North Fork John Day Anadromous Fish Habitat Enhancement

1988 Annual Report

Prepared by

Jacqueline S. Dougan Assistant Project Leader
Umatilla National Forest
North Fork John Day Ranger District
P.O. BOX 158
Ukiah, OR 97880
Commercial - (503) 427-3231

Alan G. Scott Assistant Project Leader
Umatilla National Forest
Heppner Ranger District
P.O. Box 7
Heppner, OR 97836
Commercial - (503) 676-9187

John A. Sanchez Project Leader
Umatilla National Forest
Supervisor's Office
2517 SW Hailey Ave
Pendleton, OR 97801
Commercial - (503) 276-3811

Contract No. DE-A179-84BP16725

Project Number 84-8

January, 1989

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ABSTRACT

In 1988, the Umatilla National Forest constructed fish habitat improvements on Desolation Creek, Wilson Creek, Little Wall Creek, North Hidaway Creek, Five Mile Creek, and the Red Boy Mine area, A stream survey was conducted on Camas Creek and seven other tributaries, during the 1988 field season.

Work on the North Fork John Day River was to maintain the annual monitoring program implemented during the 1987 project year. Several side channels are being monitored for stream temperature to compare with main channel temperature.

Work on the Red Boy Mine included the closing of the mine with concrete and installing a 6 inch pipe to carry effluent 300 yards to an old closed channel, The mining effluent is carried to settling ponds that extend for approximately 0.25 miles.

Work on Desolation Creek created quality rearing pool habitat by constructing 30 rock and 4 log weirs and 8 rock deflectors in 1.5 miles of the stream, Two of the pools that were created are of the size and depth sufficient for adult chinook resting and holding. In addition, 70 boulders and 48 LWMs were placed in the stream to improve cover for rearing and 10 main stem rock sills were constructed. One debris jam was dismantled and side passage was created.

Work continued in 1988 along 0.5 miles of Wilson Creek. Twenty-two new pool forming structures were built together with 250 streambank stabilization structures. Riparian instream planting was increased with the establishment of 30 sedge plants. There was also some work on previously constructed structures. Additional logs and root wads were placed in the stream to help create more in-stream diversity and hiding cover,

In Little Wall Creek during 1988, 33 pool forming structures were built. The The success of these structures was proven during the extremely dry summer of 1987-88. They increased summer time flows by intercepting underground water which was brought back to the surface, The 1988 project year included planting 300 riparian plants placing 138 boulders in-stream and stabilizing 765 feet of streambank. This is the final year for the Little Wall fish improvement project.

In North Hidaway Creek during 1988, 56 pool-creating log and rock weirs were built. In each associated pool cover logs with root wads attached were installed and cover boulders were placed, Several of the pools were of sufficient size to function as adult holding pools, All disturbed areas adjacent to the project were seeded with a riparian seed mix,

In Fivemile Creek during 1988, 20 pool-creating log and rock weirs were built. In each associated pool root wads and cover boulders were placed. In addition 6 rock deflectors and 150 boulders were placed as cover and bank stabilization.

The Camas Creek stream surveys accomplished 70.45 miles of surveyed stream during the 1988 field season, The survey conducted was the Hankin & Reeves Limiting Factors Survey to find the limiting factors for anadromous fish. All data was completed and compiled in a written report.

SUBPROJECT I - North Fork John Day River Mainstream and Side Channel Monitoring

INTRODUCTION

The commercial and recreational values of Oregon's anadromous salmon and steelhead fisheries are well known, The John Day River and its tributaries are important areas for natural anadromous salmonid reproduction. The North Fork John Day River is a major contributor to this production.

The project area is located in northern Grant County on the North Fork John Day Ranger District, Umatilla National Forest in T.6S., R.32E., and T.6 & 7S., R.33E.

From 1979-1986, the Umatilla National Forest rebuilt two side channels and reopened 25 additional side channels from river mile **63** to river mile **76.** The Forest also constructed numerous other structures in the river and side channels to increase juvenile spring chinook rearing habitat.

The North Fork John Day project has become an emergent issue pertaining to the impact of the side channels and boulder placements on stream temperature. Ill response to this issue the Forest Service started a monitoring project on the side channels in 1987.

