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GRANDE RONDE BASIN FISH HABITAT ENHANCEMENT PROJECT

Annual Report 1999

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GRANDE RONDE BASIN FISH HABITAT

ENHANCEMENT PROJECT

1999 ANNUAL REPORT

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ABSTRACT

On July 1, 1984 the Bonneville Power Administration and the Oregon Department of Fish and Wildlife entered into an agreement to initiate fish habitat enhancement work in the Joseph Creek subbasin of the Grande Ronde River Basin in northeast Oregon. In July of 1985 the Upper and Middle Grande Ronde River, and Catherine Creek subbasins were included in the intergovernmental contract, and on March 1, 1996 the Wallowa River subbasin was added. The primary goal of ***"The Grande Ronde Basin Fish Habitat Improvement Project"*** is to access, create, improve, protect, and restore riparian and instream habitat for anadromous salmonids, thereby maximizing opportunities for natural fish production within the basin. This project provided for implementation of Program Measure 703 (C)(1), Action Item 4.2 of the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program (NPPC, 1987), and continues to be implemented as offsite mitigation for mainstem fishery losses caused by the Columbia River hydro-electric system.

All work conducted by the Oregon Department of Fish and Wildlife is on private lands and therefore requires that considerable time be spent developing rapport with landowners to gain acceptance of, and continued cooperation with this program throughout 10-15 year lease periods. This project calls for passive regeneration of habitat, using riparian exclosure fencing as the primary method to restore degraded streams to a normative condition. Active remediation techniques using plantings, off-site water developments, site-specific instream structures, or whole channel alterations are also utilized where applicable. Individual projects contribute to and complement ecosystem and basin-wide watershed restoration efforts that are underway by state, federal, and tribal agencies, and local watershed councils.

Work undertaken during 1999 included: 1) Implementing 1 new project in the Wallowa subbasin and 4 new projects in the Grande Ronde drainage, which protect 1.6 miles of stream and 174.0 acres of habitat; 2) Planting and/or seeding 3.2 stream miles with 14,144 plants and 50 lbs. of seed; 3) Establishing 6 new photopoints and retaking 188 existing photopoint pictures; 4) Monitoring stream temperatures at 14 locations on 8 streams; 5) Riparian fence and water gap maintenance on 96.9 miles of fence; and 6) Installing 1,647 feet of juniper rip rap using 208 whole juniper trees in one stream to stabilize eroding streambanks. Since initiation of the project in 1984 over 60 miles of anadromous fish bearing streams and 1,600 acres of habitat have been protected, enhanced and maintained.

INTRODUCTION

Background

It is widely recognized that wild and naturally spawning populations of salmon and steelhead are at low levels throughout the Columbia River Basin as a result of impaired fish mainstem passage, blocked habitat, habitat degradation, fishing, predation and other factors. Habitat degradation and its causes within the Grande Ronde Basin have been well documented (Anderson and others, 1992; CTUIR, 1984; Henjum and others, 1994; Huntington, 1993; McIntosh and others, 1994; Sedell and Everest, 1991). ESA listings of Snake River salmonid populations through the Endangered Species Act led to increased efforts to implement ecosystem or watershed based approaches to species recovery within individual subbasins (Anderson and others, 1992; Huntington, 1994; Mobrand and Lestelle, 1997; NMFS, 1997; Wallowa Co.-Nez Perce, 1993). The intent of this project is to work within this framework by providing offsite mitigation for mainstem losses of habitat and fish productivity caused by the construction and operation of eight dams on the Columbia River. This is achieved through coordinated efforts to protect and improve spawning and rearing habitat, and improve fish passage.

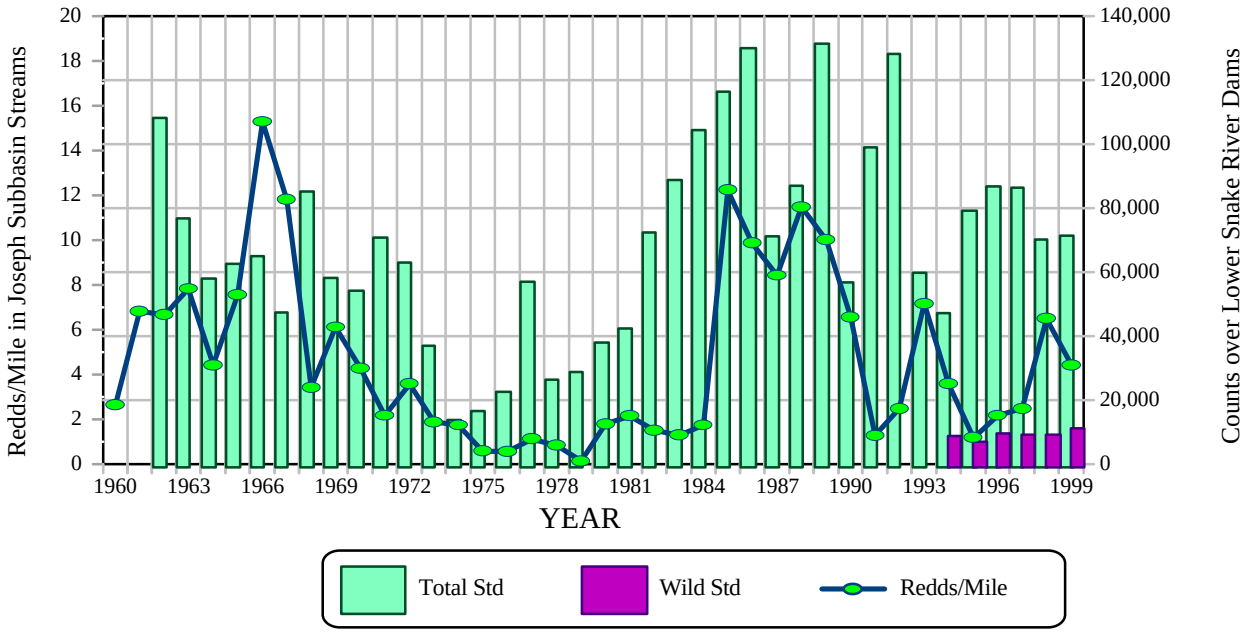
Prior to implementation of this project, streams within the Grande Ronde River basin were examined as part of a study funded by Bonneville Power Administration (BPA), and undertaken by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Oregon Department of Fish and Wildlife (ODFW). The study compiled the basic information necessary to identify, evaluate, prioritize, and recommend site-specific solutions to major problems impacting the anadromous salmonid resource and fisheries, and prepared an integrated overall plan for the study area (CTUIR, 1984). The identification, priority, and implementation of habitat work within these drainages represented a consensus among staff from ODFW, Tribal, and Federal entities (Appendices 1 and 2), and established an initial template from which to pursue fish habitat enhancement projects. In 1996 project areas were re-prioritized based on several factors, including: 1) review of work completed in the basin; 2) review of more recent watershed assessments such as those produced through funding from the Grande Ronde Model Watershed Program or local watershed groups; 3) and input from local district fisheries biologists.

Fisheries Status

Historically the Joseph Creek subbasin has been an excellent producer of summer steelhead, and continues to be managed as a wild fishery. Wild summer steelhead spawning ground counts on index streams began in the 1960's. Redds/mile in this basin from 1970 through 1984 indicated severe reductions of spawning adults returning to this subbasin (Figure 1). This downward trend showed signs of improvement from 1985 to 1989, and have fluctuated considerably since then.

Summer steelhead escapement over Lower Granite Dam (which includes all wild and hatchery stocks entering Oregon and Idaho) has fluctuated a great deal but showed substantial improvements after 1981 when fish passage improvements were initiated (Figure 1). Total escapement over Lower Granite have remained in excess of 65,000 fish since 1995, however, counts of the wild portion of the run which began in 1994, remain low, averaging only 13.% of the total run in the last 6 years.

Figure 1. Snake River Summer Steelhead Spawning and Dam Counts, 1960-1999



SOURCES: Columbia River Fish Runs and Fisheries, 1938-1998, Status Report. ODFW Wallowa District Fisheries Biologists.

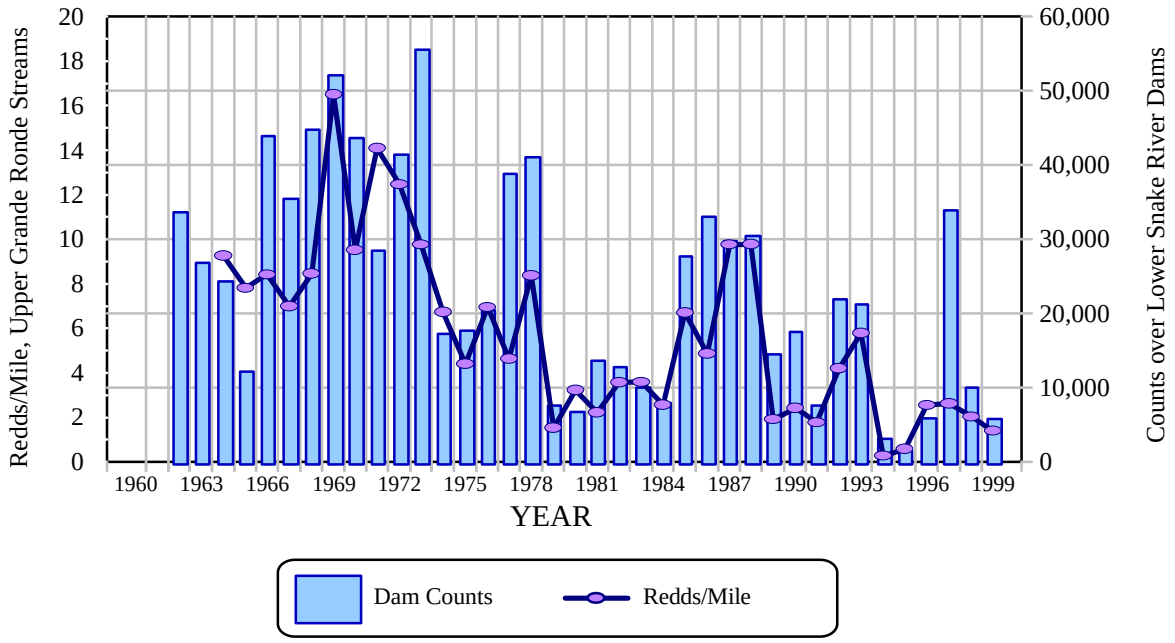
NOTES: Streams included in this chart include Joseph Creek subbasin index steelhead spawning ground counts in Butte, Chesnimnus, Crow, Devil's Run, Elk, McCarty Gulch, Peavine, Swamp,Summit and TNT Gulch Creeks. Joseph Creek steelhead counts consist solely of wild fish and are considered to be representative of other wild runs in the Grande Ronde Basin. The 1962-1974 dam counts are at Ice harbour and Little Goose, the 1975-1996 counts are at Lower Granite dam. Wild steelhead were counted separately from hatchery origin beginning in 1994.

The Wallowa River subbasin historically supported sockeye, coho, and fall chinook in addition to strong runs of steelhead and spring chinook. However, sockeye and coho are now extinct, and only small numbers of fall chinook remain, which generally spawn lower in the basin.

In the Upper Grande Ronde River drainage historical records also indicate excellent production of both summer steelhead and spring chinook, but chinook spawning redd counts indicate that returns to the Upper Grande Ronde River drainage remain well below those observed in the late 1960's and early 1970's (Figure 2). The 1994 and 1995 redd counts were the lowest on record since extensive surveys were initiated in 1986 (Carmichael, 1994). Spring chinook escapement over Lower Granite dam (which includes hatchery and wild fish) follow the same general pattern, with 1995 being the lowest run count on record (Figure 1). Although runs over Lower Granite increased to 33,946 in 1997, redd counts in Upper Grande Ronde streams remained much lower

than hoped for. The wild fish component of the run has averaged 42% during the plotted time period (Swartz, 1996).

Figure 2. Snake River Spring Chinook Spawning and Dam Counts, 1962-1999



SOURCES: Columbia River Fish Runs and Fisheries, 1938-1998, Status Report. ODFW La Grande District & Research Fisheries Biologists.

NOTES: Spring chinook dam counts include adults and jacks. Fish passage improvements and smolt transports began after 1981. Streams in this graph include ODFW index spawning ground counts of wild fish in Catherine Creek, the Upper Grande Ronde River, Sheep Creek, and the Minam River.

Causes and Consequences of Declines

There are many reasons for declines of anadromous fish in the Grande Ronde River Basin since the mid-1970's, including: 1) problems with adult and juvenile passage that occurred following construction of 8 Columbia and Snake River dams between 1938-1975 (ODFW/WDF, 1997), 2) Commercial, sport and Tribal demands for the fishery resource, 3) Degradation of spawning and rearing habitat throughout the basin, 4) A major forest fire, followed by a flash flood event in the Upper Grande Ronde headwaters during peak migration and spawning in August of 1989 resulted in decimation of the adult chinook run and their progeny (Boehne and others, 1989).

