1190 Annual Report

North Fork John Day Anadromous Fish Habitat Enhancement

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TABLE OF CONTENTS

ABSTRACT

In 1990, the Umatilla National Forest Constructed fish habitat improvements on Fivemile Creek, Camas Creek, Lane Creek, Rancheria Creek, Wilson Creek, and Big Wall Creek. Monitoring of all prior stream improvement projects was completed for the North Fork of the John Day and Heppner Districts.

Work continued upstream in 1990 along one mile of Fivemile Creek. Nineteen new pool-creating structures were completed. An addition of 15 instream logs and deflectors will provide small pool habitat and hiding cover and will reduce stream channel width. Rootwads and boulders were added to each pool to provide diverse stream habitat.

The stream enhancement project began in 1990 along 1.5 miles of Camas Creek. Eighteen pool-creating weirs were built to provide quality fish habitat. Each pool was constructed with rootwads, brush, and boulders to provide quality hiding cover. Ninety boulders were placed in the channel to provide pocket pool habitat. Six log deflectors were used to promote channel narrowing and sediment entrapment.

The construction of weirs occurred on a 1.5 mile section of Lane Creek. Thirty-eight fish habitat structures with pools excavated below each weir were completed. Each pool was enhanced with rootwads and boulders. Three deflectors and eight log placements were placed to promote stream channel narrowing and edge recovery.

Stream enhancement work began this year along one mile of Rancheria Creek. Twenty-six rock and log weirs were created to provide 20 quality pools downstream. Ten log placements will trap sediment and encourage restoration of the riparian area. Bank armorment in 13 areas and placement of 15 deflectors will prevent further bank erosion,

Work continued in 1990 along 0.5 miles of Wilson Creek. Eight new pool-forming structures were built. Logs with rootwads attached were placed in all pools to help create more instream diversity and hiding cover. Seventeen log or rock deflectors were constructed in addition to the wings on the weirs to help stabilize eroding bank conditions. Two side channel entrances were modified to maximize main channel low flow volume and one debris jam was modified.

Instream enhancement work began in 1990 on Big Wall Creek. Thirty-nine new pool-forming structures were built in 2.1 miles of stream. Rootwads were placed in the pools to help provide hiding cover for rearing juveniles, and to increase instream diversity. To help stabilize eroding bank conditions, an additional 18 rock or log deflectors were constructed, 1.6 pieces of large wood were anchored into the streambed, and two banks were armored with rock placements. Three side channel entrances and one debris jam was modified.

Physical stream monitoring was completed on over 10% of the BPA funded stream improvement structures. This data will be useful in improving structure function and planning future maintenance activities. Pool habitat quality and use was also recorded to help evaluate project effectiveness over time.

SUBPROJECT I - North Fork John Day Tributaries Fish Habitat Improvement

Subproject Ia. - Fivemile Creek System

INTRODUCTION

The Fivemile Creek project is located on the Umatilla National Forest in T.4 & T.5S, R.29 & R.30E, Umatilla County, Five Mile Creek is part of the Camas Creek drainage which is tributary to the North Fork John Day River.

Historically, Fivemile contained abundant habitat for the spawning and rearing summer steelhead. Within the last twenty years, a falls formed one mile from the mouth of Fivemile Creek which became a partial barrier to stealhead migration. ODFW recognized the need to improve upstream adult steelhead passage and in 1987 built several weirs which decreased the vertical jump and velocity barrier at the falls.

In 1986, a physical stream survey was conducted on Fivemile Creek and it's tributaries. The survey data indicated that the quantity of pool sufficient to provide adequate rearing was very low - approximately 11% of the surface area. There was very little woody material in the channel or riparian area. Bank erosion was a problem in areas of concentrated cattle use and past logging. Stream surface shading was poor due to the loss of riparian vegetation. There were several long stretches of subsurface flow in the upper reaches of Fivemile Creek as well as it's tributaries. Adequate spawning gravel was limited by a heavy silt concentration. There was widening of the stream channel due to the loss of wood and vegetation in the riparian area,

Habitat enhancement work began on Fivemile Creek in 1988 and continued through 1990. We concentrated our first efforts at providing adequate pool habitat for smolt survival in winter and summer. Log and rock weirs were built to provide pools and clean spawning gravel. Pools were constructed to increase diversity and hiding cover to the system by adding woody debris, rootwads, and boulders. Many of these pools intercepted cool subsurface flows which improved water quality during the summer low flow period.

Spawning of summer steelhead has increased over the last few years. Redds were observed in the tailout of several pools, We have also observed smolts of different age classes using the constructed pools.

Restoration of the riparian area will be necessary to provide adequate stream shading and streambank stability. It was necessary to change the cattle management plans for this area to accomplish this. The Range Conservationist and allotment permittee agreed that rangeland improvements were necessary to improve riparian habitat condition. An area plan will be completed in 1991 to adequately address riparian habitat objectives.

OBJECTIVES

1. Improve instream cover, diversity, and complexity by adding woody material.

2. Increase rearing and hiding habitat for summer stealhead by increasing the quality and quantity of pools.

3. Increase the quantity and quality of steelhead spawning habitat by constructing log and rock weirs which retain bedload gravels suitable for spawning.

4. Reduce bank erosion by installing bank deflectors, seeding disturbed areas, and placement of large wood capable of trapping sediments and protecting riparian vegetation.

PROJECT DESCRIPTION

Project activities began in the spring of 1990 with scoping and analysis of proposed work area. Restoration opportunities were identified and specific methods of correcting habitat deficiencies were finalized with ODFW. Plans were prepared, structure design and layout was completed, and pre-work conditions were documented.

All project work for this year was completed in September. The excavator built log and rock structures to provide pool habitat. Boulders, woody debris, and rootwads were added to pools to provide diverse habitat and hiding cover. Large wood was pulled into the riparian area to promote recovery of the riparian area by trapping sediment and protecting riparian vegetation.

ACHIEVEMENTS

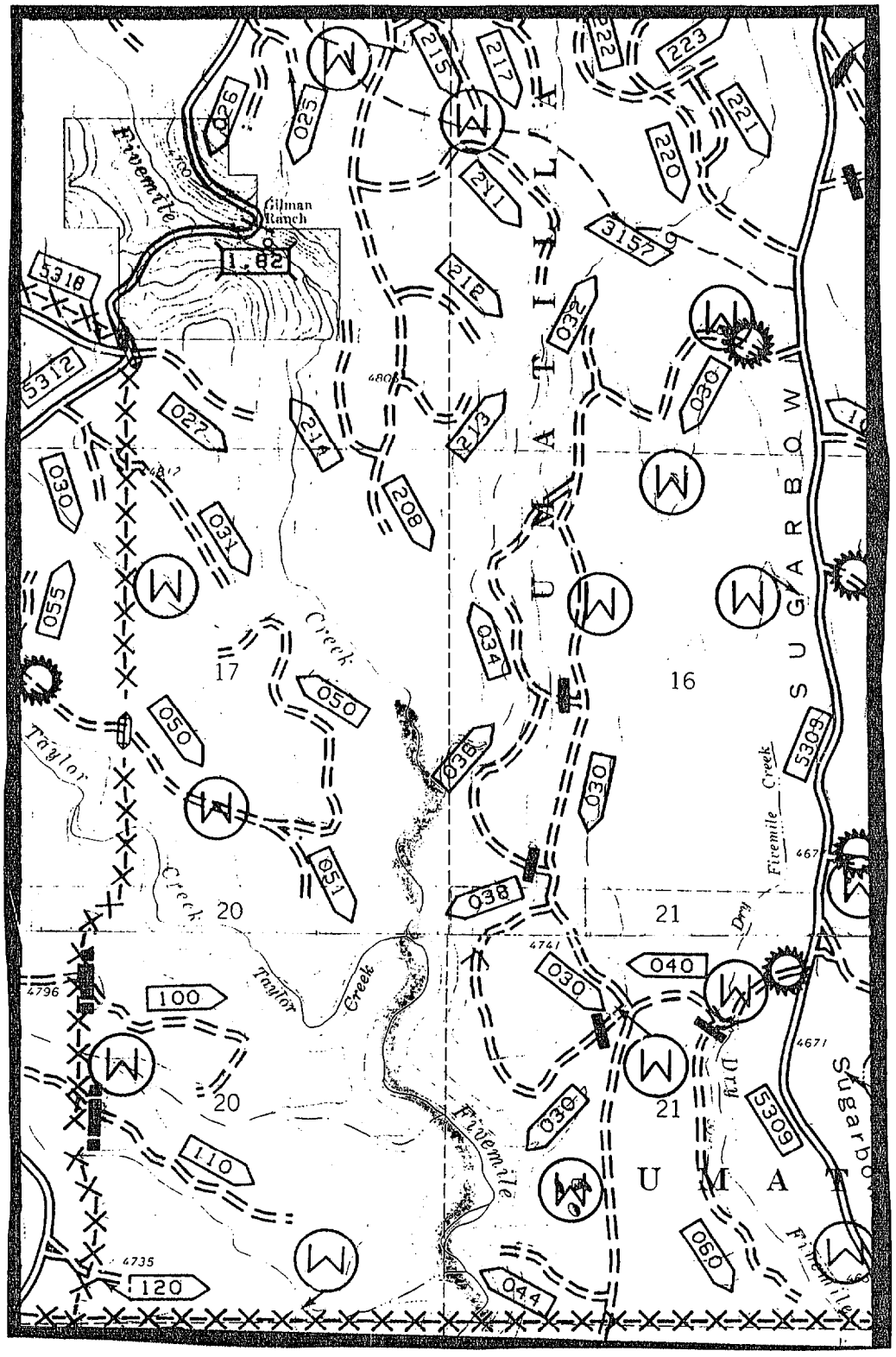
Stream enhancement work took place over 1.0 mile of Fivemile Creek. A total of 19 large pool-creating structures were constructed. Stream channel narrowing, small pool habitat and hiding cover for smolts will be provided by 15 deflectors and instream logs. Rootwads and boulders added to pools will provide diverse habitat for different age classes. Instream boulders were placed to create pocket pools and promote streambank recovery.

