

OPERATIONS OF THE BONIFER SPRINGS JUVENILE
RELEASE/ADULT COLLECTION FACILITY

Annual Report 1984-1985

by

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of the
Umatilla Indian Reservation

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INTRODUCTION

The Umatilla River system historically supported large populations of anadromous fish which included steelhead trout, and fall and spring runs of chinook salmon. Since time immemorial, the runs provided the people of the Walla Walla, Cayuse and Umatilla Indian Tribes with a substantial fishery, integral to the social, cultural, and religious fabric of their lives. During the past few decades however, forestry, agriculture, irrigation, and hydropower development, as well as myriad other impacts have combined to severely deplete anadromous fish returns to the Umatilla Basin.

Only a small run (approximately 1000 fish) of summer steelhead has survived the gamut of adverse conditions posed by the hydroelectric dams, irrigation structures, and dwindling instream flows. Both the fall and spring runs of chinook salmon were destroyed. As a consequence of the diminished steelhead run and the extinction of the salmon runs, much natural spawning and rearing habitat within the Umatilla Basin is under-utilized. Increased habitat utilization and establishment of hatchery produced runs would benefit all fishery user groups of the affected area.

The Umatilla River and its tributaries originate in the Blue Mountains of Eastern Oregon. The drainage system is largely contained within the boundaries of the Umatilla National Forest and the lands of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). Recently, cooperative efforts of the Oregon Department of Fish and Wildlife (ODFW), the CTUIR, and the Bonneville Power Administration (BPA) have sought to restore anadromous fish production in the Umatilla Basin. These efforts involve adult and juvenile passage improvements in the lower Umatilla River, habitat enhancement in tributaries and construction of two juvenile release/adult collection facilities on the Umatilla Indian Reservation. Acceleration of steelhead and chinook salmon smolt production through the use of off-site hatcheries coupled with the acclimation of smolts in facilities located within the basin would hasten development of hatchery produced runs and help reseed the existing habitat, allowing benefits from other enhancement projects to be realized sooner than they otherwise would be. Among the initial steps toward rebuilding anadromous fish resources of the Umatilla River Basin was the construction of the Bonifer Springs Steelhead Acclimation Facility. The facility was funded by the BPA and was the first facility of its kind to be completed under the Northwest Power Planning Council's Fish and Wildlife Program.

Project Objectives

- 1) Enhancement of the natural spawning summer steelhead run in the Umatilla River Drainage.
- 2) Establishment of a hatchery produced summer Steelhead run in the Umatilla River.
- 3) Protect the Confederated Tribes right to fish as reserved by the Treaty of 1855 with the U.S. Government.
- 4) Enhance Indian and non-Indian fishing opportunities within the Umatilla River System.
- 5) Demonstration of low-tech, low-cost acclimation facilities in conjunction with off-site hatchery production for reestablishment of anadromous salmonid populations.
- 6) Partial mitigation for the impact of federal hydroelectric projects on the Umatilla River fisheries.

METHODS FIND MATERIALS

Pre-Project

Umatilla Reservation lands were studied by the U.S. Fish and Wildlife Service in 1980 to identify areas suitable for location of facilities for acclimation of juvenile anadromous fish and for trapping and holding adult fish until ready for spawning. One of the most critical needs for such a project is a dependable water supply of adequate quality and quantity. Two water sources, Bonifer Springs and Minthorn Springs, were discovered which met all of the necessary criteria for development. The Bonifer Springs location was developed first in the fall of 1953. The Minthorn Springs facility was constructed in late 1985. Only Bonifer Facility operations will be discussed in this report.

Project Location

Bonifer pond is located near the mouth of Boston Canyon Creek, a tributary to Meacham Creek at river mile 2.0 (Appendix A). Meacham Creek enters the Umatilla River at river mile 78.8. The one-acre pond is fed by three separate springs; one is approximately 1/8 mile in length and the other two springs flow about 1/2 mile before entering Bonifer Pond. The pond depth averages four feet and temperatures range from 40 degrees F in the winter to 60 degrees F in later summer. Flows at the outlet of Bonifer Pond range from 1.5 to 3.0 cubic feet per second.

Project Description

The Bonifer Springs project proceeded in three main phases:

- (1) Engineering design and selection of the contractor;
- (2) Construction; and
- (3) Initiation of facility operation and maintenance.

Final designs were completed in 1982. BPA officially authorized the construction of the project on January 7, 1983. The project was completed in October of 1983.

From the start, the project was a cooperative effort between CTUIR and ODFW. The funding proposal was cooperatively developed and submitted to BPA in 1982. ODFW provided input and reviewed the facility designs which were developed under tribal contract. All construction was performed under tribal contract. Facility operation is carried out by the Tribe with cooperation from ODFW. It is anticipated that the Minthorn Springs Facility will be operated in the same manner and the proposed Umatilla Hatchery (mother hatchery for the two satellite facilities) will be operated by ODFW with some assistance from the tribe.

Prior to construction, Bonifer Pond existed with a culvert outlet into Boston Canyon Creek. The major construction activities included:

- 1 - Drain Bonifer Pond through a separate ditch.
- 2 - Remove culvert and replace with concrete fishway.
- 3 - Deepen pond to retain a larger volume of water.
- 4 - Add stoplogs to refill pond and create a stair-step ladder through fishway.
- 5 - Build electric fence around pond and feeder springs to protect water source from livestock which graze throughout the area.

The concrete fishway at the pond outlet is 60 feet long, 4 feet wide, and 6 feet deep. The lower half of the fishway is inclined and contains four slots for stoplogs so fish can reach the v-shaped conduit trap near the center of the fishway. The upper half has no laddering and is used for holding of adult fish. A conduit grate is placed at the upper end of the fishway to keep adults from entering the pond and security screens are locked in place above the holding area.

A 3-foot culvert was installed underground parallel with the fishway for release of juvenile fish from Bonifer Pond. Small mesh screens are placed at the inlet of the fishway for holding juveniles during acclimation. The pond can be drained by removal of stoplogs at the fishway or culvert inlets.

In accordance with the objectives, the project plans adapted the existing natural features of the site to create a low-cost facility in terms of both construction and operation. The operation and maintenance were deliberately aimed to employ low-tech procedures. In addition, all project features were designed to be as unobtrusive as possible.

Project Operational Plans

knifer Facility operational plans for 1984 and 1985 (appendix H) were written before each year operations. Actual project operations were carried out as anticipated both years. Abstracts were prepared for 1984 and 1985 (Appendix D and E) operations as a part of the annual BPA project presentations.

RESULTS AND DISCUSSION

Adult Broodstock Collection

The operational phase actually began in March of 1983, seven months prior to the completion of construction. In anticipation of the completion of the Bonifer Springs Facility, biologists from the ODFW and CTUIR trapped returning adult Steelhead at Three Mile Dam on the lower mainstem of the Umatilla River. The fish were transported to a holding tank at McNary Dam where they remained until spawning.

The CTUIR and ODFW concurred that only native Umatilla Summer Steelhead would be used to enhance the depressed Umatilla run. It was felt that taking 100 fish for broodstock at the Threemile Dam trap would not significantly effect the present run size ^{13 P} near 1000. Also, non-Indian and Indian Steelhead sport fishing has never been closed in the Umatilla River.

Adult Steelhead were trapped in the top step of the west-side ladder at Threemile Dam. To remove fish, the water level was reduced through the ladder and fish were dip-netted out and placed into a 50 gallon tanker trailer for transport. This trapping arrangement has worked for broodstock collection but the concentration of fish in the nearly dewatered ladder cause additional stress. New adult trapping and holding facilities are a part of the Threemile Dam modification project scheduled to begin in 1987.

A total of 161 steelhead adults were captured at Threemile Dam in March and April of 1983 (Table 1). Prespawning mortality during the holding period at McNary Dam was a problem. A total of 83 adults (52%) died before they could be used for spawning. Adults that were not spawned were transported and released in the upper Umatilla near Corporation Guard Station. A total of 33 females were spawned in April for an egg take of approximately 132,000 (Table 2). Eggs were water hardened and placed in jars for transport to Oak Springs Hatchery on the Deschutes River where they were incubated and juveniles were reared. The fish collected at Threemile Dam in the spring of 1983 provided the **founding native steelhead broodstock** for the juvenile acclimation and release at Bonifer- in 1984.

TABLE 1. 1983 Adult Steelhead Broodstock Collection

Date	Fish Taken at Threemile Dam		
	Male	Female	Total
March 25	8	31	38
March 28	2	24	26
March 29	3	15	18
April 1	5	14	19
April 8	7	0	7
April 14	?	?	5
April 18	?	?	47
TOTALS			161

TABLE 2. 1983 Steelhead Spawning and Mortality at McNary Dam

Date	Females Spawmed	Prespawning Mortality		
		Male	Female	Total
April 13	11	2	4	6
April 19	9	2	2	4
April 25	13	5	21	38
May 2	0	?	?	47
TOTALS		33		83

Collection of steelhead adults during 1984 was started in February and completed in April. Fewer fish were captured because fewer fish passed the west-side ladder. The old east-side ladder was opened up for the 1984 steelhead run. Biologists felt that at least one-half the run passed through the east ladder.

A total of 52 steelhead were captured in the west ladder and transported to the newly completed Bonifer adult holding area (Table 3). The fish were checked for ripeness once or twice weekly during holding. Twenty-one females, 66% of those collected, were spawned (Table 4), producing about 100,000 eggs. The eggs were fertilized and then transported to Oak Springs Hatchery for incubating and for rearing of the young. Unspawned fish were released in to Meacham Creek below the Bonifer Spring Acclimation facility.

Prespawning mortalities during the adult holding period at Bonifer were significantly less than those observed in 1983 at McNary Dam. A total of 4 adults (7.7%) died before they could be used for spawning (Table 4). Even though adults were held for a longer time period, this mortality was about seven times less than the previous year at the McNary holding pond. The difference was felt to be due to the better water quality at Bonifer Springs versus the Columbia River.

TABLE 3. 1984 Adult Steelhead Broodstock Collection

DATE	Fish Taken at Threemile Dam		
	Male	Female	Total
March 1	8	9	17
March 6	5	5	10
March 9	4	9	13
March 16	1	2	3
April 13	2	7	9
TOTALS	20	32	52

TABLE 4. 1984 Steelhead Spawning and Mortality at Bonifer

DATE	Females Spawned	Prespawning Mortality		
		Male	Female	Total
April 10	5	0	0	0
April 18	2	0	2	2
April 26	2	0	1	1
May 4	8	1	0	1
May 10	4	0	0	0
TOTALS	21	1	3	4

A total of 104 steelhead adults were captured at Threemile Dam and transported to Bonifer from January to April of 1985 (Table 5). Approximately 150,000 eggs were taken from 33 females in April (Table 6). Eggs were again transported to Oak Springs Hatchery for incubation and juvenile rearing. Incubation and rearing will eventually occur at the proposed Umatilla Hatchery (presently in design phase) near Irrigon, Oregon.

The prespawning mortality was again low compared to the 1983 adult holding operations at McNary Dam. Nine adults (8.7%) died prior to spawning (Table 6). Unspawned fish were again released into Meacham Creek below the Bonifer Facility.