The overall project goal is to monitor side channel temperatures and fluctuations with main channel temperatures by:

1. Using hydrothermographs to systematically monitor changes in stream temperatures,

2. Photo monitoring specific structures in side channels over the next several years,

3. Evaluating all data taken during **3** years and making information available.

PROJECT DESCRIPTION

Hydrothermographs are installed on several side channels and we have been collecting data on the side channels and main stem since 1987, During the 1988 field season the monitoring was continued and will continue through 1989 to complete three years of data collection. The water temperature study consisted of monitoring 39 side channels; 27 of which had been opened by the Umatilla National Forest. The objectives of this study were:

1. To identify and briefly describe all the North Fork John Day River side channels in the project area between Texas Bar bridge and Bismark Creek.

2. To identify those side channels which have the potential heating characteristics to increase water temperature.

3. To determine whether these side channels singly or in combination have an adverse effect upon the temperature of the North Fork John Day River.

The monitoring began on June 29th and continued through October. Monitoring was done by U.S.D.A. Forest Service personnel with hand-held thermometers, Ryan temperature recorders, Gurley current meters, and photo points. Photo points established in 1987 were again monitored during the 1988 field season where new photos and structure information was collected,

Preliminary observations and results:

1. Eight side channels were found to be cooler than the main stem. Influencing factors were, side streams flowing into the channel and subsurface flow interception.

2, Nine channels dried up, indicating a potential for entrapment.

3. Sixteen channels showed no heating problems. Most of these channels were short, well shaded, and carried good volumes of water.

4. Six channels were identified as having high potential for heating and were monitored with temperature recorders sampling on half hour intervals. Five of the six channels showed at least some degree of heating.

The data will be reduced and analyzed and a report will be available this spring.

Due to below average flows last year, monitoring will be continued in **1989** in the five channels that experienced increased temperature and the channels that dry up.

SUBPROJECT II - North Fork John Day Tributaries Fish Habitat Improvement

Subproject IIa- Clear and Granite Creeks Improvement

INTRODUCTION

Fisheries habitat enhancement work has occurred on four miles of Clear Creek and a two mile stretch of Granite Creek, Fish habitat enhancement work has been ongoing in this area since the early 1960's. This stream reach is an important spawning and rearing area for spring chinook and summer steelhead.

Three inactive mines in the area of the Clear Creek fish habitat enhancement work discharge toxic water containing high concentrations of mineral acids, iron, copper, and sulfates. The mine water iron oxide precipitate coats stream gravels with an orange precipitate that limits aquatic insect production and can seal alevins in a redd. Research also indicates that heavy metals in the effluent can have a detrimental effect on smoltification when the fish approach salt water. Mine pollutants in the pool had formed a "no-use" influence zone approximately 2 miles in length and even longer during low flow years.

Work on the toxic water discharge from these inactive mines began in 1981 when a concrete plug with outlet pipe was installed in the portal of the Black Jack mine. In 1983 the discharge was piped 100 yards down the hill to a small temporary settling pond. In 1987 a 400 yard long buried pipeline was installed to carry the effluent to an old closed channel in the dredge tailings where a bog l/2 mile long could be established. In 1987 a small temporary settling pond was constructed for the effluent from the Blue Bird mine,

GOALS

1. Restore and enhance the anadromous fish habitat lost by gold mining effluents flowing into Clear Creek - Granite Creek system.

2. Improve water quality and restore 2 miles of additional spawning and rearing habitat.

3. To monitor effectiveness of mine closings by physical stream testing, photo documentation, and established hydrothermograph stream monitoring.

OBJECTIVES

1. Reduction of heavy metal concentrations - Plugging of the Redboy mine and the diversion of it's seepage has reduced heavy metal toxicity in Clear Creek.

2. Increase spawning area - by opening up 2 miles of stream previously in "no-use", due to mining effluents,

PROJECT DESCRIPTION:

The Red Boy mine was closed in 1988 by the excavator with a concrete plug. A 6 inch pipe was buried from the mine downslope 300 yards to an old closed channel. The pipe was completely covered with gravel and topsoil. The pipe carries all the mining effluents to four settling ponds that extend approximately l/4 mile, The ponds are successfully capturing mining effluents and presently one hundred feet of dredge material separates Clear Creek from the mine water ponds,

ACHIEVEMENTS

It is anticipated that the decreased toxicity of Clear Creek will result in 2-4 miles of additional spawning and rearing habitat for Chinook salmon and steelhead. This will increase the amount of diverse habitat available for spawning and rearing. An increase in smolt survival or spawning use will not be apparent for several generations.

