



## **1998 ANNUAL RESIDENT HATCHERIES REPORT**

**IDFG 99-13  
August 1999**

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# RESIDENT FISH HATCHERIES

## 1998 ANNUAL REPORT

Resident fish hatcheries reared and stocked over 19 million fish weighing 1.26 million pounds. More than 2,500 stocking trips were made to plant fish in over 500 waters in the state.

Resident hatchery program costs were 2.1 million dollars for an average cost of \$1.66 per pound or \$0.11 per fish. Cost varied greatly between the hatcheries. Cabinet Gorge Hatchery had the lowest cost per fish at \$0.056 and Ashton Hatchery had the highest at \$0.22 per fish. This is due to the great diversity in the resident hatchery system goals. Cabinet Gorge Hatchery produced 3.9 million fish averaging 1.74 inches in length using a seven month growing season and Ashton Fish Hatchery used the entire 12 months of fish production and produced an average 6.2 inch rainbow trout *Oncorhynchus mykiss*.

Rainbow trout of catchable size (8 to 12 inches) comprised approximately one-half of the program costs at approximately \$1.1 million.

The Sandpoint Fish Hatchery was taken out of production by a heavy snowstorm December 31, 1996 that destroyed the water supply line. This hatchery raised westslope cutthroat trout *Oncorhynchus clarki lewisi* brood fish and various other species. The water supply line was repaired during 1998 although this hatchery produced no fish during 1998.

Three captive broodstocks were maintained and spawned at the resident hatcheries producing over 18 million eggs for various resident programs. These stocks include Kamloops, and Hayspur rainbow trout maintained at Hayspur Hatchery; and Westslope cutthroat trout at the Clark Fork Fish Hatchery.

The Idaho Department of Fish and Game Engineering Bureau had limited funds for hatchery maintenance work during 1998. The bureau installed some screening and fencing at various hatcheries and installed the structure for a traveling moss screen at Hagerman Hatchery.

**Idaho Department of Fish and Game  
Resident Hatcheries Fish Production  
01/01/98 - 12/31/98**

Hatchery	>inches		<6 inches		Average Fish per pound	Feed		Average Length	Total cost	Cost/ 1,000 fish	Cost/ pound
	Number	Pounds	Number	Pounds		Pounds	Costs				
American Falls	143,668	63,965	1,408,450	19,668	17	83,120	\$29,790	5.07	\$235,625	\$151.80	\$2.82
Ashton	165,806	49,133	389,184	9,103	9.5	42,202	\$14,171	6.2	\$127,608	\$219.00	\$2.19
Cabinet Gorge	0	0	3,914,255	9,460	413	8,435	\$5,449	1.74	\$222,220	\$56.77	\$23.49
Clark Fork	201,929	48,778	2,822,817	67,659	25.9	129,537	\$58,799	4.6	\$261,425	\$86.45	\$2.19
Clearwater	364,872	61,913	0	0	5.89	73,844	\$20,773	7.2	<sup>a</sup> \$34,957	\$95.80	\$0.56
Grace	361,981	87,849	881,716	34,462	10.17	151,625	\$64,962	6.03	\$186,821	\$150.21	\$1.53
Hagerman	1,674,594	390,464	2,455,095	118,174	6.19	408,440	\$148,139	7.1	\$450,702	\$143.67	\$0.89
Mackay	81,690	45,150	2,395,050	25,184	35.2	89,644	\$37,881	4	\$218,200	\$88.10	\$3.10
McCall	0	0	193,520	285	679	289	\$400	1.5	\$37,975	\$196.23	\$13.98
Nampa	671,168	220,056	891,700	13,742	6.7	267,782	\$96,338	6.90	\$329,161	\$114.88	\$1.31
TOTAL PRODUCED	3,665,708	967,308	15,351,787	297,737	<sup>a</sup> 16.07	1,254,918	\$476,702	<sup>b</sup> 5.37	2,104,694	\$110.67	\$1.66

<sup>a</sup>Does not include any permanent salaries.

<sup>b</sup>Denotes weighted means.

Total cost for each hatchery is that hatchery's total budget minus capital outlay expenditures.

Total of 19,017,495 fish; 1,265,045 pounds produced.

These numbers represent the data for the fish produced, not necessarily the fish planted in to the waters of Idaho.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**AMERICAN FALLS FISH HATCHERY**

**1998**

**Bill Doerr, Fish Hatchery Manager I  
David Billman, Assistant Fish Hatchery Manager  
Todd Garlie, Fish Culturist  
Paul Martin, Fish Culturist**

## INTRODUCTION

American Falls Fish Hatchery (AFFH) is a resident fish hatchery located on approximately 120 acres of land owned by the Idaho Department of Fish and Game (Department) on the north bank of the Snake River, one-half mile below the American Falls Reservoir Dam. The AFFH is two miles by road from the town of American Falls.

The primary objective of the AFFH is to rear 250,000 catchable sized (9- to 12-inch) rainbow trout *Oncorhynchus mykiss*. The AFFH also produces fingerling (four- to six-inch) rainbow trout as requested. The number and pounds of fingerling produced varies from year to year.

Three permanent state employees staff the AFFH. Volunteer hatchery hosts are utilized for the spring and summer tourist season.

Funding for the AFFH operation comes from license monies, from interest on an American Falls Irrigation District endowment, and from mitigation funds for the Gem State Project at Idaho Falls.

The physical layout of the AFFH consists of ten (100 ft x 8 ft x 3 ft) single pass concrete raceways, ten (100 foot x 8 ft x 3 ft) reuse concrete raceways, and a hatchery building containing fourteen (21 ft x 4 ft x 2 ft) concrete rearing vats.