TABLE 5. 1985 Adult Steelhead Broodstock Collection

DATE	Fish Taken at Threemile Dam		
	Male	Female	Total
January 16	2	6	8
March 5	7	38	45
March 8	11	35	46
April 2	5	0	5
TOTALS	25	79	104

TABLE 6. 1985 Steelhead Spawning and Mortality at Bonifer

DATE	Females Spawmed	Prespawning Mortality		
		Male	Female	Total
April 2	0	0	1	1
April 8	4	1	2	3
April 15	7	0	2	2
April 22	11	0	1	1
April 29	11	0	3	3
TOTALS	33	1	9	10

ACCLIMATION AND RELEASE OF JUVENILE FISH

The objectives for releasing Juvenile fish in Bonifer pond for temporary holding immediately prior- to smolt migration are as follows.

To allow fish to recover from stress after being transported therefore increasing survival when released into the actively flowing stream a short time later. To allow fish for the first time to begin feeding naturally part-time before they must feed full-time on their own following release from the pond. (Fish are fed during holding but they also begin feeding on their- own in the natural pond.)

To imprint Juveniles on the specific Bonifer Springs water source 90 adults can be captured and utilized at the facility upon return. (In the near term, fish will be used for further enhancement of the Steelhead population throughout the Umatilla Basin.)

1983 Releases

The first release of Juvenile fish in Bonifer Pond occurred in the spring of 1983 before the fishway was constructed. Approximately 20,000 of the total 100,500 fall chinook upriver bright yearlings released in the Umatilla Basin that spring were temporarily held and fed in Bonifer Pond. Since no access existed to the Bonifer site at that time, a cooperative effort with Union Pacific Railroad was worked out. Two 5,000 fish tanker trailers were loaded on a railroad flatcar near Hermiston and a unique "Chinook, Express" run was made up to Bonifer Pond (See Appendix F, Photo 14). A make-shift screening set-up was used at the culvery outlet so fish could be temporarily held. The screen was removed in two weeks and most Juveniles migrated out of the pond within one week even though it could not be drained. The few that didn't migrate on their- own were seined out.

1984 Releases

The first release of Juveniles following completion of the Bonifer facility was in the spring of 1984. In late March, 53,300 fall chinook yearlings were released into the pond (Table 7). The fish were fed once per day (25 lbs OMP/day) for two weeks. The fish fed very well and observed mortalities were negligible. During the previous year when 80,500 yearling brights were released directly in upper Meacham Creek, the mortality was estimated at several thousand shortly after the releases. There was no scientific reason for acclimating the Bonifer fish for a two week period. It was felt by biologists that this time period was adequate for imprintation and recovery from stress and also convenient for operational scheduling.

Table 7. 1984 Juvenile Salmon and Steelhead Releases in Bonifer

Date 1/	Species	No. Released	Size
March 22	URB F.Chin. Yearling	24,180	8-9/lb.
March 23	URB F.Chin. Yearling	29,120	8-9/lb.
TOTAL	URB F.Chin. Yearling	53,300	
May 8	S.Stld. Yearling	15,876	7-8/lb.
May 9	S.Stld. Yearling	17,147	7-8/lb.
May 10	S.Stld. Yearling	16,657	7-8/lb.
May 11	S.Stld. Yearling	8,259	7-8/lb.
TOTAL	S.Stld. Yearling	57,939	

1/ Pond was drained for juvenile release about two weeks following in-pond release.

In May of 1984, 57,939 adipose clipped Steelhead yearlings from Oak Springs Hatchery were stocked in Bonifer Pond (Table 7). The fish were progeny of the Umatilla River adults that were held and spawned at the temporary McNary facility a year earlier. Like the salmon juveniles, these fish were also held for a two-week acclimation period (fed 25 lbs dry diet per day).

In order to monitor the out-migration and assist smolts through the lower Umatilla late in the migration season, the juvenile trap at the Westland Irrigation Diversion located 54 miles downstream from Bonifer Springs was set on May 29. The trap was checked on May 30th, after 24 hours of collection. Six marked fish from the Bonifer release and 30 wild juvenile Steelhead were captured. On May 31st, after an additional 30 hours of collection, the trap yielded 8 juveniles from the Bonifer Springs facility and 3 wild fish. The trap does not capture all out-migrating smolts.

The monitoring established that the Juvenile fish were able to move downstream during the week following their release. It could not be determined when the peak of the released fish reached the trap, nor could the ratio of released fish to wild fish in the system be estimated.

In November of 1984, grade-out subyearling Steelhead (22,000) from Oak Springs were released in Bonifer Pond. These fish were the result of the first egg take at Bonifer in the spring of 1984. The grade-outs are considerably smaller than the rest of the Juveniles and biologists felt that they would over-winter better in Bonifer Pond than in the river. The fingerlings were not fed through the winter and were released with the fall chinook the next spring.

1985 Releases

II-1 March of 1985, upriver bright fall chinook yearlings (137,655) were released into Bonifer Pond (Table 8). Like the year before, these fish were fed daily (50 lbs. OMP/day) during a 2-week acclimation period. This was the largest concentration of fish to date in Bonifer Pond. There was negligible mortality and the fish all appeared healthy following the acclimation period.

TABLE 8. 1985 Juvenile Salmon and Steelhead Releases in Bonifer

Date ^{1/}	Species	No. Released	Size
March 12	URB F.Chin. Yearling	37,466	7.5/lb.
March 13	URB F.Chin. Yearling	46,849	8.0/lb.
March 14	URB F.Chin. Yearling	47,041	7.9/lb.
March 15	URB F.Chin. Yearling	6,299	7.7/lb.
TOTAL	URB F.Chin. Yearling	137,655	
May 7	S. Std. Yearlings	25,625	7.5/lb.
May 8	S. Std. Yearlings	28,032	8.5/lb.
May 9	S. Std. Yearlings	6,273	8.5/lb.
TOTAL	S. Std. Yearlings	59,930	
Aug. 9	URB F.Chin. Sub-Yr1.2/	51,000	51/lb.

^{1/} Pond was drained for juvenile release about two weeks following in-pond release.

^{2/} F.Chinook were reared for 2.5 months and released on Oct. 23, 1985.

In May of 1985, 53,850 adipose clipped Steelhead yearlings were stocked in Bonifer Pond (Table 8). The smolts were progeny of the first Umatilla River Adults that were held and spawned at the Bonifer Facility in the Spring of 1984. The fish were fed (25 lbs dry diet per day) and held for a two-week acclimation period before release from the pond.

Like the previous year, grase-out Steelhead subyearlings (33,134) were again stocked in Bonifer in November. The fingerlings were not fed through the winter.

It was originally anticipated that the Bonifer Facility would only be used for temporary holding/acclimation of Juvenile fish. In the summer of 1983 temporary rearing of fall chinook snbyearlings was tried. About 51,000 fish were stocked on August 9th and fed daily until release on October 23rd (Table 8). The fish were stocked at \$1/lb. and were released at 16.2/lb. The daily feeding level started at 25 lbs. of Bio-Diet and was increased to near 50 lbs. at time of release. The pond temperatures peaked at 62 degree F at the outlet during hot days in Flugust and September. Very few mortalities were observed throughout the rearing period and all fish appeared to be in excellent health at time of release. Some of these fish were seen a week later in lower Umatilla River by a crew doing adult passage studies.

All the Umatilla River Juvenile salmon and steel head release sizes and locations since ODFW started releases in 1981 are detailed in Table 9. Anticipated releases in 1986 are also indicated. Tagging information fur fall chinook salmon releases in 1983 through 1985 and anticipated 1986 releases are presented in Table 10.

Operational Difficulties

During the first 1984 adult Steelhead holding period in the Bnnifer fishway, debris accumulation on the grates became a problem. A large amount of floating aquatic plants originating in the shallow upper portion of the pond was wind blown to the pond outlet and was forced into the fishway all at one time. The plant debris normally passes through the fishway but the sudden large quantity clogged the p and bent the first grate in the fishway. The damaged grate was removed and repaired and no adult Steelhead were lost. To salve the problem, floating boards were placed in front of the fishway entrance which deflected debris to the side of the fishway. Plant accumulations were removed weekly while checking on the adult Steelhead condition. No further problems have occurred.

Water flowing through the Bonifer fishway enters Bust on Canyon Creek. A pool at the outflow of the fishway was originally constructed so Juveniles could leave the fishway and easily move on downstream to Meacham Creek. A pool will also be necessary when returning adults jump from Boston Canyon Creek, into the fishway. Within one year after construct ion the pool completely filled in with gravel. This made it difficult to completely drain the pond when releasing juveniles. A new peal was constructed with a rock weir across Buston Canyon Creek. Just above the fishway. It was felt that the rock weir would hold back some of the gravel bedload movement and maintain the pool by creating scour (see Appendix F, photo 18).

TABLE 9. JUVENILE SALMON AND STEELHEAD RELEASES IN THE UMATILLA RIVER BASIN/1

Year	Summer Steelhead Releases		Fall Chinook Salmon Releases			
	Upper Umatilla	Bonifer	Lower Umatilla	Upper Umatilla	Bonifer	Minthorn
1981	17,558 (y) 9,400 (sy)	0	0	0	0	0
1982	59,494 (y) 67,930 (sy)	0	3,828,500 (sy) /2	0	0	0
1983	60,500 (y) 52,700 (sy)	0	0	80,500 (y)	20,000 (y)	0
1984	0	57,939 (y) 22,000 (sy)	636,759 (sy) /3	169,280 (y)	53,300 (y)	0
1985	0	59,930 (y) 39,134 (sy)	3,221,993 (sy) /3	60,490 (y)	137,655 (y) 50,000 /4	0
1986	0	60,000 (y)	3-4 mill (sy) /3	0	123,000 (y)	93,000

/1 y = fish released as yearlings, just prior to downstream migration

sy = fish released as sub-yearlings; salmon will migrate following release, stld will rear another year

/2 Salmon release in 1982 was tule stock, all others have been upriver brights -- the desired stock.

/3 Fingerlings released below Three Mile Dam to avoid loss in irrigation diversions.

/4 Sub-yearlings were reared in Bonifer Aug. - Oct.; released in late October at yearling size (16/lb).

fish:Releases

Table 10 Umatilla River Juvenile Release and Tagging Information for Upriver Bright Fall Chinook

Brood	No. Released	Release Time	Release Size	No. Tagged	CWT Code	Release Location
81	100,500	March 83	5.9/1b	100,500	7-21/41	Bonifer + Meacham Cr
82	222,580	March 84	8.6/1b	94,610	7-28/29	Bonifer + Meacham Cr/1
83	636,759	June 84	86/1b	195,824	7-31/24	Lower Umatilla
83	198,145	March 85	7.8/1b	89,762	7-31/27	Bonifer + Upp.Umat./2
84	3,221,993	June 85	92/1b	228,475	7-33/26	Lower Umatilla
84	50,000	Oct 85	16/1b	30,838	7-31/62	Bonifer Facility/3
84	216,000	March 86	5/1b	93,000	7-33/27	Bonifer + Minthorn/4

IA All tagged fish released in upper Meacham Creek

1.5 Tagged fish released both 1 t Bonifer (57,637) and Upper Umatilla River (32,125)

/3 Fish were reared through summer and released from knifer in fall

/4 Tagged fish released at Minthorn (93.000) : untapped at Bonifer (123.0)

F1 TagCODE

During initial stocking of Juveniles in Bonifer Pond, some fish were observed in the feeder springs above the pond. These fish, especially steelhead, would not migrate downstream when the pond was drained. This problem was solved by construction of a cobble weir across the feeder springs which allowed water to trickle through but blocked fish from going upstream.