Subproject IIb - Desolation Creek

INTRODUCTION

The project area is located in the northern edge of Grant County in the North Fork John Day Ranger District, Umatilla National Forest in T.8S., R.33E. and T.gS., R.33E (see vicinity map in Appendix A). Desolation Creek is tributary to the North Fork John Day River from the south, 0.5 miles upstream from the Highway 395 bridge.

Forest Service employees that were in the area in the 1930's observed spring chinook salmon spawning in Desolation Creek. Several barriers in the lower portions of the stream apparently had blocked salmon passage since that time. Louisiana-Pacific Corporation, landowner in the blockage area, removed the barriers in the 1970's.

Presently, spring chinook salmon, summer steelhead, and resident trout use Desolation Creek. The spring chinook spawning population is at a low level; Oregon Department of Fish and Wildlife estimated that 20 adults or less spawned in the stream annually, Steelhead were estimated at 140 spawners annually.

Each spring, trout anglers report catching late migrating spring chinook smolts in lower portions of the stream, An August 1982 pre-work stream inventory of Desolation Creek fish habitat conditions tallied one spring chinook adult at stream mile 20.5. In September 1986 three spring chinook salmon redds and four live adult spring chinook were observed in the project area by CTUIR biologists during a cooperative spawning survey coordinated by ODFW. In July and August of 1987 five adult spring chinook were seen in or above the 1987 project area by Forest Service personnel,

An evaluation of the 1982 stream inventory data indicated that existing pool habitat for both adult holding and juvenile rearing was naturally limiting anadromous fish production, Presently the pool/riffle ratio is in unworked areas averages 11% percent pool and 89 percent riffle as opposed to the 60:40 pool/riffle ratio which is considered optimum for rearing juvenile salmon and steelhead. The opportunity exists to increase the pool percentage from 11% toward 60%. All of the pools will be designed to increase juvenile rearing

while several pools will be designed to provide the depth and size required for adult holding. The opportunity also exists to add gravel catching structures to Desolation Creek to increase anadromous fish spawning areas.

The overall project objective is to increase the production potential of spring chinook salmon by:

1. Changing the pool/riffle ratio from the present 11:89 towards the optimum 60:40 and improving the quality of the existing pools by adding cover and increasing depth,

2. Constructing at least one adult anadromous fish resting pool per mile

3. Increasing the amount of woody material in the stream to improve instream cover, and the diversity and complexity of the stream.

4. Increasing anadromous fish spawning areas in both size and quality by constructing rock weirs that will retain bedload gravels.

5. Designing and installing fish habitat structures that control bank erosion.

PROJECT DESCRIPTION

Project activities consisted of preparing and administering a contract to place rock structures, boulders,large woody material and riprap in Desolation Creek. The contractor began work on July 15,1988 construction was completed on September 1, 1988.

In 1988 the Forest constructed 30 rock weirs, 10 rock sills, 4 log weirs, 41 pools 2 of which were designed as adult holding pools, installed 5 large woody placements including 3 digger logs, placed 68 boulders in pools for cover and 70 boulders in the stream outside created pool areas for cover, built 8 rock deflectors, one debris jam dismantled,and spread 200 lbs of riparian seed mix to increase stream bank stability,

Work progressed downstream from mile 16.50 just south of Battle Creek to approximately 1.5 miles downstream to north of Welch Creek at mile 15.0 for a total of 1.5 miles of stream worked, Rock and log weirs were constructed from previously hauled rock to create pool forming structures. Woody debris and rocks were added to pools and in the main channel for diversity and hiding cover, A large log jam was pulled apart as passage problems were becoming apparent. Chinook were spotted several times in the construction process, holding in pools, Fire season closures closed this contract before all work was completed.

Table 1: Summary of the Desolation Creek Project to Date

Structure	1985	1986	1987	1988	Total
Rock Weirs	52	68	50	31	201
Rock Sills	0	0	34	10	44
Log Weirs	0	4	7	4	15
Deflectors	0	7	0	7	14
Adult Holding Pools	1	4	2	2	9
Boulders Placed	97	191	505	138	931
Instream Logs Placed	11	40	91	3	145
Side Channels	2	3	1	0	6
Side Channel Length	1,584	39167	500	0	5,251
Alcoves and Blind Channels	5	0	0	0	5
Alcoves and Blind Channel Length (ft.)	550	0	0	0	550
Debris Jam Bypass	1	0	0	1	2
Cuttings Planted	18	68	0	0	86

ACHIEVEMENTS

The increase in total anadromous fish habitat capability from the project is estimated to be **2,128** spring chinook smolt and **669** summer steelhead smolt giving an estimated value of $21,190 annually.

