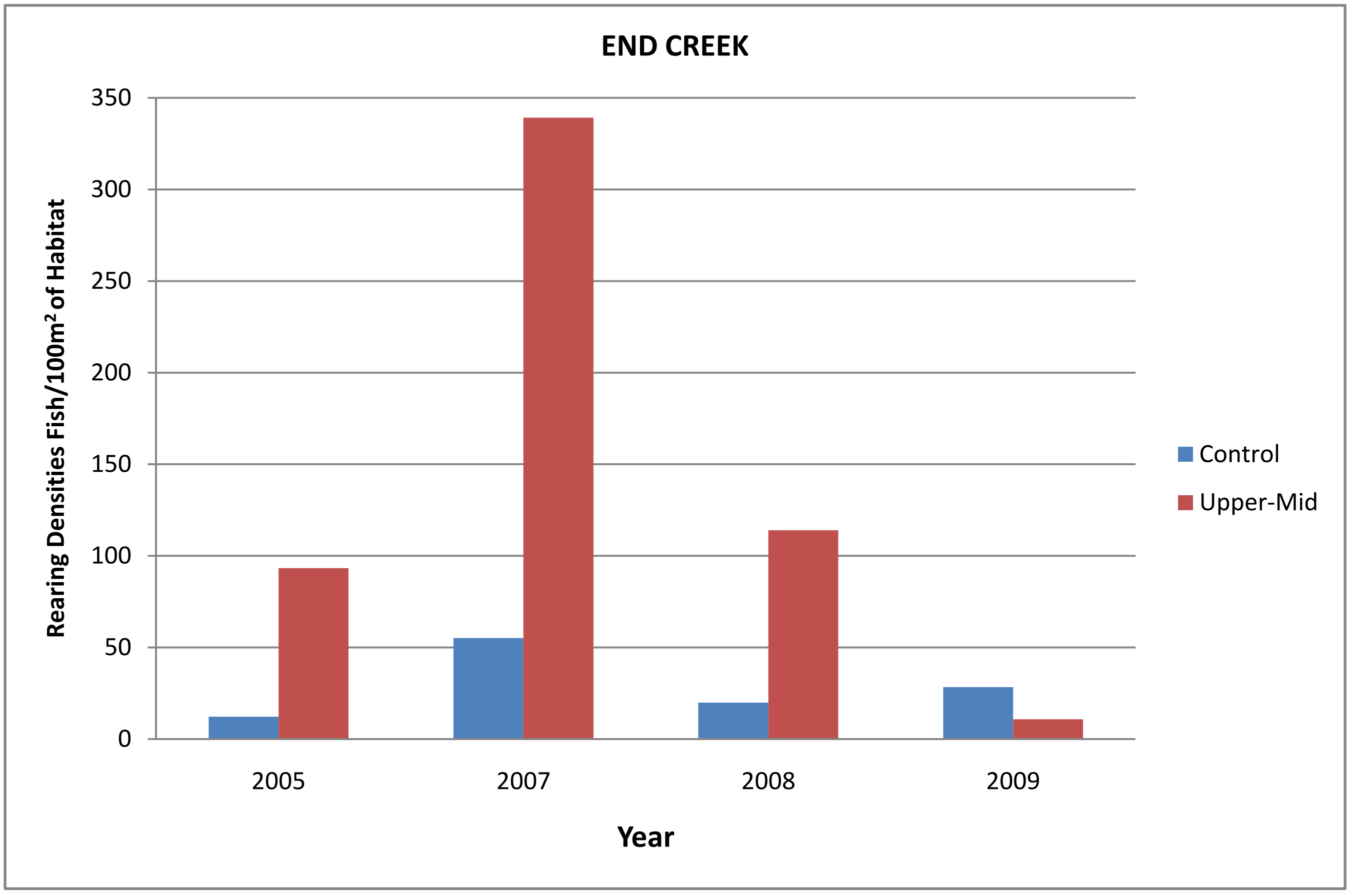