Observations in the Grande Ronde River basin indicate optimum spawning and rearing areas for summer steelhead and spring chinook are limited in large portions of these drainages by degradation of riparian and instream habitats (Noll, 1987; Anderson & others, 1992; Huntington,

1994). For example, approximately 70% of the large pool habitat in the mainstem Upper Grande Ronde River and 26% in Meadow Creek have been lost since 1941 (Sedell and Everest, 1991). The average percent shade cover over low gradient constrained, and low gradient unconstrained streams in the Grande Ronde Basin are 33% and 24%, respectively (Huntington, 1994).

Management practices that have contributed to habitat degradation within project areas include beaver trapping, livestock overgrazing, irrigation diversions and cropland agriculture, timber harvest, road construction, mining, stream channelization, and introduction of exotic species. Several factors associated with instream and riparian habitat degradation have limited natural production of salmonids in the Grande Ronde River basin, including: 1) High summer water temperatures, 2) Low summer flows, 3) Lack of riparian vegetation, 4) Poor habitat diversity and loss of floodplain connectivity, 5) Channel instability, and 6) Winter icing.

Considerable effort and money have been invested in trying to resolve mainstem dam passage problems. Tighter restrictions on ocean and river harvest of these stocks have also been implemented, and tribal salmon fishing in the basin ceased almost entirely since 1983. Despite these efforts, salmonid populations continued to decline. The National Marine Fisheries Service listed the Snake River portion of the Columbia River sockeye salmon run as an endangered species in December 1991. The Snake River wild portion of the summer and spring chinook runs were combined and listed as threatened in December 1994, along with the fall chinook. Bull trout and summer steelhead listings followed in 1997 and 1998.

Solutions

The Grande Ronde Basin Fish Habitat Enhancement Project is a logical and integral part of the species recovery process by implementing projects that establish long term riparian and instream habitat protection, and tributary passage improvement on private lands through riparian lease agreements. Planning for implementation of these projects includes the participation and involvement of private landowners, state and federal agencies, tribes, model watersheds, and watershed councils. Individual projects contribute to ecosystem and basin-wide watershed restoration and management efforts that are underway by these groups.

Out of basin variables (such as mainstem passage and harvest) are beyond the scope of this project, but the in-basin limiting factors mentioned above could be adequately addressed if proper habitat enhancement techniques are utilized. Drake (1999) concluded that seasonal maximum temperatures and variables related to it explained distribution and abundance of trout in Upper Grande Ronde streams, and that management and restoration activities should focus on reducing stream temperatures. Streams in the John Day basin with greater than 75% shade maintained acceptable stream temperatures for rainbow trout and chinook salmon (Maloney and others, 1999), and the lowest temperatures were observed in streams from ungrazed watersheds. This program primarily relies on restoring natural vegetative recovery, floodplain connectivity and groundwater interactions, using riparian fencing in streams that have been impacted by livestock grazing. This method has proven to be effective in protecting and restoring streams (Beschta and others, 1991; Chaney and others, 1993).

In more severely degraded areas, fencing, in combination with placement of instream structures and riparian plantings, can accelerate the natural recovery process (Chaney and others, 1993; ISG, 1996; Huntington, 1994; NMFS, 1997, Roper and others, 1998). In channelized or severely entrenched streams more aggressive action including whole channel alterations or relocations of streams may be required (Rosgen, 1996; Federal Interagency Stream Restoration Group, 1998). The Grande Ronde Basin Fish Habitat Enhancement Project incorporates both passive and active techniques that provide optimum habitats for returning adults and their progeny, and help achieve the overall goal of maximizing natural anadromous fish production in the Grande Ronde River basin.

DESCRIPTION OF PROJECT AREAS

Five of the ten subbasins within the Grande Ronde Basin are included in the project areas. Not included are the Minam, Lower Grande Ronde, Wenaha, Imnaha, and Inner Snake subbasins. Those subbasins are comprised mostly of Forest Service, National Recreation Area, or Wilderness lands (Figure 1).

JOSEPH CREEK SUBBASIN:

The Joseph Creek subbasin (part of Federal Hydrologic Unit Number 17060106) constitutes a major drainage within the Grande Ronde Basin of northeast Oregon. It drains approximately 635 square miles of the 5,299 square mile Grande Ronde Basin. It contains an estimated 225 miles of anadromous fish habitat, and is managed for wild summer steelhead. It empties into the Grande Ronde River 4.3 miles above the confluence of the Grande Ronde and Snake rivers (Figure 2). Approximately 75 percent of the Joseph Creek subbasin is within the project area. Not included in the project area is lower Joseph Creek in Washington state, and the Cottonwood Creek drainage which enters Joseph Creek 4.4 miles above Joseph Creek's confluence with the Grande Ronde River (Figure 2).

Within the project area 120.5 miles of stream were identified as in need of habitat enhancement; 75 miles on private land and 45.5 miles on public lands (Appendix 1).

WALLOWA RIVER SUBBASIN:

The Wallowa River subbasin (part of Federal Hydrologic Unit Number 17060105) drains approximately 721 square miles and includes approximately 168 miles of streams used by spring chinook and summer steelhead. It starts at the confluence of the Grande Ronde and Wallowa rivers; 81.4 miles upstream from the confluence of the Grande Ronde and Snake rivers (Figure 2). A large portion of the drainage originates in the northern half of the Eagle Cap Wilderness.

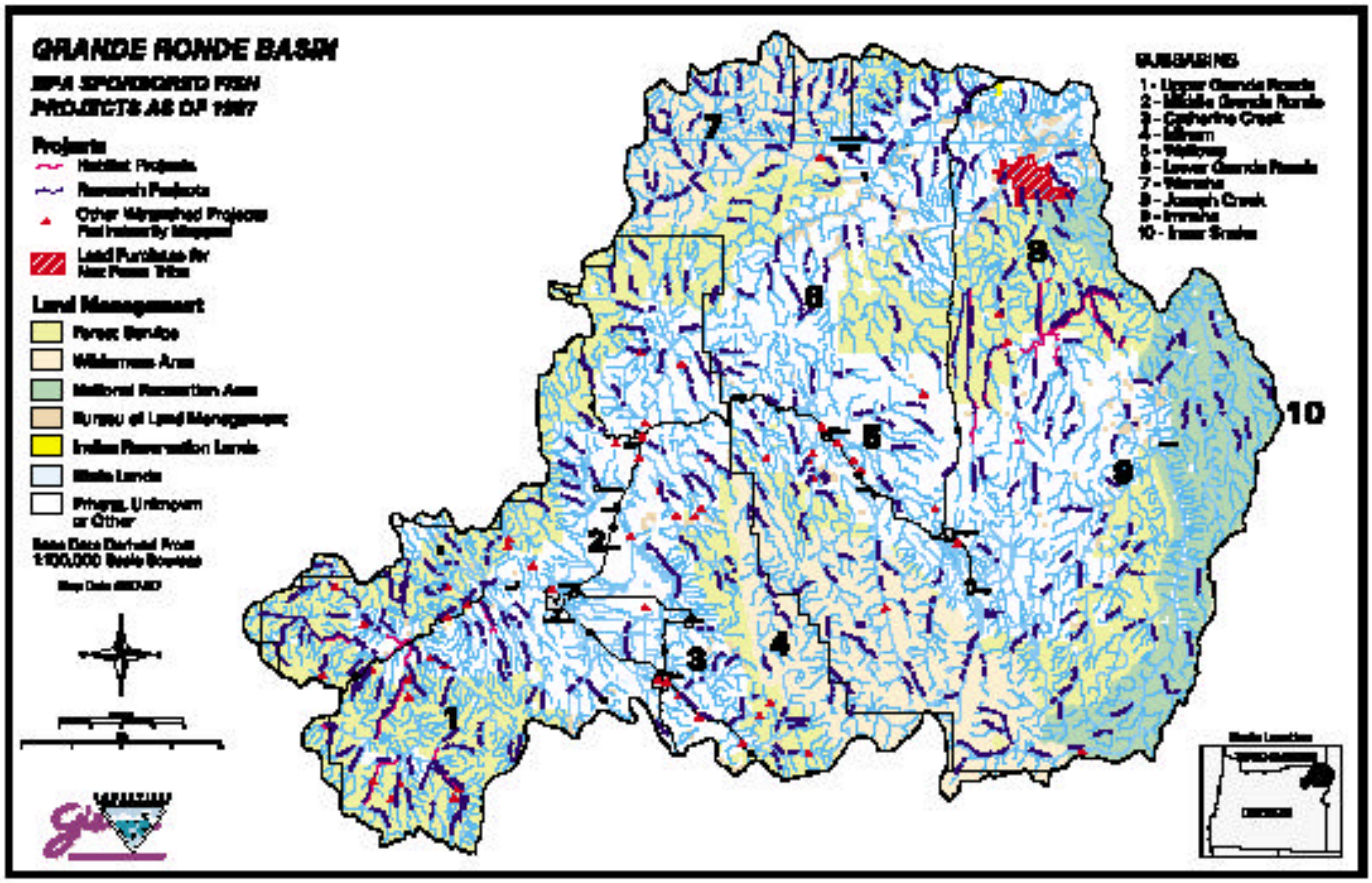
Within the project area 43.0 miles of stream were identified as in need of habitat enhancement, all within private lands (Appendix 1).

UPPER GRANDE RONDE RIVER DRAINAGE:

The Upper Grande Ronde River drainage (Federal Hydrologic Unit Number 17060104) includes the Upper Grande Ronde, Middle Grande Ronde and Catherine Creek subbasins. It drains approximately 1,650 square miles of the 5,299 square mile Grande Ronde Basin, and contains an estimated 660 miles of anadromous fish habitat. It also starts at the confluence of the Grande Ronde and Wallowa rivers at Rondowa (Figure 2), draining the western half of the Eagle Cap Wilderness and the northern portion of the Elkhorn Mountain range.

Within the project area 211.8 miles of stream were identified as in need of habitat enhancement; 116.8 miles on private lands and 95.0 miles on public lands (Appendix 2).

Figure 2. The Grande Ronde River Basin and subbasins in Northeast Oregon



METHODS AND MATERIALS

The goal of this program is to optimize spring/summer chinook and summer steelhead smolt production and survival within the Grande Ronde River Basin using habitat enhancement measures. To accomplish this goal, work will progress in the following phases:

1. IMPLEMENTATION - Prework
2. IMPLEMENTATION - Onsite
3. OPERATIONS and MAINTENANCE
4. MONITORING and EVALUATION

IMPLEMENTATION - Prework:

This is one of the most time consuming and important phases of the program, in which landowner relations and goals of the project are established, and work activities scheduled. Prior to project construction the following activities are conducted:

Project Planning

Project planning includes design, layout and mapping of all work to be done onsite, landowner coordination, development of contracts and contract specifications, and obtaining necessary work permits.

Project Preparation

Prior to signing leases or construction contracts, all lease boundaries and work sites must be identified, staked, and agreed upon by the landowner and/or contractor. Work sites may include easements or right-of-ways, fences, livestock watering gaps, instream structures, offsite water developments, planting, and miscellaneous lease or construction related areas.

Riparian Lease Development and Procurement

Riparian lease development and procurement includes meeting with landowners and/or their legal representatives specifically for the purpose of developing an acceptable lease or cooperative agreement text. Lease documents must be signed, notarized, and filed in the county courthouse.

Field Inventories

These may include prework stream surveys, and photographic documentation to provide baseline information on habitat condition and potential for improvement prior to any onsite implementation.

IMPLEMENTATION - Onsite:

Onsite implementation encompasses the actual on-the-ground work phase of the program and may include any or all of the following:

Instream Structures

During late summer and early fall when stream flows are lowest, instream structures may be installed in streams at locations preselected by fishery biologists and/or hydrologists. Instream structures will be installed to specifically address the factors limiting fish production in each stream reach. Structures of various types may be used to provide optimum pool/riffle ratios, raise stream water tables, collect spawning gravels, and increase the amount of large woody debris, thereby increasing quantity and quality of spawning and rearing habitats. Hard rock structures may be necessary under some circumstances, but bioengineered or other "soft" structures will be the primary methods used to stabilize streambanks. Boulders may be used to create small rearing pools and hiding cover, and may be used as anchor points for cabling large woody debris.

Planting

During the early spring, shrub and/or tree species may be planted at preselected locations along streams within project areas. Since high summer water temperatures are a major limiting factor, plantings will be made to provide stream shade, thereby reducing summer water temperatures and increasing salmonid utilization of streams. The maximum shade attainable for most streams in project areas is estimated at about 80 percent.

Plantings may also be done in areas of poor bank stability as a preferred alternative to the more costly rock structures. Plantings will be done only after riparian fences have been installed to ensure their protection. During the fall, areas disturbed during implementation activities will be seeded to stabilize soils and discourage weed growth.