Table 2, Increase in Smolt Production in Desolation Creek

	Chs	St11
Estimated increase in numbers of smolts	**2,128**	699
@ **1.5** percent spawning escapement 1/	**x0.015**	**x0.015**
Estimated increase in numbers of adult spawners	**32**	10
Net value per escaping adult 2/	**x$550**	**x$359**
Estimated annual value **1988** BPA project	**$17,600**	**$3,590**

1/ As per conversation with Errol Claire, **1/8/88.**
2/ Meyers **1982.** "Net Economic Values for Salmon and Steelhead from the Columbia River System," U.S. Department of Commerce, June 1982.

Subproject IIc - Lower North Fork John Day Tributaries

WILSON CREEK

INTRODUCTION

The Wilson Creek project is located on the Umatilla National Forest in T6S, R27E (Grant Co.). Wilson Creek is a part of the Wall Creek system which is a tributary to the North Fork John Day River, The stream produces summer steelhead and resident trout.

A stream survey was conducted on Wilson Creek in 1985. An analysis of the reach data revealed that both the quantity and quality of pool habitat was limiting production of juvenile summer steelhead. Average pool depth was less than a foot, far too shallow to be an effective rearing habitat, The lack of quality pool habitat must have been recognized as a factor limiting production ten years earlier when several pool forming gabions were installed in the stream. The stream survey crew noted that these structures were still providing some of the best pool habitat on the creek. These gabion structures and the recent enhancement work done in 1986 and 1987 have clearly demonstrated their value in improving steelhead rearing habitat. During the summer, these structures intercept underground flows and bring them to the surface, This increases the amount of water in the stream and provides thermal refuges to carry over the juvenile steelhead through the critical months of July and August.

In addition to a need to improve pool habitat, there were opportunities to increase the amount of spawning gravel, add more cover and to correct some unstable streambank conditions.

The overall project objective was to increase the production potential of summer steelhead by:

1. Increasing juvenile steelhead rearing habitat-construct pool creating structures to improve the current 27:73 pool:riffle ratio.

2. Increasing both the size and quality of anadromous fish spawning areas-structures will be designed to retain bedload gravels.

3. Improving bank stability-rock deflectors and riprap will be used to control bank erosion.

4. Increasing vegetative cover-establish poplar/cottonwood and willow plantings along the streambanks.

PROJECT DESCRIPTION

Project activities began in the fall of 1987 with scoping and analysis of the proposed work area. Restoration opportunities were identified and specific methods of correcting habitat deficiencies were proposed. Plans were finalized the next spring. Structure design and layout was completed and pre-work conditions were documented. The equipment rental contract was awarded in April and work started on July 11, 1988.

The first two weeks of contract work consisted of rock hauling on both the Wilson Creek project and the Little Wall Creek project. Two dump trucks were utilized to move rock as close to the stream as possible. A crawler-loader completed the rock moving from dump sites to individual construction sites. The crawler-loader worked almost 17 days constructing access roads, moving rock, and logs to selected locations, In addition to getting materials to sites on this year's project, rock was hauled to twelve sites scheduled for work next year. Once the materials were in place the excavator began constructing enhancement structures. Work progressed up to August 29, then the high fire danger curtailed any equipment use. Contract work was stopped and did not restart until October 3. The Wilson Creek project was finished the next week and the excavator was moved to Wall Creek where two "K" weirs were constructed. These structures have worked well on Wilson Creek but Wall Creek has higher flows and greater velocities so these two pilot structures were constructed to allow time for an evaluation of their effectiveness before project planning is done in 1991.

The primary objective on the Wilson Creek project was to increase the number and depth of pools. This year's project relied heavily on log weir structures and constriction/scour pool structures to increase pool habitat. The log weir structures were mainly "K" weirs, log weirs with two deflector wings. These structures are becoming the mainstay on Wilson Creek because of there ability to intercept subsurface water and concentrate flows in the dry summer months. They have been very successful over the years in maintaining high quality pools and retaining bedload gravels which increase spawning areas, To add habitat diversity, constriction/scour pool structures were interspersed between a series of log weirs. These structures were usually an enhancement or duplication of naturally occurring structures, They involve log, rock or root wad arrangements that constrict flows and scour out a pool. The most common arrangement was either a root wad-boulder constriction or a boulder cluster-log wing constriction.

To increase instream cover at least one root wad was placed in each pool. Logs or root wads were also placed in key places on the stream to prove habitat diversity.