Water for the AFFH comes from Reuger Springs located on the AFFH property. These springs flow an average of 20 cubic feet per second (cfs) at a water temperature of 55° to 59° F.

## FISH PRODUCTION

The AFFH raised Hayspur strain rainbow trout, Hayspur Kamloops trout, and Troutlodge Kamloops trout for the 1998 production year. The Troutlodge strain of fish performs very well at this facility.

The Clark Fork Fish Hatchery received as transfers 41,250 catchable Kamloops rainbow trout (13,750 lbs.) and 261,793 fry (762 lbs.) from AFFH. The AFFH stocked 102,418 catchable rainbow trout (50,215 lbs.), and 1,146,657 fingerling (18,906 lbs.) during this period. Total stocked and transferred is 1,553,118 fish, weighing 83,633 lbs. (Appendix 1). Net production for the year (pounds stocked + pounds on hand December 31, 1998 – pounds on hand 1/1/98) was 79,371 pounds.

Costs for 1998 for various sizes of fish food were \$29,790.91. Feed costs for the year were \$0.3753 per pound of fish produced, or \$0.019 per fish (Appendix 2). Production costs overall were \$2.67 per pound of fish produced, or \$0.144 per fish. This cost includes income from all sources, and the cost of transportation to stocking waters, including the costs of fish transports stationed at the Nampa Hatchery

Feed conversion for the year averaged 1.05 pounds of feed per pound of fish produced.

## **HATCHERY IMPROVEMENTS**

- The public nature trail, started in 1997, was expanded. There were 150 trees and shrubs planted for a wildlife shelterbelt.
- A safety railing was fabricated for the center walkway area of the raceways to enhance employee safety.
- Repairs and modifications were begun to bring the AFFH into compliance with the Americans with Disabilities Act.
- A metal replacement roof was installed on residence #2.
- The two pumps supplying water to the hatchery building were replaced.
- The water measurement device installed in the AFFH intake line was calibrated and put into use.
- Two new 8-tray vertical incubators were purchased and installed in the hatchery building.

## **HATCHERY NEEDS**

- Nineteen incubators in the hatchery building are in need of replacement. These incubators were received when a LSRCP hatchery discarded them in 1989.
- A new residence to replace residence #2, or remodeling of that residence.
- Metal siding on the garage for residence #1.
- Metal or vinyl siding on residence #3.
- Repair of the automatic feeding system.

## **PUBLIC RELATIONS**

The AFFH received an estimated 5,000 visitors during this period. These consisted of public school groups from March through July, and again in October. We also had scout groups, family reunions, bird watchers, drop-in visitors, hunters, and fishermen. Visitors were noted from nearly every state and various foreign countries. Two major media contacts were made with local television stations and newspapers. A "Living Stream" educational project is being taught by hatchery employees at Indian Hills Elementary School in Pocatello.

## **CREEL CENSUS**

The AFFH assisted regional personnel in a creel census on the Snake River from American Falls Dam to Eagle Rock. The census was run twice weekly during the entire fishing season in both 1997 and 1998.

In 1997, 4,000 catchable Troutlodge Kamloops rainbow trout were adipose clipped and stocked in that section of the Snake River, half in May, half in July (after flood flows of 50,000 cfs). An estimated 36% of that group returned to the creel in 1997 and an additional 40% of that same group returned to the creel in 1998. These fish were raised in low densities (D.I. <0.16), at the American Falls Hatchery

In 1998, 8,000 catchable Troutlodge Kamloops rainbow trout were adipose clipped and stocked in the same section of the Snake River, half in May, half in June. They were separated from the 1997 fish visually. That is, fish in the creel less than 14 inches were considered to be those stocked in 1998. Because the number stocked was doubled, they had to be raised at densities double those of the previous year. The return-to-creel for the 1998 group was only 20%.

In this instance, doubling the number of catchables requested for this section of the river had no effect on number of fish returning to the creel. The percentage return to the creel was cut by 50% when the number stocked was doubled. We feel this is perhaps because of density considerations at the hatchery.

## **VOLUNTEER PROGRAM**

The hatchery host program, which was started in 1997, was continued this year. Hosts for the 1998 season were Don and Bonnie Hollingsworth. They turned out to be excellent workers, and helped the hatchery crew with conducting tours of the grounds, and some general maintenance and sign building

## **HABITAT IMPROVEMENT**

In 1998, as in 1996 and 1997, part of the AFFH park area was converted to wildlife habitat. Approximately 120 Native American plum, Hawthorne, Siberian pea, crabapple shrubs, and eight spruce trees were planted

## **ACKNOWLEDGMENTS**

This year employees at AFFH were Bill Doerr, Hatchery Manager I; David Billman, Assistant Fish Hatchery manager; Todd Garlie, Fish Culturist for six months; Paul Martin Fish Culturist for six months; and Don and Bonnie Hollingsworth, Hatchery Hosts.



Appendix 1. Fish transferred or stocked by region, American Falls Hatchery, 1998.