Table 1. Summary of the Fivemile Creek Project

Structure	1987	1988	1989	1990	Total
Rock Weirs W/ Pools	6	15	16	11	48
Log Weirs W/ Pools	0	5	16	8	29
Sills	1	0	0	0	1
Deflectors (Log & Rock)	4	6	32	9	51
Instream Logs	8	8	0	6	22
Root Wads	n/a	12	30	35	77
In Pool Boulders	n/a	70	40	78	188
In Stream Boulders	n/a	80	150	75	305
Adult Holding Pools	1	0	0	0	1

PIVEMILE CREEK 1990
Stream Enhancement Project
North Fork John Day Ranger District
Umatilla National Forest

T.SS., R.30E.,
Sect. 17 & 20



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GN MN
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19° 338 MILS

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Subproject Ib. - Camas Creek

INTRODUCTION

The Camas Creek project is located on the Umatilla National Forest in T. 5S, R.33E, Umatilla County, Camas Creek is a sixth order stream that flows into the North Fork John Day River 2.75 miles west of Dale, Oregon.

Camas Creek is approximately 38.5 miles long. It historically produced a large population of summer steelhead and a population of chinook salmon. Natives to the area talk of the large chinook salmon runs that once migrated upstream into Camas until the mid-1950's. The ODFW estimated that Camas Creek has the potential to increase the present summer steelhead population three to four fold. The remnant chinook salmon population also has good potential to rebound if habitat conditions improve,

Camas Creek runs through land managed by state, U.S. Forest Service, and private interests. On the U.S. Forest Service land, cattle have been excluded from the riparian area for approximately ten years. On the state land, a management plan has been developed by ODFW to protect the riparian area adjacent to Camas Creek. Recovery of riparian vegetation and improved channel morphology is evident in both of these areas. However, the riparian zone along most of the privately owned land is in poor condition. There is continual stream channel widening, streambank erosion, loss of riparian vegetation, and woody debris removal. This year (1991), ODFW will start restoration and enhancement efforts with private land owners along Camas Creek. They will concentrate on fencing cattle out of the riparian area and installing instream structures to promote channel narrowing, pool building, and restoration of riparian habitat.

A Hankin and Reeves stream survey was completed on 36.5 miles of Camas Creek in 1988. The physical survey revealed very low pool quantity and quality, woody debris absent, and very low stream surface shade. Suitable spawning gravel for chinook salmon was scarce. Much of the stream gravel was in dry areas or in very shallow water during the spawning run, Suitable rearing habitat for steelhead smolts appeared to be unavailable during summer months. The stream channel was confined to a narrow floodplain (less than 100 feet) for much of it's length due to placement of State Highway 244. Streambank stability was generally good on state and federal land, but there were areas on private land that had channel widening, mass wasting, and active bank erosion.

We have monitored the temperature of Camas Creek and it's tributaries for the last two years. Stream temperatures on Camas Creek exceeded 80°F during summer low flows, particularly where the channel was wide, no pools existed and shade was lacking.

OBJECTIVES

1. Increase juvenile steelhead and chinook salmon survival by creating quality pool habitat.

2. Improve pool quality and diversity by adding rootwads, boulders, and wood to each pool.

3. Provide hiding and thermal cover for adult chinook and steelhead smolts by increasing the amount of woody material in the stream.

4. Increase chinook salmon spawning gravel by creating structures that produce clean gravel at the tailouts of pools.

5. Improve streambank stability and revegetation by adding boulder placements and log deflectors.

PROJECT DESCRIPTION

We began scoping for this project in the fall of 1989. All project work was coordinated with ODFW and the State Highway Department and was finalized in the spring of 1990. Structures were staked on the ground and estimates of material necessary for each structure were tabulated. A rock source was located and rock dumps were marked on the ground. It was necessary to fall trees outside of the project area for construction of log weirs. In June all boulders and logs were hauled to the project area along Camas Creek.

The excavator started building structures in mid-August just downstream of the confluence of Rancheria Creek. Several structure sites were moved, changed, or eliminated in areas where bedrock was encountered. Structures were created to promote streamside revegetation, channel narrowing, pools, and bedload entrapment. All structures were secured using the Hilti cabling method. A riparian grass seed mixture was planted at each structure site. Much care was given to the asthetic impact of these structures because of the proximity of the project site to State Highway 244.

ACHIEVEMENTS

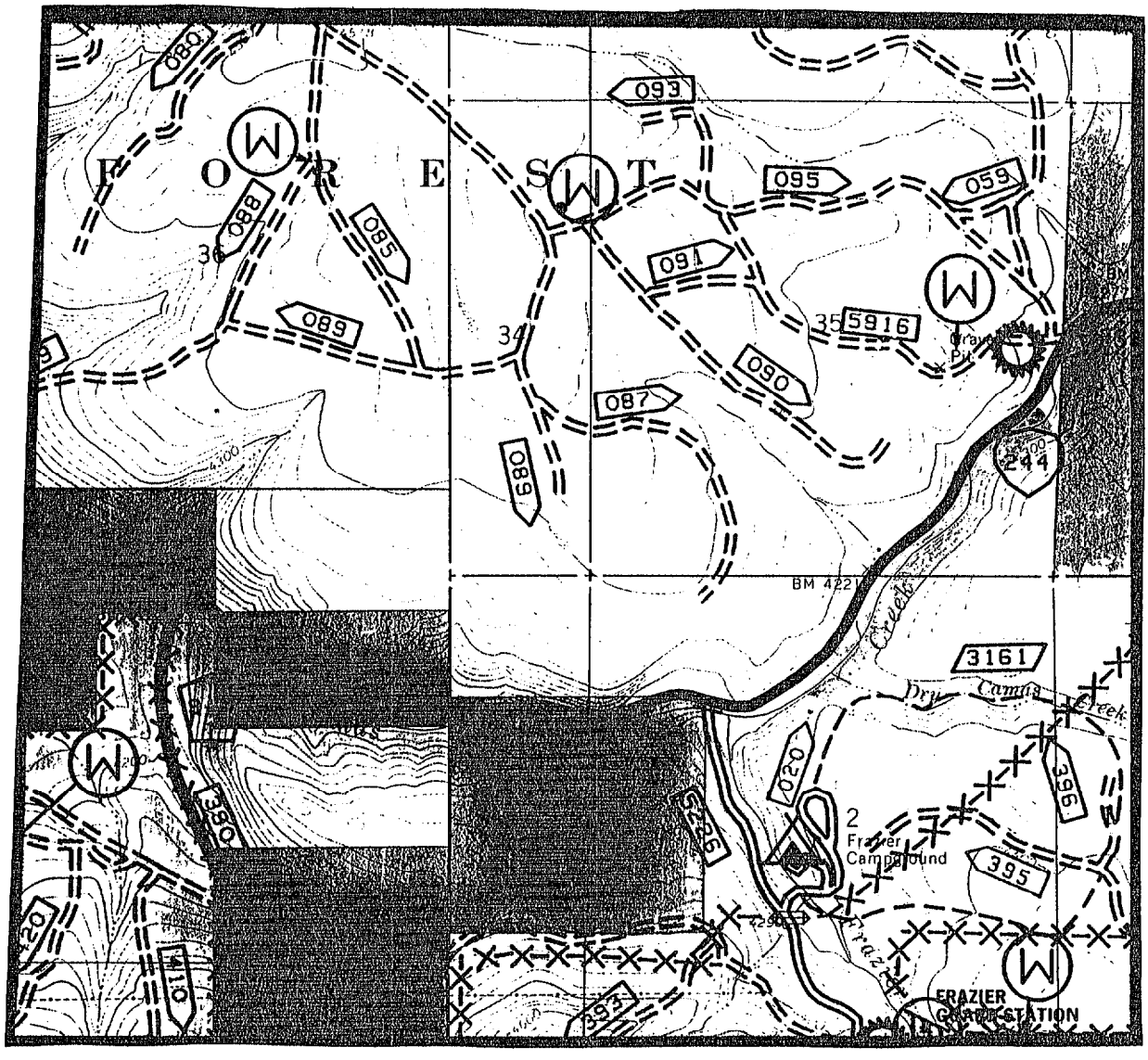
The Camas Creek enhancement project took place over a 1.5 mile section of stream. A total of 18 pool-creating weirs were constructed with rootwads and boulders added to each pool. Ninety boulders were placed in the stream to increase channel complexity and create pocket pool habitat, and improve streambank stability where erosion was occurring. Six log deflectors were used to reduce channel width and trap sediment during high flows.

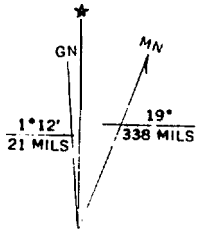
Table 2. Summary of the Camas Creek Project

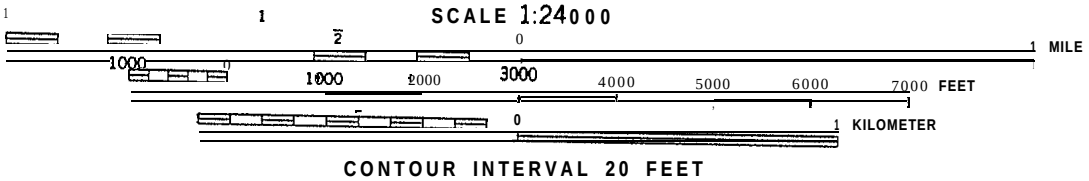
Structure	1990	Total
Rock Weirs W/ Pools	11	11
Log Weirs W/ Pools	6	6
Sills	1	1
Deflectors (Log & Rock)	6	6
Root Wads	39	39
In Pool Boulders	51	51
In Stream Boulders	90	90

CAMAS CREEK 1990
Stream Enhancement Project
North Fork John Day Ranger District
Umatilla National Forest