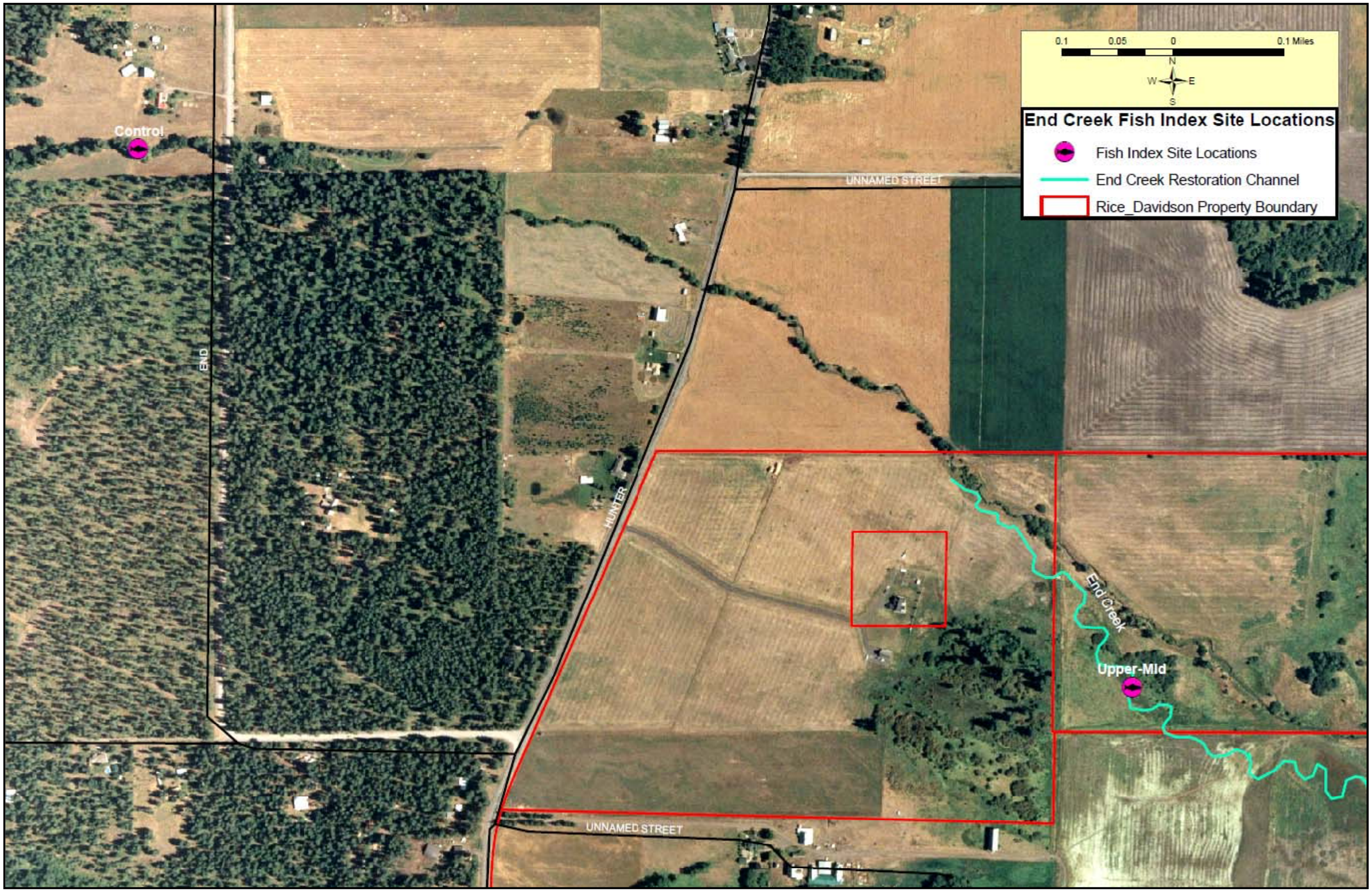