Region	Species	Number	Pounds	Destination
Panhandle	Hayspur rainbow	302,773	14,512	Clark Fork Hatchery
Clearwater		0	0	
Southwest				
Magic Valley	Kamloops rainbow	9,831	3,890	Region-wide
Southeast	Kamloops rainbow	1,194,037	46,346	Region-wide
Upper Snake	Kamloops rainbow	46,477	18,885	Region-wide
Salmon		0	0	
<b>TOTALS</b>		<b>1,553,118</b>	<b>83,633</b>	

Appendix 2. Fish feed during the 1998 production year, American Falls Hatchery

Source	Size/Type	Pounds	Cost
Rangen	Swimup, Trout & Salmon Starter	290	\$ 161.81
Rangen	Trout & Salmon #1 Dry	705	\$ 396.88
Rangen	Trout & Salmon #2 Dry	3,210	\$ 1,797.59
Rangen	Trout & Salmon #3 Dry	6,450	\$ 3,668.80
Rangen	Trout & Salmon #4 Crumble	6,000	\$ 1,931.40
Rangen	Extruded 450 Floating 1/8	50,295	\$16,336.63
Rangen	Extruded 450 Sinking 1/8	16,170	\$ 5,497.80
Silver Cup	Dry Starter		
Silver Cup	#1 Salmon Fry		
Silver Cup	2 Salmon Fry		
Silver Cup	#4 Salmon Fry		
Silver Cup	#5 Extra Coarse Crumble		
Silver Cup	5/32 Pellets, Vitamin Boosted		
Silver Cup	3/32 Medicated w/Oxytet		
<b>TOTALS</b>		<b>83,120</b>	<b>\$29,790.91</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
ASHTON FISH HATCHERY  
1998**

**Mel Sadecki, Fish Hatchery Manager I**

## INTRODUCTION

Ashton Fish Hatchery (AFH) is located in Fremont County, Idaho, and approximately two miles southwest of the small community of Ashton. Constructed in 1920 and funded by fishing license dollars, AFH serves as a "specialty station," rearing six species/strains of trout, char and grayling including rainbow trout *Oncorhynchus mykiss*, Colorado rainbow trout, cutthroat trout *O. clarki*, brook trout *Salvelinus fontinalis*, golden trout *O. aguabonita*, Arctic grayling *Thymallus arcticus*.

The majority of fish produced at Ashton Hatchery are fry and fingerling (1- to 6-inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable size fish (6- to 10-inches) are also reared at Ashton and distributed locally in waters managed on a put-and-take basis.

## FISH PRODUCTION

### General Overview

A total of 554,990 fish (58,216 lbs) were produced at Ashton Hatchery this year, consisting of 389,184 fingerlings (9,103 lbs), and 165,806 catchable-sized fish (including holdovers) (49,113 lbs). The total number produced was down slightly from last year, but the total pounds produced increased (Appendix 1). The majority of fish requests were met. Production cost (excluding capital outlay and fish transport) was \$127,608.00, with \$14,171.13 spent on fish feed and the remaining \$102,468.00 spent on general hatchery operations and personnel cost. Fish transportation cost was \$5,369.21 for 1998. The average cost per pound of fish produced was \$2.19 (Appendix 1).

Most of the fish reared at Ashton were received as eyed eggs (Appendix 2).

All fry and fingerlings were fed by automatic belt feeders that dribbled feed into the tanks and raceways 8- to 10- hours per day. Human disturbance was kept to a minimum, and conversions improved over hand feeding techniques.

Demand feeders were utilized in outdoor raceways for the catchables and holdovers. Feed conversion for catchables and holdovers was 1.10 in 1998 (Appendix 3). Waste settling areas were created in the lower 15% of the outside raceways, which served to settle fish waste for removal before it floated through the lower fish. Lights over the nursery tanks were adjusted to a moderate intensity, and growth rates were maintained by the use of automatic fry feeders and covers when the fish were moved outside to the small raceways.

The average survival for all fish stocked was 74.2% from eyed egg to distribution.

### **Rainbow Trout**

Ashton Hatchery produced and stocked 681,235 (31,215 lbs) 10-inch catchable rainbow for distribution into area lakes and streams (Appendix 1). In November 1997, we received 68,700 Hayspur rainbow trout (R9) eggs and in December 122,600 R9 eggs. From these eggs, 47,352 Hayspur R9 fingerlings, averaging 3 inches, were planted in a number of Upper Snake Region streams. An additional 84,571 (17,918 lbs) of 8-inch Hayspur R9 holdovers were produced for stocking in 1999.

### **Colorado Rainbow Trout**

15,000 Colorado rainbow trout fry were received from Hayspur Hatchery in June. 14,608 (88 lbs) 2.4-inch Colorado rainbow trout were stocked in the East Fork of the Big Lost River in October.

### **Henrys Lake Cutthroat Trout**

Henrys Lake shipped 38,000 cutthroat trout eggs to Ashton Hatchery in 1998. From these, 33,258 (127 lbs) of fingerling were planted in Sublette Reservoir, Harriman Pond, Snow Creek Pond, and Blue Creek Reservoir.

### **Brook Trout**

In 1997, 641,000 green brook trout eggs were received from Henrys Lake Hatchery. An eye-up rate of 75.8% resulted in 485,900 eyed eggs for 1998 requests. Clark Fork Hatchery received 21,400 eyed eggs. From the remaining eggs, 206,796 (6,450 lbs) fingerlings averaging 4.4 inches were stocked in Henrys Lake during October. The remaining 76,897 fingerlings were stocked in Regions 5 and 6.

### **Golden Trout**

Golden trout are reared at Ashton Hatchery whenever eggs are available. No eggs were available this year, however.

### **Arctic Grayling**

Arctic grayling are reared at AFH for statewide mountain lake stocking. In May 1998, two shipments of green eggs totaling 202,500 were transported to Ashton Hatchery from Meadow Lake, Wyoming. The eggs arrived in very poor condition; approximately 80% in the first group and 50% in the second group were dead on arrival. This resulted in an estimated 72,000 green eggs. Eye-up was very poor (approximately 45%), resulting in 32,400 eyed eggs. Fry were fed 0.4 mm Bio-Kyowa larval fish feed for the first four weeks then switched to Rangen's swim-up. Growth was good throughout the rearing period, although survival was poor. A total of 10,273 fry (8 lbs) were transferred or stocked during the summer of 1998.