The project has progressed into the lower reaches of Wilson Creek which have increased amounts of exposed, raw streambanks and more bedrock shelves that extend across the stream, The eroding stream banks were stabilized with either log deflectors or rip-rap, and an increased use of long wings on log weirs, Side channels were closed to prevent juvenile stranding, Several types of bedload catchment structures were installed on the bedrock portions to initiate a streambed building process, These stretches of bedrock were devoid of vegetation and the rock acted as a heat sink, increasing water temperature, The structures were designed to catch bedload material including spawning gravels. This material will eventually cover the bedrock allowing vegetation to become established, To speed up vegetative recovery, saw-leaf sedge clumps were transplanted among these structures. This sedge grows in rocky sites both in the stream and along the margins, Now that livestock grazing use is being controlled, the sedge should naturally increase and spread down stream providing an excellent vegetative cover source and stabilizing the stream course.

ACHIEVEMENTS

It is anticipated that the increased rearing areas associated with the boulders, rock weirs and large woody material will result in increased steelhead survival from egg to smolt, Assuming the increased rearing area equates to a proportional increase in fish production, this year's increase is estimated at **654** smolt annually and will require at least one generation before results become apparent.

Table **3.** Summary of the Wilson Creek Project to Date.

Structure	**1986**	1987	**1988**	Total
Pool Forming Structures				
Rock Weirs	**39**	12	**6**	**57**
Log Weirs	0	**13**	**16**	**38**
Other Pool Structures 1/	63	**9**	10	19
Sills & Berms		0	0	63
Streambank Stabilization Structures				
Deflectors	**24**	19	1	**44**
Bank Protection 2/	0	320	**250**	**570**
Other Habitat Enhancement Work				
Boulders Placed	**183**	**64**	**128**	**375**
Instream Logs Placed	**18**	0	**8**	**26**
Root Wads Placed	**53**	38	**32**	**123**
Fish Passage Improvement z/	1	0	0	1
Side Channel Closure 4/	**15**	0	1	**16**
Bedload Catchment Structures 5/	0	0	5	**5**
Hardwood Cuttings or Clumps Planted	**192**	**291**	0	**483**
Sedge Clumps Planted 6/	**4**	0	30	**34**
Wall Creek Accomplishments				
Log Weirs (w/root wads)			2	2
Instream Logs Placed			1	1

1/ Includes enhancement of natural weir formations, root wad constrictions, or scour pool arrangements.
2/ Measured in feet. Rock rip-rap, juniper rip-rap or log armoring of banks.
3/ Removal of barrier that inhibited migration,
4/ Side channels closed to prevent juvenile stranding,
5/ Structures designed to catch bedload and initiate a streambed building process over bedrock portions of the stream so that vegetation can become established,
6/ Saw-leaf sedge clumps (an excellent cover producing sedge) planted to establish an upstream seed source.

Table 4. Increase in Smolt Production in Wilson Creek.

	St
Estimated increase in numbers of smolt	654
@ 0.625 percent spawning escapement 1/	x 0.015
Estimated increase in numbers of adult spawners	9.8
Net value per escaping adult 2/	x $ 359
Estimated annual value 1988 BPA project	$ 3,518

1/ As per conversation with Errol Claire, l/8/88,
2/ Meyers 1982, "Net Economic Values for Salmon and Steelhead from The Columbia River System," U.S. Department of Commerce, June 1982.

Subproject IId

Little Wall Creek

INTRODUCTION

Little Wall Creek produces summer steelhead and resident trout. It is a headwater stream of Wall Creek which is a tributary to the North Fork John Day River. The stream is located on the Umatilla National Forest in T6S, R27E and T7S, R27E (Grant Co.).

A 1985 physical stream survey indicated that summer steelhead production was being limited because there was not enough pool habitat and spawning gravel. The stream channel was broad, shallow and lacked habitat diversity. During the summer months when stream flows were low and temperatures high, this lack of rearing habitat became critical, There were few pools with sufficient depth and hiding cover to carry over the juvenile steelhead. Rearing habitat enhancement work was first planned as a timber sale area improvement project to be funded by Forest Service KV funds, These plans were later expanded into a joint BPA-Forest Service project to increase summer steelhead production. The enhancement project started in 1986. Work continued in 1987 and scheduled restoration work was completed this year,

The overall project objective was to increase the production potential of summer steelhead by:

1. Increasing the pool:riffle ratio to approach 50:50.

2. Increasing both the size and quality of anadromous fish spawning area by constructing weir structures so that they will retain bedload gravels.