Fencing

Destruction of streamside vegetation by domestic livestock has been a major problem within project areas. To provide protection from livestock, and thereby promote rapid recovery of existing and planted vegetation, fences will be constructed along riparian zones within project areas. When negotiating fence locations with landowners, preference will be given to projects where fences are located well outside the normal flood-prone area.

Offsite Water Developments

In an attempt to reduce the number of watering gaps in riparian fences (thereby reducing fence construction and maintenance costs), and to encourage livestock utilization of vegetation away from riparian areas, offsite water sources will be developed.

Miscellaneous Implementation Activities

Cooperator sign boards denoting riparian enhancement projects as cooperative efforts between BPA, ODFW and private landowners will be installed at high visibility sites along completed riparian enhancement project areas. Other activities may be required to complete a fish habitat enhancement project and meet landowner needs.

OPERATIONS AND MAINTENANCE:

Operations and maintenance activities will begin the year following implementation and include:

Landowner Coordination

Ongoing coordination and cooperation between the landowners and ODFW is a vital element to ensure long-term project success after the initial implementation is completed.

Fence Maintenance

Biannual inspections of all project areas will be made. Following these inspections all fence maintenance will be done. Stream cross fences and/or water gap cross fences may be installed or removed during these inspections, or at any time during the year to meet landowner needs and to ensure maximum recovery within the projects.

Instream Maintenance

Annual inspections of all instream structures will be done, usually in combination with fence maintenance inspections. Instream structures are generally expected to provide long lasting benefits with low maintenance. Instream structure maintenance will be done on a case by case basis, depending on impact of the structure failure on riparian recovery, streambank stability and/or landowner needs.

Revegetation

Replanting and/or seeding of project areas may be necessary to produce adequate stream shading, bank stability, or cover within the 15-year lease period. Events such as severe flooding and bank erosion, or when recovery is unacceptably slow due to lack of parent stock may result in a decision to replant an area.

Miscellaneous Operations & Maintenance Activities

These activities may include vehicle, ATV, and equipment maintenance and repair. Other activities include installing or replacing project signs, and efforts to control wildlife damage.

MONITORING AND EVALUATION:

Whenever possible, some level of monitoring will be established prior to project implementation, and will continue beyond the term of the lease agreement if the landowner is willing. Individual projects will be monitored using one or more of the following methods:

Photopoint Establishment

Photopoint establishment will include locating and placing permanent markers at sites from which photographs can be taken at regular intervals. These photographs are a primary means of documenting physical and biological changes along streams. Also associated with photopoint establishment is development of a photopoint notebook for each project area. These notebooks

contain maps of all photopoint locations, instructions on taking the photographs, and labeled slides and prints.

Photopoint Picture Taking

Standardized pictures will be taken from preselected photopoints prior to implementation on any project area and then for the next two years immediately following completion of a project. Once these initial photos are obtained the frequency of photopoint picture taking may diminish to once every two to three years.

Habitat Monitoring Transect Establishment

Within selected project areas permanent habitat monitoring transects will be established. Specific measurements will then be taken along each transect to record channel morphology, and vegetative characteristics. These measurements will be repeated at regular intervals and compared with original measurements as a means of quantitatively measuring environmental changes through time.

Habitat Monitoring Transect Data

Immediately after establishing habitat monitoring transects, baseline data will be collected. Data collection will be done on the first year following completion of implementation activities and thereafter at approximately 3 to 5 year intervals.

Thermograph Data Collection and Summarization

Thermographs will be installed at various locations throughout the project area. Thermograph data will be recorded, collected, summarized, and graphed on a regular basis. The purpose of this type of monitoring is to detect changes in stream water temperatures that may occur over the years within fenced-off, recovering riparian areas.

Miscellaneous Monitoring and Evaluation

Miscellaneous monitoring and evaluation activities may include chinook salmon and steelhead redds counts, juvenile fish population surveys, streambank stability surveys, and evaluating riparian vegetative recovery and/or planting success.

RESULTS AND DISCUSSION: FIELD ACTIVITIES

The following field activities were completed in 1999:

IMPLEMENTATION - Prework:

Project Planning

Design and Layout

Identification of property boundaries for privately owned lands along priority streams in the Joseph Creek and Upper Grande Ronde drainages was the first step in the planning habitat enhancement work. The majority of mapping for private lands was completed in 1988, and aerial photographs (8 inches/mile) were taken by BPA on many project streams in 1987. Additional mapping in 1999 included purchasing landownership map at county courthouses, and ordering additional aerial photographs of potential projects from the ASCS Aerial Photography Field Office.

Lease maps were completed on the Whiskey Creek/Cox project and the Grande Ronde River/Alta Cunha Ranches project.

Stream habitat surveys, fish presence/absence data and aerial photographs were reviewed to prioritize potential new projects.

Landowner Coordination

A great deal of time was spent in communication with landowners throughout the project area to develop riparian leases or coop agreements, and plan onsite work.

Several landowners along Hurricane Creek were contacted to determine potential restoration projects upstream of existing leases. The fish habitat biologist and the Enterprise District Fisheries Biologist later met with three landowners which could result in implementation of at least one new project.

The biologist provided assistance to Mark Tipperman for entering his property into a special natural resources tax incentive program.

The technician met with Bob and Darla Sunderman on Eaton Creek (Five Points subbasin) to discuss location of a cattle exclosure fence.

Technician spoke with Rex Christenson about extending the upper riparian fence line on the Beaver Creek/Crown Pacific property, including the mouth of Dry Beaver Creek.

The technician met with Charlie Kissinger on Hurricane Creek to review a proposed fence line and check on attempts at revegetating the areas that had been previously cleared.

Developing Contracts and Contract Specifications

Fence contractors were given notice to restart the Meadow Creek/Alta Cunha fence in July and final inspections were completed in October.

The biologist assisted Mark Tipperman and NRCS personnel in contracting out construction of 2 new spring developments on Meadow Creek.

Obtaining Work Permits

Oregon Division of State Lands permit applications were sent in for conducting instream work on Salmon, Camas and Meadow creeks.

A Biological Assessment was written and submitted to BPA and the National Marine Fisheries Service for adding large wood and conducting other instream work on the Meadow Creek project.

Project Preparation

Approximately 0.2 miles of Whiskey Creek (tributary to the Wallowa River) on the Cox property was staked, and ODFW personnel delivered fence materials to the project.

A total of 1.6 miles of the Grande Ronde River was staked out on the Alta Cunha Ranches property.

Fence materials were delivered to the Meadow Creek/Alta Cunha Ranches project. A total of 25 instream work sites were staked out on 1.8 miles of Meadow Creek. Whole trees, rock and boulders were hauled to individual work sites.

Juniper riprap sites on Salmon Creek were staked out. Cutting and hauling of junipers for this project was completed. A skidder was rented to shuttle junipers to individual job sites. Wayne Cooke of Enterprise donated junipers.

The biologist and Allen Childs of the CTUIR staked out instream work sites on the upper 2 miles of the McCoy Creek/Alta Cunha Ranches property.

ODFW personnel delivered fence materials to the Eaton and Dobbin creek projects.

Thirteen stream cross sections were taken of lower McCoy Creek on the Tipperman property to determine degree of incision and amount of earth or rock fill needed to install plugs when the channel will be realigned.

Riparian Lease Development and Procurement

Considerable time was spent contacting several prospective landowners, resulting in the signing of 1 new lease agreement and 2 cooperative agreements:

Barry Cox contacted us regarding a potential fence project on Whiskey Creek in the Wallowa

River subbasin. He already has a lease agreement with us on the Wallowa River and wanted to enroll Whiskey Creek, an important steelhead tributary, in the program. A lease agreement for the Whiskey Creek/Cox project was later signed and filed in the Wallowa County courthouse.

Cooperative agreements were signed on 1) the Eaton Creek/Sunderman property that will protect 0.5 miles of stream and 160 acres of habitat; and 2) the Grande Ronde River/Smidtt property, protecting 0.5 miles of stream and 6 acres.

Prospective Projects:

The biologist discussed fence designs and layout of the Meadow Creek project with John Habberstad. Mr. Habberstad decided he would not like to see riparian fences built near the streams, and instead would prefer to exclude 450 acres of his 500 acre parcel. He proposed building new property boundary fences which would protect 1.1 miles of Meadow Creek, and 1.2 miles of Campbell Creek. No water gaps or cross fences would be required.

The biologist and Allen Childs of the CTUIR met with Shauna Mosgrove to discuss potential fencing and instream work projects on 3.7 miles of McCoy Creek, 1.3 miles of Jordan Creek and 1.1 miles of Bear Creek. She was very pleased with the work recently completed on Meadow Creek and is willing to implement similar programs on these other streams. She is also interested in restoring the lower portions of Bear and Jordan creeks in the Longley Meadows area where channelized portions of stream and existing NRCS grade control structures are in much need of repair.

Dick Levy of Cunningham Sheep was contacted to discuss potential fencing and spring developments on Snipe and Cooper creeks.

Field Inventories

Several project areas were inspected to determine past planting and natural revegetation success, and to identify 1999 planting sites.

A walk through survey was conducted on the Grande Ronde River/Alta Cunha Ranches property to determine fencing and planting needs. Jordan and Bear creeks on the Alta Cunha Ranches property upstream of the Highway 244 were inspected to determine feasibility and location of potential fences and instream structures. The lower 0.5 miles of Bear Creek was inspected to determine condition of existing NRCS installed log weir structures which currently do not provide fish passage.

The fencelines along the lower 0.7 miles of the McCoy Creek/Tipperman property were inspected to determine elk use and trails. The riparian fencelines will be moved away from the edge of the stream and completely outside the valley floor in the spring of 2000. Two spring development sites were also located that will replace 4 watergaps.

The biologist and EBA completed a Rosgen Level II survey (stream cross sections, longitudinal profiles, valley slopes, pebble counts, etc) on Milk Creek, a tributary to Catherine Creek. Data collected will be used to determine feasibility of realigning an 800 ft. channelized section into

historic meanders. The stream in this reach currently runs next to Highway 203 and is straighter, steeper and has a much higher percentage of riffle habitat than it did historically.

A pre-project survey of large wood (>12 inch dia. x 35 ft. long) was conducted on the Meadow Creek/Alta Cunha ranches project. Only 6 pieces were found within the bankfull area in the 1.8 mile reach. High summer water temperatures and lack of large pools (which are often created by large wood) are key limiting factors that will be addressed in this project.

IMPLEMENTATION - Onsite:

Instream Structures

Instream work on Meadow Creek was completed during the last two weeks of July. A total of 115 large-medium pieces of wood were placed at 25 work sites (Table 1). Eighty-eight of these pieces were whole conifer trees with root wads attached. Trees ranged in size from 9-30 inches in diameter, and 35-100 feet in length. An additional 596 pieces of small wood were placed, with the vast majority of this wood coming from unburned slash piles from a recent logging operation. All of the wood, rock and boulders were donated by the landowner.

Medium and large wood was uprooted from nearby hillslopes and transported using trackhoes. This wood was placed in a variety of configurations depending on individual site conditions. Generally, wood was selected to meet the ODF/ODFW minimum size guidelines was for key structure members (trees with root wads attached and a minimum length of 1½ times the active channel width). In many cases wood was placed to create scour pools which are lacking in this reach; other structures were designed to aggrade the channel and reactivate the floodplain where the stream had downcut and was disconnected. In most cases, several pieces of wood were used together to mimic natural debris collecting structures. At a few sites it was determined that engineered logjams (ELJ's) were appropriate (Figure 1). A minimal amount of cabling was done, securing key members at a few main joints. It is anticipated that some movement or shifting will occur during high flows.

A dump truck was used to haul the small wood to the work sites, and trackhoes were used to distribute it. Small wood was not cabled and was placed both within and outside the wetted channel. This strategy will allow the small wood to move freely and hang up on the larger key pieces, creating complex debris jams. Some of it was placed in high water channels and on point bars where it will help collect sediments and create seedbeds for native riparian vegetation to become established (Figure 2).

The majority of boulders used were placed in two rock weir structures. One weir was designed specifically to stabilize a road crossing. Other boulders were used at wood structures sites to provide additional habitat or help secure the wood. One last section of old railroad grade that was not removed last year was obliterated. One backwater pool was constructed, providing fish access to cold water from a floodplain tail seep. Bank shaping was done at two sites on vertical cut banks to reconnect the floodplain and channel, and speed vegetative recovery.

ODFW personnel cabled structures as needed, and installed coir fabric. The CTUIR assisted with planning and onsite implementation of the project. A total of 118 hours of trackhoe time and 23 hours of dump truck time were required to complete the project.