## **HATCHERY IMPROVEMENTS**

The only hatchery improvements this year were to comply with the Americans with Disabilities Act, which included accessibility modifications to the parking area and restrooms.

Future needs include construction of a large storage area, heated shop/garage east of the Quonset hut, siding and windows for the three-car garage; septic tank/field work will be needed for both residences; and a new concrete driveway for residence #1.

## **FISH STOCKED AND TRANSFERRED**

Ashton Hatchery's stocking program remained similar to last year's program, with only minor changes (Appendix 4). The survival of the Arctic grayling was the most obvious change. Numbers of catchable rainbow trout on station were sufficient to meet requests, so for the first time in several years, no additional catchables were shipped in from other hatcheries. The only fish transferred from Ashton Hatchery to other facilities in 1998 were Arctic grayling.

## **ASHTON FISH SPAWNING**

Ashton Hatchery personnel traveled to Henrys Lake Fish Hatchery to sort and spawn cutthroat trout, rainbow x cutthroat hybrids.

## **FISH FEED**

A total of 42,202 pounds of fish feed were fed (Appendix 5) to produce 45,677 pounds of gain (Appendix 1), for an average conversion of 0.92. Holdover rainbow trout began the year on Silver Cup, changing to Rangen's because of feed contracts. Arctic grayling were started on Bio-Kyowa larval fish feed and switched to Rangen's swim-up. All other fish were fed Rangen's from swim-up to stocking.

## **PUBLIC RELATIONS**

Approximately 4,000 people visited Ashton Hatchery this past year. About 1,500 elementary students from as far away as Idaho Falls visited the hatchery last spring, summer, and fall. Our visitor information center answers questions about the hatchery, fishing and hunting regulations, and various Idaho Department of Fish and Game (Department) policies.

Fishing was again allowed in the hatchery settling pond for kids 12 and under on Free Fishing Day. The Forest Service provided signs and personnel to assist the hatchery crew in showing the kids how to fish. The Upper Snake Region fishery personnel provided bait, hooks, bobbers, and fishing poles for the event, while conservation officers helped teach ethics and laws to the kids. Area businesses provided hot dogs, buns, condiments, and soft drinks for participants. About 250 kids took advantage of free fishing, and all caught fish. The largest fish caught weighed 14 pounds, with 15 to 20 additional fish in the 3- to 5-pound range.

## **SPECIAL PROJECTS**

### **Fish Marking**

Adipose clips were given to 20,000 of the 206,796 brook trout stocked in to Henrys Lake.

### **Regional Efforts**

Hatchery personnel assisted with firearms training for Hunter Education in Ashton. Ashton personnel also ran the Free Fishing Day program at the hatchery.

## **HENRY'S LAKE FISH SPAWNING**

The 1998 cutthroat trout run consisted of 4,677 cutthroat and 5,418 hybrid trout totaling 10,905 fish. Cutthroat males numbered 2,380 and cutthroat females numbered 2,297. Hybrid males numbered 2,788, and 2,630 females were counted. The average length for male cutthroat was 458 mm and females averaged 439 mm total length; combined. Average cutthroat total length was 448 mm. Hybrid trout males averaged 474 mm and females averaged 448 mm; combined male and female hybrid trout average length was 458 mm total length.

Cutthroat green eggs totaled 2,321,690 from 1094 females for an average fecundity of 2,122 eggs per female. Eyed cutthroat trout eggs totaled 1,399,939 for an eye up of 61.9%.

Hybrid trout green eggs totaled 721,328 from 282 female cutthroat for an average fecundity of 2,526 eggs per female. Eyed hybrid trout eggs totaled 408,695 for an eye up of 56.5%

Brook trout were not trapped or spawned at Henrys Lake this year.

## **HATCHERY IMPROVEMENTS**

The main hatchery improvements this year include the installation of a handrail at the back of the main residence to meet OSHA requirements and the completion of the snowmobile trailer.

## **FRY TRAPPING**

Creel census was not conducted this year, however a fry trapping project was undertaken by Doug Megargle and Jeff Dillon. Krey-Meekin and Bypass fry traps were installed and monitored on Howard Creek Duck Creek, Targhee Creek, and Timber Creek.

## **RIPARIAN FENCING**

The riparian areas of the creeks and of the lake itself were maintained as in past years.

## **FISH SCREENS**

The fish screens on the tributaries around Henrys Lake were maintained as in previous years. A plan is being implemented to do needed routine maintenance on a couple of screens each year as funding allows.

Appendix 1. Fish production and cost, 1998, Ashton Fish Hatchery.