FIGURE 35: CONTROL AND UPPER-MID JUVENILE FISH POPULATION MONITORING LOCATIONS FOR THE END CREEK STREAM RESTORATION PROJECT



Meadow Creek

CTUIR staff initiated juvenile fish monitoring on Meadow Creek in 2008 for the Habberstad Property Stream Restoration Project (implemented in 2009 after fish sampling) in order to establish a baseline from which to evaluate project goals and objectives associated with restoring and enhancing STS spawning and juvenile rearing habitat (see Figure 42 for index sites within the project boundaries). Specific objectives of the salmonid monitoring and evaluation effort include estimating the abundance and age classes for salmonids and their subsequent responses to project actions. The sampling protocol employed was a closed model Petersen mark-recapture estimator (adapted from Johnson et al. 2007; Salmonid Field Protocols Handbook).

TABLE 8: MEADOW CREEK HABBERSTAD PROJECT AREA POPULATION ESTIMATES OF AGE CLASSES FOR SUMMER STEELHEAD/RAINBOW TROUT (STS) FISH/100M^2 BY SITE LOCATION

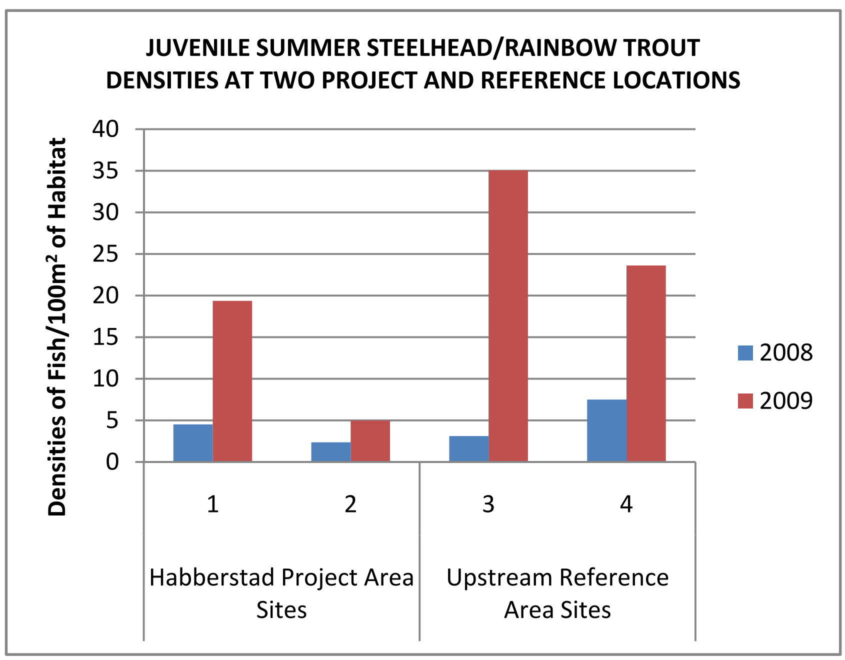
Site ID	Area (m^2)	STS 0+	STS juv.	STS 2+	STS Total
1	420	7.14	0.48	0.00	4.52
2	338	2.07	0.59	0.00	2.37
3	385.4	0.52	3.11	0.00	3.11
4	426.4	3.99	3.52	0.00	7.50

July, 2009 Meadow Creek Fish STS/100M^2

Site ID	Area (m^2)	STS 0+	STS juv.	STS 2+	STS Total
1	314.60	0.41	3.93	0.83	19.36
2	349.70	0.00	11.71	8.36	4.98
3	336.60	0.00	2.14	0.71	35.06
4	585.44	0.00	3.83	0.41	23.61

In 2008 and 2009 four sites were sampled, site #1 and #2 are inside the project area and site #3 and #4 are at upstream reference locations. Overall, 2008 appears to have a much lower population density with population estimates ranging from 2.37-7.50 fish/100m^2 as opposed to 2009 where population densities ranged from 4.98-35.06 fish/100m^2. In both 2008 and 2009 sites within the project area ranged from 2.37-19.36 fish/100m^2 and reference sites ranged from 3.11-35.06 fish/100m^2 (see Table 8 Figure 36). Interestingly, age 0+ fish were present at each site in 2008 and only present at one site in 2009. Furthermore, age 2+ fish were absent from the sample in 2008 and present at each location in 2009. A cause of this may be the timing of each sample, where 2008 was collected in August and 2009 was collected in July. Sampling will occur again at each location in 2011 in order to monitor changes post-project implementation.

FIGURE 36: MEADOW CREEK HABBERSTAD PROJECT AREA DENSITIES OF TOTAL JUVENILE STS AGE CLASSES PER SITE LOCATION



Produce Pisces Status Reports

Quarterly Pisces reports were prepared generally on schedule and reviewed and accepted by the BPA project COTR. These reports provide a regular update on project progress on status of work elements and associated milestones.

Produce Annual Report

Annual reports provide updates on project progress on an annual basis and follow standard BPA formatting.

Habitat Enhancement & Restoration Project Implementation during FY2009

The following section provides an overview of accomplishments on the Upper Grande Ronde River Mine Tailings Restoration Project and the Meadow Creek (Habberstad) Fish Habitat Enhancement Project.