Figure 2. An engineered log jam (ELJ) constructed on Meadow Creek, Site 15, July 1999. Whole trees up to 30 inches in diameter and 80 feet in length were placed revetment style along an outside bend to stabilize the bank and enhance the quality of an existing pool. The largest tree had a 10 ft. diameter root wad that will provide hiding cover for juvenile steelhead. Tree tips were partially buried and placed outside of the bankful area to provide stability during winter flows and ice events.

TABLE 1. Instream work completed on the Meadow Creek/Alta Cunha Ranches property, July 1999.

	SIZE OF WOOD PLACED: *						
	Large	Medium	Small		OTHER	Pools	Joints
SITE	>20" x 35'	>12" x 35'	>6" x 10'	BOULDERS	STRUCTURES	Excavated	Cabled
1	1	3	26	5		2	4
2A	0	2	16	2		0	3
2B	0	4	13	5		2	3
3A	0	2	15	7		1	1
3B	1	5	10	40	40-bld weir & road x-ing, level 50' RR grade	0	14
4	0	2	11	5	Backwater pool excavated.	2	2
5	0	2	12	3		2	3
6	0	3	40	1		1	5
7	0	4	45	0		3	3
8	0	2	27	3		0	3
9	0	8	42	0	ELJ, 130'x20' & 60'x20' channel excav.	0	3
10	1	1	0	2		0	2
11	1	3	58	0		0	2
12A	2	5	6	0		1	2
12B	2	3	42	3		0	4
13	0	4	40	0		2	3
14	0	8	2	8	8-bld U-weir	3	3
15	3	4	7	1	ELJ	2	3
16	1	1	4	1		1	1
17	0	5	55	1	65' bank shaping	2	5
18	1	7	0	0		0	4
19	0	3	24	0		1	3
20	2	9	38	0		1	1
21	2	3	13	0		2	2
22	0	5	50	0		0	4
Total	**17**	**98**	**596**	**87**	**8**	**28**	**83**

**Note: Wood size classes are based on a combination of those used in the Upper Grande Ronde Anadromous Fish Habitat Protection, Restoration and Monitoring Plan, 1991, and ODFW Aquatic Inventory Project guidelines.*

Planting

Cottonwood and willow cuttings and poles were collected and stored in coolers in late winter. Ponderosa pine, Douglas fir, and western larch were ordered and stored in the State Forestry cooler. The Meadow Creek/Alta Cunha Ranches project was planted with 9,940 conifers and 1,125 hardwoods (Table 1). As part of the cost share on this project, CTUIR personnel and approximately 10 Salmon Corps members assisted with planting. Scarred areas on the Meadow Creek/A. Cunha Ranches project were seeded with 50 lbs. of riparian grass seed mix. See also "Operations & Maintenance-Revegetation".

TABLE 2. Riparian Plantings in Grande Ronde Basin Streams, 1999.

		Plant Species							
Stream	**Landowner**	Ponderosa Pine	Douglas Fir	Tamarack	Choke Cherry	Alder	Cottonwood cuttings/poles	Willow cuttings	**Site Totals**
Camas Ck.	Pendleton Ranches						59		**59**
Chesnimnus Creek	Yost							360	**360**
Meadow Ck.	A. Cunha Ranches	4,830	3,050	2,060	200	325	100	500	**11,065**
Salmon Ck.	McDaniel	200				175		2,040	**2,415**
Sheep Ck.	Vey/BLM					200			**200**
Wallow River	Wiseman	45							**45**
Species	**totals:**	**5,075**	**3,050**	**2,060**	**200**	**700**	**159**	**2,900**	**14,144**

Fencing

ODFW personnel constructed 0.4 miles of 6-strand high tensile fence and one water gap on the Whiskey Creek/Cox project.

Badger Fencing completed 1.41 miles of fence on the Meadow Creek/Alta Cunha Ranches project that was started in 1998. Two electric water gaps were constructed by ODFW personnel.

Individual landowners constructed fences on Eaton Creek, the Grand Ronde River, and Dobbin Creek totaling 1.1 miles. In total, five projects were implemented in 1999 protecting 2.9 miles of stream and 174 acres of habitat.

TABLE 3. Summary of Projects Completed by the ODFW/BPA Grande Ronde Basin Fish Habitat Enhancement Project, 1985 – 1999.

UPPER GRANDE RONDE:		Year	Stream	Acres	Fence	Water	Spring
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Devel.
Beaver Creek	Clark/Crown Pacific	1993-94	6.0	243.6	11.5	10	0
Coon Ck. Tributary	Warren*	1998	0.25	2.1	0.5	1	0
Dobbin Ck	Rynearson*	1999	0.4	4.4	0.4	1	0
Eaton Creek	Sunderman*	1999	0.5	160	0.5	0	0
Fir Creek	Wyland*	1997	0.4	3.0	0.8	1	0
Fly Ck.	Smith	1987	1.2	14.8	1.7	3	0
Grande Ronde R.	Smidtt	1999	0.5	6.0	0.2	0	0
Little Ck.	Kerr*	1998	0.25	5.0	0.4	2	0
McCoy Ck.	Misener/Tipperman	1988	1.9	84.2	3.35	6	3
Meadow Ck.	Alta Cunha Ranches	1998-99	1.8	149.8	3.5	2	0
Meadow Ck.	B.M.C.B.A.	1990	0.4	6.6	1.1	1	0
Meadow Ck.	Misener/Tipperman	1988	2.7	96.2	5.3	3	3
Meadow Ck.	Waite	1989	1.2	19.7	2.6	1	1
Sheep Ck.	BLM	1988	0.7	12.8	0.8	0	0
Sheep Ck.	Vey	1987-88	4.3	54.7	6.0	8	4
U.G.R. River	Bowman/Hoeft	1991	1.5	37.8	3.2	3	1
U.G.R. River	Crown Pacific	1997	5.2	179.7	5.1	1	2
U.G.R. River	Delve	1991	0.5	7.0	0.9	1	2
Whiskey Ck.	Courtney	1991-92	3.3	35.0	5.6	14	3
Whiskey Ck.	Hampton	1990-91	1.5	15.2	3.0	6	0
		Subtotals:	**34.5**	**1,137.6**	**56.5**	**63**	**19**
JOSEPH CREEK SUBBASIN:							
Butte Ck.	McDaniel	1990-91	2.7	29.7	5.3	9	1
Chesnimnus Ck.	McDaniel	1992	3.8	130.1	8.1	13	0
Chesnimnus Ck.	Yost	1986-87	3.0	41.8	5.6	8	0
Crow Ck.	Buhler	1989	0.8	7.4	1.5	5	0
Crow Ck.	Fleshman	1988	1.2	10.5	2.4	6	2
Elk Ck.	Birkmaier (expired)	1986	0.6	7.7	1.4	5	0
Pine Ck.	McDaniel	1991	1.5	43.5	3.2	4	0
Salmon Ck.	McClaran	1989	0.7	7.0	1.4	3	0
Salmon Ck.	McDaniel	1990	1.6	45.5	3.2	6	0
Swamp Ck.	Boise Cascade	1987	2.6	48.6	5.0	5	5
Swamp Ck.	Olsen (expired)	1985	2.4	16.2	4.4	8	0
		Subtotals:	**20.9**	**388.0**	**41.5**	**72**	**8**
WALLOWA SUBBASIN:		Year	Stream	Acres	Fence	Water	Spring
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Devel.
Hurricane Ck.	Irby	1998	0.7	20.3	0.6	0	0
Hurricane & tribs.	Jones	1997	0.8	9.0	1.3	4	2
Wallowa River	Burrows*	1998	0.06	0.3	0.06	0	0
Wallowa River	Cox	1998	0.4	4.7	0.4	0	0
Wallowa River	Johnson	1998	0.1	1.3	0.1	1	1
Wallowa River	McCrae	1998	0.2	2.8	0.2	0	0
Wallowa River	Wiseman	1998	0.7	8.1	0.7	0	1
Whiskey Ck.	Cox	1999	0.2	3.6	0.4	1	0
		Subtotals:	**3.2**	**50.1**	**3.8**	**6**	**4**
NORTH FORK JOHN DAY:							
Camas Creek	Pendleton Ranches	1995	**2.3**	**27.3**	**4.1**	**4**	**31**

GRAND TOTALS:	**60.9**	**1,603**	**105.9**	**145**	**31**

* Indicates a 10-15 year cooperative agreement, landowner does project maintenance.

Offsite Water Developments

The Wallowa River/Johnson spring development was completed. ODFW supplied the materials, while the installation work was completed by the landowner.

Two solar powered spring developments were constructed by ODFW personnel on the McCoy and Meadow creek projects. Two additional spring developments were contracted out by ODFW, NRCS and Mark Tipperman on Meadow Creek. These will eliminate the need for 5 water gaps.

Miscellaneous Implementation Activities

Several goose and bird boxes were installed on Hurricane Creek and the Wallowa River projects. Fish habitat sign boards were constructed and placed on new projects.

OPERATIONS AND MAINTENANCE:

Landowner Coordination

Various landowners were contacted throughout the year to discuss timing of cattle movements, water gap needs, fence realignments, weed control and protection of riparian plantings.

Doug McDaniel agreed to spray noxious weeds within the leased properties on Butte, Chesnimnus, Pine and Salmon creeks.

The biologist spoke with Gary Cremer, Flip Houston and Bill Swartz to regain access into the Beaver Creek/Crown Pacific property. Rex Christensen, who leases the hunting and grazing rights on the property, had been denying access to the project.

Mark Tipperman was contacted to determine number and locations of spring developments.

Instream Maintenance

An inspection of structures was completed while repairing fences and water gaps. Most structures were functioning within specifications and very little maintenance was needed. Minor work included placing 44 beaver-cut trees into Sheep Creek. An additional 14 trees were cut by project personnel and placed along eroding banks.

In the Joseph Creek subbasin work was completed repairing damages from the 1997 floods using FEMA funds. A private landowner in Wallowa donated whole juniper trees that were used for the repairs. A total of 208 trees were transported to 20 job sites on Butte, Crow, Chesnimnus and Pine creeks. The trees were used to construct juniper riprap, protecting 1,674 feet of streambank (Table 4). The Kubota tractor was used to load and move materials. FEMA funds totaling

$18,587 in labor and materials were used to complete all of the work.

TABLE 4. Streambank stabilization conducted in Joseph Creek subbasin streams, 1999.

Stream	No. Sites	No. Trees	Ft. Treated
Salmon Ck./McDaniel	15	166	1,432
Salmon Ck./McClaran	5	42	242
Totals:	**20**	**208**	**1,674**

Revegetation

Table 1 summarizes revegetation and new project planting activities undertaken in 1999. Selection of revegetation sites was based on the need to improve bank stability, accelerate shade recovery, or to provide future large woody debris. A total of 3,079 trees and shrubs were planted on 5 projects to revegetate several streams where recovery did not occur as anticipated. Maps of planting sites were completed to aid with future monitoring of plant survival.

Fence Maintenance

Routine maintenance inspections of a total of 54.8 miles of project fence were completed in the spring, that included: 32.2 miles in the Upper Grande Ronde River drainage; 15.1 miles in the Joseph Creek subbasin; 3.4 miles in the Wallowa subbasin; and 4.1 miles in the Camas Creek drainage. A total of 252 stream cross fences and/or watering gaps were inspected and maintained in the spring and fall.

Maintenance of stream cross fences included removal of these structures in the fall to prevent damage from icing and high flows, and reinstallation and repair in the spring after flows subsided. Maintenance of water gaps consisted of ensuring that all entry gates, escape gates and fence structures were functioning properly. Routine maintenance of the main fence lines included removing fallen trees, repairing and tightening wires, and repairing structures. Aerial surveys were conducted to help quickly identify cattle trespass problems throughout the project area. Fish habitat personnel regularly patrolled all projects during the hot summer months and kept cattle trespass problems to a minimum.

No significant flooding occurred this year, so maintenance was below average this year. Project personnel converted several water gaps to electric fences where appropriate. Water gaps and solar pumps were removed from all projects for the winter as needed. Projects that required significant amounts of labor and materials in 1999 included:

Upper Grande Ronde subbasin

On the Beaver Creek fence 35 trees were sawed off the fence line, 4 broken wires repaired, and one rim rock anchor point replaced. On the Upper Grande Ronde River 16 trees were removed from the fence, 9 removed on Whiskey Creek, and 3 on Sheep Creek. The upper McCoy Creek boundary & cross fence was completely rebuilt. ODFW personnel removed approximately 0.7 miles of existing high tensile corridor fence along lower McCoy Creek. The materials will be

reused next spring along the new easement boundaries which will incorporate the entire meadow. Significant trespass problems occurred on Whiskey Creek and several repairs to water gaps and other structures were completed, including excavating pools within water gaps to provide more water for cattle. Repairs were made to electric water gaps on the UGR River and Meadow Creek, and two gates were rebuilt.