Some fence damage problems were experienced during snow periods when elk utilize the Bonifer area for winter range. In the spring before cattle are grazed in the area, 1 to 2 days, with a two-man crew must be spent on maintaining and repairing the two miles of fence around the pond and feeder springs.

Operation and Maintenance Costs

Total construction costs of the Bonifer Facility including engineering expenses was about 875,000. The operation and maintenance expenses during the first two operational years (1984 + 1985) totaled near \$0,000. The O + M funds were used for labor to feed fish, travel, miscellaneous supplies and repairs, construction of a rock weir, property lease, facility insurance, and indirect expenses. Fish food during this initial period was provided by ODFW. The summer rearing of fall chinook was not covered by BPA O + M funds since this activity was not anticipated.

Under full operation in the future, annual operation and maintenance costs are anticipated to be near \$20,000 per year. This would cover expenses for trucking and holding of adult Steelhead, spring acclimation of fall chinook spring chinook, and Steelhead Juveniles, and for rearing of spring chinook through the summer for fall release.

FUTURE USE OF FACILITY

Future Bonifer Facility operation will involve continued holding spawning of adult Steelhead. Eggs will eventually be transported to Umatilla Hatchery. The new hatchery should be ready for the 1988 Steelhead egg take. Juvenile fall chinook and Steelhead will continue to be acclimated in the pond each spring. Starting in 1986 it is anticipated that yearling spring chinook will also be acclimated at Bonifer in the spring and Subyearling spring chinook will be reared through the summer. Spring chinook operations were not carried out so far because Juveniles have not been available. The projected 1986 salmon and Steelhead release plans for the entire Umatilla Basin Program are detailed in Table 11.

BONIFER FISH FACILITY O & M EXPENSES

July 1. 1984 - Dec 31, 1985

	<u>Total Expenses To Date</u>	<u>Unbilled Expenses</u>
<u>Labor</u>		
- 2 Man months @ \$1,500/mo (see attachment)---	\$3,000.00	
- Fringe at 15% -----	<u>450.00</u>	
		\$3,450.00
<u>Travel</u>		
- 47 trips Mission to Bonifer (36 mi./trip @ .155/mi) -----	262.26	
- 3 mo. GSA,vehicle lease @ 103/mo -----	309.00	
*- Pendleton to Portland flight - 1984 BPA pjct. rpt.	<u>145.00</u>	
		571.26
<u>Supplies</u>		
*- Rake, Brush, & Shovel _____	41.17	
1 - Chest Waders & Hip Boots (2 pr.each) -----	<u>379.41</u>	
		-0-
<u>Materials & Repairs</u>		
*- Lg. backhoe rental for rock weir construction	940.00	
- Aluminum tubing for fish grate -----	39.00	
*- Aluminum welding to fix fish grate -----	<u>36.75</u>	
		39.00
<u>Property Lease</u>		
- To owner H. Mingle for tax year 1984-1985 --	369.55	
- To owner H. Mingle for tax year 1985-1986 --	<u>376.56</u>	
		746.11
<u>Facility Insurance</u>		
- Liability insurance for 1984 -----	558.00	
- Liability insurance for 1985 -----	<u>785.00</u>	
		1,343.00
	Subtotal ---	<u>\$6,149.37</u>
<u>Indirect</u>		
- 26.9% of subtotal -----		<u>1,654.18</u>
	TOTAL DUE	<u><u>\$7,803.55</u></u>

* Already billed to BPA - (Total \$1,542.33)

BONIFER SPRINGS FISH ACCLIMATION FACILITY
 Operation & Maintenance Record July 1, 1984 - Nov. 30, 1985

Date	<u>Activity</u>	<u>Labor (days)</u>	<u>Trips (to Bonifer)</u>
7-20-84	Check and service electric fence	1	1
10-16-84	Check and service electric fence and look for local rock source for construction of a rock weir in Boston Canyon Creek at mouth of fishway	1	1
10-24-84	Survey and stake out locations of rock weir	1	1
10-25-84	Work up Bonifer rock weir cross - sections and other pre-project data as per tribal stream zone alteration requirements	1	
10-26,29, 30,31,84	Compile and summarize Bonifer operational information and draft narrative for final report	3	-
11-6,7-84	Supervise construction of rock weir near mouth of Bonifer fishway (to create jump-pool and control gravel aggregation at fishway entrance)	2	2
12-13-84	Get repairs done on fish grate (at local aluminum welder) - was damaged in spring of '84 due to a sudden accumulation of aquatic plants in fishway		
1-16-85	Transported the first Steelhead adults (8 total) with ODFW from Three Mile Dam to the Bonifer Facility for holding - also trimmed off stop-logs to better fit fishway	1	
3-5-85	Transported Steelhead adults (45 total) from trap at Three Mile Dam to, Bonifer for holding	1	-
3-8-85	Transported Steelhead adults(46 total) from trap at Three Mile Dam to Bonifer for holding	1	-
3-12,13, 14-85	Accompany fish trucks to Bonifer and release upriver bright yearlings (total 130,000) in pond for acclimation. Set screens in place for holding juveniles.	1.5	

<u>Date</u>	<u>Activity</u>	<u>Labor (days)</u>	<u>Trips (to Bonifer)</u>
3-13 thru 28-85	Feed juvenile salmon in Bonifer Pond, remove debris from screens & water surface at the pond outlet, G remove mortalities (16 days)	8	14
3-26,27, 28-85	Prepare for and present annual BPA project report in Portland.	2	
3-29-85	Pull juvenile screens at Bonifer Pond outlet to allow fish to migrate downstream.	.5	1
4-2-85	Transported Steelhead adults (5 total) from trap at Three Mile Dam to Bonifer for holding. Checked other broodstock for condition/ripeness		-
4-8-85	First Steelhead spawned (4 females) at Bonifer. Eggs, ovarian fluid & tissue samples taken		1
4-15-85	Spawned Steelhead (6 females) at Bonifer Eggs> ovarian fluid, and tissue samples taken.	1	1
4-22-85	Spawned Steelhead (11 females) at Bonifer Eggs, ovarian fluid, and tissue samples taken.	1	1
4-29-85	Spawned Steelhead (11 females) at Bonifer. Eggs, ovarian fluid, and tissue samples taken.	1	1
S-7,8, & 9-85	Accompany fish trucks to Bonifer and re-release Steelhead yearlings (total 60,000) in pond for acclimation. Set screens in place for holding juveniles.	1.5	
5-8 thru 19-85	Feed juvenile Steelhead in Bonifer Pond, remove debris from screens and water surface at pond outlet, and remove mortalities (12 days).	6	10
S-20+21-85	Pull juvenile screens and stoplogs at Bonifer Pond outlet to allow fish to migrate downstream. Electroshock and seine juveniles out of feeder springs into pond.	1.5	1
6-4-85	Checked to see that all juveniles were out of Bonifer Pond.	.5	1
6-9,6, 7-85	Repair and hook up electric fence around Bonifer Pond and feeder springs.	2.5	1
TOTALS		42 man days (approx. 2 months)	17 trips

TABLE 11 Projected 1986 Salmon and Steelhead Releases for the Umatilla River Basin.

Species	Brood	Stock	Hatchery	Number	Location	Juvenile Releases		Fish Marked	
						In Facility ^{1/}	In River ^{1/}	Yes	No
Fall Chin.	84	Bonneville	Irrigon	90,000	Minthorn	E. March	M. March	X (CWT All #7-33/27)	
Fall Chin.	84	Bonneville	Irrigon	110,000	Bonifer	E. March	M. March	X	
Fall Chin.	85	Bonneville	Irrigon	2.5 Mill.	Lower Uma.	-----	L. May	X (CWT 200,000)	
Fall Chin.	85	Bonneville	Irrigon	100,000 ^{2/}	Minthorn	E. June	L. Oct	X ^{4/}	
Spr. Chin.	84	Carson	Carson	100,000	Bonifer	L. March	M. April	X	
Spr. Chin.	85	Carson	Irrigon	300,000 ^{3/}	Upper Uma.	-----	E. April	X	
Spr. Chin.	85	Carson	Irrigon	100,000 ^{2/}	Bonifer	E. June	L. Oct	X ^{4/}	
Sum. Stld.	85	Umatilla	Oak Springs	60,000	Bonifer	L. April	E. May	X (adipose clip)	

1/ E = Early; M = Mid; L = Late

2/ To be reared through summer & released from facilities in fall

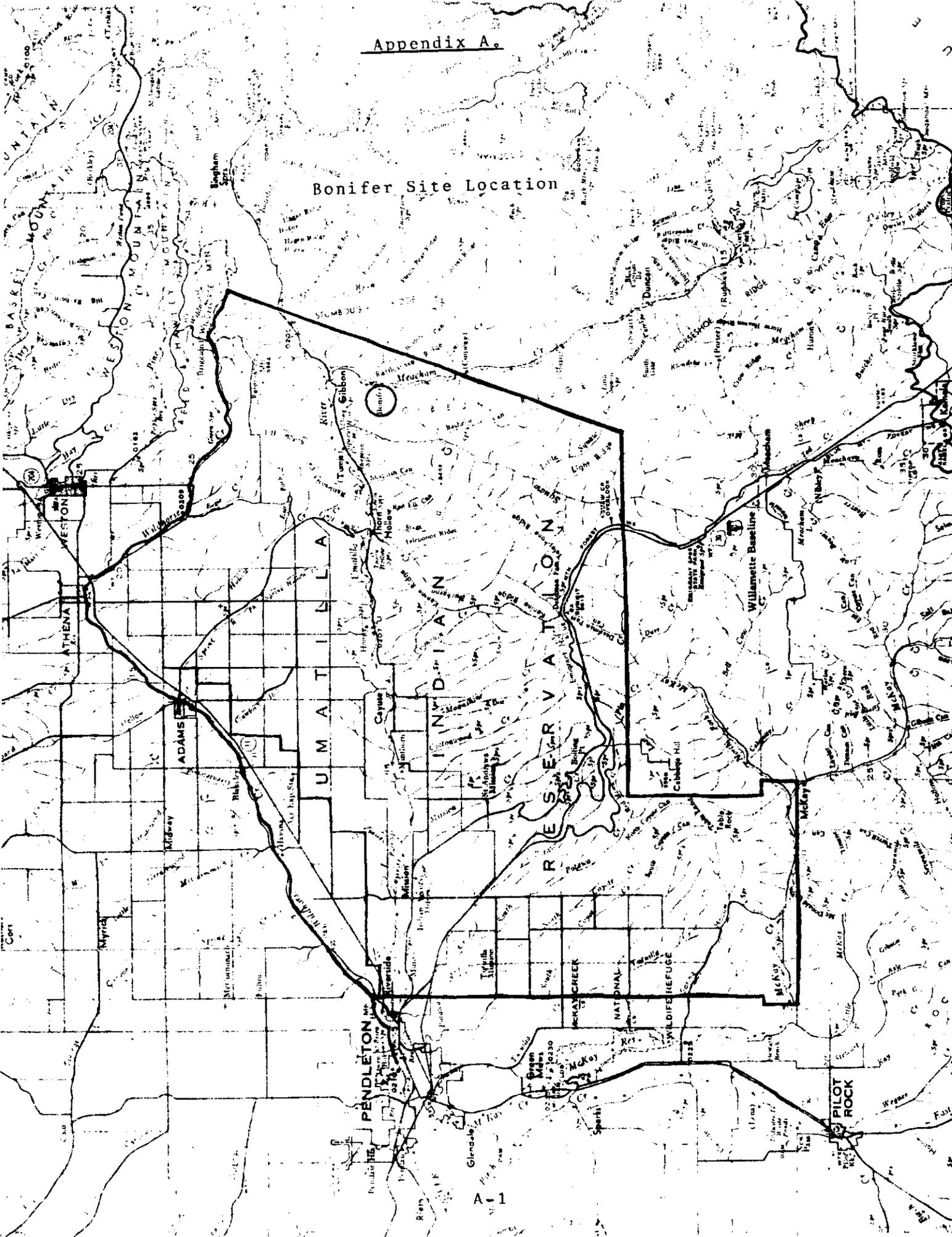
3/ To be released in habitat in upper mainstem, N. Fk., S. Fk., and N. Fk. Meacham Creek