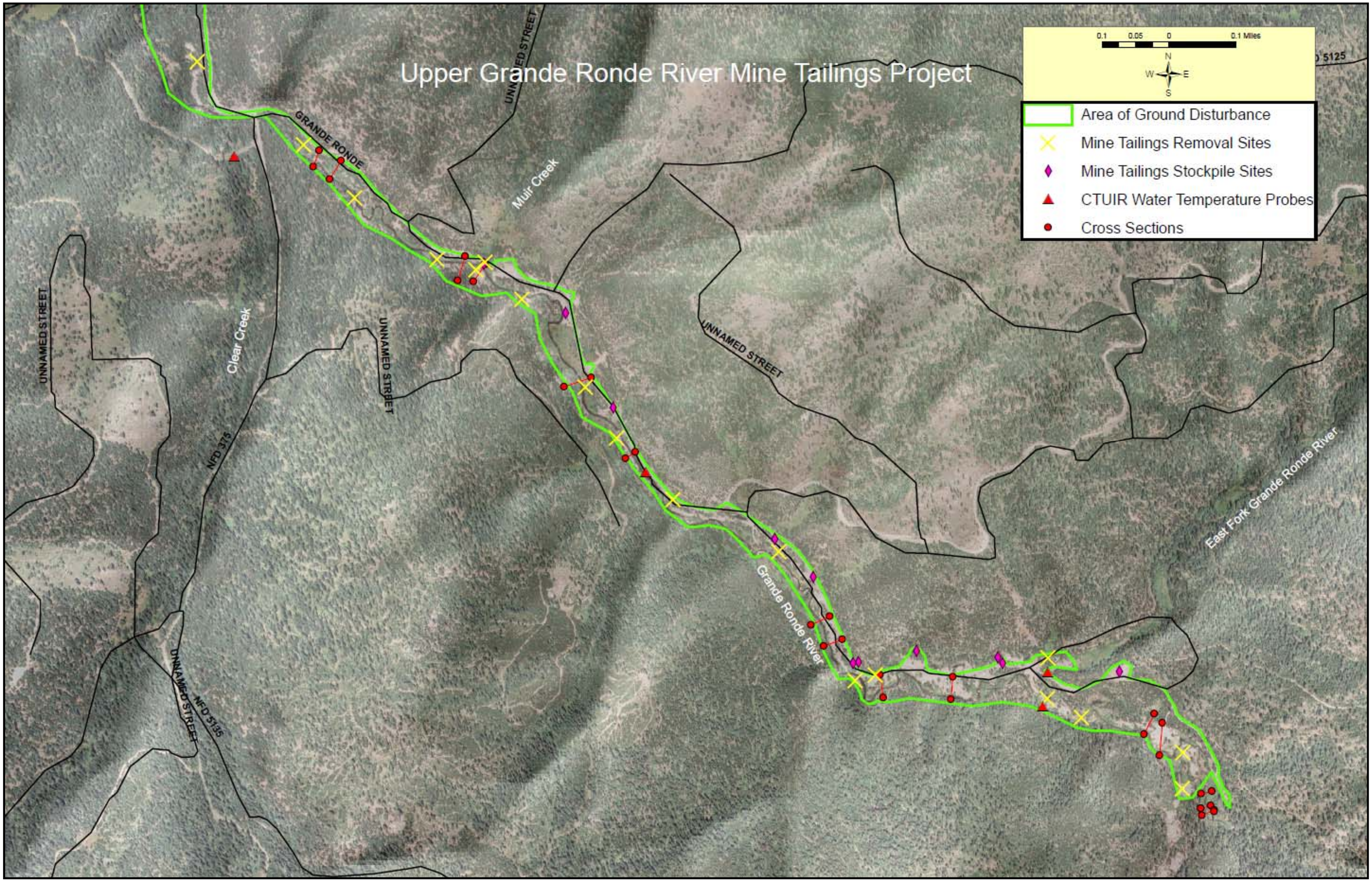
Upper Grande Ronde River Mine Tailings Restoration Project

The Upper Grande Ronde River (UGGR) provides spawning and rearing habitat for Snake River Basin summer steelhead, Snake River Basin spring/summer chinook salmon and bull trout, all of which are federally listed as Threatened under the Endangered species Act. Historic timber harvest and gold mining, conducted in 1940 and 1941 utilizing a dredge, has removed larger conifers from the valley bottom and created piles of tailings within the floodplain, where in many cases they cross the valley floor and extend toe slope to toe slope. The tailing piles have constricted the river channel, pushed it to one side of the valley floor and simplified the channel disconnecting the river from its floodplain (Figure 37). Therefore, floodplain function, habitat complexity, pool quality and quantity, riparian vegetation, stream shading, and instream channel function were severely altered. Restoration activities occurred in the late 1980's and early 1990's, where large wood structural elements were added to the channel. However, those restoration activities did not address floodplain function, riparian vegetation, and stream shading. Furthermore, many of the structures placed in the channel have caused juvenile fish passage problems and undesirable changes to stream channel morphology, such as increased width to depth ratios.