Joseph Creek and Wallowa subbasins

A crib was rebuilt and 6 trees removed on Swamp Creek. A new gate was installed on the Wallowa River/Wiseman project, and 100 feet of old fence was removed on Hurricane Creek.

Camas Creek Drainage

All fences and water gaps were in good shape.

Miscellaneous Operations & Maintenance Activities

Weed control was completed on the McDaniel properties (Butte, Pine and Chesnimnus creeks) by the landowner for the cost of $965. Arrangements were made with Dan Sherwin of the Wallowa County Weed Control to spray the primary noxious weeds on other leased areas for $2,073. The spraying was done to eliminate the primary noxious weeds as identified by the Oregon Department of Agriculture.

Two solar pumps were installed on the Upper Grande Ronde River/Crown Pacific property, and considerable amount of time was spent troubleshooting them. Both pumps were eventually sent back to the manufacturer. An existing spring development on the McCoy Creek/Tipperman property was maintained and a second trough added.

Routine service was completed on the Kubota tractor, Shaver post driver, ATV's, Hilti drills, chainsaws and trailers. New tires were purchased for one of the utility trailers and the ATV trailer. Cameras and fence chargers were sent in for repairs.

New shelves were constructed in the storage shed located at the NE Region office. Electric lights and plug-ins were also installed. Materials were transferred from Ladd marsh Wildlife Area to this building.

Fish habitat signs were replaced on Meadow and McCoy creeks.

MONITORING AND EVALUATION:

Photopoint Establishment

Two new photopoints were established on the Eaton Creek/Sunderman project, and 4 were established on the Grande Ronde River/Smidtt project. Digital photographs of the instream work on Meadow Creek were organized into a descriptive photo series illustrating the types of structures used, and the objectives of various structure placements at specific sites (such as pool formation, increase sinuosity, etc.).

Photopoint Picture Taking

188 photopoints of a total of 261 were retaken in 1999. All photopoint pictures were processed, labeled, and filed in permanent notebooks. The EBA reorganized many of the notebooks and filed backup slides. Several slides were selected and made into prints for the annual report or distributed to landowners.

Habitat Monitoring Transect Establishment and Data Summarization

In the Upper Grande Ronde drainage 40 habitat monitoring transects were established on Sheep Creek and 40 on McCoy Creek in 1988. In the Joseph Creek drainage 30 transects were established on Elk Creek and 30 on Chesnimnus Creek in 1988. All data sets from the original measurements were entered into a summarization program on Dbase III Plus in 1993, but data has yet to be summarized. None of these transects were repeated in 1999.

A Rosgen Level II survey was conducted on the Meadow Creek/Alta Cunha Ranches project shortly after instream structures were installed. Data collected included two cross sections, a longitudinal profile and pebble counts.

Thermograph Data Collection and Summarization

Hourly temperature data have been recorded, collected, summarized and graphed from thermographs in Sheep and McCoy creeks since 1988; from Salmon Creek since 1991; and Beaver and Camas creeks beginning in 1994.

Two new Unidata Starlogger thermographs were installed at the upper and lower ends of the Meadow Creek/Alta Cunha Ranches project. Both were enclosed in locked, weatherproof boxes. These will record both water and air temperatures. The new thermograph on lower Meadow Creek malfunctioned. It was replaced by the manufacturer and redeployed, with an extended thermistor cable.

Two Hobo Temp thermographs were deployed during the summer months on Jordan and Whiskey creeks where no temperature data had previously been taken.

Two Ryan Tempmentor thermographs from Salmon Creek were sent back to the manufacturer for repair and calibration. The thermographs were calibrated and reinstalled. The units had been recording sporadic negative temperatures again.

The upper thermograph at Camas Creek was relocated 30 feet upstream due to bank erosion. Two NIST thermometers were purchased to check instrument accuracy in the field. Summarization/graphing instructions were edited for use in Excel 7.0.

Thermograph Data Analysis

It is important to keep in mind tolerances of salmonids to changes in water temperatures as we analyze the data. The upper lethal limit for chinook salmon has been reported as 26.2^{o}C, and the lower lethal limit at 0.8^{o}C. Upper and lower lethal limits for steelhead are 23.9^{o}C and 0.0^{o}C (Meehan, 1991). The Independent Scientific Group (ISG, 1996) also reviewed available

information and concluded that the thermal requirements for chinook salmon are approximately as follows:

LIFE STAGE	TEMPERATURE			
	Optimum	Range	Stressful	Lethal*
Adult migration and spawning	50 °F (10 °C)	46.4 -55.4 °F (8 –13 °C)	>60 °F (>15.6 °C)	>70 °F (>21 °C)
Incubation	<50 °F (<10 °C)	46.4 -53.6 °F (8-12 °C)	>56 °F (>13.3 °C)	>60 °F (>15.6 °C)
Juvenile rearing	59 °F (15 °C)	53.6-62.6 °F (12-17 °C)	>65 °F (>18.3 °C)	>77 °F (>25 °C)

** Lethal is for 1-week exposures, higher temperatures may be tolerated for shorter exposure times.*

They also concluded that other salmonid species are not markedly different. Salmonid populations are able to respond to temperature changes by moving upstream or downstream to find thermal refuges. Warming of streams, however, may concentrate salmonids into small areas where they may be more susceptible to predation (see 1998 Annual, Appx 3), or lead to invasion of non-native species (Ebersole, et.al., 1994). In 1996 the Oregon Department of Environmental Quality (ODEQ), in accordance with an Environmental Protection Agency mandate, listed water quality limited streams in the state. The "303(d)" list included guidelines for stream temperatures; streams whose 7-day average of the daily maximum temperatures exceeded 17.8° Celsius (64° Fahrenheit) were listed as being thermally polluted, and are considered to have sub-lethal temperatures for salmonids and other cold-water species.

Analysis of summer stream temperature data by site are summarized below:

Salmon Creek:

Thermographs were installed at two sites in 1991. The upper site is located at the upstream end of the McDaniel property at RM 2.4. The lower site is near the mouth at RM 0.1, on the McClaran property. Riparian fencing at the upper site was completed in 1990; the lower site was fenced in 1989.

Salmon Creek has consistently shown cooling of stream temperatures as water travels downstream through the riparian corridor. In 1992, comparison of upper and lower summer mean weekly maximum temperatures showed an average cooling of 1.69°C at the lower (downstream) thermograph. In the summer of 1999 the average was 3.35°C cooler at the lower end (Figure 3). Salmon Creek is a small mid-elevation stream, and despite some recent heavy flooding, the vegetation is now in better condition to prevent damage from high flows, and there has been a considerable increase in the amount of shade along this reach. The stream channel has narrowed and deepened, reducing the stream water surface area and amount of solar radiation reaching the creek. There are also inputs of ground water from some springs that were also fenced off in 1990 which are also becoming more shaded.

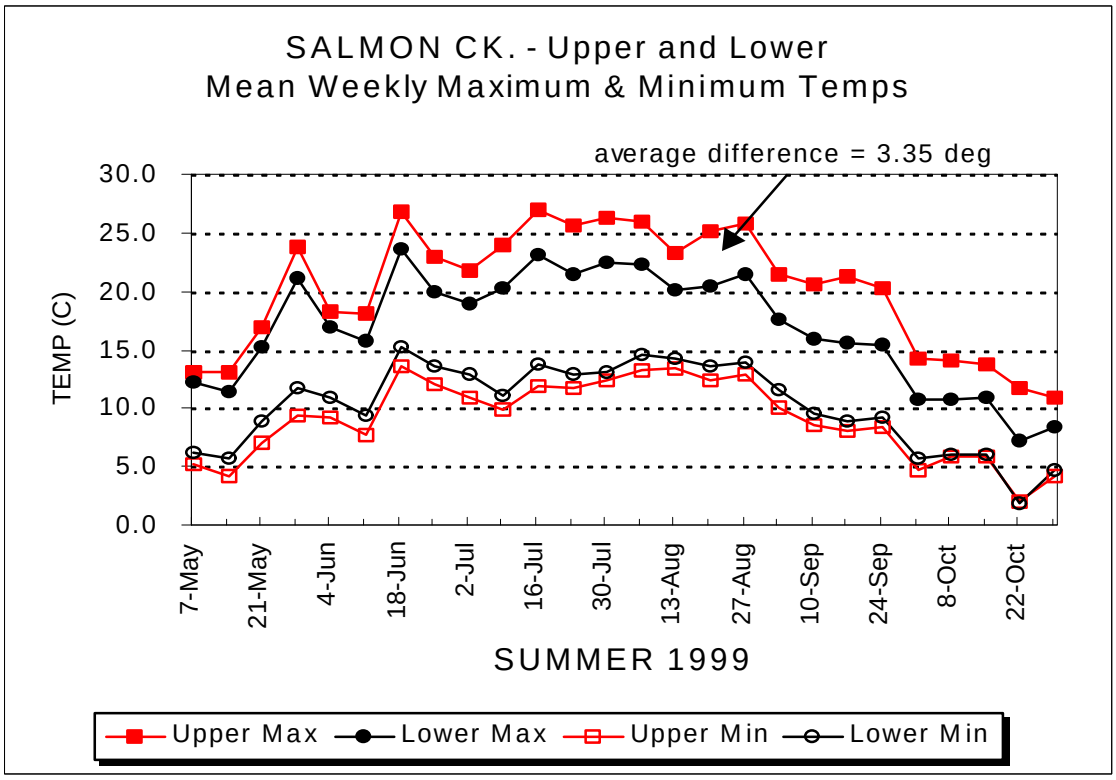


Figure 3. Mean weekly summer temperature data on Salmon Creek in 1999, at RM 2.4 (Upper) and RM 0.1 (Lower).

McCoy Creek:

Two thermographs were installed in 1988 on the Tipperman property; riparian fencing was constructed in the same year. The lower site is located near the mouth of McCoy Creek, and the upper site is about 1.6 miles upstream, at the start of a canyon. In 1997 the McCoy Meadows channel relocation project was implemented in the upper meadow (RM 0.8 to RM 1.5), which diverted the existing channel into one of the pre-1970 channels.

In 1988, the first year of data collection, summer mean weekly maximum temperatures at the lower (downstream) site averaged 3.70°C warmer than the upper site. In 1999 the upper thermistor was out of the water recording air temperatures so data could not be compared (Figure 4). Temperatures at the lower site continue to be very warm and show large daily fluctuations.

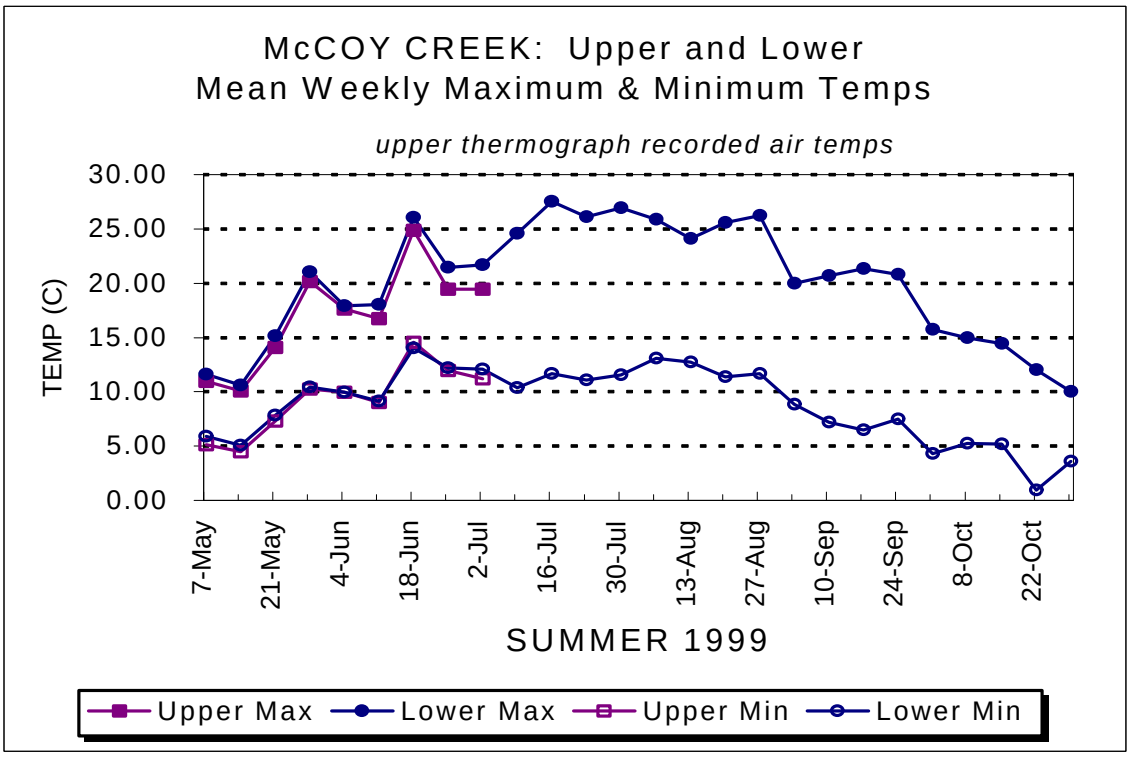


Figure 4. Summer temperature data on McCoy Creek in 1999, at RM 1.6 (Upper) and RM 0.0 (Lower).