4/ Fish to be marked by terramycin additive in diet during brief period in summer

	MARCH	APRIL	MAY	JUNE
Bonifer -----)	100K Accl. 1+ f. chin.	100K Accl. 1+ sp. chin.	60K Accl. stld.	100K Stock 0+ sp. chin.
Minthorn -----)	100K Accl. 1+ f. chin.			100K Stock 0+ f. chin.
Lower River ---)			2.5 Mill Release 0+ fall chinook	
Upper River ---)		300K Release 0+ sp. chin.		

Appendix A.

Bonifer Site Location



1984 OPERATIONAL PLAN

Bonifer Springs Salmon and Steelhead Acclimation Facility

February May: Adult Steelhead Holding

- Adult steelhead captured in ladder at Three Mile Dam will be trucked to Bonifer for holding.
- A broodstock of approximately 75-100 is needed for egg-take to provide the 50,000-60,000 smolts to be released at Bonifer in the spring on 1985.
- Fish will be held in fishway between aluminum grates.
- Screen will be locked over holding area for security.
- Bonifer Pond outflow through the fishway will provide adequate water exchange for holding of all adults.
- Facility operational checks will occur at least once per week during this period.

April - Mid-May: Adult Steelhead Spawning

- Adult steelhead will be checked weekly for spawning condition.
- Ripe fish will be spawned at the facility by Tribal and ODFW personnel.
- Eggs will be: stripped from females into buckets
fertilized by several males
placed in glass jars for water hardening and transport
transported to Oak Springs Hatchery for incubation
- Females will be discarded after spawning.
- Males will be returned to the holding area following each spawning and returned to Boston Canyon Creek/Meacham Creek in mid-May.
- Unspawned females will also be returned to Boston Canyon Creek/Meacham Creek in mid-May.

Late March - April: Acclimation of Juvenile Fall Chinook

- Release approximately 50,000 yearling upriver bright fall chinook into Bonifer Pond.
- Feed juveniles once daily (about 35lbs. Oregon Moist Pellet per day) during a two week acclimation period.
- Keep juveniles in pond by placing screens at pond outlet (at fishway intake); all outflow will pass through fishway.
- Maintain screens daily (remove aquatic vegetation) during juvenile holding period.
- After a two week holding period, adjust outflow so that one-half passes through the fishway (for adult holding) and one-half passes through the juvenile release pipeline.

Late March - April: Acclimation of Juvenile Fall Chinook (CONTINUED)

- Monitor out-migration to ensure all or nearly all salmon smolts are gone before juvenile steelhead are released (may require draining and refilling of pond if smolts do not voluntarily leave).

Early May - Mid-May: Acclimation of Juvenile Summer Steelhead

- Release 50,000-60,000 juvenile steelhead (yearlings) into Bonifer Pond.
- Feed juveniles once daily (about 50lbs. dry pellet per day) during a two week acclimation period.
- Keep juveniles in pond by placing screens at pond outlet (at fishway intake); all outflow will pass through fishway.
- Maintain screens daily (remove aquatic vegetation) during juvenile holding period.
- After a two week holding period, drain pond to ensure that smolts move downstream.
- Monitor Umatilla River Streamflows and correspond with ODFW and irrigation districts to obtain information on smolt movement and timing past lower river irrigation diversions.
- Assist ODFW in capture (at Westland Diversion) and hauling of smolts to Columbia River if the lower river is not suitable for smolt passage.

1985 OPERATIONAL PLAN

Bonifer Springs Salmon and Steelhead Acclimation Facility

November (1984) - April: Rearing/Acclimation of sub-yearling
-Juvenile Steelhead

- In November 1984, release grade-out 1984 brood juvenile steelhead (10,000 - 30,000) from Oak Springs Hatchery (those fish that are considerably smaller than the 50,000 - 60,000 juveniles that will be released in May 1985).

Hold juveniles in Bonifer Pond for rearing until juvenile fall chinook are released in April 1985.

Check fish and water conditions approximately every two weeks; Juveniles will feed on their own and will probably also feed on OMP during the two-week. Juvenile fall chinook feeding/acclimation period just prior to release into Boston Canyon and Meacham Creek.

January - May: Adult Steelhead Holding

Adult Steelhead captured in ladder at Three Mile Dam will be trucked to Bonifer for holding.

- A broodstock of approximately 75-100 is needed for egg-take to provide the 50,000 - 60,000 smolts to be released at Bonifer in the spring of 1985.

Approximately 20 fish per month will be trucked from Three Mile Dam to the Bonifer facility; the desired male/female ratio will be 1:3.

Fish will be held in fishway between aluminum grates.

Screen will be locked over holding area for security:

- Bonifer Pond outflow through the fishway will provide adequate water exchange for holding of all adults.

Facility operational checks will occur at least once per week during this period.

April - Mid-May: adult Steelhead Spawning

Adult Steelhead will be checked weekly for spawning condition.

- Ripe fish will be spawned at the facility by Tribal and ODFW personnel.

Eggs will be: Stripped from females into buckets;
Fertilized by several males;
Placed in glass jars for water hardening and
transport;
Transported to Oak Springs Hatchery for
incubation.

Females will be discarded after spawning.

Males will be returned to the holding area following each
spawning and returned to Boston Canyon Creek/Meacham Creek
in mid-May.

Unspawned females will also be returned to Boston Canyon
Creek/Meacham Creek in mid-May.

Late March - April: Acclimation of Juvenile Fall Chinook

- Release approximately 50,000 yearling upriver bright fall
chinook into Bonifer Pond.

Feed juveniles once daily (about 35 lbs. Oregon Moist
Pellet per day) during a two week acclimation period.

- Keep juveniles in pond by placing screens at pond outlet at
fishway intake); all outflow will pass through fishway.

Maintain screens daily (remove aquatic vegetation) during
juvenile holding period.

- After a two week holding period, adjust outflow so that one-
half passes through the fishway (for adult holding) and one-
half passes through the juvenile release pipeline.

Monitor out-migration to ensure all or nearly all salmon
smolts are gone before juvenile steelhead are released (may
require draining and refilling of pond if smolts do not
voluntarily leave).

Early May - Mid-May: Acclimation of Yearling Juvenile Summer Steelhead

Release 50,000 - 60,000 juvenile steelhead (yearlings) into
Bonifer Pond.

Feed juveniles once daily (about 50 lbs. dry pellet per day)
during a two week acclimation period.

Keep juveniles in pond by placing screens at pond outlet (at
fishway intake); all outflow will pass through fishway.

Maintain screens daily (remove aquatic vegetation) during

juvenile holding period.

After a two week holding period, drain pond to ensure that smolts move downstream.

- Mc.nitar Umatilla River-streamflows and coordinate with ODFW and irrigation districts to obtain information on smolt movement and timing past lower river- irrigation diversions.

Assist ODFW in capture (at Westland Diversion) and hauling of smolts to Columbia River, if the lower river is not suitable for smolt passage.

May

Perform necessary maintenance on the electric fence around Bonifer Pond and feeder springs before the start of the cattle grazing season (sometime in May).

Turn on electric fence and maintain throughout the grazing season, (May - late Fall).

OPERATION AND MAINTENANCE OF THE BONIFER
SPRINGS JUVENILE ACCLIMATION AND ADULT
HOLING FACILITY

Gury James, Project Leader
Confederated Tribes of the Umatilla Indian Reservation
P.O. Box 638. Pendleton. Oregon 97801, (503) 276-8221
BPA Project Officer: Tom Vogel
BPA Project Number: 82-18
Program Measure Number: 704 (i)(1)

Relationship to Program Measure: The Bonifer Springs juvenile release and adult holding facility, Part of Program Measure 707 (i)(1), is located on the Umatilla Indian Reservation. The facility is an important element in the Umatilla Basin anadromous fish restoration program. The Bonifer facility consists of a fishway at the outlet of a one-acre spring-fed pond. The facility will be used for acclimation of juvenile salmon and Steelhead and for holding of adults before spawning. Adult steelhead returning to Bonifer or eggs from those fish will be outplanted in undrained areas throughout the Umatilla drainage. Some returning fish (adipose fin clipped) may be used for hatchery broodstock, but wild fish will be the main broodstock component to maintain genetic integrity.

The Bonifer facility will also be used to restore chinook salmon in the Umatilla Basin. Upriver bright fall chinook juveniles from the Bonneville Hatchery will be released from Bonifer annually to develop hatchery and naturally producing runs.

The Umatilla Hatchery, also part of Program Measure 701 (i)(1), is now in the preliminary design phase and will be the "mother" hatchery for both the Bonifer and Minthorn facilities.

Technical Results: The Bonifer Facility was completed in 1983. In early 1984, 52 adult summer Steelhead were captured in the lower Umatilla River and were held at Bonifer prior to spawning. Approximately 100,000 eggs were taken from 21 females in April and May. The eggs were transported to Oak Springs Hatchery for incubation and juvenile rearing. Yearlings will be released into Bonifer Pond in the spring of 1985.

In mid-March 1984, 70,000 yearling upriver bright fall chinook were acclimated in Bonifer Pond for two weeks prior to release, as were 60,000 yearling summer Steelhead in early May.

Technical Review: Not applicable; the facility is operational.

Evaluation of Effectiveness: Returns resulting from annual Steelhead releases (50,000-60,000) from Bonifer Pond are expected to double the present adult run of 1000 fish within three years. Decreased mortality was observed in 1984 compared with years prior to construction of the Bonifer facility. Adult Steelhead holding mortality at Bonifer was only 7% in 1984 as compared to 33% in 1983 when fish were kept in a holding tank at McNary Dam. Juvenile salmon and Steelhead mortality following release into the pond was negligible compared to observed mortality following instream releases in previous years.