The CTUIR and Wallowa-Whitman National Forest Service partnered to complete the first phase (Figure 38) (second phase will be implemented by the Forest Service in 2010) of the project during FY2009 in order to address some of the limiting factors for the aforementioned ESA listed fish species. Limiting factors include: floodplain connectivity, instream habitat complexity, and lack of sufficient velocity refuge. This phase of the project was implemented with goals of improving floodplain connectivity, increasing availability of instream and off-channel refugia for ESAfish species, restoring appropriate stream channel morphological processes such as sediment/gravel sorting, increasing the abundance of riparian and wetland plant communities and removing previously installed structures were adversely constraining channel morphology and/or not meeting objectives.

FIGURE 37: AERIAL PHOTOGRAPH OF MINE TAILINGS PROJECT 2008 (PRE-PROJECT)

FIGURE 38: UPPER GRANDE RONDE RIVER MINE TAILINGS REMOVAL AND FLOODPLAIN RESTORATION PROJECT IMPLEMENTATION AND MONITORING SITES



Implementation:

Project planning began in early 2009 with the Forest Service completing environmental compliance documentation relating to instream work, and the CTUIR completing cultural resource consultation. Implementation occurred during July, 2009, in which, CTUIR and Forest Service biologists were on-site daily to inspect subcontract construction. 5,000 dump truck loads of mine tailings (approximately 60,000 cubic yards) were removed from the floodplain and relocated to pre-determined locations (Figures 39 and 40) allowing for the reclamation of 2.5 miles of floodplain, wherein 4 small side channels were established. Some of the tailings contained small ponderosa pine trees that had to be removed. Therefore, those trees were placed within the floodplain to act as roughness elements. 44 of the existing restoration structures were either removed or modified in order to allow for suitable stream morphological processes to occur. Furthermore, all areas of disturbance (over 5 miles) were seeded with a native riparian and upland grass seed blend and subsequently, weed-free straw mulch was spread over disturbance areas to act as an erosion and moisture control tool. In the fall of 2009, CTUIR staff planted sedge plugs (harvested from near site locations) in the 4 constructed side channels and in all low areas within the reclaimed floodplain in order to give the riparian and wetland plant communities a jumpstart in establishment.

FIGURE 39: PHOTO OF MINE TAILINGS BEFORE/DURING REMOVAL

FIGURE 40: PHOTO OF MINE TAILINGS AFTER REMOVAL

Pre and Post Project Monitoring:

CTUIR biologists conducted pre-project stream morphological surveys (cross-sections and longitudinal profile) of the project reach using a Trimble R8 GPS. Additionally, some cross-sections were repeated immediately following construction in order to show the dramatic change in floodplain elevation (Figure 41). These surveys will be repeated in the future in order to monitor changes in channel morphology. Furthermore, six temperature probes were distributed in or near the project area (see monitoring and evaluation, water temperature analysis section for detailed probe locations and results). Temperature monitoring will continue for the foreseeable future during the months of May-November (start and end dates vary as weather permits). Fish population monitoring in the UGGR is conducted by both the CTUIR and ODFW Early Life History Projects and future reports will incorporate information from these studies.

FIGURE 41: EXAMPLE OF A CHANNEL CROSS-SECTION BEFORE AND AFTER PROJECT IMPLEMENTATION OF THE MINE TAILINGS PROJECT

The following table illustrates project accomplishments:

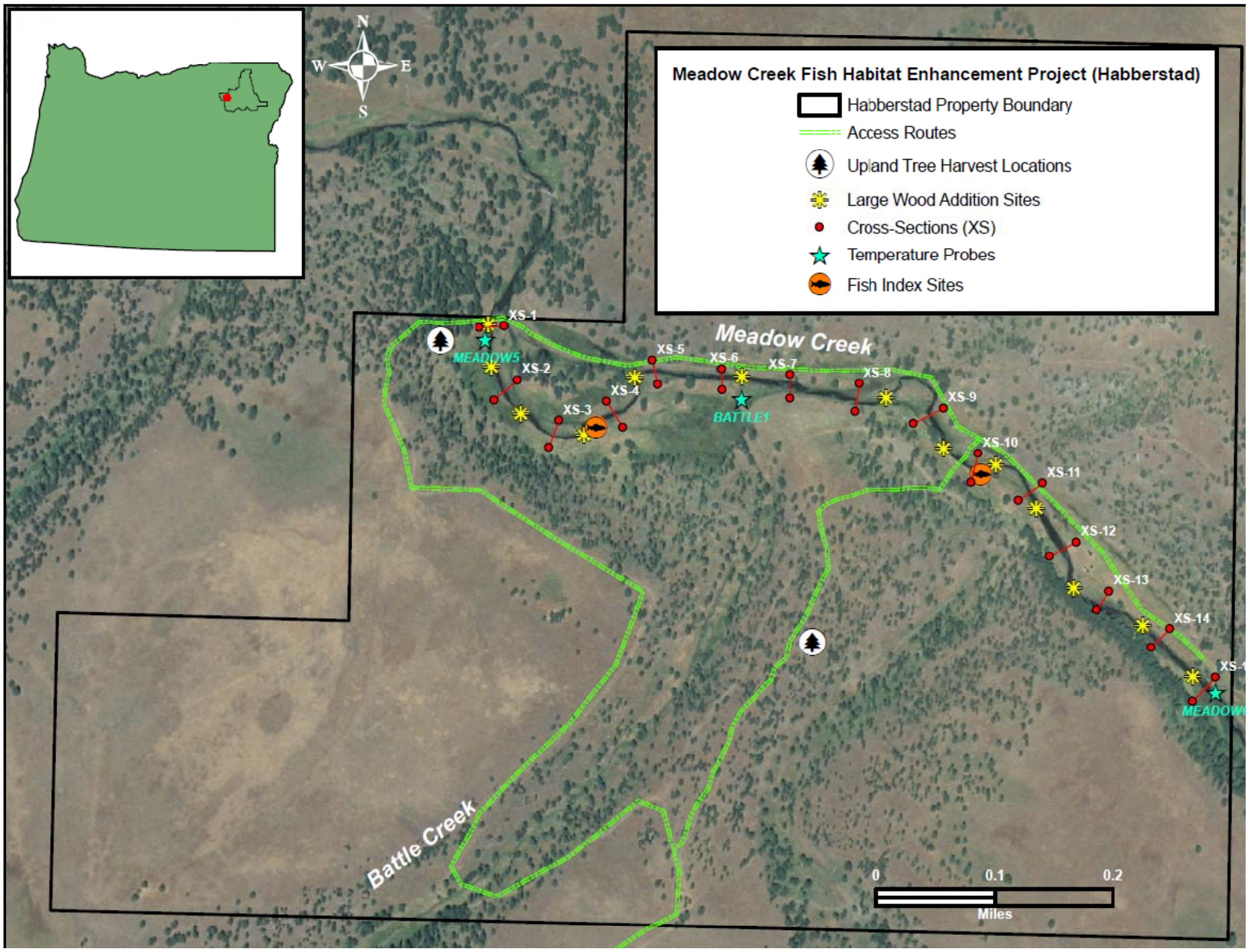
TABLE 9: UPPER GRANDE RONDE RIVER MINE TAILINGS RESTORATION PROJECT METRICS

PROJECT ACTION	PROJECT METRICS
Mine Tailings Removal	5,000 dump truck loads (60,000 cubic yards)
Floodplain Wood Placement	Each tailings removal site within the floodplain had trees placed on the disturbed ground (about 2.5 miles of floodplain)
Seeding and Mulching	5 miles of disturbed ground, both upland and riparian, were planted with native grass seed and mulched with weed-free straw
Removal of Archaic Restoration Structures	44 structures were removed or modified
Cross-sections and Longitudinal Profile	15 cross-sections; 12 within the area of effect and 3 upstream used as references
Water Temperature Probes	6 probes placed in strategic locations in, or near the project area

Meadow Creek: Habberstad Property Restoration Project

From July 1, 2009 to July 31, 2009 an in-stream restoration project, funded by the Bonneville Power Administration (BPA) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Grande Ronde Fish Habitat Project, was completed on John Habberstad's property on the main-stem of Meadow

FIGURE 42: IMPLEMENTATION AND MONITORING LOCATIONS FOR THE MEADOW CREEK, HABBERSTAD PROPERTY, RESTORATION PROJECT



Creek between river mile 7.56 and 8.48 (Figure 42), where the CTUIR was the entity in charge of all operations, including environmental compliance documentation, cultural resource surveys and subcontract administration. The floodplain, base flow stream channel and riparian habitats along Meadow Creek have been severely impacted due to extensive logging, grazing and railroad grade construction. Thus, large wood recruitment potential has been reduced; resulting in the loss of suitable stream channel habitat for juvenile salmonids and other native fishes. In some reaches of the project area the floodplain is entirely abandoned. Therefore, the purpose of this project was to enhance in-stream and floodplain habitat complexity with the addition of large wood (primarily whole trees) in order to address some of the limiting factors for Snake River Basin anadromous steelhead, which are listed as Threatened under the Endangered Species Act. A few of these limiting factors are; small quantities of refuge from predation and/or solar input, lack of sufficient pool/riffle habitats, high turbidity during increased stream flows, elevated summer stream temperatures and poor spawning gravels.