3. Controlling bank erosion.

4. Increasing vegetative cover by establishing poplar/cottonwood and willow plantings along the streambanks.

Project DESCRIPTION

Project planning began in the fall, Structure design and lay out was based on experience gained during the last two 'years of work on Little Wall Creek. The equipment rental contract was prepared in the winter and awarded in the spring. The first project activity involved planting 300 cottonwood seedlings on April 17. The cottonwoods were planted in shade deficient areas of last year's project. Contract work started on July 11, 1988 with three days of rock hauling. Two dump trucks were used to haul 62 loads of boulders to the creek. A crawler-loader dispersed the rock to construction sites. Actual structure construction with an excavator started on October 13 after the Wilson Creek project was completed, Fortunately fall water levels were still low so work could continue without siltation of downstream spawning gravels, A second excavator was brought in November first to help make up time for the 5 weeks lost when the project was shut down because of high fire dangers. Work was completed on November 17. A total of 43 pool forming structures were constructed. This finished planned structural enhancement work for the stream. Future work is still planned using Forest Service funds to restore and improve vegetative conditions,

This year's project once again relied heavily on log weir structures. These structures have proven very successful on this stream. They maintain deep pools, retain spawning gravels and during the critical hot summer months they intercept underground flows and return them to the surface providing cooler water to the pools. To add habitat diversity rock weirs and root wad constriction structures were also constructed, At least one root wad was placed in each pool for hiding cover. Where possible large woody material was also anchored in the stream channel to increase habitat complexity.

Unstable streambank were treated with rock rip-rap, log armoring, or deflector wings, Side channels were closed to prevent juvenile stranding.

The lower portion of Little Wall Creek is dominated by saw-leaf sedge. This riparian sedge provides excellent vegetative cover for the creek but it; was absent from most of the project area. The sedge is preferred by cattle and continual heavy use over the years led to it's gradual removal from the more accessible reaches of the stream. A few clumps were experimentally transplanted to the headwaters of the stream in 1986. They survived but grazing pressure kept them hedged down. A riparian pasture fence, started last year and expected to be completed this spring, will limit grazing on the stream. With grazing use under control the sedge should flourish. This year more sedge clumps were planted around several of the structures. These plants and future plantings will eventually spread down the the stream providing vegetative cover and stabilizing the stream channel.

ACHIEVEMENTS

It is anticipated that the increased rearing areas associated with the boulders, rock weirs and large woody material will result in increased steelhead survival from egg to smolt, Assuming the increased rearing area equates to a proportional increase in fish production, this years increase is estimated at 965 summer steelhead smolt annually and will require at least one generation before results become apparent.

Table 5. Summary of the Little Wall Creek Project to Date.

Structure	1986	1987	1988	Total
Pool Forming Structures				
Rock Weirs	1	1	3	5
Log Weirs	22	2	30	54
Other Structures 1/	0	0	10	10
Sills & Berms	1	0	0	1
Stream Stabilization Structures				
Deflectors/ Stream Diverters 2/	3	0	7	10
Bank Protection 3/	0	0	765	765
Other Habitat Enhancement Work				
Rock Clusters/Boulders Placed	0	0	183	183
Instream Logs Placed	0	0	5	5
Root Wads Placed In Pools	5	25	43	73
Riparian Plantings				
Hardwoods Planted	0	0	300	300
Sedge Clumps Planted 4/	0	22	13	35

1/ Includes enhancement of natural weir formations, root wad constrictions, or scour pool arrangements,
2/ Stream diverters use for closing side channels to prevent juvenile stranding,
3/ Measured in feet. Rock rip-rap or log armoring of banks.
4/ Saw-leaf sedge clumps (an excellent cover producing riparian sedge) planted to establish an upstream seed source,

Table 6. Increase in Smolt Production in Little Wall Creek.

	St
Estimated increase in numbers of smolt	965
@ 1.5 percent spawning escapement 1/	x 0.015
Estimated increase in numbers of adult spawners	14.5
Net value per escaping adults 2/	x$359
Estimated annual value 1988 BPA project	$ 5,206

1/ As per conversation with Errol Claire, l/8/88.
2/ Meyers 1982. "Net Economic Values for Salmon and Steelhead from The Columbia River System," U.S. Department of Commerce, June 1982.