T.4S., T.5S.
R.33 1/2E.
Sect. 35 & 2



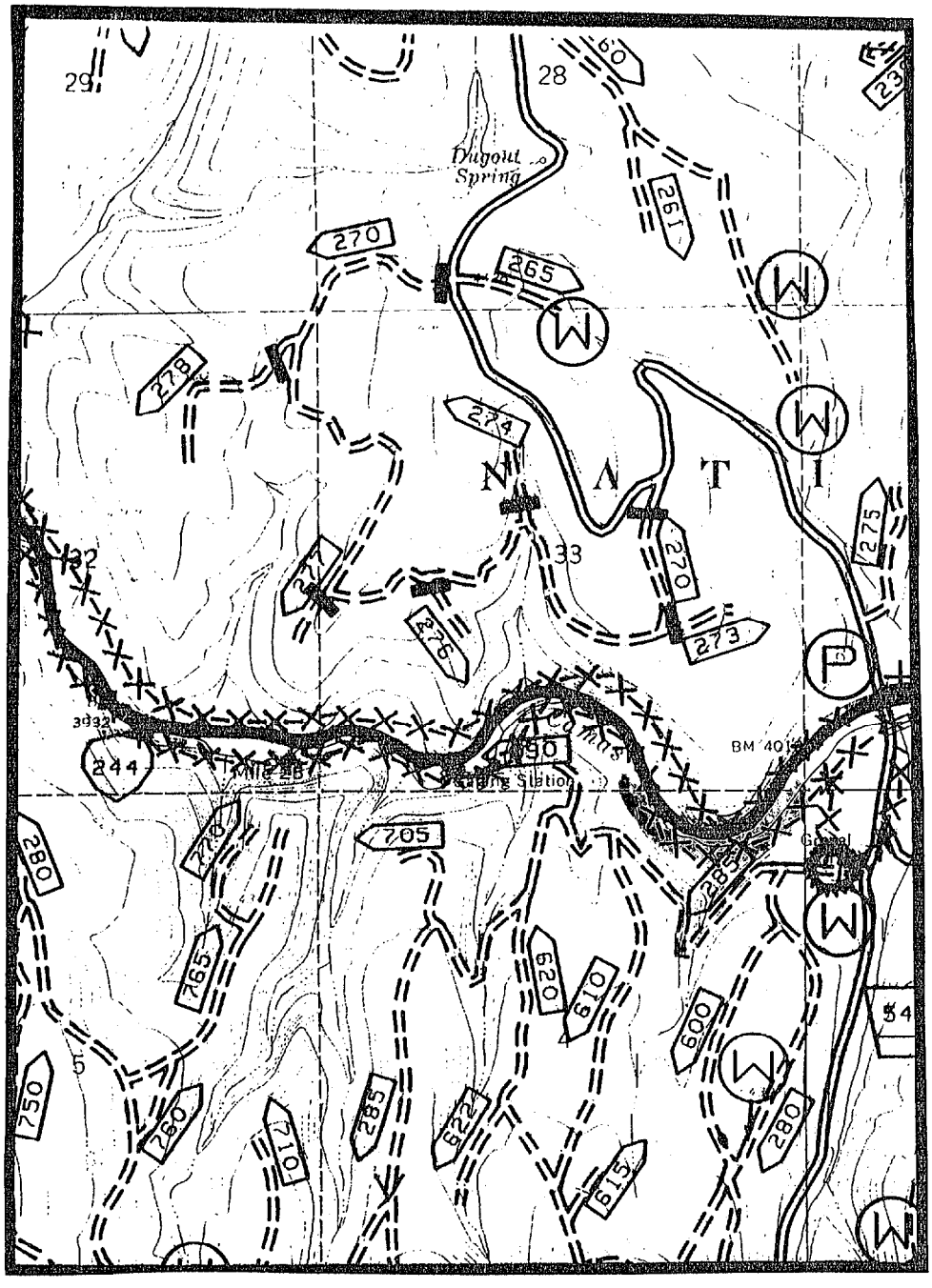




CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

CAMAS CREEK 1990
Stream Enhancement Project
North Fork John Day Ranger District
Umatilla National Forest

T.4S., T5S.
R.33E
Sect. 33 & 4



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1 KILOMETER

GN MN 19° 338 MILS
2° 1°12 21 MILS

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Subproject Ic. - Lane Creek

INTRODUCTION

The Lane Creek project is located on the Umatilla National Forest in T5S, R33E, Umatilla County. Lane Creek is a part of the Camas Creek drainage, which is a tributary to the North Fork John Day River,

Lane Creek provides spawning and rearing habitat for summer steelhead. A Hankin and Reeves stream survey was conducted on 8.9 miles of Lane Creek in 1988. Analysis of this survey data indicated low pool quality and quantity, which in turn limits available rearing and spawning habitat. Woody material was absent from the riparian areas and from the stream channel. Pools were shallow and contained little hiding cover. Stream shade and instream cover were very low in some areas.

Livestock grazing and distribution were addressed in a new allotment plan written in 1988. Fisheries objectives were introduced into the plan for the first time. New utilization standards were set to control the amount of grazing allowed in riparian areas. As a result, the allotment was split into two new allotment units. New division fences were constructed by the permittees which allowed better distribution and less concentration of livestock in several meadow and riparian areas. One division fence runs parallel to Lane Creek on the east bank in most areas, preventing one herd from using Lane Creek. The other division fence is parallel to Lane Creek on the west bank for the first two miles which creates a corridor of no use by cattle.

OBJECTIVES

1. Increase the pool frequency in treated reaches by the construction of pool-creating weirs.

2. Increase instream hiding and rearing cover by adding rootwads, boulders, and brush complexes to pools.

3. Increase streambank stability by placement of large wood and boulders to act as deflectors.

4. Increase the spawning gravel available by designing the structures to collect clean bedload gravels at the tailouts of pools.

PROJECT DESCRIPTION

Field reconnaissance and final scoping for the project was finished in the spring of 1990. Analysis of the project area was conducted by an interdisciplinary team, Structures to enhance and restore fisheries habitat in Lane Creek were planned and their locations were staked on the ground. Estimates were made of material needed to construct each structure. All boulders necessary to construct weirs were available in the immediate area. It was necessary to move one side of the new allotment fence to provide access for the excavator.

Construction of weirs began on July 16th just north of the Lane Creek Campground and continued upstream for 1.5 miles. Each construction site and the access road were cleaned up by the excavator.

Pools were designed and built to provide adequate hiding cover by placing several rootwads or brush complexes in each pool. Existing pools were enhanced by digging them out and adding boulders or woody material. Boulders and log deflectors were constructed to create channel changes and add diversity to the stream. Each structure was secured by the Hilti cabling method, and disturbed areas were seeded with a riparian seed mixture.

ACHIEVEMENTS

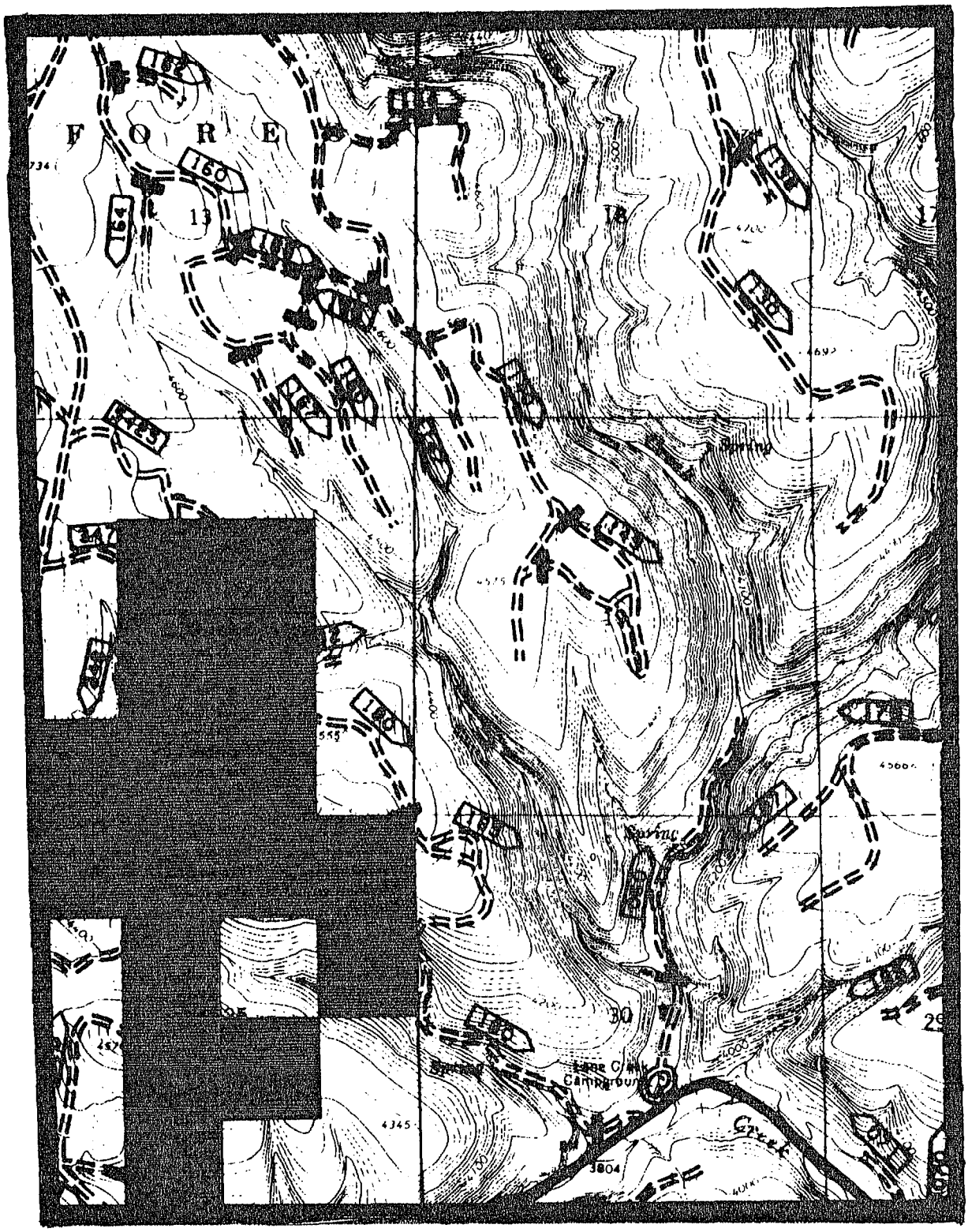
The stream enhancement work took place over a 1.5 mile section of Lane Creek. A total of 34 weirs were constructed to bring the percentage of pools closer to the optimum level. Forty quality pools were created with the addition of rootwads and boulders to existing pools as well as the newly constructed ones. Three deflectors and eight log placements were constructed to add diversity to the channel. Four sills were built to form channel-wide pools at high flow.