Degree of Program Measure Fulfillment: Projects remaining for completion of Program Measure 704 (i)(1) include construction of the Umatilla Hatchery for annual production of 200,000 steelhead smolts (to be released at both acclimation facilities), and **operation and** maintenance for both acclimation facilities.

OPERATION AND MAINTENANCE OF THE BONIFER SPRINGS JUVENILE ACCLIMATION
AND ADULT HOLDING FACILITY

Gary James, Project Leader
Confederated Tribes of the Umatilla Indian Reservation
PO Box 638, Pendleton OR 97801
(503) 276-8221
BPA Project Officer: Tom Vogel
BPA Project Number: 82-18
Program Measure Number: 704(i)(t)

Relationship to Program Measure: The Bonifer Springs juvenile Release and Adult Holding Facility, part of Program Measure 704(i)(1), is located on the Umatilla Indian Reservation. The Bonifer facility, completed in 1983, consists of a fishway at the outlet of a one-acre spring-fed pond. Juvenile salmon and Steelhead are acclimated in the pond, and adults are held in the fishway before spawning. Adult returns or eggs from those fish will be outplanted in underseeded areas throughout the Umatilla drainage. Some returning fish (adipose fin clipped) may be used for broodstock, but wild fish will be the major broodstock component to maintain genetic integrity.

The Umatilla Hatchery, also part of Program Measure 703(i)(1), is now in the preliminary design phase and will be the "mother" steelhead hatchery for both the Bonifer and Minthorn facilities.

Technical Results: In early 1985, 104 adult steelhead were captured in the lower Umatilla River and were held at Bonifer prior to spawning. Approximately 150,000 eggs were taken from 32 females. Most eggs were transported to Oak Springs Hatchery for incubation, rearing, and later release back to Bonifer in the spring of 1986. Some eggs were supplied to a local sports club for hatch-box incubation. This resulted in a 14,000-fry outplant in Birch Creek. In the spring of 1985, 140,000 yearling upriver bright fall chinook and 60,000 yearling summer Steelhead smolts were acclimated and released from Bonifer Pond. Another 50,000 sub-yearling fall chinook were reared for three months and released in late October.

Evaluation of Effectiveness: Returns from annual Steelhead releases (50,000-60,000) at Bonifer Pond are expected to double the previous adult run size of 1,000 fish within three years. Observed facility advantages have been low mortalities of juveniles before release and adults before spawning. All or a portion of the juveniles released have been tagged for later evaluation of adult returns.

Degree of Program Measure fulfillment: Projects remaining for completion of Program Measure 704(i)(1) include construction and maintenance of the Umatilla Hatchery for annual production of 10,000 steelhead smolts and operation and maintenance of the Bonifer and Minthorn acclimation facilities.



Photo 1. Bonifer Pond in winter.

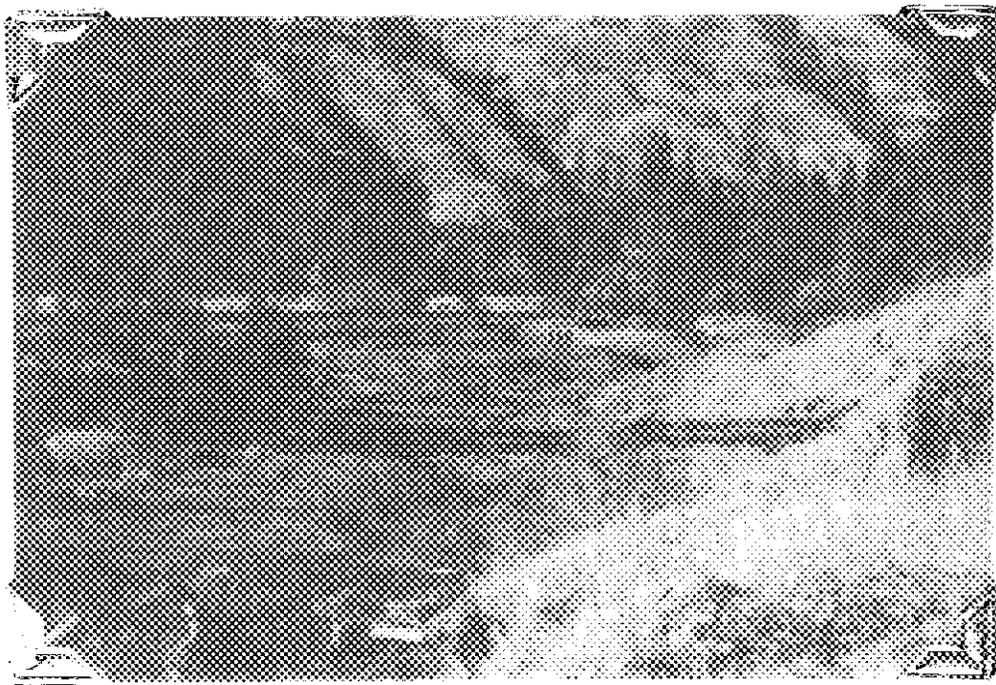


Photo 2. Bonifer Pond drained during summer of 1983 construction period.

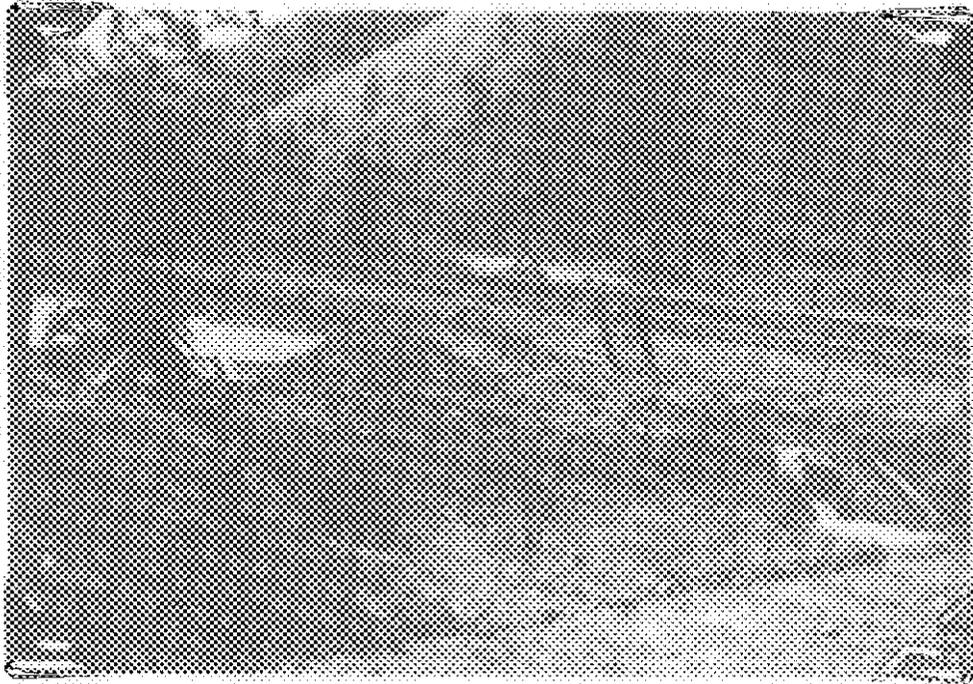


Photo 3. Digging trench to drain Bonifer Pond and divert flows around construction area.

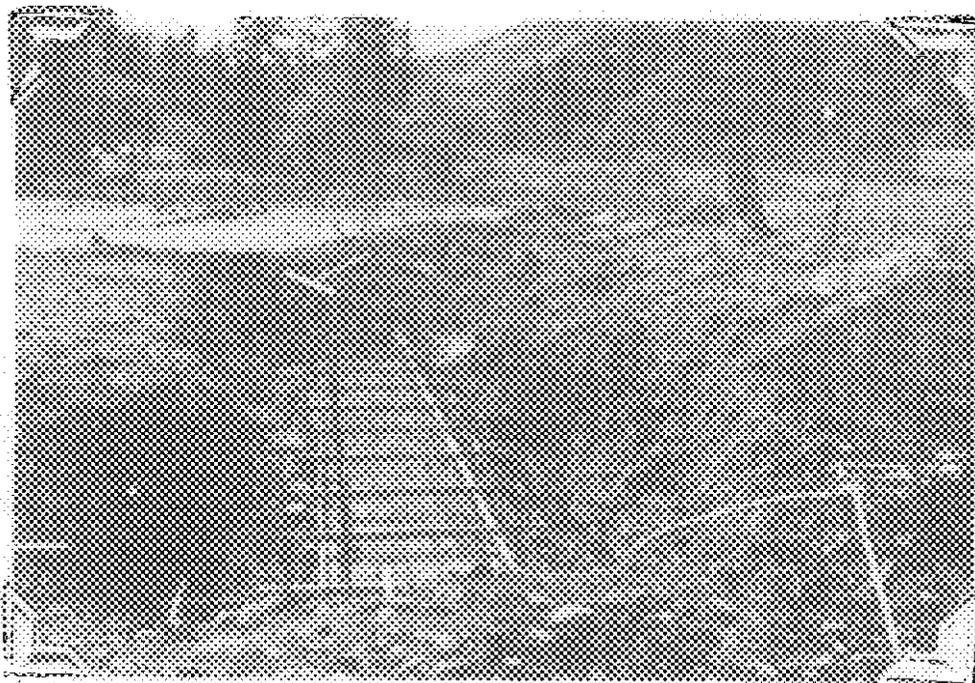


Photo 4. Ready to pour concrete footing for fishway.

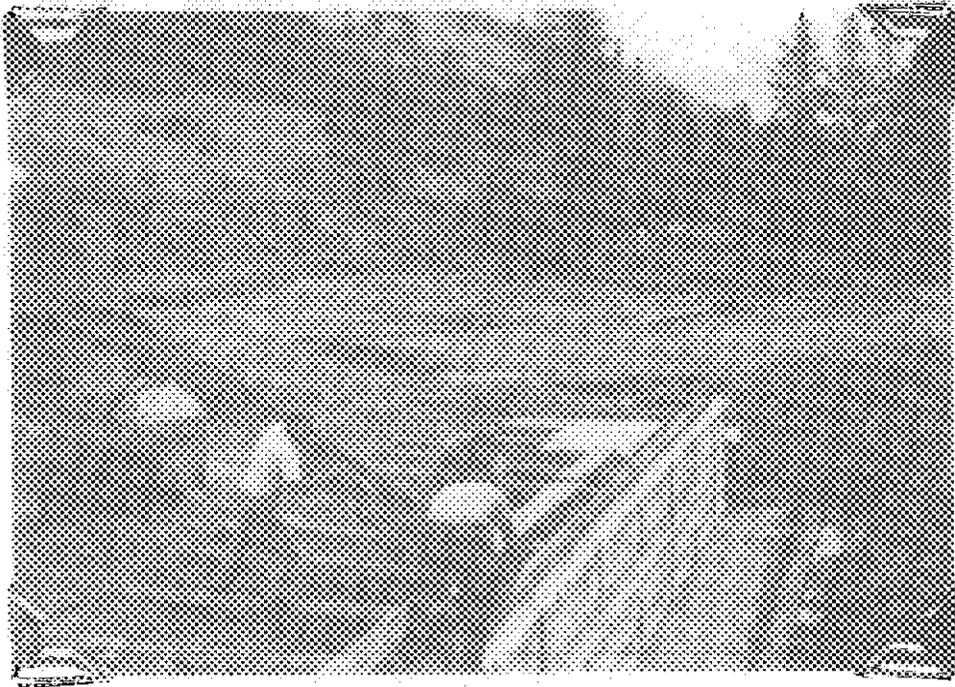


Photo 5. Pouring first wall of fishway.