Subproject IId - Fivemile Creek System

INTRODUCTION

The Fivemile Creek System is located on the Umatilla National Forest in T4 & 5S, R29 & 30E and is tributary to Camas Creek which is tributary to the North Fork of the John Day River (see vicinity map in Appendix A). Fivemile Creek and its tributaries have historically been used for spawning and rearing by summer steelhead. Within the last twenty years a falls has formed one mile from the mouth of Fivemile Creek, This falls, which is on private land, has become a partial barrier to steelhead adult migration, The Oregon Department of Fish and Wildlife improved passage in the fall of 1987.

In 1986 a physical stream survey was conducted for Fivemile Creek and its tributaries, An evaluation of survey data indicates that the quantity of pool sufficient to provide adequate rearing is very low, approximately eleven percent of the surface area, The survey also indicated heavy past grazing impacts on the streams and some subsurface flow. The past year was one of the driest recorded and several streams in the Fivemile Creek system that always had flow were dry, Spawning gravel and riparian vegetation were also limited along some reaches of the stream,

From the survey evaluation the overall project objective will be to increase the production potential of summer steelhead by:

1, Increase pool frequency to attain quality pools separated by a distance of approximately 3 to 6 channel widths in treated reaches by the construction of weirs and placement of large woody material and boulders.

2. Constructing at least one large pool per mile of stream.

3. Increase stream bank stability.

4. Increase and protect vegetation in the riparian area by designing structures that promote riparian area recovery.

PROJECT DESCRIPTION

Project activities in 1988 consisted of preparing and administering a contract to create log and rock weirs for increasing pool habitat and improve instream cover. The enhancement work on 0.5 miles of stream should be very effective as steelhead smolts were present in large numbers, due to passage provided at Five Mile falls. The riparian improvements were funded out of Forest Service KV funds.

ACHIEVEMENTS

A total of 0.5 miles of stream were worked creating 20 pools creating structures each with wood and rock placed in the associated pools. 150 boulders were placed in the stream for hiding cover and for bank stabilization.

Table 7. Summary of the Fivemile Creek Project to Date.

Structures	1987	1988
Stream/riparian rehabilitation (miles)	0.2	0.5
Instream logs	8	8
Weirs/pools	6	20
Sediment traps	100	3
Deflectors	4	6
Sills	1	0
Adult holding pool	1	0
Boulders	0	150

Table 8. Increased Smolt Production in Fivemile System

	sts
Estimated increase in numbers of smolt	1112
@ 1.5 percent spawning escapement 1/	x 0.015
Estimated increase in numbers of adult spawners	17
Net value per escaping adults 2/	x$359
Estimated annual value 1988 BPA project	$6,103

1/ As per conversation with Errol Claire, 1/8/88.
2/ Meyers 1982, "Net Economic Values for Salmon, and Steelhead from The Columbia River System," U.S. Department of Comtnerce, June 1982.

S&project IIe - Camas Creek System

North Hidaway Creek

INTRODUCTION

North Hidaway Creek is a tributary in the Camas Creek system which is tributary to the North Fork John Day River. The location of the project is T.5S., R.33E and R,33-1/2E. (see vicinity map in Appendix A),

Summer steelhead and resident trout habitat improvement in North Hidaway Creek was initially proposed as a KV project associated with timber sale improvement. These plans were expanded into a joint BPA-Forest Service project to increase summer steelhead production, Surveys of the stream indicated that quality pool habitat is naturally limiting steelhead production.

PROJECT DESCRIPTION

In North Hidaway Creek in 1988 the Forest constructed 55 pool-creating log and rock weirs, placing woody material and cover boulders in each. Several of the pools created are of sufficient size to function as adult holding pools.

The overall project objective is to increase the production potential of summer steelhead by:

1. Increase pool frequency in treated reaches to attain quality pools separated by a distance of approximately **3** to **6** channel widths in treated reaches by construction of weirs and the placement of large woody material.

2. Constructing at least one adult steelhead resting pool per mile.

3. Increase streambank stabilization.

ACHIEVEMENTS

It is anticipated that the increased rearing areas associated with the boulders, rock weirs and large woody material will result in increased steelhead survival from egg to smolt. Assuming the increased rearing area equates to a proportional increase in fish production, this increase is estimated at **1518** smolt annually and will require at least one generation before results become apparent.

Table 9. Summary of the North Hidaway Creek Project to Date.