Table 3. Summary of the Lane Creek Project

Structure	1990	Total
Rock Weirs W/ Pools	21	21
Log Weirs W/ Pools	13	13
Sills	4	4
Deflectors (Log & Rock)	3	3
Instream Logs	8	8
Root Wads	69	69
In Pool Boulders	34	34
In Stream Boulders	10	10

LANE CREEK 1990
Stream Enhancement Project
North Fork John Day Ranger District
Umatilla National Forest

T.4S., R.33E.
sect. 19 & 30



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CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

GN
MN
1°12'
21 MILS
19°
338 MILS

Subproject Id. - Rancheria Creek

INTRODUCTION

The Rancheria Creek project is located on the Umatilla National Forest in T5S, R33E in Umatilla County. Rancheria Creek is part of the Camas Creek system, which is a tributary to the North Fork John Day River.

Rancheria Creek provides spawning and rearing habitat for summer steelhead. The area has been grazed by cattle and sheep for the past 100 years. The allotment has only sheep that graze the area at the present time. Vegetative and streambank recovery is evident over much of the riparian area. Better management of this area has been obtained by using a sheep herder to constantly keep the animals moving throughout the allotment. They are not allowed to concentrate in an area for any length of time. Riparian grasses, sedges, and stream channel narrowing is evident in many areas along Rancheria Creek.

A Hankin and Reeves stream survey was conducted on 2.8 miles of Rancheria Creek in 1988. Quality pools were very infrequent and woody material was present in only 30% of all units surveyed. Stream surface shade was limited and spawning gravel was mostly unavailable or covered with silt, The availablility of future wood to fall naturally into the stream system was minimal due to the removal (harvest) of diseased trees from the area in the past. Most shading occurred from streamside vegetation and undercut banks. Brush along the streambank had been browsed heavily in the past, but showed signs of recovery.

Field inspections and analysis of the area led to the selection of reach one just north of State Highway 244. This area, although in riparian recovery, would not see any natural pool-building activity for over 50-100 years due to the absence of trees near the stream. In addition, the area was deficient in spawning gravel. Properly designed structures could help to improve the amount of gravel retained in the system.

OBJECTIVES

1. Increase the pool frequency in treated reaches by construction of pool-creating weirs.

2. Increase instream hiding and rearing cover by adding rootwads, boulders, and brush complexes to pools.

3. Increase streambank stability by placement of large wood and boulders as deflectors.

4. Increase the spawning gravel available by construction of structures designed to trap bedload.

PROJECT DESCRIPTION

Final scoping and several field inspections were conducted in the spring of 1990. Plans were finalized and areas where habitat enhancement was needed were designated. Structure sites were staked on the ground, and the amount of material necessary for construction was estimated. Logs and boulders were not available on site. The Forest Geologist identified a rock pit adjacent to the stream as a good rock source, The pit was developed at the end of June and boulders were hauled to each construction site. Logs were cut about a half mile away from the project area and were also hauled to each weir site.

The project area started about 1.5 miles upstream from the mouth of Rancheria Creek and continued downstream for one mile. Construction of weirs began on August 13th and continued until all structures were completed on August 31st. The excavator had all material on site when construction began. Log and rock weirs with low wings were carefully designed and placed to promote overland flow during high water runoffs and allow sediments to deposit and begin rebuilding streambanks above the weirs. Woody debris and downed logs available in the area were pulled into the riparian area to promote sediment trapping and revegetation. The quality of the pools associated with the weirs was increased by the addition of root wads and brush available on site. Weirs were constructed to promote the deposit of spawning gravel at pool tailouts. Several areas of bank erosion and headcutting were stabilized by wood and boulder placements. Each construction site and access area was cleaned up by the excavator as it moved downstream.

The Hilti crew followed the machine downstream and used the Hilti cable method to secure structures. All disturbed areas and low vegetation areas were seeded with a riparian seed mixture. The road to this area has been permanently closed.

ACHIEVEiMENTS

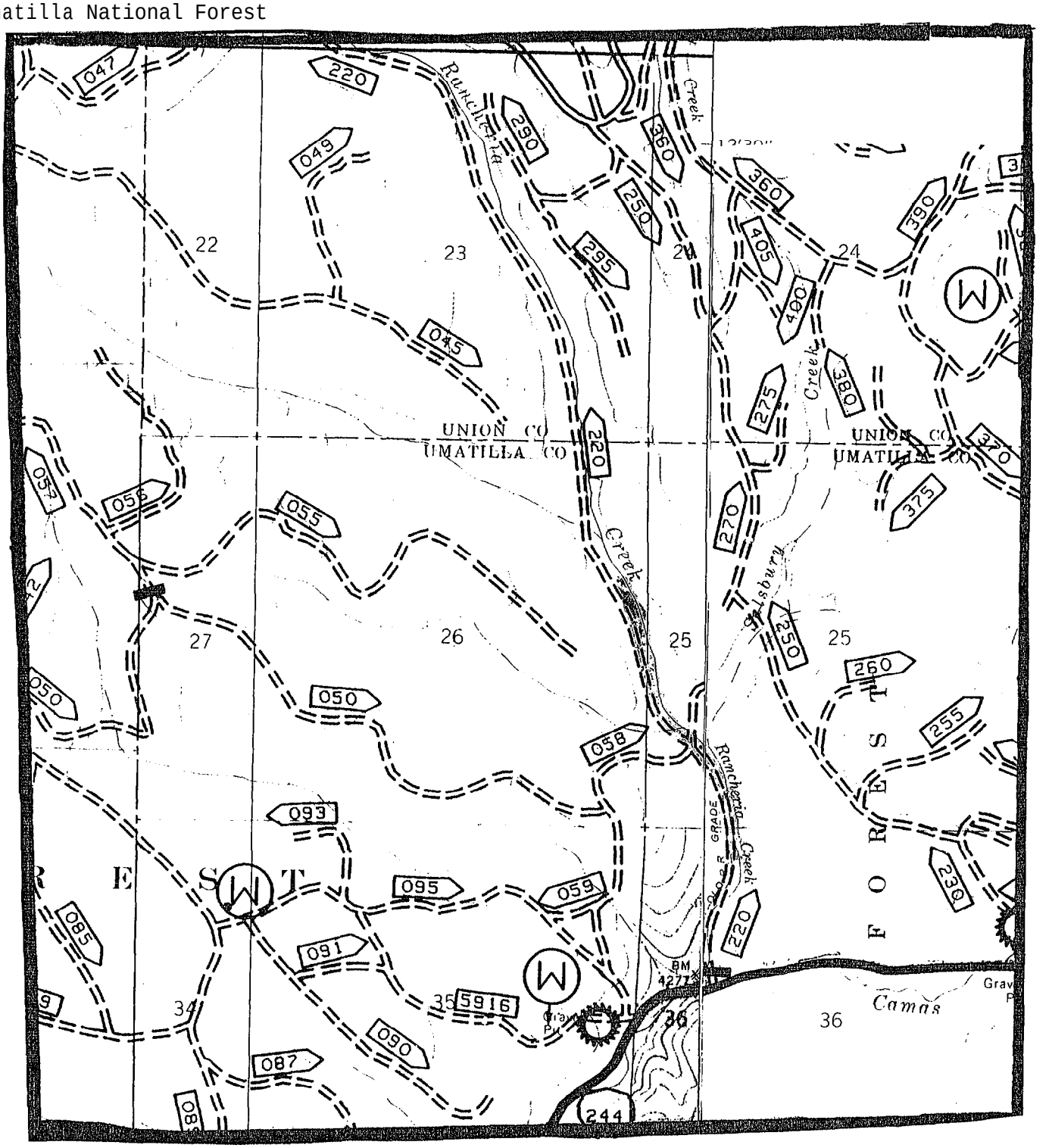
The stream enhancement work took place on a 1.0 mile section of Rancheria Creek. A total of 26 weirs were constructed to bring the percentage of pool habitat up to the optimum level. Twenty quality pools were created by the addition of rootwads and boulders. Ten log placements were added to increase diversity and complexity of the system. Banks were armored in 13 areas and 15 deflectors were created to stabilize the banks and prevent further erosion from occurring.

Table 4. Summary of the Rancheria Creek Project

Structures	1990	Total
Rock Weirs W/ Pools	12	12
Log Weirs W/ Pools	14	14
Sills	0	0
Deflectors (Log & Rock)	15	15
Instream Logs	10	10
Root Wads	26	26
In Pool Boulders	16	16
In Stream Boulders	30	30

RANCHERIA CREEK 1990
Stream Enhancement Project
North Fork John Day Ranger District
Umatilla National Forest

T.4S. R.33 1/2E
Sect. 25 & 26



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GN MN
1°12' 21 MILS
19° 338 MILS

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Subproject Ie. - Wilson Creek

INTRODUCTION

The Wilson Creek project is located on the Umatilla National Forest in T7S, R26E, in Grant County. Wilson Creek is a part of the Big Wall Creek system which is a tributary to the North Fork John Day River. The stream produces summer steelhead.

A stream survey was conducted on Wilson Creek in 1985. An analysis of reach data revealed that high water temperatures as well as both the quantity and quality of pool habitat were limiting production of juvenile summer steelhead. The creek averages 27% pool habitat. Average pool depth was less than one foot, which is too shallow to be effective rearing habitat. Ten years ago, this lack of good quality pool habitat was recognized as a factor which limited production, and 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 in 1985.

A Hankin and Reeves stream survey was done on Wilson Creek in 1990. The creek was broken up into two reaches for the purposes of the survey. The upper reach of the stream now contains 47% pool habitat, and the lower reach now has 35% pools with the addition of this year's work. An overall average of 41% pool habitat over the entire length of the stream that runs through Forest Service lands has now been reached. In addition, the amount of large wood in the streambed has been increased. The upper reach has 42 pieces of wood per mile, while the lower reach (where bringing large wood into the riparian area has been emphasized) has 135 pieces per mile.

The gabion structures and the recent enhancement work done in 1986 - 1989 have clearly demonstrated their value in improving steelhead rearing habitat. During the summer, these structures intercept cool subsurface 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. After several years of drought conditions, large portions of Wilson Creek dried up in 1990, with the exception of most of the pools constructed in the last four years. Without these pools, the mortality rates of juvenile steelhead would have been very high. Instead, juveniles of several age classes were observed in the pools throughout the summer.