Species	Size	Number of Fish	Pounds Planted	Weight Gained in 1998	Cost/lb	Cost/fish	Total Cost
<b>Fingerlings produced and stocked</b>							
Colorado rainbow	2.4	14,608	88	78.6	\$11.78	\$0.06	\$925.93
Hayspur rainbow	3.5	47,352	793	770.4	\$4.32	\$0.07	\$3,331.99
Henry's Lk cutthroat	2.1	33,258	127	115.4	\$18.15	\$0.06	\$2,095.17
Brook trout	4.3	283,693	8,087	7,987.0	\$2.75	\$0.07	\$21,965.49
Arctic grayling	1.0	10,273	8	5.4	\$116.40	\$0.06	\$628.55
<b>Totals/Average</b>	<b>3.8</b>	<b>389,184</b>	<b>9,103</b>	<b>0.0</b>	<b>\$3.23</b>	<b>\$0.07</b>	<b>\$28,947.13</b>
<b>Catchables produced and stocked</b>							
Hayspur rainbow	9.9	81,235	31,215	19,414	\$1.19	\$0.28	\$23,127.99
<b>Totals/Average</b>	<b>9.9</b>	<b>81,235</b>	<b>31,215</b>	<b>19,414</b>	<b>\$1.19</b>	<b>\$0.28</b>	<b>\$23,127.99</b>
Hayspur rainbow	8.0	84,571	0	17,918	\$0.86	\$0.18	\$15,511.02
<b>Totals/Average</b>	<b>8.0</b>	<b>84,571</b>	<b>0</b>	<b>17,918</b>	<b>\$0.86</b>	<b>\$0.18</b>	<b>\$15,511.02</b>
<b>Grand Total</b>		<b>554,990</b>	<b>40,318</b>	<b>46,288.8</b>	<b>\$1.46</b>	<b>\$0.12</b>	<b>\$67,586.14</b>



Appendix 2. Eggs and fish received and transferred during 1998, Ashton Fish Hatchery.

Species	Eggs	Fish	Fish	Destination
	Received	Received	Transferred	
Arctic Grayling	32,400	0	8,043	Statewide
Hayspur rainbow	<sup>a</sup> 191,300	0	0	Region 6
Brook trout	<sup>a</sup> 0	0	0	Henry's Lake
Henry's Lake cutthroat	35,000	0	0	Region 6
Colorado R. rainbow	0	15,000	0	Region 6
<b>Totals</b>	<b>258,700</b>	<b>15,000</b>	<b>8,043</b>	

<sup>a</sup>For stocking in 1999.

Appendix 3. Comparative growth rates, feed conversion, and percent survival for all species reared at Ashton Fish Hatchery, 1998.

Species	Average Monthly length increase	Average Conversion	Percent Survival
Rainbow (catchables)	.498	1.19	99.0
Rainbow (fingerlings)	.474	0.88	68.9
Brook trout	.456	0.90	58.3
Colorado rainbow	.352	0.88	97.4
Cutthroat	.318	0.88	95.0
Arctic grayling	.42	3.10	31.7
<b>Holdover for 1999 stocking.</b>			
Rainbow	.621	1.02	68.9

Appendix 4. Origin of fish stocked or transferred in 1998, Ashton Fish Hatchery.

Species	Source	Eggs	Fish	Destination	Stocked	Transferred	Size (in)
Hayspur rainbow	Hayspur	<sup>a</sup> 122,600	--	Region 6	81,235	--	9.9
Hayspur rainbow	Hayspur	<sup>a</sup> 68,700	--	Region 6	47,352	--	3.5
Arctic grayling	Meadow Lake WY	32,400	--	Statewide	2,230	8,043	1.0
Colorado rainbow	Hayspur	0	15,000	E.F. Lost River	14,608	--	2.4
Brook trout	Henrys Lake	<sup>a</sup> 485,900	--	Henrys Lake	283,693	--	4.3
Henrys Lake cutthroat	Henrys Lake	35,000	--	Region 6	33,258	--	2.1
<b>Total stocked or transferred</b>		<b>744,600</b>			<b>462,376</b>	<b>8,043</b>	
<sup>a</sup> Received prior to 1998.							

Appendix 5. Feed used at Ashton Fish Hatchery, 1998.

Size	Source	Pounds	Cost/lb.	Total cost
B-400 larval	Biokyowa	2.2	41.36	\$91.00
Swimup	Rangens	250.0	0.7712	\$167.86
#1 starter	Rangens	550.0	0.6927	\$381.01
#2 starter	Rangens	3350.0	0.5329	\$1,785.38
#3 starter	Rangens	8000.0	0.3280	\$2,624.00
3/32 pellet	Rangens	4000.0	0.3320	\$1,328.00
1/8 pellet	Rangens	17100.0	0.3145	\$5,377.95
4.0 mm pellet	Silver Cup	8950.0	0.2700	\$2,416.50
<b>Totals</b>		<b>42202.2</b>		<b>\$14,171.70</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**CABINET GORGE FISH HATCHERY**

**1998**

**Bradford W. Dredge, Fish Hatchery Manager I  
Bruce Thompson, Assistant Fish Hatchery Manager**

## **INTRODUCTION**

Cabinet Gorge Fish Hatchery (CGFH) is located on the south bank of the Clark Fork River in Bonner County, Idaho, approximately eight miles southeast of the community of Clark Fork. The CGFH was constructed in 1985 and was co-funded by Washington Water Power (WWP), Bonneville Power Administration (BPA), and Idaho Department of Fish and Game (Department). The primary purpose for CGFH is to produce late-spawning kokanee salmon *Oncorhynchus nerka kennerlyi* fry for release into Idaho's Lake Pend Oreille. Kokanee fry are needed to mitigate for the loss of wild kokanee recruitment caused by hydroelectric power projects in the Pend Oreille watershed. The kokanee fry release is timed to coincide with cycles of zooplankton blooms.

The CGFH is staffed with two permanent employees. Thirty-three months of temporary labor are available for use during the year. Housing accommodations include two residences for the permanent staff and crew quarters for two temporary employees.

### **Water Supply**

Cabinet Gorge Dam is located about one mile upstream from the CGFH. After its completion in 1952, artesian springs began appearing along the Clark Fork River at the present site of the hatchery. The CGFH water supply consists of approximately 4.4 cfs from a spring and approximately 20 cfs from a well field. The temperatures of the lower spring and upper well field vary inversely with each other over a 12-month period. The cooler water from the lower springs (pumps #7 and #8) were utilized to incubate eggs. A mixture of the two water sources allowed incubation and early rearing water temperatures to be maintained around 50°F (range 44.0 F to 51.5°F). Production water ranged from 38.8 °F to 49.3 °F.