Structure	1986	1987	1988	Total
Weirs	20	17	55	92
Boulders Placed	20	20	86	126
Instream Logs Placed	20	17	49	86

Table 10. Increase in Smolt Production in North Hidaway Creek.

	sts
Estimated increase in numbers of smolt	1518
@ 1.5 percent spawning escapement 1/	x 0.015
Estimated increase in numbers of adult spawners	23
Net value per escaping adults 2/	x$359
Estimated annual value 1988 BPA project	$8,257

l./ As per conversation with Errol Claire, l/8/88,

2/ Meyers 1982. "Net Economic Values for Salmon and Steelhead from The Columbia River System," U.S, Department of Commerce, June 1982.

SUBPROJECT IIf - CAMAS CREEK STREAM SURVEY

INTRODUCTION

Preliminary stream surveys of several stream systems in our district indicate a lack of quality pool and juvenile rearing habitat, This may be limiting anadromous fish production conducting limiting factors analysis on Camas Creek and it's tributaries will help develop a plan to improve production potential of steelhead. Data collected will determine project work and management plans for the next several years. Data will be shared with other departments on the Forest and for future work by ODFW,

OBJECTIVE

The overall project objective was to determine the factors limiting production potential for steelhead and develop an action plan by:

1. Conducting physical stream surveys throughout the Camas Creek system.
2. Conduct limiting factors analysis in all streams within the Camas Creek system,
3. Develop a plan to improve production potential of steelhead based on limiting factors analysis and physical stream surveys,

PROJECT DESCRIPTION

A four person crew conducted limiting factors analysis and stream survey on **71** miles of the Camas Creek Stream System, Personnel were trained for the Hankin & Reeves method of analysis and certain other riparian criteria was expected to be collected during the survey, Biological, vegetative and range information was collected with the survey data and compiled into a report and analysis tables,

ACHIEVEMENTS

During the 1988 field season 71 miles of amadromous streams in the Camas Creek system were surveyed for limiting factors of fish production. We collected data, developed a cotnputer program to analyze the data and completed a written report+ complete with summary tables,

PROJECT MONITORING

Monitoring of the project results in the North Fork John Day Sub-basin has been coordinated with the Oregon Department of Fish and Wildlife; however, no on-the-ground smolt monitoring occurred in 1985, 1986 or 1987. ODFW conducted spawning ground counts on the North Fork of the John Day River, Clear and Granite Creeks, and Desolation Creek, A physical stream survey for project streams was conducted in 1986 to monitor the physical habitat changes that have occurred since the inititation of project work in 1984 and for pre-work purposes on streams proposed for **1987** project work, Prework surveys of structures in the streams indicated the need for adjustments of flow into some side channels in the North Fork John Day River, resetting boulders in Clear Creek, and modifying structure construction in Wilson and Little Wall Creeks. Structures in Desolation Creek and Hidaway Creek required no maintenance.

PROJECT COSTS

Table 11. Project Costs, April 1, **1988** to March **30, 1989**

Bonneville Power Administration Funds:			
a.	Salaries		$ **60,950**
b.	Transportation and travel		$ **8,942**
c.	Materials and supplies		
	Expendable		$ **14,837**
	Nonexpendable		$ **136**
d,	Equipment rental contracts		**$140,648**
e.	Overhead @ 10.7%		$ **24,130**
		Total	**$249,643**
Umatilla Forest Appropriated Funds:			
a.	Salaries		**$31,182**
b,	Transportation and travel		$ **3,838**
c.	Materials and supplies		$ **3,701**
d.	Equipment rental contracts		**$12,003**
		Total	**$50,724**

REFERENCES

Claire, Errol, 1988. Personal communication on January 8, 1988,

Meyers, Philip A., 1982, "Net Economic Values for Salmon and Steel-head from the Columbia River System," U,S. Department of Commerce, 23 pages, June 1982.

Oregon State Game Commission, 1959. "Fishery Division 1958 Annual Report", June 1959, page 182.

Estimated Production by Structure,

Structure	.Annual smolt output
Side channel	448Chs - 140Sts
Boulders placed	4Chs - 2sts
Log or Rock Weirs	28Chs - 8sts
Alcove	28Chs - 8sts
Rock Sills	14cns - 4Sts
Log in pool	7Chs - 3sts
Deflectors	7Chs - 3sts
Adult Holding Pools	70Chs - 21sts
Instream Logs	7Chs - 3 sts

Assumptions

1. If one is not planning from spring chinook, then steelhead smolt output doubles.

2, One large adult holding pool per mile is necessary to gain full benefit from the rest of the project,

3. Output numbers derived by Andrews and ODFW representatives and account for an assumed 30% presmolt mortality.