In addition to a need to improve pool habitat, there were opportunities to increase the amount of spawning gravel by designing the structures to catch bedloads, to add more cover by placing rootwads and woody material in the stream, and to correct some unstable streambank conditions by using log and rock deflectors.

Some developing failures of earlier structures were detected, consisting mostly of rock movement during high flows. Repairs of these structures are scheduled to begin during the 1991 field season, There has been an increased emphasis on cabling this year's structures to avoid similar movement in the future.

The 1990 field season will conclude all anticipated new instream construction in Wilson Creek. However, maintenance of the structures will be an ongoing process to ensure their continued desired performance.

OBJECTIVES

1. Create juvenile steelhead rearing habitat by constructing pool-creating structures.

2. Expand the diversity and complexity of the stream by increasing the amount of woody material in the stream.

3. Stabilize streambanks by using deflectors to control bank erosion and allow vegetative recovery to begin.

4. Increase both the size and quality of anadromous fish spawning areas by installing structures designed to retain bedload gravels.

PROJECT DESCRIPTION

Project activities began in the spring of 1990 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, structure design and layout were completed, and pre-work conditions were documented. Rock source and rock dump sites were selected, and fueling sites and access roads were staked on the ground. The equipment rental contract was awarded in April and work started in Wilson Creek on July 17, 1990.

The excavator built structures from July 17th through July 25th. and then moved out of the creek to spend three days loading rock for the Wall Creek project. On July 30th. the excavator returned to building structures in Wilson Creek, and concluded the construction work on August 1. All of the rock needed for construction of the stream enhancement structures had been hauled into place during the 1989 field season. This allowed the excavator to spend most of its time on actual construction. Throughout the course of the contract, the excavator was also used to clean up work sites. Grass seed was spread over all access roads and areas where ground disturbance had taken place. Crews returned to Wilson Creek in October to finish cabling all new structures together, and to complete the photo documentation of the project.

The primary focus on the Wilson Creek project has been to increase the number and depth of pools. However, as the project progressed into the lower reaches of the stream, increasing amounts of bedrock were encountered, and many more exposed, raw streambanks were evident, This year's project changed focus a little to concentrate on stabilizing these raw banks with log and rock deflectors, while constructing weirs with pools where the breaks in bedrock allowed the opportunity to do so. Downed logs and woody material were pulled into the riparian area where possible to help stabilize the ground, provide streamside cover, and deter cattle from heavily trampling the stream banks. In two places, side channels were closed, and a debris jam was modified to allow the stream to flow back into the main channel. The weir structures were mainly K-weirs with two deflector wings. These structures have become the mainstay on Wilson Creek because of their ability to intercept cool subsurface water and concentrate flows in the dry summer months. They have been very successful over the years in maintaining high quality pools. To increase instream cover, rootwads were placed in all pools.

Another objective was to increase spawning habitat by retaining bedload gravels. The structures were designed and placed in the stream in locations that would catch bedload gravels during high flows and eventually provide added spawning habitat.

ACHIEVEMENTS

Stream enhancement work took place over a 0.5 mile section of Wilson Creek. A total of eight pool-creating weirs were constructed, which brings the percent of pool habitat to 41%, a more optimum level for the creek. These pools will provide hiding and thermal cover, and the addition of woody material will provide habitat diversity for steelhead juveniles. New spawning areas will be formed at the pool tail-outs as well as upstream of the weirs. Severely eroded streambanks have been reinforced with 17 log and rock deflectors, and vegetative recovery will begin to occur.

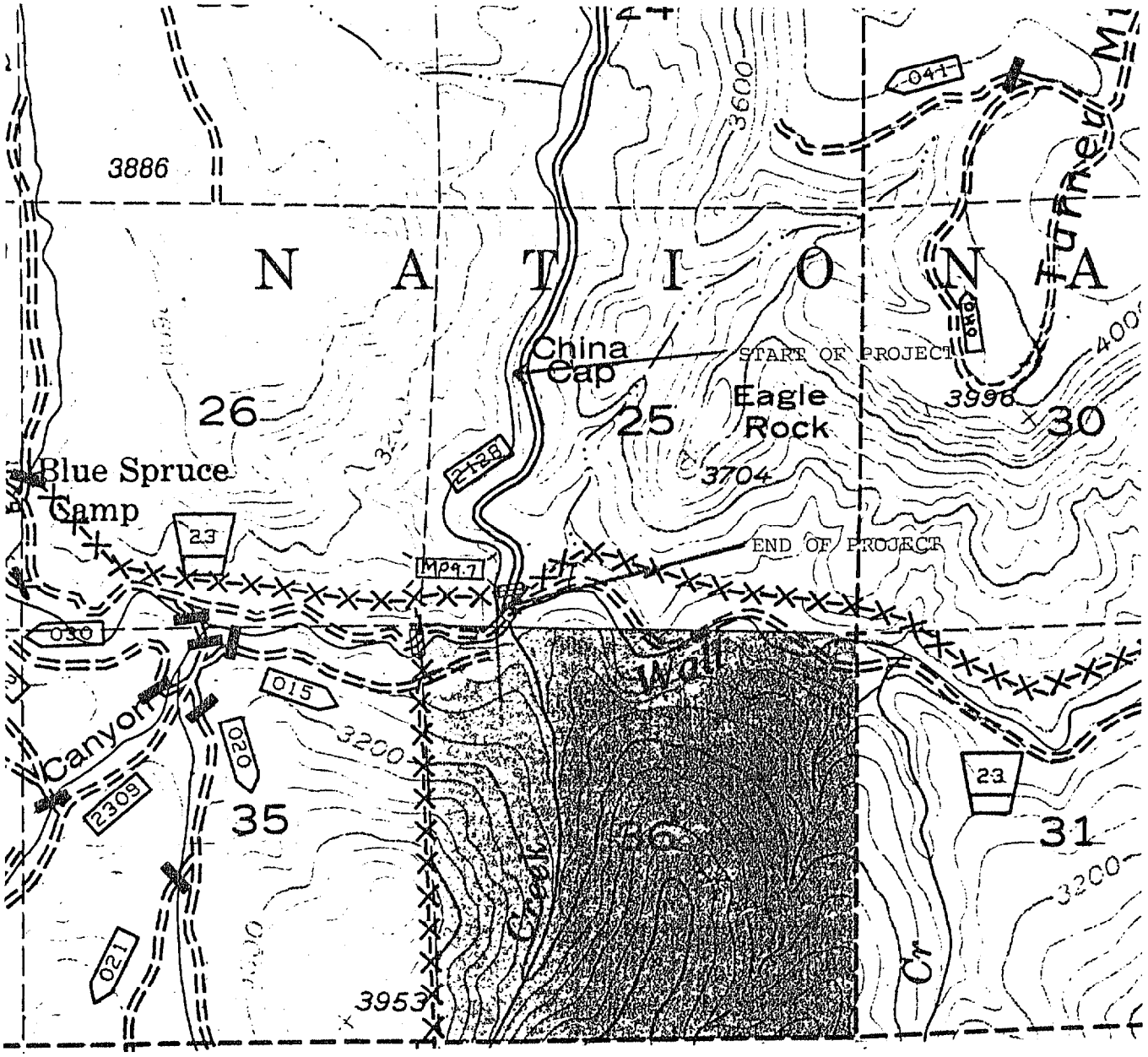
Table 5: Summary of the Wilson Creek Project ot Date

Structure	1986	1987	1988	1989	1990	Total
Rock Weirs w/ Pools	39	12	6	26	6	89
Log Weirs w/ Pools	9	13	16	27	2	67
Sills	63	0	0	3	0	66
Deflectors (log & rock)	24	339	251	40	19	673
Instream Logs	18	0	13	0	2	33
Root Wads	53	38	32	42	8	173
In Pool Boulders	12	13	8	0	0	33
In Stream Boulders	171.	13	8	2	0	194
Debris Jam Bypass	1	0	0	0	1	2
Side Channels Closed	15	0	1	2	2	20
Vegetative Plantings	1%	291	30	0	0	517

WILSON CREEK 1990
Stream Enhancement Project
Heppner Ranger District
Umatilla National Forest

N

T7S, R26E
S25



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Subproject If. - Big Wall Creek

INTRODUCTION

The Big Wall Creek project is located on the Umatilla National Forest in T7S, R26E in Grant County. Big Wall Creek is a tributary to the North Fork John Day River. The stream produces summer steelhead. Oregon Department of Fish and Wildlife officials believe that there may still be a remnant of a chinook salmon run in the stream.

In 1988, two test weirs (K-weirs with log wings) were constructed in Big Wall Creek, a short distance downstream from the mouth of Wilson Creek. A Hankin and Reeves physical stream survey was done in 1989, and identified deficiencies in both the quantity and quality of pool habitat on Big Wall Creek. High water temperatures and a lack of large wood in the stream were also noted to be limiting production of juvenile summer steelhead. Though the two weirs are only three years old, they have withstood high runoffs and do provide the best pool habitat on Big Wall Creek. Many adult steelhead have been observed in these pools on their way upstream to spawn. Spawning gravels are starting to collect at the tailouts of the pools, and large deposits of bedload are building up on the upstream sides of the wings. Willows are head-high and other riparian vegetation is beginning to appear on what was formerly a dry, rocky streambed.

The 1989 stream survey shows that the portion of Big Wall Creek running through Forest Service land has only 5% pool habitat. Water temperatures ranged from 54° F to 74' F. The survey recorded 312 pieces of large wood per mile. Several years of drought conditions have had an effect on Big Wall Creek. Entire stretches of the creek dried up in 1990. The need for instream structures which could intercept cool, subsurface flows and concentrate them into pools to provide rearing habitat for juvenile steelhead that lasts through the hot dry summers is obvious.

Analysis of the stream survey data, discussions with the ODFW and field inspections led to the selection of the project site. The instream construction began at the upper limits of where anadromous fish are known to exist, and progressed downstream from there. In addition to a need to improve pool habitat, there were opportunities to add more cover by placing rootwads and woody material in the stream, to correct some unstable streambank conditions by using rock and log deflectors, and to increase the amount of spawning gravel by designing the structures to catch bedloads.