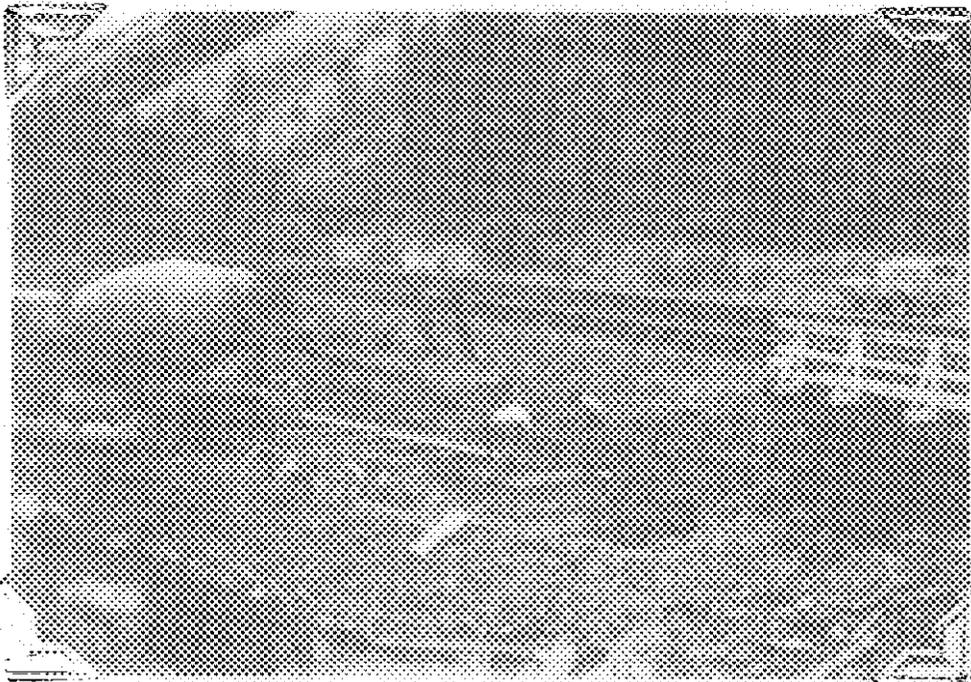


Photo 6. Pouring second wall of fishway.

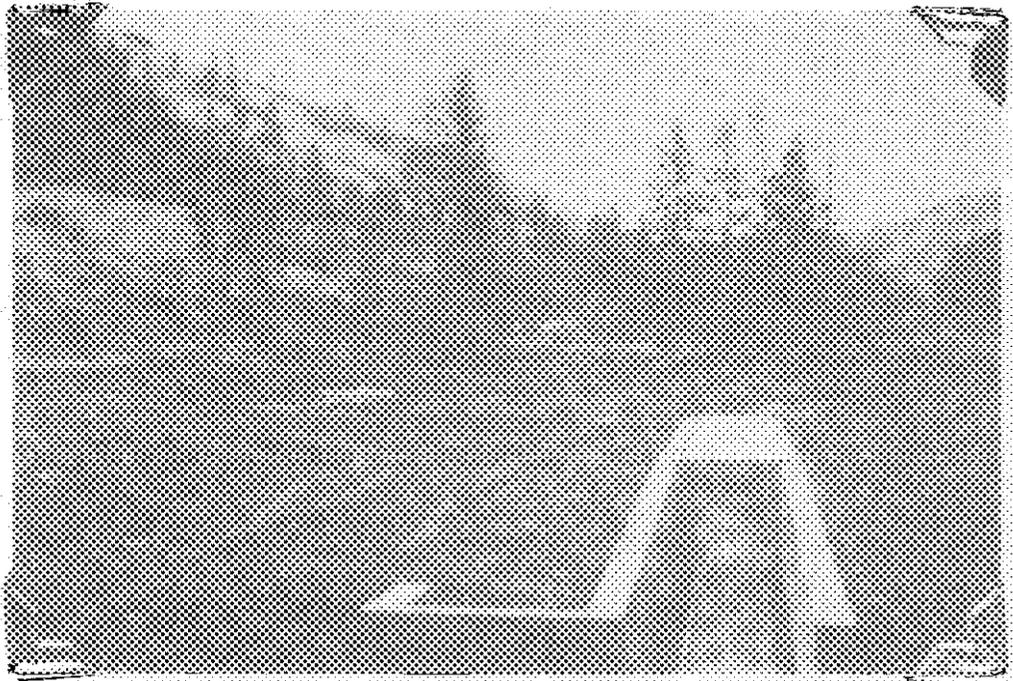


Photo 7. Nearly completed project prior to refilling pond.

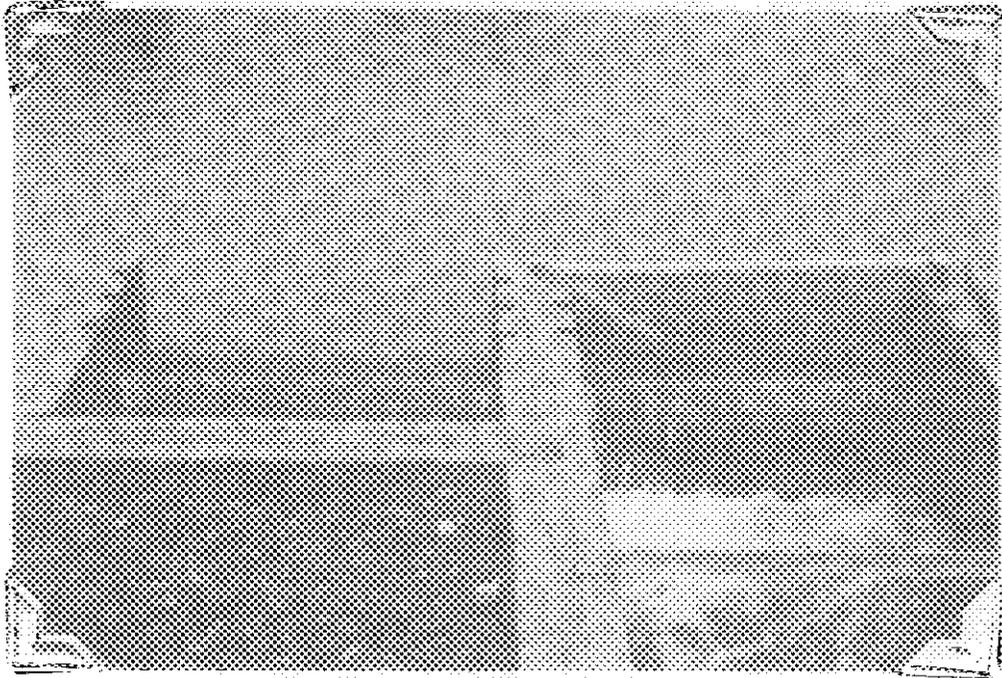


Photo 8. Intake of juvenile release culvert and fishway showing slots for stoplogs, grates, or screens.



Photo 9. Fence construction around springs
by tribal member.



Photo 10. Solar collector, battery, and
energizer for electric fence.

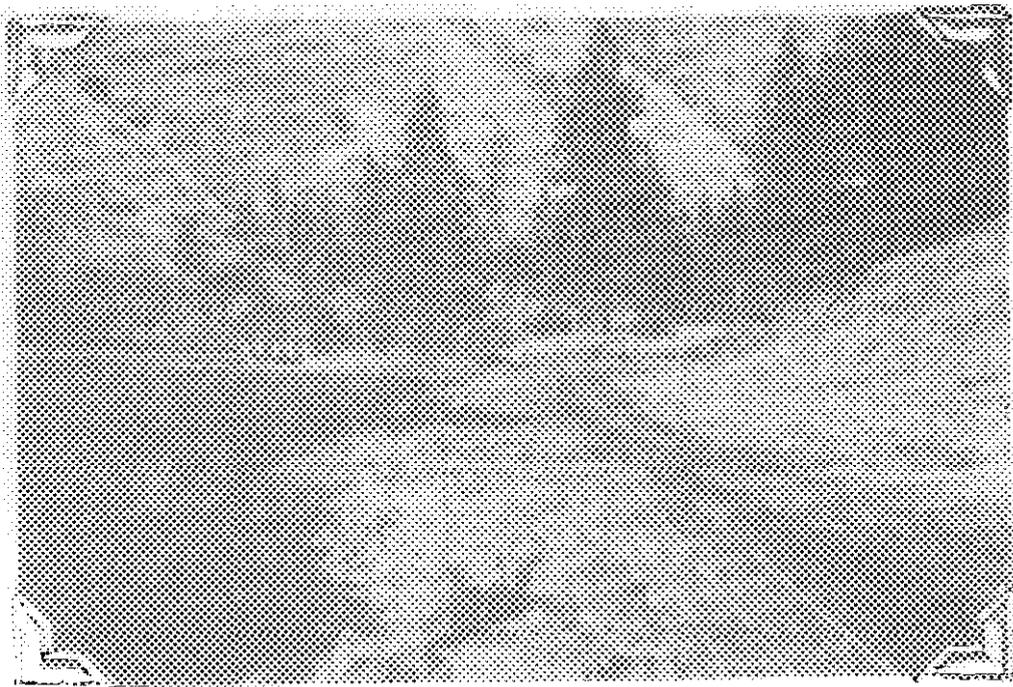


Photo 11. Completed fence around Bonifer Pond.



Photo 12. Construction of livestock water trough in feeder spring of Bonifer Pond.