Sheep Creek:

Thermographs were installed in 1988 on the Vey property and fencing was completed the same year. The upper site is located at RM 6.7 near the U.S. Forest property boundary. The lower site is located 4.3 miles downstream at RM 2.4 and about 100 feet upstream from the bridge along F.S. Road 51.

Comparison of summer mean weekly maximum temperatures shows that lower Sheep Creek averaged 1.46^{o}C warmer than the upper site in 1988 and 2.10 ^{o}C warmer in 1999 (Figure 5). Data collected over the 11 year period continue to show moderate and consistent warming of 1 to 3^{o}C at the lower thermograph, with no apparent trends developing to date. Daily fluctuations at both sights are moderate.

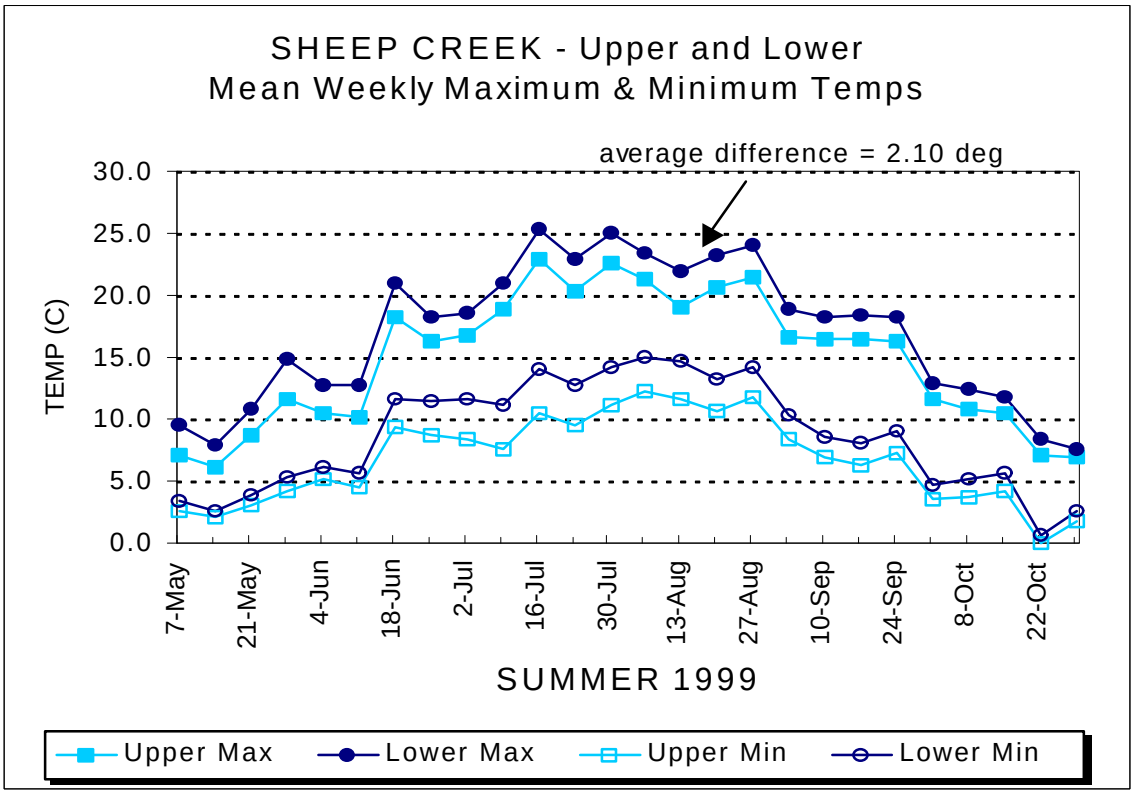


Figure 5. Summer temperatures on Sheep Creek in 1999 at RM 6.7 (Upper) and RM 2.4 (Lower).

Beaver Creek:

ODFW installed Hobo Temp thermographs at the mouth of Beaver Creek, and at the Crown-Pacific/ U.S. Forest Service property boundary at RM 5.9 in July 1994. These were replaced in November 1994 with Unidata Starlogger thermographs that also recorded ambient air temperature. Riparian fencing was completed on the lower half of the study area in 1993, and on the upper half in 1994.

Comparison of Beaver Creek mean weekly maximum water temperatures in 1999 showed continued warming of water moving downstream as has been observed in past years (Figure 6), with temperatures at the lower site averaging 3.79^{o}C warmer. Stream temperatures at the Upper Beaver Creek site, however, are one of the few places we have monitored that generally do not exceed ODEQ water quality standards. Temperatures at the lower site are also cool relative to other streams monitored, and only exceeded the ODEQ standard in 4 weeks of the 26 week period. A large portion of the upper drainage is within the protected La Grande City Watershed.

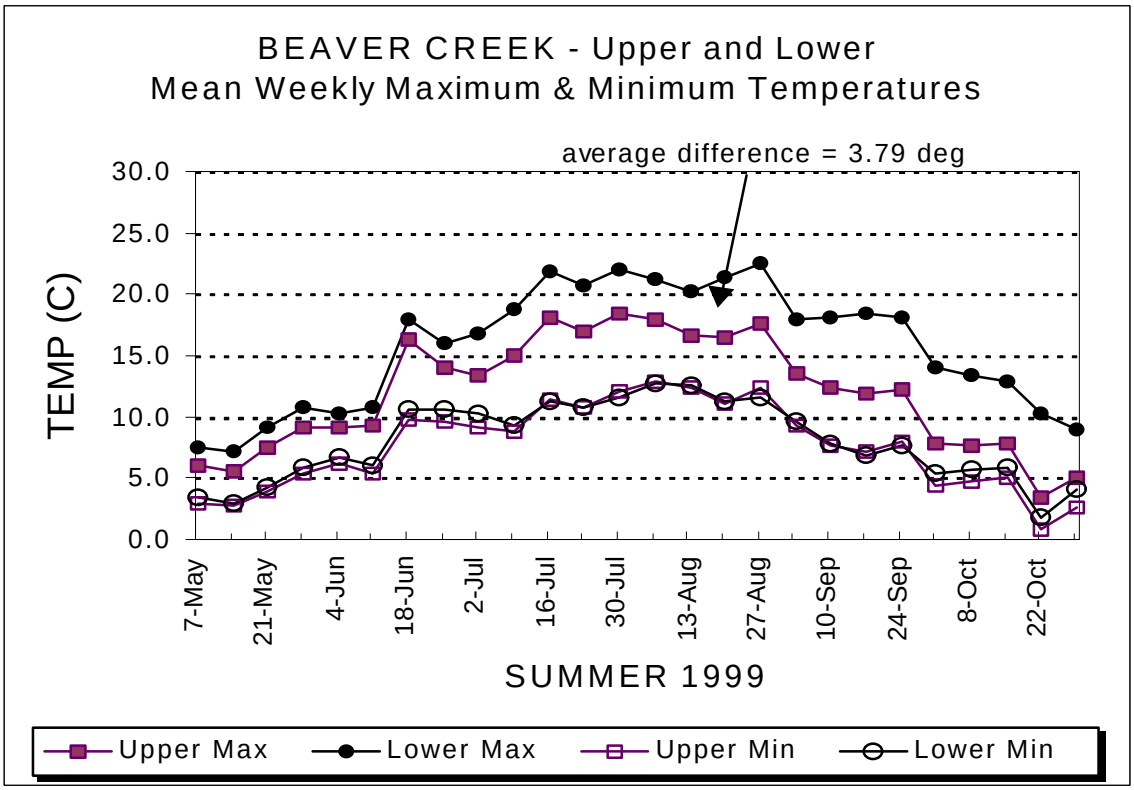


Figure 6. Summer temperature data on Beaver Creek in 1999, at RM 5.9 (Upper) and RM 0.0 (Lower).

Camas Creek:

Permanent Unidata Starlogger thermographs were placed at the upper and lower ends of the project area in May of 1995, recording stream and ambient air temperatures. Riparian corridor fencing was completed in 1995. The upper site is located about 0.3 miles downstream of Lehman Hot Springs Road at RM 29.6; the lower site is about 2.8 miles farther downstream at RM 26.8 at the Pendleton Ranches/Forest Service property boundary. Comparison of summer mean weekly maximum temperatures showed that lower Camas Creek averaged 0.50^{o}C warmer than the upper site in 1995, but in 1999 the lower site was 0.45^{o}C cooler than the upper (Figure 7). It is too early to tell if this trend will continue.

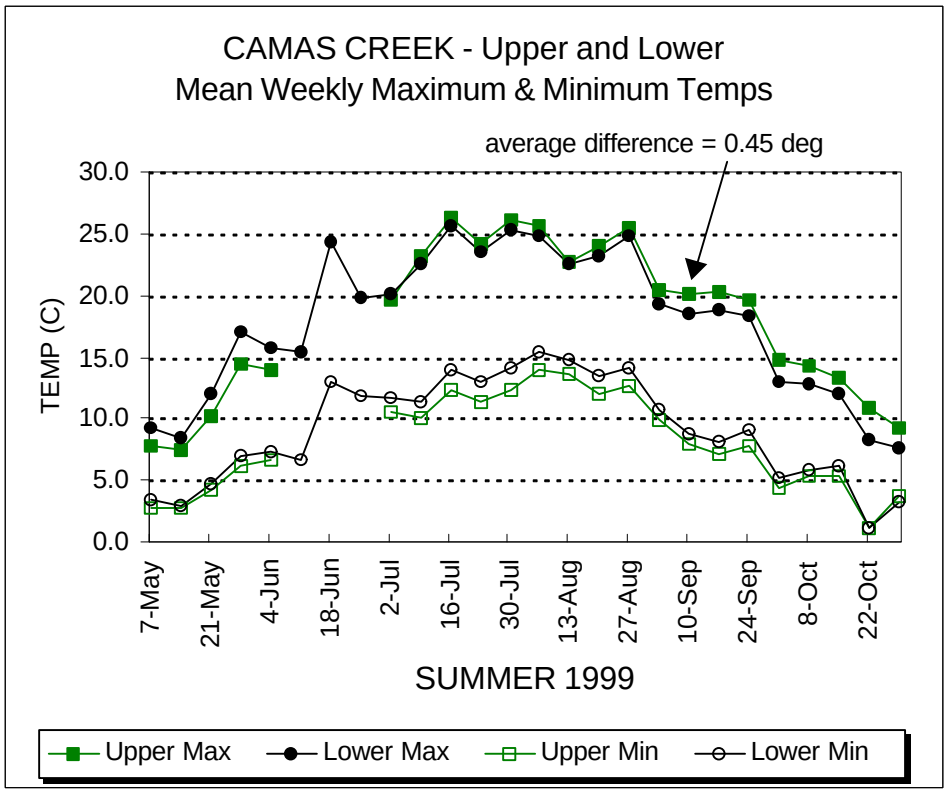


Figure 7. Summer temperature data on Camas Creek in 1999, at RM 29.6 (Upper) and RM 26.8 (Lower).

Meadow Creek

Permanent Unidata Starlogger thermographs were installed at the upper and lower ends of the Alta Cunha Ranches projects at river miles 10.3 and 8.7 in May of 1999. Both units were set up to record water and ambient air temperatures. Problems were experienced with the thermographs at both locations, therefore no data is presented.

Whiskey and Jordan Creeks

Two additional thermographs were installed at the mouths of Whiskey and Jordan creeks. Whiskey creek was fenced several years ago but no project monitoring of stream temperatures has been conducted. Over the past few years steelhead redd counts and increased abundance of juveniles near the mouth have been observed, therefore we wanted to determined what summer temperatures were like in this area. Temperatures in Whiskey Creek were generally very warm, exceeding the ODEQ standard for most of the summer (Figure 8).

Jordan Creek is the site of a proposed fencing project and we wanted to gather at least one year of pre-project summer temperature data at the mouth, however the stream flows were very low and much of the recorded data was air temperatures when the thermistor became de-watered.