Another phase of the 1990 project was to construct a fence along a portion of Big Wall Creek to exclude cattle from the riparian area. An allotment boundary fence is already in existence on the north side of the creek which runs from the Forest boundary upstream to just above the mouth of South Fork of Wall Creek. The new fence ties into this existing fence and runs up the south side of the stream until it hits the private land at the mouth of Wilson Creek. It is anticipated that another section of fence will be built as part of the 1991 project which will continue up Big Wall Creek and exclude the entire anadromous portion of the stream from livestock grazing, with the exception of the piece of private land in the middle. ODFW is working with the private land owners to finish this final section of fence.

OBJECTIVES

1. Create juvenile steelhead rearing habitat by constructing pool-creating structures to improve the previous level of 5% pool habitat.

2. Expand the diversity and complexity of the stream by increasing the amount of woody material in the stream.

3. Stabilize streambanks by using deflectors to control bank erosion and allow vegetative recovery to begin.

4. Increase both the size and quality of anadromous fish spawning areas by installing structures designed to retain bedload gravels.

5. Improve riparian vegetative condition by controlling livestock distribution in the riparian area by constructing a fence.

PROJECT DESCRIPTION

Project activities began in the spring of 1990 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, structure design and layout were completed, and pre-work conditions were documented. Rock source and rock dump sites were selected, and fueling sites and access roads were staked on the ground. The equipment rental contract was awarded in April and work started in Big Wall Creek on July 16, 1990.

The excavator spent 1.5 days digging test holes through the length of the project area. Several stretches of bedrock were evident, and the ability to dig a pool of acceptable depth was confirmed at each site before the rock was hauled in. Several proposed weir sites had to be dropped. The excavator then moved to do some construction on Wilson Creek. The three trucks became available on July 26th. and the excavator was used to load rock for the Big Wall Creek project. This project had very good road access, so the rock for each structure was dumped near each construction site.

Once the rock haul had finished, and the construction work on Wilson Creek was completed, the excavator moved back to Big Wall Creek on August 2nd. Weir construction commenced, and continued until all structures had been built on September 4th. Throughout the course of the contract, the excavator was also used to clean up work sites and close any access roads. Grass seed was spread over all access roads and areas where ground disturbance had taken place. Crews returned to Big Wall Creek during October and November to finish cabling all new structures together, and to complete photo documentation of the project.

The District Range Conservationist met with the permittees and agreed on a location for the fence during August. The fence location was flagged on the ground, and contract specifications were written. The contract was awarded in the late fall, but was then cancelled because adverse winter weather had stopped the possibility of construction. It will be reawarded in the spring of 1991, and it is anticipated that the fence construction will be completed by June 1991.

The primary objective on the Big Wall Creek project is to increase the number and depth of pools. However, of equal importance is the need to improve the overall condition of the entire riparian area. This year's project concentrated as much on stabilizing raw and eroding banks with rock and log deflectors as it did on building pool-forming weirs, A lot of bedrock was encountered while digging the test holes, and was either undiggable or the pools could not be dug very deep. The weirs were constructed where breaks in the bedrock allowed the opportunity to do so. They are mainly K-weirs with two deflector wings, which have proven their ability to intercept subsurface flows, maintain high quality pools, and provide thermal refuges for juvenile steelhead throughout the hot summer months. Measurements were taken in August, showing a vast temperature difference between riffles and pools. Readings taken in one of the newly constructed pools were 64° F, while the riffle just above the pool was 78° F.

Downed logs and woody material were pulled into the riparian area wherever possible to help stabilize the ground, deter livestock from trampling the streambanks, and to provide streamside cover. Rootwads were placed in most of the pools to increase instream hiding cover. Three old side channels were blocked, and one debris jam was removed.

Another objective was to increase spawning habitat by retaining bedload gravels. The structures were designed and placed in the stream in locations that would catch bedload gravels during high flows and eventually provide added spawning habitat.

ACHIEVEMENTS

Stream enhancement work took place over a 2.1 mile section of Big Wall Creek. A total of 39 pool-creating weirs were constructed, which will begin to increase the percentage of pool habitat toward a more optimum level for this creek. These pools will provide thermal and hiding cover, and the addition of woody material in the pools and in the streambed will provide habitat diversity for juvenile steelhead. New spawning areas will be formed at the pool tail-outs as well as upstream of the weirs. Eroded streambanks have been reinforced with 18 rock or log deflectors, three side channels have been closed to low flow conditions, and 16 pieces of large wood have been anchored within the riparian area. These improvements, in addition to the construction of the fence next spring and changes in grazing strategies, will allow vegetative recovery to begin.

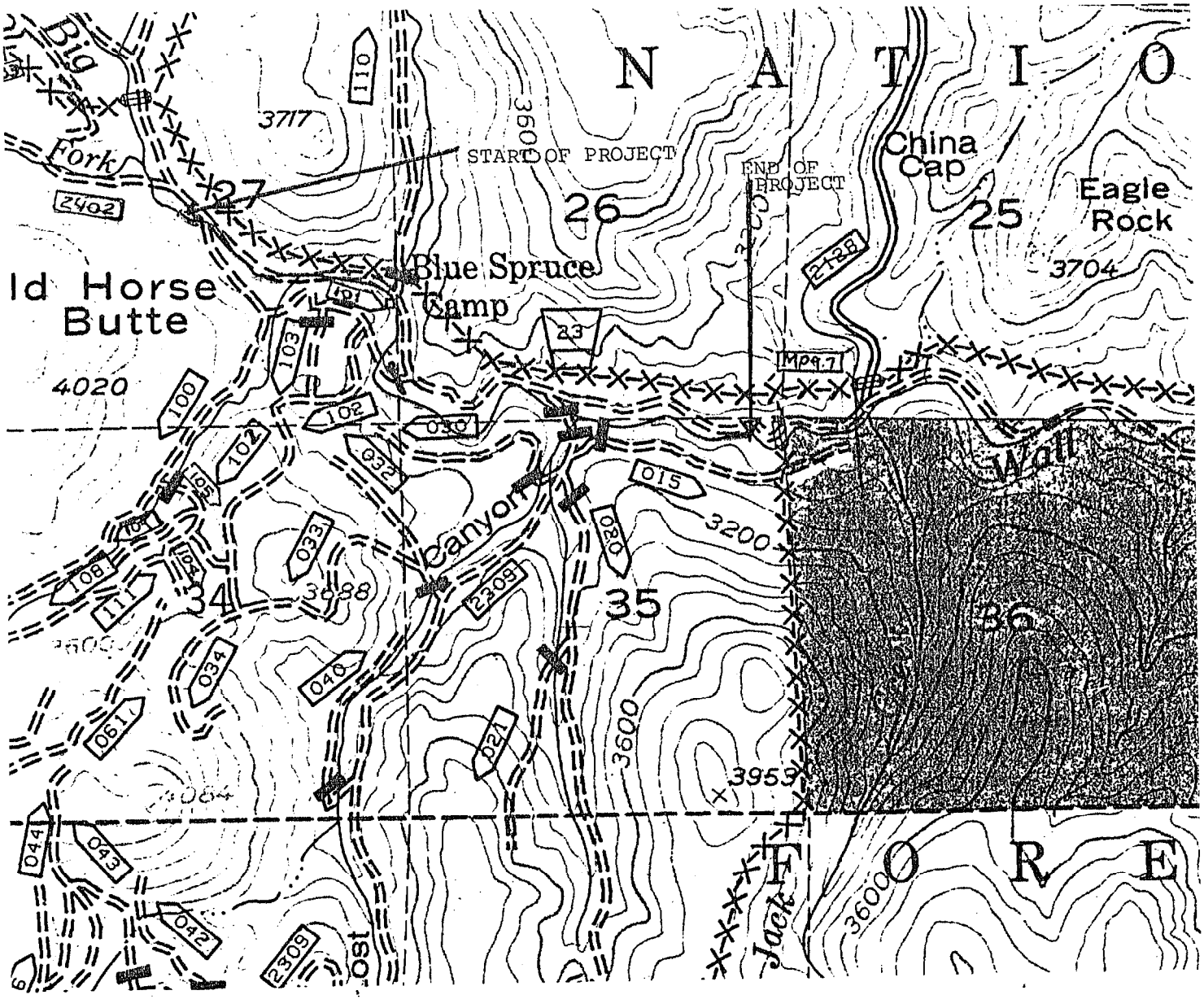
Table 6: Summary of the Big Wall Creek Project to Date

Structure	1988	1990	Total
Rock Weirs w/ Pools	0	19	19
Log Weirs w/ Pools	2	20	22
Sills	0	3	3
Deflectors (log & rock)	0	18	18
Instream Logs	0	16	16
Root Wads	0	37	37
Debris Jam Bypass	0	1	1
Side Channels Closed	0	3	3

BIG WALL CREEK 1990
Stream Enhancement Project
Heppner Ranger District
Umatilla National Forest