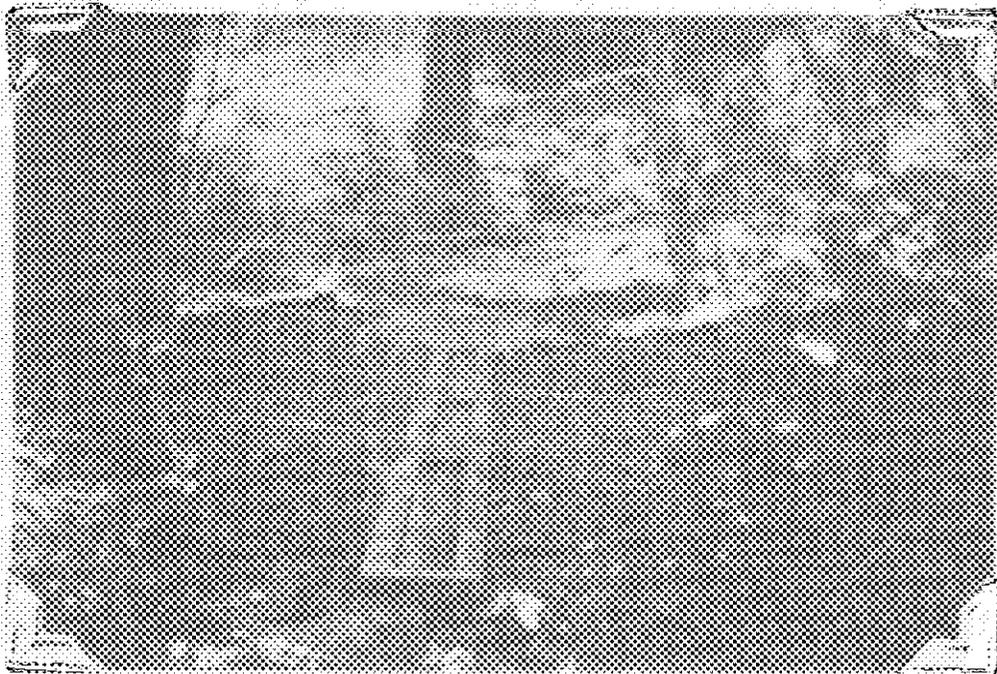


Photo 13. Completed livestock watering trough with fencing on both sides.

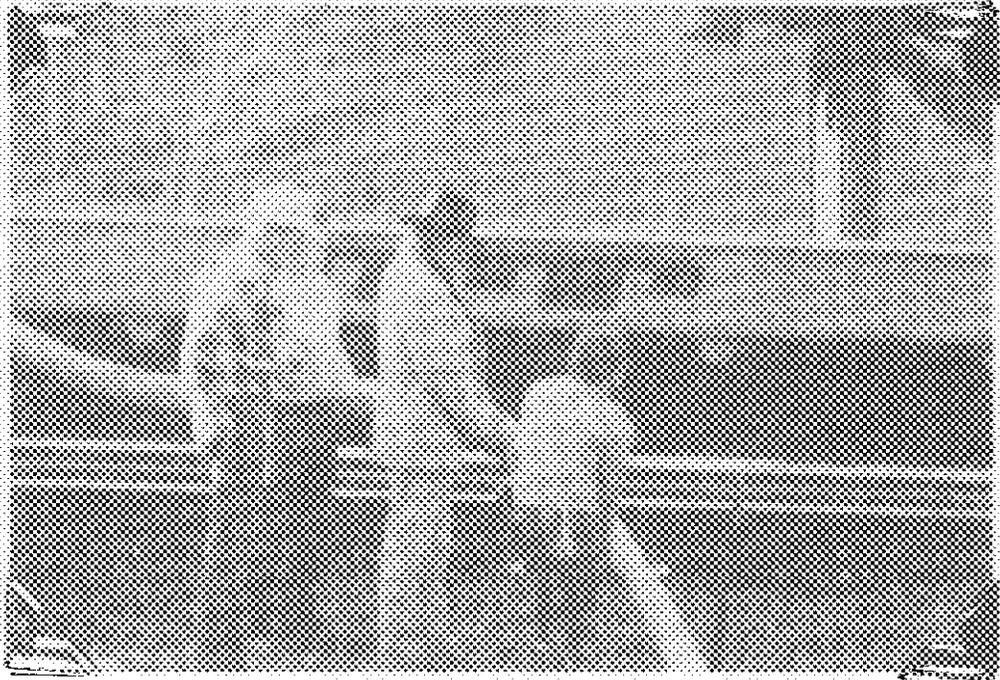


Photo 14. The first release of fall chinook juveniles into Bonifer Pond ("Chinook Express") showing representatives of UPRR, ODFW, CTUIR, and US Army COE.

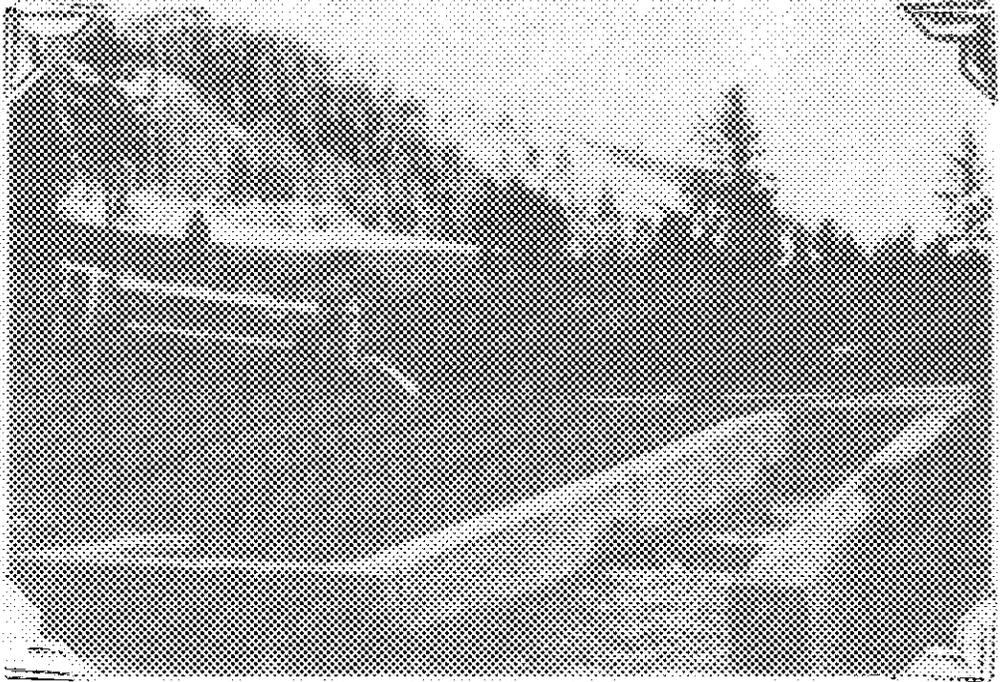


Photo 15. The first release of juvenile steelhead into the completed Bonifer facility in Spring of 1984.

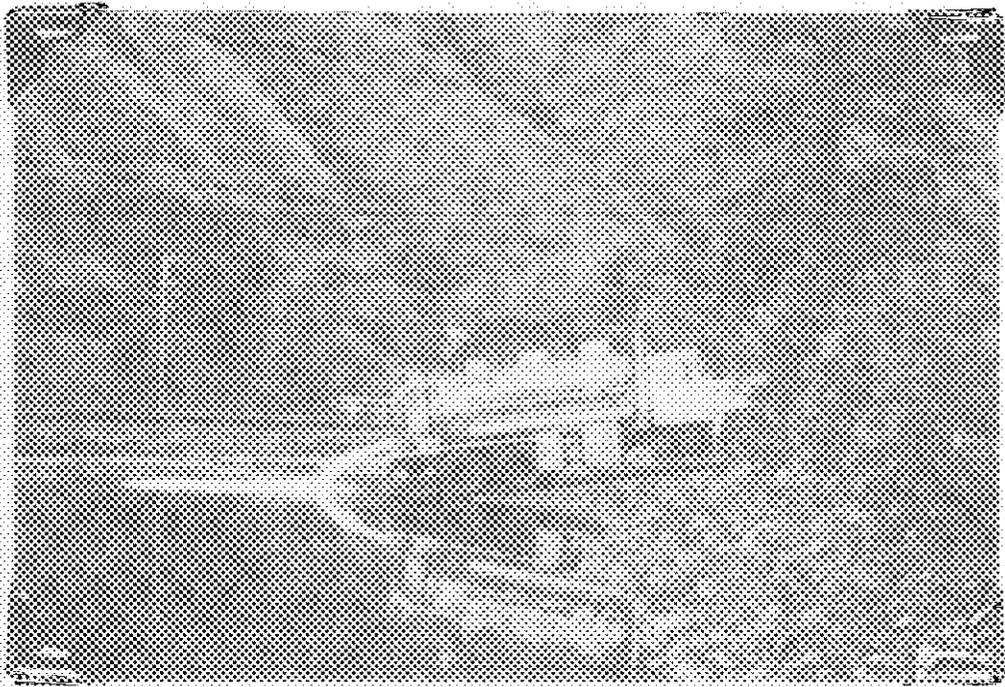


Photo 16. Release of juvenile chinook in Bonifer Pond.

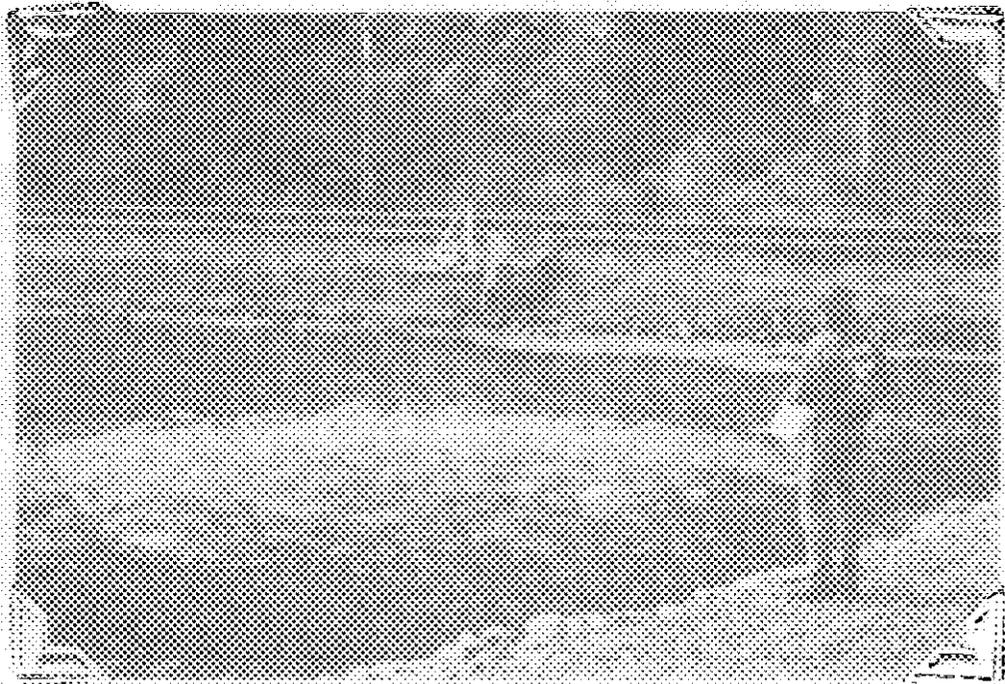


Photo 17. Feeding of juvenile fish during two-week acclimation period.