The CGFH utilizes six pumps to move water to a common headbox. The lower spring and upper well field water serves the 31,000 cubic feet (cf) of rearing space in the hatchery building and the 1,500 cf of space in the adult holding ponds.

### **Rearing Facilities**

Rearing facilities at the CGFH include 192 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with a maximum capacity of 140,000 kokanee eggs each. In addition, a total of 30 upwelling incubators, which are 6 inches in diameter and 18 inches high, are available. The smaller incubators have a maximum capacity of 30,000 kokanee eggs. The 6-inch incubators may also incubate up to 6,500 fall Chinook salmon eggs. The 64 concrete raceways have rearing space of 31,000 cf. The hatchery building encloses approximately one-third of each raceway. The adult kokanee holding area consists of two holding ponds (10 ft x 30 ft each) at the head of the fish ladder. Additional adult holding is available in three holding ponds (10 ft x 30 ft each).

## **PRODUCTION**

Between January 1, 1998 and December 31, 1998, CGFH produced a total of 3,914,255 fish weighing 9,460 pounds (Appendix 1). On January 1, 1999, a total of 8,955,972 Lake Pend Oreille kokanee salmon eggs and newly hatched fry were on hand (Appendix 2). In addition, a total of 2,195,206 early kokanee salmon fry, 97,073 fall chinook salmon fry, and 928,838 rainbow trout eggs and newly hatched fry were on hand.

A total of 8,435 pounds of feed produced 8,607 pounds of gain for an overall feed conversion of 0.98. Total production cost (less capital outlay) was \$222,220.00 resulting in a cost per pound of fish of \$23.49, cost per inch of fish of \$0.0299, and \$56.77 per thousand fish (Appendix 1).

### **Lake Pend Oreille Kokanee**

#### **General Rearing**

Fertilized eggs were brought to the CGFH and disinfected in 100-ppm PVP iodine for 10 minutes. After enumeration by volumetric displacement, the green eggs were placed into upwelling incubators until eye-up. At eye-up the eggs were shocked, sorted and counted with the Jensorter JHC-114 model sorter. Fry were allowed to swim out of the incubators into the raceways at 1,500 to 1,520 temperature units. All fry were thermally mass marked via temperature manipulation in the raceways. Feed training began at 1,700 to 1,720 temperature units.

Kokanee were feed trained at approximately 50°F using Rangen Trout and Salmon starter for 17 days. Feed training continued from the 18<sup>th</sup> day to the 34<sup>th</sup> day utilizing a 50:50 mix of Trout and Salmon starter and Trout and Salmon starter #1. On day 35 the fry were placed on Trout and Salmon starter #1 only. The fry remained on Trout and Salmon starter #1 until they reached an average size of 800 fish per pound. The fry were then placed on Trout and Salmon starter #2 for the remainder of the rearing season. Release size objectives have changed from about 1.3 fry inches (1986) when the CGFH began operations to the present request of a 2-inch average size at release. To meet the request, the CGFH capacity has been reduced from 30 million fry to 16 million fry.

Egg collection lasts over two months, and a cross-section of the run is required for each release strategy. Growth rates were not manipulated during the 1998 season to achieve a universally sized 2-inch fry. The fish were reared using 38 monthly temperature units per inch of growth. For the fourth consecutive season, fish were not taken off feed or overfed to attain the average 2-inch size parameter at release. After approximately six weeks of feed training, the fry were extended in the raceway, and water temperatures were lowered to emulate natural production in Lake Pend Oreille.

A total of 2,909,071 kokanee fry were produced at an average length of 1.89 inches and an average weight of 496 fish per pound. These fish gained 5,350 pounds from 4,917 pounds of feed, resulting in a conversion rate of 0.92:1.0. Fish feed production cost was \$26.20 per pound, \$0.0301 per inch, and \$58.43 per thousand for Lake Pend Oreille kokanee. Whatcom Lake kokanee production cost was \$21.34 per pound, \$0.0225 per inch, and \$42.29 per thousand.

Survival of green eggs to feeding fry for Lake Pend Oreille kokanee was estimated at 76.9% (1997, 83.9%). Survival from first feeding to release was estimated at 98.1% (1997, 98.8%), resulting in survival from green egg to release of 75.0% (1997, 82.9%). The Lake Whatcom kokanee eggs were received at eye-up. Survival of eyed-eggs to feeding fry was estimated at 97.5%. Survival from first feeding to release was estimated at 98.2%, resulting in survival from eyed-egg to release of 95.7%.

### **Fish Marking**

To evaluate the success of a kokanee stocking program in Lake Pend Oreille, an otolith marking (Volk, et al., 1990) program was initiated at CGFH. All kokanee fry received a thermally induced otolith mark.

Otolith marking normally occurs between eye-up and button-up stages, but plumbing at CGFH precluded normal procedures due to its inability to accommodate supplying two water sources of different temperatures to the incubating eggs and sac fry. The incubation vessels, however, allowed for volitional swim-up of fry into separate rearing raceways, which were plumbed to accommodate a marking program. This situation provided the impetus to attempt marking fry at the end of the button-up.

Analysis of pre-release voucher specimens (Grimm, et al. 1998) verified the presence of a recognizable otolith mark on all thermally treated fry. The thermal marks (T-marks) from the 1997 brood were unambiguous and easy to recover from both the pre-release vouchers and the trawl specimens.