N

T7S, R26E
S25,26,27



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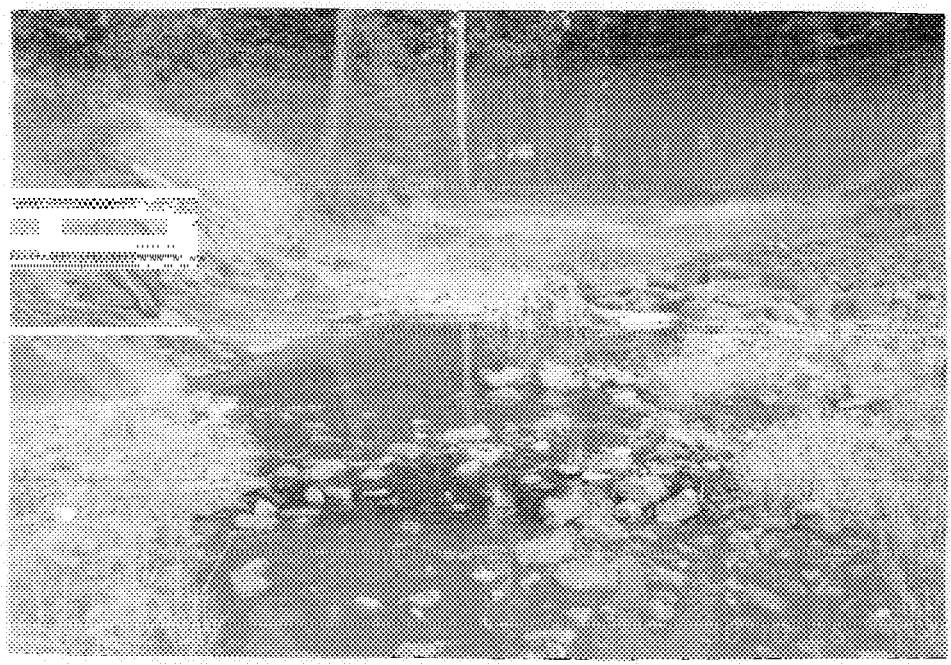
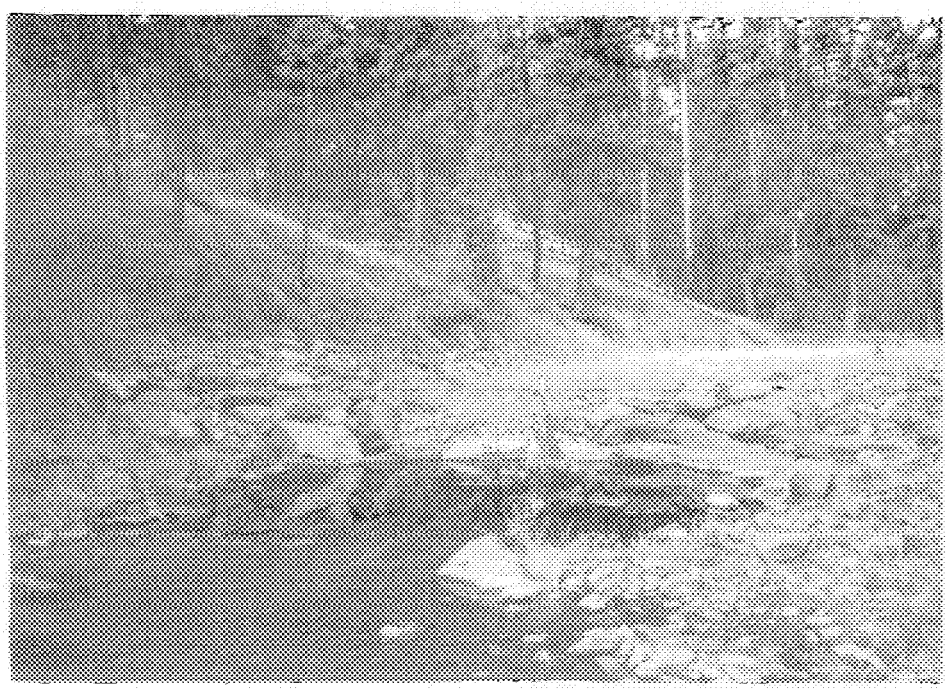
Pool enhancement of existing glide by adding a rock deflector and roo twad

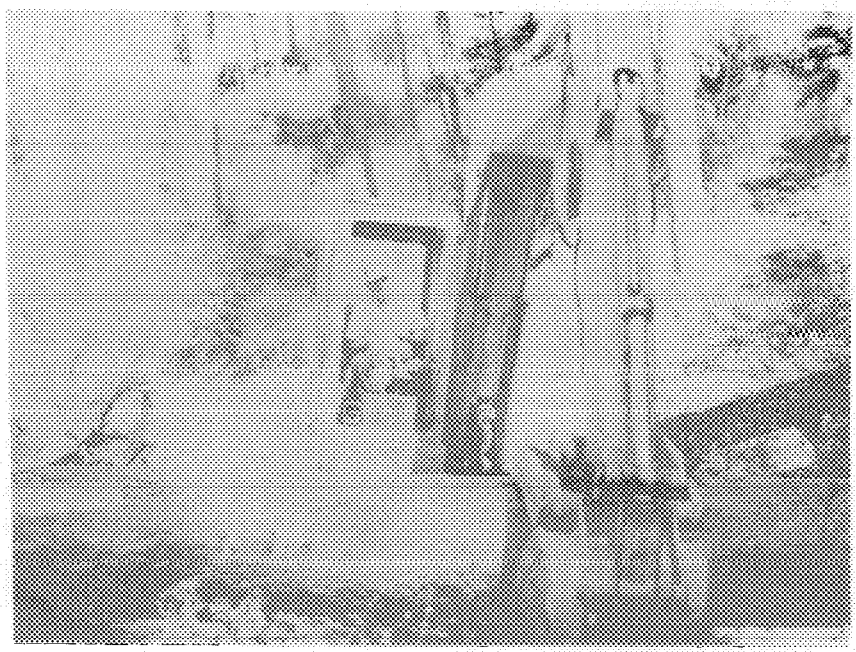




Rock weir constructed on Fivemile Creek. Boulder wings will excavate pool during high flow.

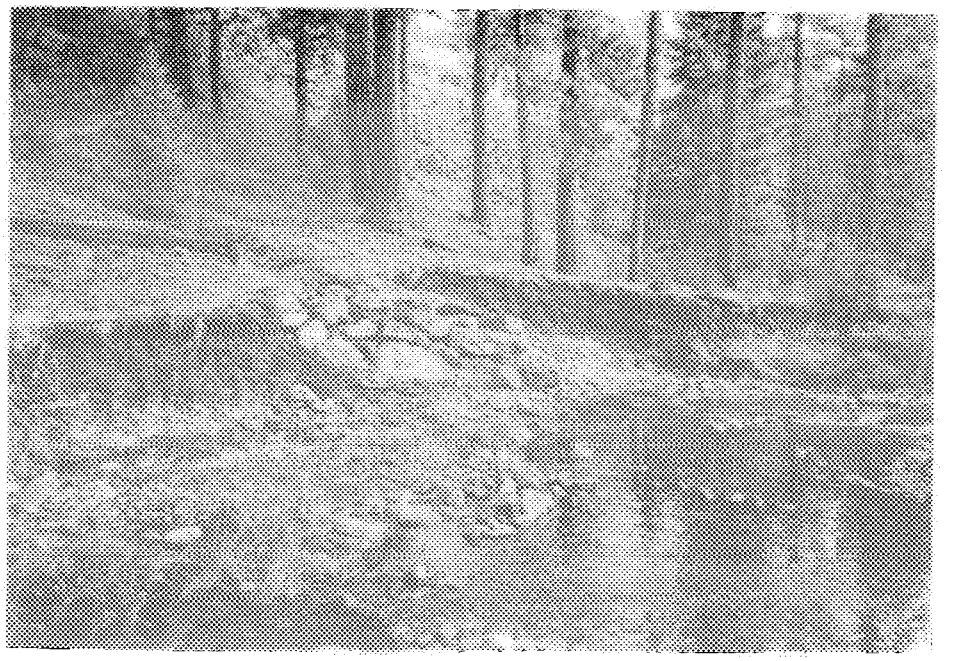
Log weir with excavated pool below. Rootwad and boulders added to pool.

Log weir from the 1989 Fivemile Creek project, showing riparim recovery,



Excavator moving log into place for log weir on Camas Creek. Desolation Creek.

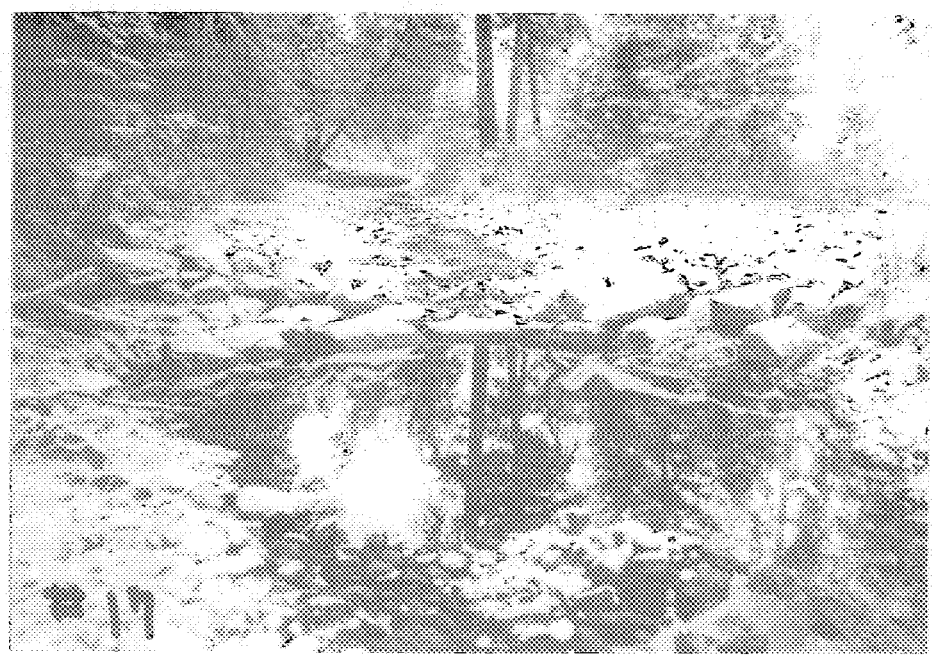
Excavator? moving boulders from rock pit. Boulders were used to build weir on Rancheria Creek.



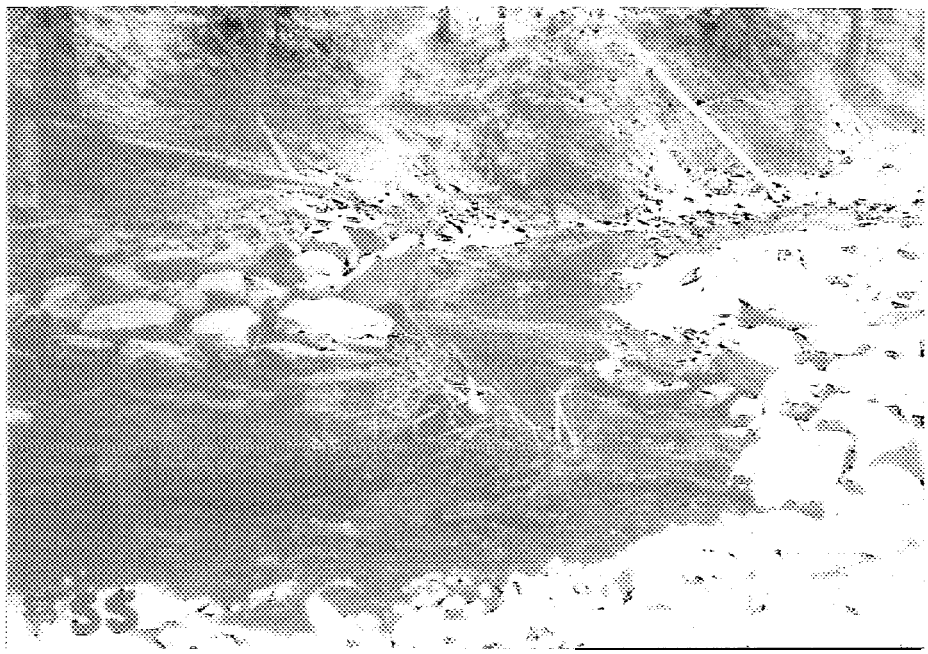
Rock deflector constructed on Wilson Creek. The rocks will deflect high flows away from the severely eroded bank,

Log deflector on Wilson Creek. Logs were placed to protect a raw bank. Boulders will prevent water from cutting around behind the logs.