Tree Harvest and Implementation:

A 200 series track-mounted excavator was used to harvest whole trees with root wads (donated by the landowner) from upland sources, transport them to stockpile areas and install designed log jams (Figures 43-45). A total of 13 sites were delineated, where a log jam consisting of 4-7 whole trees was constructed using 2-3 larger trees as anchors, with smaller trees and tree tops integrated into the structure for stability and complexity. We used the best available science and professional experience in the creation of the log jams in order to mimic natural large wood accumulations in forested stream systems. Typically, placement locations were on point bars and stream meanders to facilitate streambed scour, thus creating pool habitats and refuge for native fish species, however in some locations single trees or smaller structures were positioned in order to enhance existing pools and riffles.

FIGURE 43: HABBERSTAD PROPERTY UPLAND TREE HARVEST

FIGURE 44: UPPER HABBERSTAD PROJECT AREA IN APRIL, 2009 (PRE-PROJECT)

Pre and Post Project Monitoring:

CTUIR biologists conducted pre-project stream morphological surveys (cross-sections and longitudinal profile) of the project reach using a Trimble R8 GPS. These surveys will be repeated in the future in order to monitor changes in channel morphology. Furthermore, three temperature probes were installed, on the upper project boundary, in Battle Creek (a major tributary within the project area) and the lower project boundary in order to monitor stream temperatures during and after project implementation (see monitoring and evaluation, water temperature analysis section for results). Temperature monitoring will continue for the foreseeable future during the months of May-November (start and end dates vary as weather permits). Additionally, CTUIR staff repeated fish sampling at previously demarcated index sites using a backpack electro-fisher (see fish population monitoring section for results). Future monitoring of fish populations within the project area will be completed using scientifically accepted snorkeling techniques in order to minimize impacts on native fishes during sampling efforts.

FIGURE 45: UPPER HABBERSTAD PROJECT AREA IN MARCH, 2010 (POST-PROJECT)

The following table illustrates project accomplishments:

TABLE 10: SUMMARY OF HABBERSTAD PROJECT ACTIONS AND METRICS

ACTION	METRICS	
Harvest Whole Trees From Uplands	98 Trees	
Large Wood/Log Jam Implementation	13 Sites	4-7 trees per site, with a number of single trees placed strategically between sites
Cross-sections and Longitudinal Profile	15 Cross-sections	
Water Temperature Probes	3 probes; on the upper and lower property boundaries and in Battle Creek	
Fish Sampling at Index Sites	4 sites; 2 in project area and 2 upstream references	
Post Project Seeding	All areas of riparian ground disturbance, completed in early spring of 2010	

SUMMARY AND CONCLUSIONS

Project development and implementation during FY2009 generally proceeded as planned. Major highlights of the project included impelemnation Upper Grande Ronde River Tailings Project and the Meadow Creek (Habberstad) Fish Habitat Enhancement Project. Project planning efforts have also provided new project opportinuties in priority reaches within the subbasin for future implementation.

The project continues to provide technical, administrative, and construction/implementation support to the GRMW, landowners, and other agencies to develop and implement projects. Technical support is provided through the GRMW Board of Directors and Technical Committee and by assisting others with technical needs on potential projects, including developing project opportunities, assisting landowners with meeting their objectives, conducting field surveys and baseline investigations, identifying and securing cost-share funding, and developing documentation for various environmental compliance and permit needs. Part of the strength of this project is its' ability to work cooperatively with co-managers which facilitates opportunities to develop consistent strategies, share responsibilities associated with project planning, design, implementation, and monitoring/evaluation, and provides a forum in which to solicit and secure multiple cost share project options. Landowner incentive programs administered by the Department of Agriculture through NRCS (Wetland Reserve Program, Conservation Reserve and Enhancement Program), for example, have generated considerable interest in the Subbasin by large private landowners that might otherwise not be interested in conservation programs and/or habitat restoration opportunities. Several past and proposed CTUIR-BPA and co-manager sponsored have been successfully linked to these programs which provide significant opportunities to protect and restore habitat and leverage cost-share funds through other funding sources (EPA, OWEB, NAWCA, BMRC, etc). In addition, this cooperative inter-agency relationship provide opportunities to jointly develop project-specific objectives, strategies, and techniques, brings in specialized expertise such as engineers, fluvial morphologists, and biologists, and spreads the workload associated with Subbasin restoration and enhancement projects.