Two factors contributed to the success of the T-marking and recovery of the T-marks. The first was the ability to manipulate water sources separately in each raceway without affecting the water in the other raceways. The second was the small (less than ten days) spread of the egg takes that were in each raceway. These factors allowed CGFH personnel to thermally treat groups of fry that collectively were at the same developmental stage. That is important because it places the otolith pattern in relatively the same geographic region of the otolith, making examination for and recovery of the mark much easier.

Creating and recovering the T-mark for the 1996 and 1997 CGFH kokanee brood was successful. Adjustments to spacing between thermal events will be made to the 1998 brood T-marking effort to create artificial patterns less similar to natural daily increments patterns.

Trawl surveys in Lake Pend Oreille were conducted during September 1998. Twelve trawl hauls were made in each of three sections of the lake. There were 100 age-0 and 100 age-1 fry collected and sent to the Washington Department of Fish and Wildlife otolith lab for analysis. By examining their otolith, they were able to determine wild fry from hatchery fry. Hatchery fry made up 67% of the age-0 samples while wild fry made up the remaining 33%. Hatchery fry made up 36% of the age-1 sample while wild fry made up the remaining 64%.

The success of the program has been encouraging. The most beneficial part of the program is that it is cost effective. A total of 2.9 million fry were T-marked and no additional costs were required. In the years to follow, it will be possible to improve estimates of these year classes of fish in Lake Pend Oreille.

### **Fish Liberation**

On June 16-17, 1998, 2,483,740 kokanee fry were released into Sullivan Springs. No fry were released into the Clark Fork River during the summer of 1998.

Numbers at release were based upon Jensorter counter/sorter inventory numbers at eye-up, minus mortality. All fish were off feed for three full days before inventory pound counts were taken. Pound counts were completed on all raceways three days prior to fish being loaded onto the transport vehicles. All raceways were displaced onto the transport trucks during the Sullivan Springs release to double-check inventory numbers. Weight displacements were performed to support current fish inventory numbers on hand at the time of release.

The Sullivan Springs release group was transported in one Department tanker (3,000-gallon capacity). Loading densities of small fish in the tankers was kept below 0.60 pounds per gallon. Fish were planted below the bridge on the access road to the Department patrol cabin. One tanker made four releases during the period of June 16 through 17, 1998.

### **Other Species**

On April 30, 1998, a total of 748,316 rainbow trout were transferred to the Hagerman State Fish Hatchery. The fry averaged 480.9 fish per pound and had attained a length of 1.72 inches. In addition, on April 30, 1998, a total of 159,299 kamloop trout were transferred to the Hagerman State Fish Hatchery. The fry averaged 585.7 fish per pound and had attained a length of 1.62 inches.

On June 16, 1998, a total of 11,436 fall Chinook salmon were planted into Deadwood Reservoir, a total of 17,141 fall Chinook salmon were planted into Lucky Peak Reservoir, and a total of 16,692 fall Chinook salmon were planted into Arrowrock Reservoir. The fish averaged 55 fish per pound and had attained a length of 3.92 inches.

On June 18, 1998, a total of 52,300 fall chinook salmon were planted into Coeur d'Alene Lake. The fish averaged 55 fish per pound and had attained a length of 3.92 inches.

On June 16, 1998, a total of 75,295 kokanee salmon were planted into Lucky Peak Reservoir. The fry averaged 485.78 fish per pound and had attained a length of 1.9 inches. The fry originated from Lake Whatcom stock.

On June 19, 1998, a total of 144,190 kokanee salmon were planted into Salmon Falls Creek Reservoir; a total of 125,304 kokanee salmon were planted into Island Park Reservoir; and a total of 70,824 kokanee salmon were planted into Ririe Reservoir. In addition, a total of 9,715 kokanee salmon were distributed into Deep Creek, Devil's Creek, and Montpelier Reservoirs. The fry originated from Lake Whatcom stock.

## **HATCHERY IMPROVEMENTS**

### **Repairs and Improvements**

- Occupational Safety and Health Administration (OSHA) safety materials were purchased and installed during the 1998 season. Metal grating was installed in the hatchery building for wheelchair access. The hatchery bathroom sink and handrail were modified to comply with changing regulations. In addition, the piping under the sink was insulated and an elevated toilet seat was made available. A new concrete slab was installed at the main entryway to the hatchery for handicap access. Handicap signs were installed to direct handicap vehicles to designated parking areas.
- The Residence #2 wooden deck was improved and a sliding glass door was installed in the master bedroom.
- Residence #1, residence #2, and the generator #2 building were painted during the summer of 1998.
- Two new shelves were installed in the hatchery bathroom cupboard.
- Raceway baffle storage racks were constructed and installed in the feed storage building. In addition, a new tool rack was installed.
- A new Cabinet Gorge Hatchery brochure was designed and made available for distribution. Local clubs donated the funding for the set-up and printing of the brochures. A total of 7,000 brochures were on hand at the hatchery during the fall of 1998.
- A total of three ball valves were replaced in the hatchery building during the fall of 1998.