Pre-construction view of a riffle on Big Wall Creek.



The same site following construction of a rock weir and pool. Rock wings have been cabled into place to channel water flows into the pool, and a rootwad has been added to provide instream cover.



Log weir constructed on Big Wall Creek. Note the rock wings that have been cabled together and the rootwas providing cover to juvenile steelhead.

Test weir built in 1988 on Big Wall Creek. bedload gravels have been deposited above the weir, and riparian vegetation is beginning to recover, Note the willows which are now over head-high.

Subproject II. - Physical Structure Monitoring

INTRODUCTION

Physical monitoring of BPA funded project work began in 1989 and continued through 1990. A two person monitoring team went to each project site on both Districts and collected information on a representative sample of the work completed.

This year's monitoring indicated that structures were, for the most part, unchanged from last year. This may have been due to a lower than average spring runoff and the use of cable to secure the structures. Drought conditions adversely affected all streams. Low flows, high stream temperatures, abundant algal growth, and dry or subterranean stretches were observed in many creeks earlier this year than in previous years. Structures in need of maintenance were identified. Results indicate that structures which had been cabled were secure. Structures built before the Hilti cable method was used had changed function somewhat over time.

OBJECTIVES

1. Identify physical changes occurring to structures over time so that design changes can be implemented to improve the strength and effectiveness of future structures.

2. Monitor structure effectiveness for fish by evaluating pool habitat.

3. Survey a representative number of structures at each project site to give collective information of the total project.

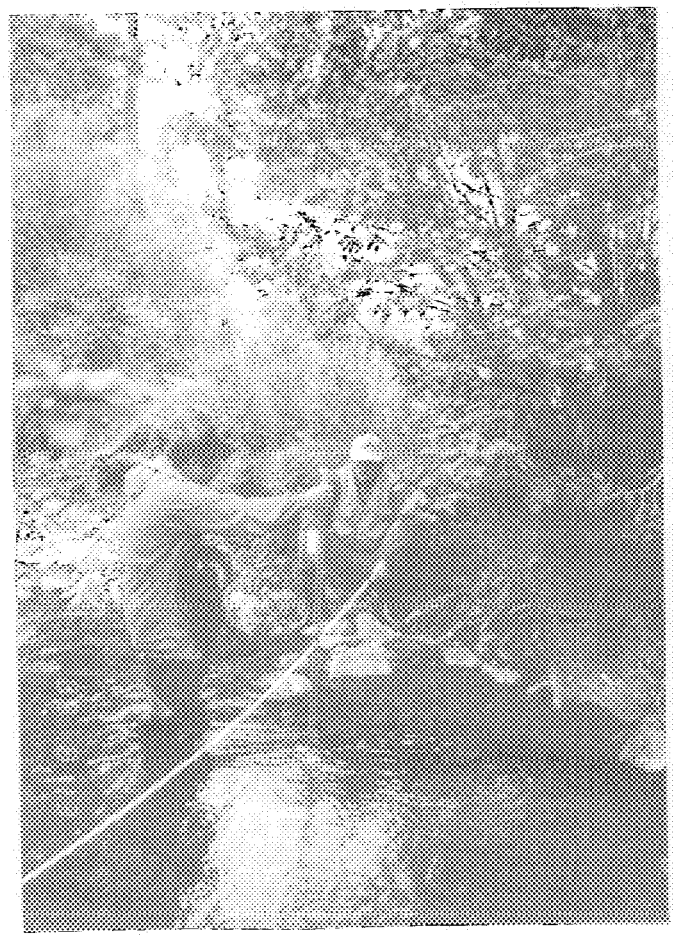
PROJECT DESCRIPTION

Measurements taken at each structure monitored included: 1.) length, width and maximum depth of pool tail crest; 2.) air and water temperature: 3.) and stream flow. Two photographs were taken of each structure. A new sketch was drawn in those cases where the structure had changed naturally or had been modified during project maintenance operations.

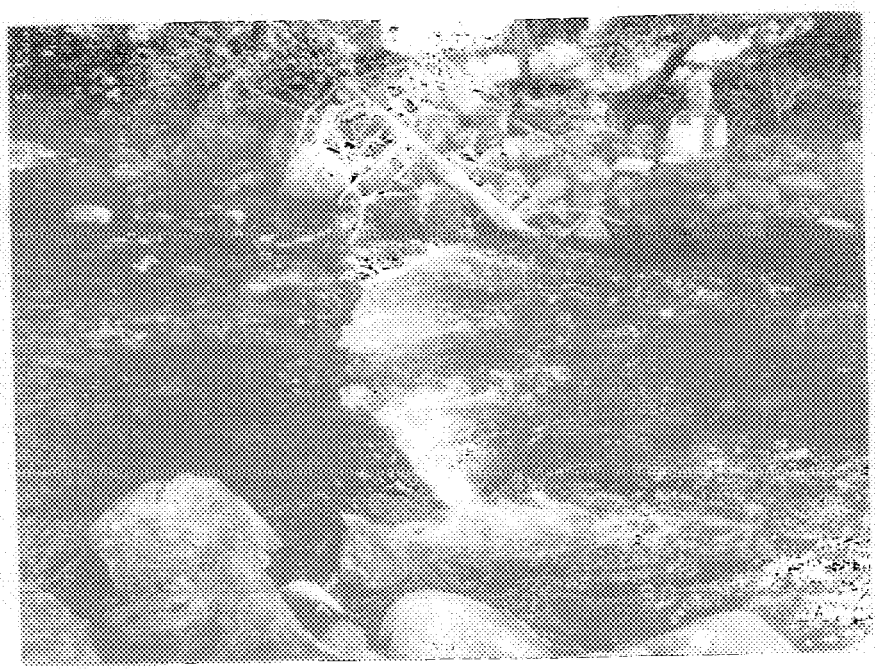
Pool substrate and composition were recorded as indicators of pool quality. The condition of cover inside the pool was recorded. Riparian habitat condition, percent of stream area shaded, and bank stability were also recorded. In addition, water temperature and discharge were recorded for each stream surveyed.

ACHIEVEMENTS

The team monitored structures in seven creeks on the North Fork John Day and Heppner Ranger Districts in 1990. They were North Fork John Day River, Fivemile Creek, Desolation Creek, Little Wall Creek, Wilson Creek, Bear Wallow Creek, Hidaway Creek and Clear Creek. Ninety-five of the 883 structures, which have been completed over the last several years, have been monitored. The effectiveness of each of these structures is now known and changes can be made to create more effective structures. Maintenance needs have also been identified through this monitoring procedure.



Monitoring team measuring channel width and stream flow on North Hidaway Creek



Monitoring person recording data at rock weir structure

Subproject III - Maintenance

INTRODUCTION

Physical monitoring of structures identified the need for maintenance of some of the instream structures. The use of the Hilti cabling method in recent years to secure structures has reduced the number of these structures requiring maintenance to less than 1%. Most of the maintenance will primarily take place on structures built during the early years of this project when cabling was not done.

Maintenance typically consists of fine tuning the structure's design to better achieve desired results. In many cases, pools were deepened and rootwads or brush complexes were added to improve the quality of juvenile rearing habitat. Partial reconstruction was also done on some structures damaged by high flows. Boulders comprising these structures were then cabled together.

OBJECTIVES

1. Maintain the desired function of all instream structures by redesigning and reconstructing structures that did not function as planned.

2. Maintain the integrity of strong functioning fish habitat structures by securing the weirs with the Hilti cable method.

PROJECT DESCRIPTION

Project scoping and final plans for project maintenance were completed in spring of 1990. The amount of material needed was estimated for each structure and the locations for the work were flagged on the ground.

Maintenance began on Desolation Creek weirs that were constructed in 1987. The spider (excavator) reworked rock weirs. Pools were created below each weir. Rootwads, brush, and boulders were added to each pool for hiding cover.

At Clear Creek, the excavator reworked several log weirs to change the function of each structure. Boulder wings were constructed at log weirs to constrict water flows and consequently maintain deeper pools. Woody material and brush were added to pools for additional hiding cover.

ACHIEVEMENTS

Maintenance was completed on a total of 38 rock weirs in Desolation Creek. Each weir was reworked to improve structure function. Pools were excavated below each weir and additional woody material was added to each pool. Six weirs were reworked on Clear Creek to help in the deposition of bedloads, which will in turn aid in riparian recovery. Wings were added to each structure to promote pool creation during high flow. Additional woody material was added to each pool.

FIELD REVIEW

In September 1990, Forest Service personnel involved in several John Day River Basin habitat enhancement projects took part in a field review of the projects. This review was organized by the Bonneville Power Administration and included biologists from ODFW, The Nature Conservancy, the Umatilla Confederated Tribes, and private consultants. Current habitat enhancement projects were looked at, as well as future projects.

PROJECT COSTS

Table 1. Project Costs, April 1, 1990 to March 30, 1991

Bonneville Power Administration Funds:		
a.	Salaries	$ 66,019
b.	Transportation and travel	$ 7,471
c.	Materials and supplies	
	Expendable	$ 43,488
	Nonexpendable	-0-
d.	Equipment rental contracts	$110,565
e.	Overhead @ 10.7%	$ 24,839
	Total	$252,382

REFERENCES

Hankin, D.D. Sampling designs for estimating the total number of fish in small streams. Res. Pap. PNW-360. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 1986. 33PP.