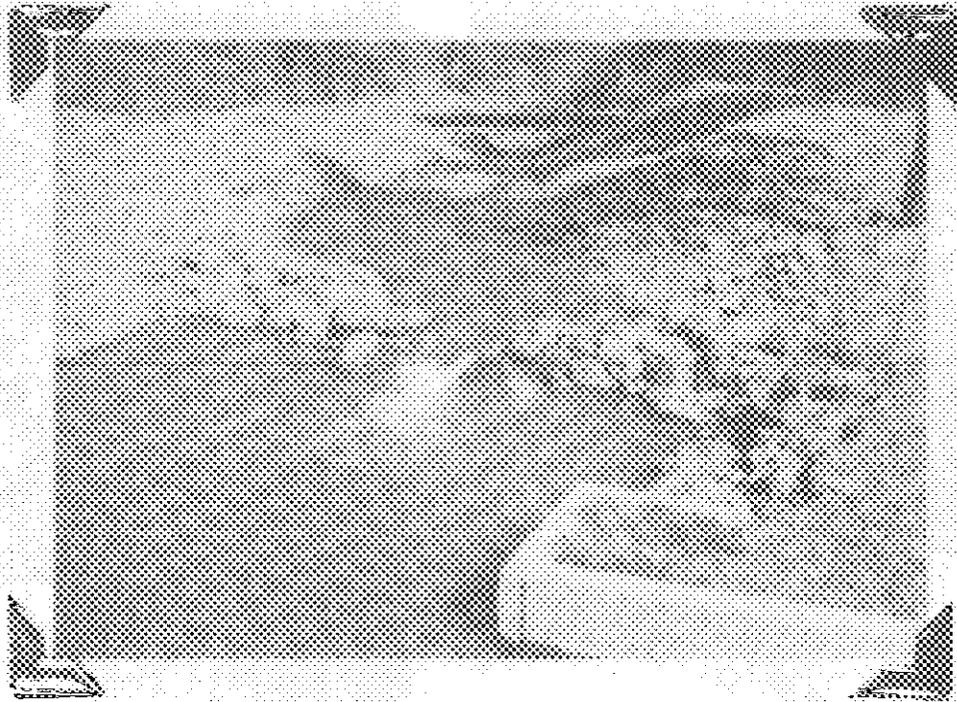


Photo 18. Rock weir constructed to create pool at the mouth of Bonifer fishway.

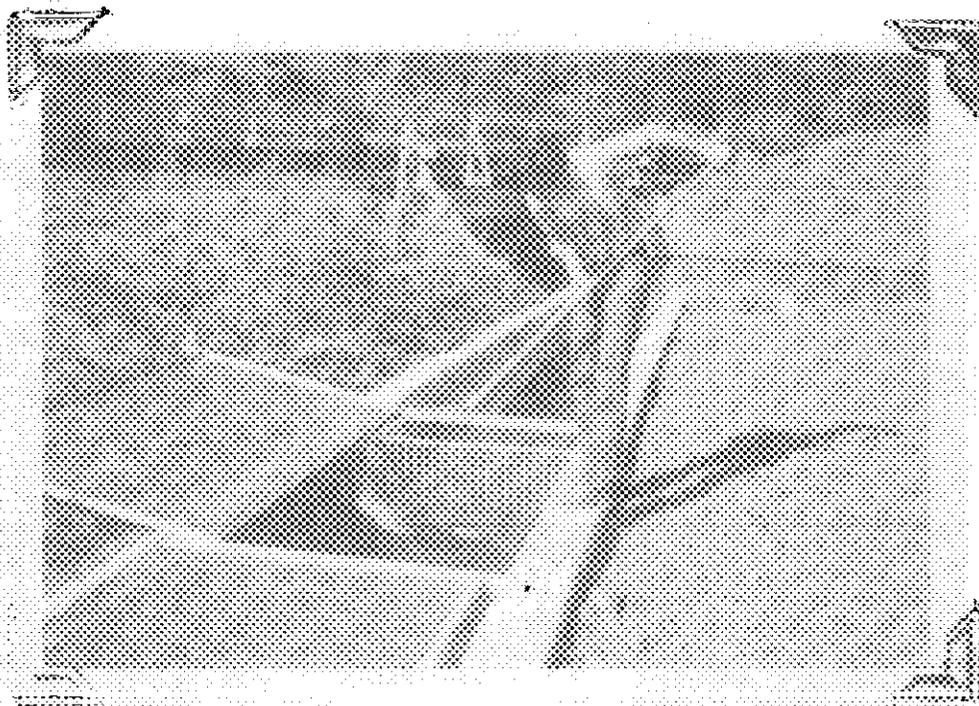


Photo 19. Checking adult steelhead for ripeness prior to spawning.



Photo 20. Taking eggs from female steelhead. Photo 21. Fertilization of eggs.

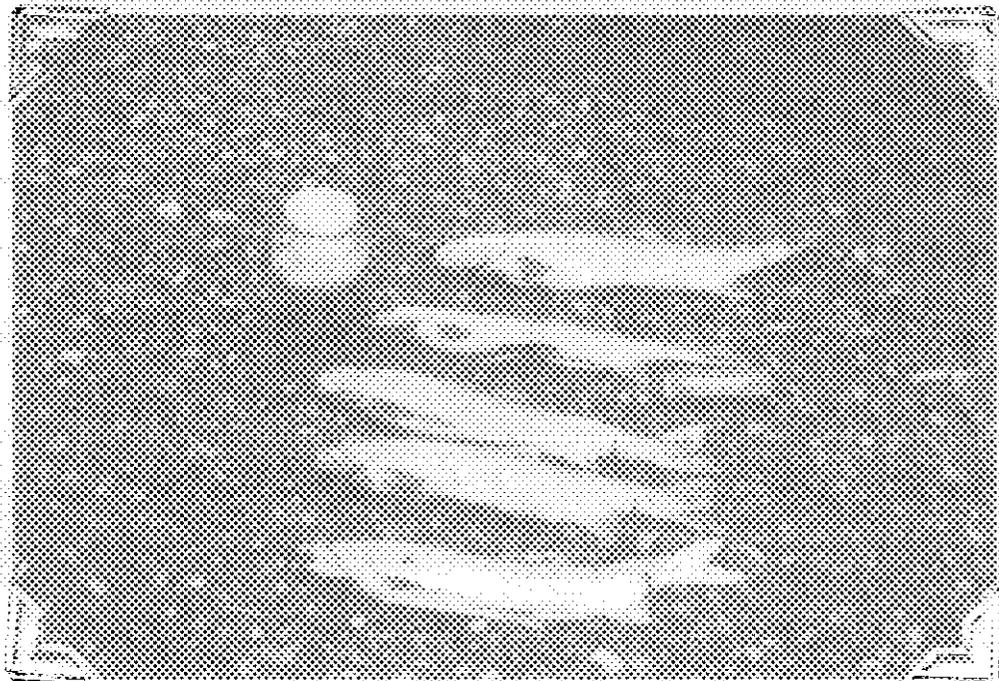
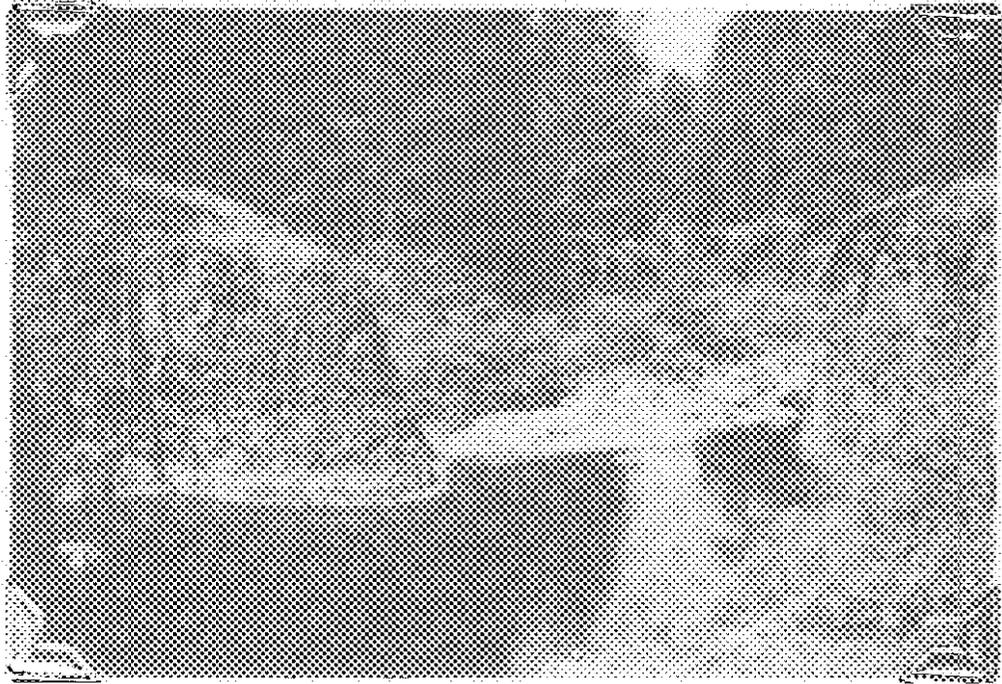
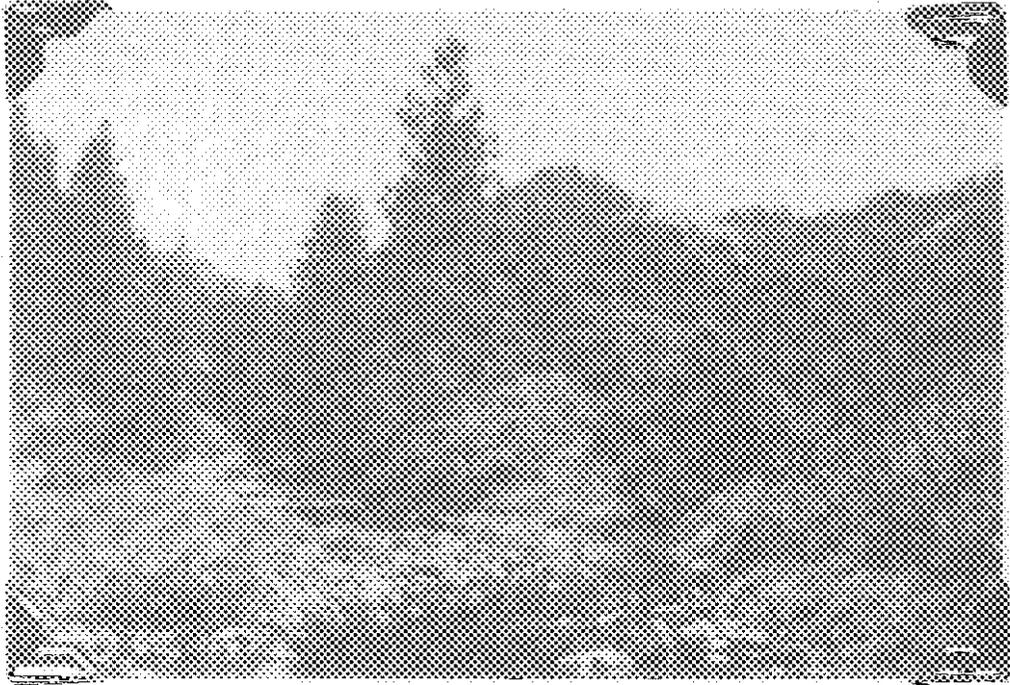


Photo 22. Spawned out female steelhead and resulting eggs in jar ready for transport.



Photos 23 & 24. Underutilized steelhead natural production areas in headwaters of the Umatilla Basin. Adult returns to Bonifer will be used to reseed these areas by adult and/or fry outplanting.