Formal staff training and application of practical experience contributes to a well developed approach to project planning, design, and implementation. Working in a cooperative, interdisciplinary team approach with GRMW, ODFW, and NRCS has increased credibility with landowners and other resource managers in the basin and led to development of additional project opportunities on private lands. By teaming with project partners, the CTUIR is an integral part of an effective restoration team.

SUMMARY OF EXPENDITURES

FIGURE 46: EXPENDITURES FOR FY 2009

Confederated Tribes of the Umatilla Indian Reservation
R & E with Comm - Grant Period
Fiscal year thru period ending April 30, 2010

488 009 - BPA1996-083-00 Grande Ronde Sub. Restoration 5/01/09 - 4/30/10	Current Month Actual	Year to Date Actual	Open Purchase Orders	Total Committed	Total Budget	Variance	% Used
Revenues							
488 009 4010 Grant/Contract Income	475,369.25	475,369.25	0.00	475,369.25	884,612.53	(409,243.28)	-53.70
Total Revenues	**475,369.25**	**475,369.25**	**0.00**	**475,369.25**	**884,612.53**	**(409,243.28)**	**-53.70**
Direct Expenses							
488 009 5000 Salaries & Wages	187,620.97	187,620.97	0.00	187,620.97	237,347.52	49,726.55	79.00
488 009 5010 Fringe Benefits	53,772.59	53,772.59	0.00	53,772.59	85,092.64	31,320.05	63.20
488 009 5101 Travel-Per Diem	1,276.14	1,276.14	0.00	1,276.14	4,634.00	3,357.86	27.50
488 009 5150 Training	7,880.00	7,880.00	358.00	8,238.00	8,754.00	516.00	94.10
488 009 5160 Auto Insurance	1,903.11	1,903.11	0.00	1,903.11	2,436.00	532.89	78.10
488 009 5190 Vehicle Expense	17,196.40	17,196.40	1,041.16	18,237.56	15,652.59	(2,584.97)	116.50
488 009 5210 Supplies	371.29	371.29	0.00	371.29	628.71	257.42	59.10
488 009 5225 Materials	12,848.39	12,848.39	7,746.45	20,594.84	27,845.51	7,250.67	74.00
488 009 5226 Books/Journals	0.00	0.00	1,217.44	1,217.44	1,836.00	618.56	66.30
488 009 5250 Non Capital Equipment	18,711.73	18,711.73	3,467.95	22,179.68	28,264.04	6,084.36	78.50
488 009 5400 Communications	8,268.51	8,268.51	402.24	8,670.75	11,897.11	3,226.36	72.90
488 009 5410 Postage & Freight	204.87	204.87	0.00	204.87	85.43	(119.44)	239.80
488 009 5430 Dues & Subscriptions	95.00	95.00	0.00	95.00	1,887.00	1,792.00	5.00
488 009 5440 Equipment Rental	1,951.26	1,951.26	0.00	1,951.26	2,647.74	696.48	73.70
488 009 5450 Printing & Duplication	0.00	0.00	0.00	0.00	500.00	500.00	0.00
488 009 5460 Insurance	7.64	7.64	0.00	7.64	(3.82)	(11.46)	-200.00
488 009 5470 Repairs & Maintenance	1,125.59	1,125.59	315.00	1,440.59	1,580.41	139.82	91.20
488 009 5770 Professional Services	1,800.02	1,800.02	2,700.00	4,500.02	9,363.98	4,863.96	48.10
Sub-Total	**315,033.51**	**315,033.51**	**17,248.24**	**332,281.75**	**440,448.86**	**108,167.11**	**75.40**
Pass-through Expenses							
488 009 6100 Subcontract fees	42,548.00	42,548.00	0.00	42,548.00	85,328.00	42,780.00	49.90
488 009 6300 Capital Equip-Gov't Funds	7,400.00	7,400.00	0.00	7,400.00	8,011.00	611.00	92.40
Sub-Total	**49,948.00**	**49,948.00**	**0.00**	**49,948.00**	**93,339.00**	**43,391.00**	**53.50**
Cost of Goods Sold							
488 009 8500 Indirect	110,387.74	110,387.74	0.00	110,387.74	154,324.67	43,936.93	71.50
Total Expenses	**475,369.25**	**475,369.25**	**17,248.24**	**492,617.49**	**688,112.53**	**195,495.04**	**71.60**
Net Difference	0.00	0.00	(17,248.24)	(17,248.24)	196,500.00	(213,748.24)	8.80

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