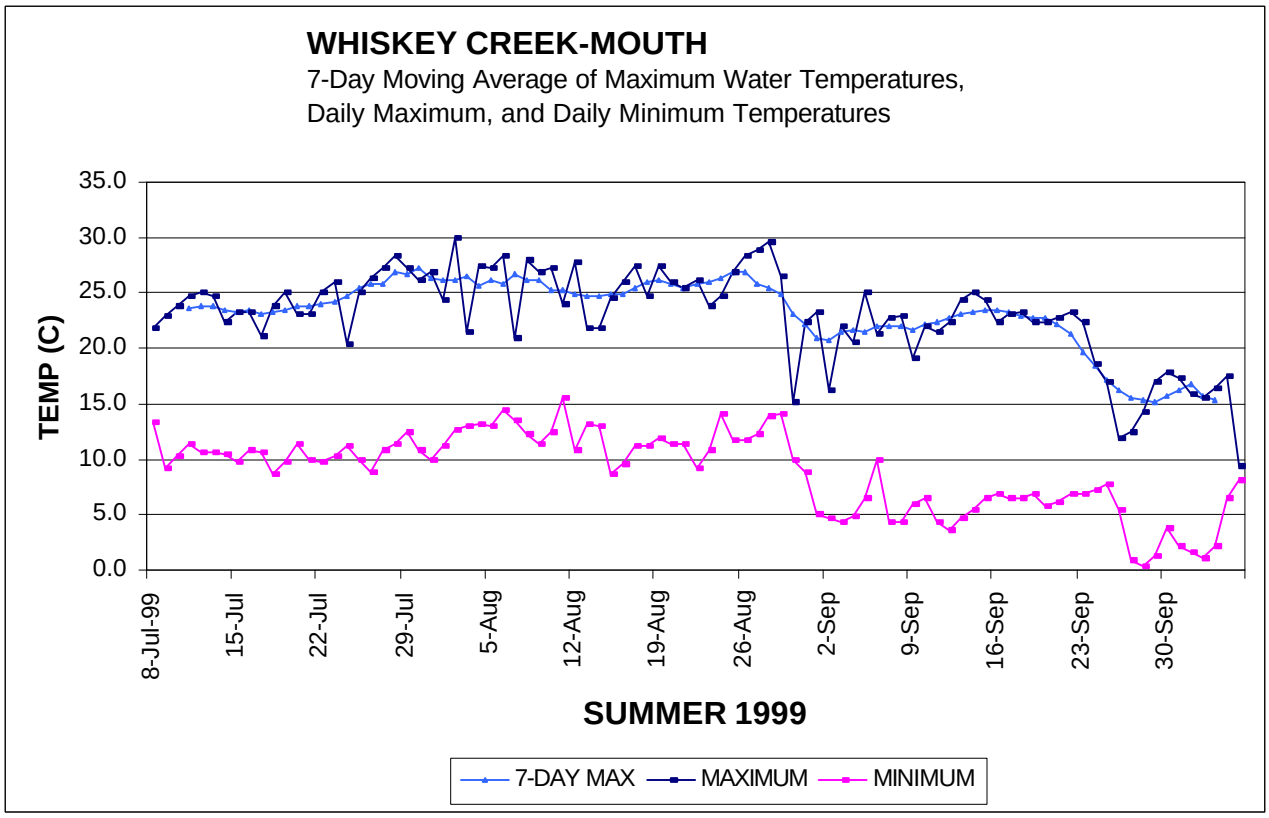


Figure 8. Summer water temperatures at the mouth of Whiskey Creek, 1999.

Miscellaneous Monitoring & Evaluation Activities

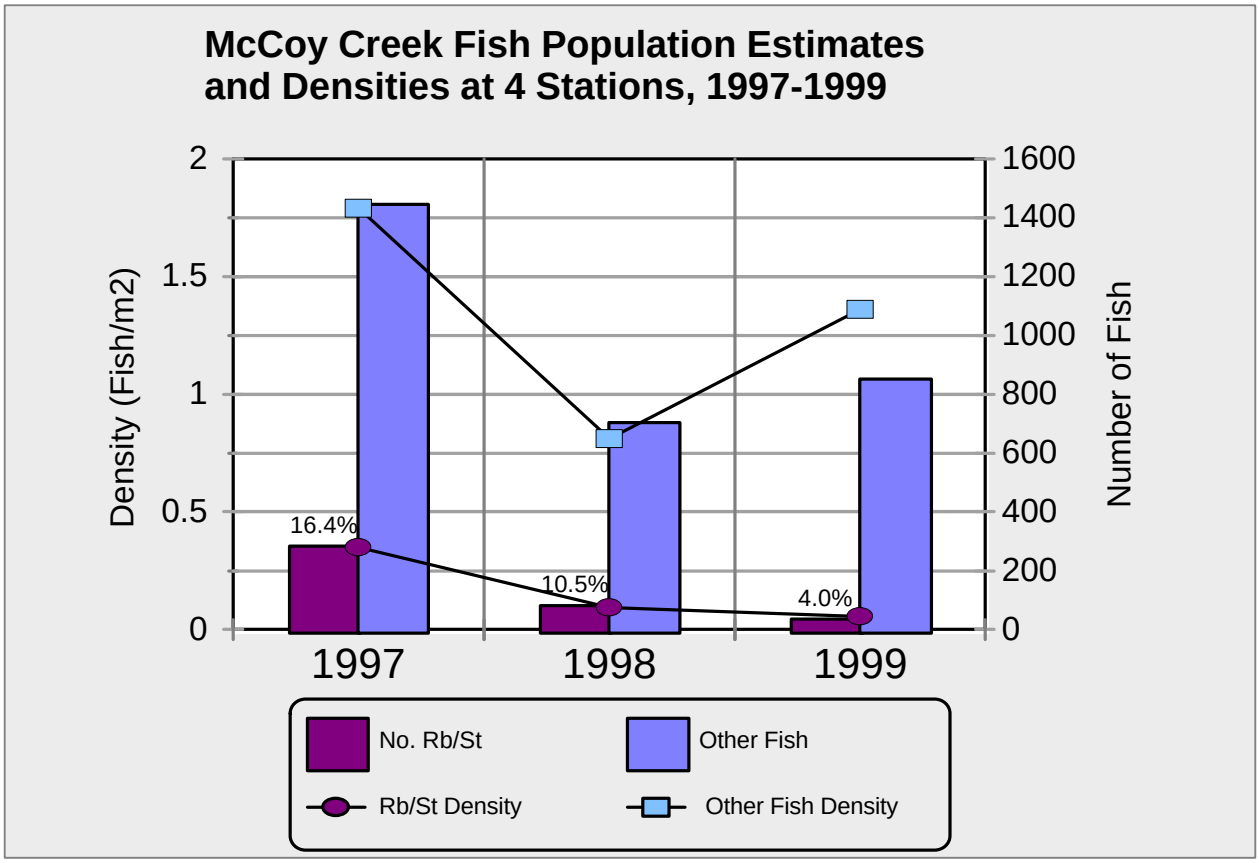
La Grande District fish personnel completed steelhead spawning surveys on Whiskey and Little Whiskey creeks for 6 consecutive weeks from April 26 to June 8, 1999. Five live fish and 13 redds were found. The redd count was the highest observed since counts began in 1993 (Table 6). No hatchery fish were observed. No new redds were observed after May 21st. This was also the second time that live fish and redds were found upstream of the forks of these two streams. An additional 1.0 miles of Whiskey Creek were surveyed above the project area; four steelhead redds were found.

TABLE 5. Steelhead redd counts on Whiskey and Little Whiskey Creeks, 1993 to 1999.

	YEAR						
	1993	1994	1995	1996	1997	1998	1999
# Redds	5	7	7	11	11	10	13
Live Fish	2	2	3	5	9	5	5

Steelhead surveys were also conducted on 1.8 miles of the Meadow Creek/A. Cunha property on May 12, 1999; and on 0.5 miles of Bear Creek (tributary to Meadow Creek) on April 29th. No redds were found in either stream, but one steelhead carcass was found in Meadow Creek.

Electroshocking surveys were repeated in McCoy Creek on June 29, 1999. Densities and percent composition of Rb/St have declined over the three year period. Presence/absence of Rb/St may be closely related to stream temperatures which are typically rising quickly this time of year. One of the four stations was not sampled in 1999 due to low water conditions in the former channel. The results are summarized in the chart below:



Additional electroshocking was conducted in the channel that was abandoned in 1997. The channel was still receiving flood flows (approximately 25% during bankful events) so the section was surveyed to determine the extent of stranding that occurred during receding flows. Only 8 steelhead were found in the 0.2 mile reach, and 5 of those were in cold seeps where they would be expected to survive throughout the summer. Several pairs of Western toads were also observed laying eggs in these areas.

Site schematics and an inventory of the number of pieces of wood and individual sizes was completed on the Meadow Creek instream project. Sites will be reviewed after high flows to monitor stability or movement of wood in this reach.

The instream work completed in 1997 on the McCoy Creek channel relocation project was reviewed once flows receded. For the most part, all structures seemed to be functioning as planned, except for some slight erosion at the upper diversion structure.

Two hundred and twenty four bird boxes were inventoried on McCoy and Meadow creeks by the landowner. Overall utilization was 71.0%, with house wrens again making up the largest percentage at 24.1%, and bluebirds close behind at 23.7%. Other species included tree swallows, and chickadees. Camas Creek bird boxes were inventoried: 6 were empty, 13 utilized by swallow, and 6 utilized by bluebird.

RESULTS AND DISCUSSION: PROGRAM ADMINISTRATION

Administrative activities during 1999 included preparation of reports and data summaries, budget preparation and purchasing, program development, and personnel hiring and supervision.

Reports and Data Summaries

Quarterly and annual progress reports for the Grande Ronde Basin Fish Habitat Enhancement program were prepared and submitted to BPA and others. The 1998 Annual was also posted on the BPA web site.

Project implementation, maintenance and monitoring summaries by subbasin and stream were completed and entered into the program database.

Oregon Plan reporting forms were completed and submitted to the Oregon Watershed Enhancement Board.

A project summary report was written for the Upper Grande Ronde/Crown Pacific project and submitted to the Grande Ronde Model Watershed.

Budgets/Purchases

Considerable time was spent obtaining quotes for construction materials, purchasing supplies, receiving material shipments, working on the Statement of Work and Budget, and tracking project expenditures from four different sources of funds (BPA, FEMA 1997, Grande Ronde Model Watershed Program, and ODFW Fish Restoration & Enhancement). The FY 99 workstatement and budget was written and submitted to BPA and ODFW fiscal. It was finally determined that the overhead rate would be set at 22.9%. An inventory of capital items was sent to Phil Havens as part of the requirements for renewing our BPA contract.

A new project proposal was written and funded by the Grande Ronde Model Watershed Program for the Meadow Creek/Habberstad project for $54,930.

Major purchases this year included: fence materials and field supplies; tree seedlings; spring development parts including 4 solar pump systems, troughs and materials; 6 new Unidata Starlogger thermographs; a laser level with two sensors; and a custom built 20-ft flatbed trailer. NRCS paid for two of the solar pumps and panels, saving the program $3,600.

Program Development

Project personnel attended a meeting with Umatilla and John Day habitat personnel to discuss program direction. Phil Havens later met with us to discuss project O&M costs, how to increase landowner cost share and involvement, and how to deal with projects that are coming to the end of their 15-yr. leases. BPA was agreeable to renewing lease agreements in order to protect investments. However, we decided we would not renew leases in all circumstances, and developed a planning matrix to help us base future decisions.

The FY 2000 project proposal was submitted and approved by the Columbia Basin Fish & Wildlife Authority approved. Responses to comments of the Independent Scientific Review Panel were included in the workstatement. However, the requested funding in the amount of $366,782 was later cut to $273,000 following review by the subregion teams.

Personnel

Requests to hire were completed for seasonal employees. Scott Stennfeld was rehired as a seasonal Experimental Biology Aide in January and worked all year. David Carroll and Ray Guse were hired as EBA's for 8 months and 2 months respectively. EBA's spent approximately 80% of their time working on O&M projects. Performance evaluations were completed for the technician and one of the Experimental Biology Aides.

Tim Bailey of Pendleton was temporarily assigned Fish Habitat Program Leader duties, and toured the project in July.

Contract Administration

The CTUIR provided funding and administered the Meadow Creek instream work contract as part of the cost share of a GRMWP funded project. The cost for treating 1.8 miles of stream was $12,763, or $1.34 per lineal ft.

The Meadow Creek fence contract was completed in August. A total of 3.5 miles of fence and 15 gates were completed for the cost of $28,664. GRMWP funds were used to complete this project.

Weed Control was completed in Wallowa County streams for the cost of $2,073.

Miscellaneous Administration

Samples of cover letters, fence specifications and proposals were sent to the Umatilla fish habitat biologist. A new GRMWP project proposal was started for the Bear and Jordan creek projects, but could not be completed before the December 15th deadline. ODFW fish passage requirements were reviewed to determine maximum rock weir heights on the McCoy Meadows project.

INTERAGENCY COORDINATION & EDUCATION

Communication, education, coordination and cost sharing of habitat enhancement activities was completed by actively pursuing opportunities to work with, and learn from personnel involved with other agencies, organizations and programs.

INTERAGENCY COORDINATION:

Information, materials or assistance was provided to members of various agencies or programs, including:

- Oregon Plan project reporting forms were sent to GWEB and the GRMWP.
- Information on culverts and stream crossing was sent to Mike Burton of the NRCS.
- The biologist submitted comments to the Oregon Department of Transportation and a private consultant regarding removal and replacement of a bridge along highway 244 at Bear Creek. As a result ODOT modified its plans and will increase channel capacity and improve streambank conditions at this site.
- Copies of 1994-1998 stream thermograph data were given to Tina Ballard of Union Soil and Water Conservation District, and a water quality meeting was attended.
- The biologist coordinated with Rick Wagner of ODF and Allen Childs of the CTUIR on a large wood addition project on the McCoy Creek Cunha and Snow properties.
- The biologist and EBA assisted the CTUIR with removing and transporting fish out of an artificially created headcut area near the mouth of Bear Creek, along the Grande Ronde River. Several thousand feet of old railroad grade bisected the floodplain, diverting flood waters and creating the headcut. After removing thousands of fish (including 4 juvenile spring chinook and 30 juvenile steelhead) the railroad grade material was pushed into the headcut area, and spring tributaries were reconnected to historic channels.
- Project personnel assisted with collection and tagging of juvenile salmonids in the Upper Grande Ronde River for an Oregon State University research project.
- The biologist assisted the La Grande fish district with an ODFW Fish Restoration and Enhancement project that included delivery of fence materials and setting up photopoints on a riparian fence project along the mainstem Grande Ronde River in the valley. A summary of R&E projects and expenditures was also completed.
- Rock drills and other equipment were loaned to the CTUIR.
- The biologist assisted the John Day Fish Habitat biologist with channel transect measurements on Granite Creek. The technician conducted a spring chinook survey for ODFW John Day district fish personnel.
- Temperature data summarization files and instructions were sent to ODFW fish habitat personnel in the Northwest Region.

Meetings were attended to provide technical input on:

- Implementation plans for work on the McCoy Meadows Restoration project. Several meetings were held to discuss planning for Phase II of the project. Construction sequence,

channel design and location in the lower meadow were reviewed. The biologist spoke with the water master to determine feasibility of diverting part of McCoy Creek water into the new channel following construction to help establish vegetation.

- Project personnel toured fish habitat projects in the John Day, Grande Ronde and Umatilla basins. USFS, CTUIR, GRMWP and NRCS personnel attended many portions of the tour.
- The biologist attended a Blue Mountain Habitat Restoration technical committee meeting.
- The biologist attended two meetings to discuss realigning Milk Creek (tributary to Catherine Creek) into a historic channel. ODF, ODOT, USWCD, GRMWP and Hall Ranch personnel were in attendance. An onsite review of instream wood placements was also conducted.

Other agencies, organizations, groups or individuals that worked cooperatively, or provided assistance or materials to this project, included:

- The U.S. Forest Service, La Grande Ranger District donated several hundred riparian trees and shrubs to the project.
- Jim Webster, hydrologist for the CTUIR, reviewed the instream work conducted/proposed on Meadow Creek and made several recommendations. Allen Childs of the CTUIR assisted with project planning, onsite implementation, and administered and funded the contract for this project.
- Lyle Kuchenbecker of the GRMWP and Bob Ries of the NMFS provided guidance regarding requirements for submitting a biological assessment for the Meadow Creek instream work.
- CTUIR personnel installed shade cards and watered plantings several times on the Meadow Creek/A. Cunha Ranches project which increased planting survival on this project.

EDUCATION:

The following educational activities were undertaken during 1999:

- Surveying equipment and the solar pathfinder were loaned to Sue Daugherty of Imbler High School for collecting transect data. The high school students have been surveying Spring Creek for several years.
- The technician and seasonal EBA's attended the ODFW Northeast Region technicians meeting; completed an ATV safety training course; a Watershed Restoration Workshop in Sunriver.
- The biologist attended the annual meeting of the Oregon Chapter of the American Fisheries Society; a Riparian Zone Ecology, Restoration and Management workshop sponsored by the NRCS; a 5-day "Applied Fluvial Geomorphology" course by Wildland Hydrology in Pagosa Springs, Colorado; and a meeting on Oregon State University riparian research in Northeast Oregon.

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APPENDIX 1. Anadromous fish streams within the Joseph Creek and Wallowa River subbasins with highest priority for habitat improvement.

			Miles of Riparian Improvement								
Joseph Creek:			Stream Miles Needing Work			Fencing:		Planting:		No. of Instream Structures	
Stream	Species	Priority	Public	Private	Total	Public	Private	Public	Private	Public	Private
Peavine Creek	Stld	1	8.0	0.0	8.0	4.5	0.0	4.5	0.0	43	0
Elk Creek	Stld	2	3.5	5.0	8.5	3.5	5.0	3.5	5.0	25	35
Chesnimnus Creek	Stld	3	12.0	8.0	20.0	12.0	8.0	8.0	4.0	60	40
Crow Creek	Stld	4	1.0	13.0	14.0	1.0	13.0	0.0	10.0	10	50
Swamp Creek	Stld	5	5.0	10.0	15.0	5.0	10.0	2.5	5.0	10	20
Pine Cr. System	Stld	6	2.0	20.0	22.0	2.0	18.0	2.0	18.0	10	40
Devil's Run Creek	Stld	7	5.0	0.0	5.0	2.0	0.0	2.0	0.0	10	10
Davis Creek	Stld	8	7.0	3.0	10.0	7.0	3.0	4.0	3.0	10	0
Butte Creek	Stld	9	0.0	4.0	4.0	0.0	4.0	0.0	3.0	0	10
TNT Gulch	Stld	10	2.0	0.0	2.0	2.0	0.0	2.0	0.0	10	0
Joseph Creek	Stld	11	0.0	12.0	12.0	0.0	12.0	0.0	12.0	0	80
Subbasin Totals			45.0	75.0	120.5	39.0	73.0	28.5	60.0	188	285
Wallowa River:											
Whiskey Creek	Stld	1	0.0	7.0	7.0	0.0	6.5	0.0	5.5	0.0	26
Prairie Creek	Ch, Stld	2	0.0	10.0	10.0	0.0	9.5	0.0	8.0	0.0	37
Trout Creek	Stld	3	0.0	14.0	14.0	0.0	13.5	0.0	11.0	0.0	52
Dry Creek	Stld	4	0.0	8.0	8.0	0.0	7.5	0.0	6.0	0.0	30
Rock Creek	Stld	5	0.0	3.0	3.0	0.0	3.0	0.0	2.5	0.0	11
Parsnip Creek	Stld	6	0.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	4
Subbasin Totals			0.0	43.0	43.0	0.0	41.0	0.0	34.0	0.0	160

SOURCE: Confederated Tribes of the Umatilla Indian Reservation, 1984. Grande Ronde River Basin: Recommended Salmon and Steelhead Habitat Improvement Measures, 92 pp.

APPENDIX 2. Anadromous fish streams within the Upper Grande Ronde drainage with highest priority for habitat improvement.

Upper Grande Ronde:			Stream Miles Needing Work			Miles of Riparian Improvement: Fencing:		Planting:		No. of Instream Structures	
Stream	Species	Priority	Public	Private	Total	Public	Private	Public	Private	Public	Private
Grande Ronde River	Ch, Stld	1	6.0	5.0	11.0	2.0	5.0	1.0	4.0	130	175
Sheep Creek	Ch, Stld	2	7.0	5.0	12.0	1.0	5.0	0.5	2.5	210	175
Fly Creek	Stld	3	6.0	6.0	12.0	1.0	5.0	0.5	3.0	180	180
Spring Creek	Stld	4	5.0	0.0	5.0	1.0	0.0	2.5	0.0	150	0
S.F. Spring Creek	Stld	5	3.0	0.0	3.0	1.0	0.0	1.5	0.0	90	0
N.F. Spring Creek	Ch, Stld	6	3.0	0.0	3.0	0.0	0.0	0.0	0.0	90	0
McCoy Creek	Stld	7	4.0	7.0	11.0	1.0	7.0	3.0	4.0	120	210
Rock Creek	Stld	8	0.0	6.0	6.0	0.0	8.0	0.0	3.0	0	90
Dark Canyon Creek	Stld	9	1.0	2.5	3.5	0.0	2.5	0.0	0.0	15	38
Meadow Creek	Stld	10	7.0	7.0	14.0	1.0	7.0	0.5	0.5	210	210
Indian Creek	Ch, Stld	11	1.0	5.0	6.0	0.5	3.5	0.0	0.0	30	150
Chicken Creek	Ch, Stld	12	5.0	2.0	7.0	1.0	1.0	0.0	1.0	75	70
Catherine Creek	Ch, Stld	13	0.0	5.0	5.0	0.0	4.0	0.0	0.0	0	150
Beaver Creek	Stld	14	1.5	5.0	6.5	0.0	3.0	0.0	0.0	45	150
Five Points Creek	Stld	15	5.5	0.5	6.0	0.0	0.5	0.0	0.5	165	15
Clark Creek	Ch, Stld	16	0.0	6.0	6.0	0.0	4.0	0.0	3.0	0	180
Little Catherine Creek	Stld	17	1.0	4.0	5.0	0.0	2.0	0.0	1.5	15	60
Bear Creek	Stld	18	5.0	0.5	5.5	0.0	0.0	0.0	0.0	75	8
Limber Jim Creek	Ch, Stld	19	2.0	0.3	2.3	0.0	0.0	1.0	0.3	30	5
Pelican Creek	Stld	20	3.0	0.5	3.5	0.0	0.0	0.0	0.0	45	8
Peet Creek	Stld	21	2.0	1.0	3.0	0.0	0.0	1.0	0.5	60	30
Little Fly Creek	Stld	22	3.0	2.5	5.5	0.0	0.0	0.0	1.0	90	75
Whiskey Creek	Stld	23	1.0	8.0	9.0	0.0	4.0	0.0	2.0	15	120
Jordan Creek	Stld	24	2.0	8.0	10.0	0.0	4.0	0.0	2.0	30	120
N.F. Limber Jim Cr.	Stld	25	2.0	0.0	2.0	0.0	0.0	0.0	0.0	30	0
McIntyre Creek	Stld	26	2.5	5.0	7.5	1.0	3.0	1.0	5.0	75	150
Waucup Creek	Stld	27	5.0	0.0	5.0	0.0	0.0	1.0	0.0	150	0
Burnt Corral Cr.	Stld	28	6.0	0.2	6.2	0.0	0.0	0.0	0.0	90	4
Lookout Creek	Stld	29	3.5	0.8	4.3	0.0	0.0	0.0	0.0	53	24
Little Dark Canyon Cr.	Stld	30	2.0	0.0	2.0	0.0	0.0	0.0	0.0	60	0
Phillips Creek	Stld	31	0.0	6.0	6.0	0.0	2.0	0.0	0.0	0	180
Gordon Creek	Stld	32	0.0	7.0	7.0	0.0	4.0	0.0	2.0	0	210
Dry Creek	Stld	33	0.0	8.0	8.0	0.0	6.0	0.0	4.0	0	240
Cabin Creek	Stld	34	0.0	3.0	3.0	0.0	2.0	0.0	0.0	0	90
Drainage Totals			95.0	116.8	211.8	10.5	82.5	13.5	39.8	2,328	3,117

APPENDIX 3

Photographs of Recovering Projects

Beaver Creek, Crown Pacific property, Photopoint #8, August 11, 1993. This pre-project photopoint shows an unstable stream channel . Considerable bedload movement is evident, along with a wide, shallow and braided active channel. Very little shade or quality instream habitat is present.

Beaver Creek, Crown Pacific, Photopoint #8, August 10, 1999. After 6 years of rest from grazing willows are well established on the developing point bar. The channel is now a single thread, with the thalweg on the far bank. Recruitment of large wood (in this case old logging slash) is taking place.

Elk Creek, Birkmaier property, Photopoint #2, October 16, 1987. Riparian fencing and instream structures were completed in 1986. Lack of riparian vegetation from both grazing and timber harvest are evident.

Elk Creek, Birkmaier property, Photopoint #2, August 16, 1999. After 11 years of rest the riparian quantity is dramatically improved. Transect data in this reach shows a narrowing and deepening of the stream channel and significant increases in shade. The lease agreement expired in 1997 but the landowner has kept the area protected since then.

Whiskey Creek, Courtney property, Photopoint #4, August 24, 1993. Fencing was completed in this reach in 1991. After two seasons of rest native shrubs are beginning to recover in this small stream.

Whiskey Creek, Courtney property, Photopoint #4, August 20, 1999. Willows are now over ten feet high but recovery in this reach is spotty. Replacement groves of cottonwoods (note mature trees in background) and conifers have not yet become well established. This may be due to lack of water and intermittent cattle trespass problems that have occurred. Portions of Whiskey Creek run dry in the summer.