- Eleven new adult fish measuring boxes were constructed at the hatchery and donated to weigh stations that serve the Lake Pend Oreille Idaho Club. Two additional boxes remain at the hatchery.
- All four 50 H.P. turbine motors had oil changes during the summer of 1998.
- All department vehicles, tractors, and small engines were serviced regularly and repaired as needed.
- Back-up generator #1 was load tested weekly and maintenance checked daily during operations. Generator #2 was operated weekly (with no load) and load tested monthly (with pump #8 only).
- The pac column by the upper adult holding ponds was modified to adequately degas the 4-6 CFS of water. The original pac column was far from adequate for the volume of water passing through it.
- A modification to the Sullivan Springs/Granite Creek catwalk was completed during the fall of 1998. The catwalk was completely rebuilt and safety guardrails were installed.
- All of the CGFH fire extinguishers received annual servicing. In addition, the Stancraft boat engine fire extinguisher was serviced.
- All of the upwelling incubators were standardized to eliminate old, experimental incubators that had been modified during previous years. All incubator manifolds were rebuilt, perforated plating checked, and floor maintenance buffing pads checked. New pads were purchased and installed in a large portion of the incubators. The remaining incubators will have new pads installed during the 1999 season.
- A total of 128 square feet of additional shelving was installed adjacent to the upper adult holding ponds. The area will supply hatchery personnel with additional space for the storage of materials and supplies.
- Generator #1 was load tested on September 2, 1998 by Intermountain Generator Service. In addition, generator #1 was serviced (oil, antifreeze) after the load testing was completed.
- Supplies for the new headbox catwalk were received during 1997. The new catwalk was installed during the summer of 1998. The electrical conduit supplying power to the alarm system was modified so that the project could be completed.
- Pumps 2-8 had the electrical contacts checked, cleaned, and replaced if necessary in the fall of 1998. Cedar Street Electric of Sandpoint, Idaho performed the work.

## **HATCHERY RECOMMENDATIONS**

Inadequate amounts of available warm water (50°F) during the production months remain the limiting factor for fish production. Although the upper well field can yield up to 20 cfs, it is too cold during the production cycle. Warmer water from the lower springs must be added to temper the upper well field water. Unfortunately, only 4.4 cfs is available from the lower springs. It has been proposed that an additional pumping station be installed on the lower spring's pipeline to help lift or push the water up to the CGFH headbox. The additional station could add approximately 1.6 cfs of warm water to the current system. The lower springs collect approximately 6 cfs of available water but the means to pump it is unavailable. Currently, generator #1 backs up a total of 19.4 cfs (pumps #8, #7, #6, #5, and #4) and a total of 7.2 cfs is backed up by generator #2 (pumps #3 and #8).

## **FISH SPAWNING**

### **Fish Trapping**

The Clark Fork River fish trap was in operation from August 26, 1998 to December 29, 1998. The first adult kokanee entered the trap on September 25, 1998, and trapping and spawning continued through the end of December. There were 3,876 adult kokanee trapped. Spawntaking records indicated 34.65% (50% in 1997, 70 fish trapped) of the spawning run was female (1,058). From August 26, 1998 to October 12, 1998 the trap was used to collect and sample bull trout. A total of 38 adult bull trout were trapped, tagged, and released.

The Sullivan Springs trap was in operation from October 19, 1998 to December 28, 1998. The Sullivan Springs trap collected 88,120 adult kokanee salmon. Of these, 10,614 adults were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records showed that 37.36% (24.75% in 1997) of the run was female (27,497).

### **Spawntaking and Eggs Received**

Clark Fork River kokanee spawntaking began on November 9, 1998 and continued to December 23, 1998. Spawntaking activities occurred from November 4, 1998 to December 24, 1998 at the Sullivan Springs collection facility.

A total of 8,955,972 green fertilized kokanee eggs were collected during the 1998-1999 spawning season. Of those, 324,926 (7,851 in 1997) were obtained from 1,058 female kokanee at CGFH, and 8,631,046 (593,810 in 1997) were obtained from 27,497 female kokanee at the Sullivan Springs trap.

## **FISH FEED**

The fish produced during 1998 were fed a total of 8,435 pounds of feed. All fish feed was acquired from Rangen Inc.. The overall conversion was .98 pounds of feed to produce one pound of fish, not including the weight of mortality (Appendix 2).

## **PUBLIC RELATIONS**

The surrounding communities recognize the CGFH as the major contributor of kokanee to the Lake Pend Oreille fishery. The importance of this local fishery to the local economy is presently estimated at over five million dollars. The CGFH has been the focus of many radio, television, and newspaper stories in recent years. With the decline of kokanee numbers in recent years, even more attention is focused on the CGFH. Because of the popularity of the lake and its attractions, tourism is a booming business, and we have people from all over the world visiting the CGFH.

A total of 300 people signed our guest registration book during 1998. An estimated 550 visitors toured the CGFH during the 1997 season. In addition, tours were given to school groups and other organizations.

The CGFH held an open house on May 16, 1998. It was the second open house since the CGFH began operations in 1986. A total of 50 people toured the CGFH on that Saturday. Most of them were local residents from Northern Idaho, Western Montana, and Eastern Washington.

## **ACKNOWLEDGMENTS**

The CGFH staff would like to thank the Cabinet Gorge Dam personnel for their continued cooperation with hatchery operations. Thanks also to the Lake Pend Oreille Idaho Club, Bonner County Sportsmen's Association, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season.

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## Appendix 1. Production summary for Cabinet Gorge Fish Hatchery, all species, 1998.

Species	Number	Pound	Length	Fish/ Lb.	Feed Fed	Feed Cost	Annual Cost	Cost/lb Of fish	Cost/1000 fish	Cost/inch Of fish	Conv.
PDO kokanee	403,771	900	1.94	448	896	\$ 578.49	\$ 23,593.06	\$ 26.20	\$ 58.43	0.0301	1.08
Whatcom kokanee	2,505,300	4,965	1.88	505	4,022	\$ 2,597.89	\$ 105,951.41	\$ 21.34	\$ 42.29	0.0225	0.89
Wash.FC	94,989	1,710	4.93	56	2,025	\$ 1,308.02	\$ 53,345.87	\$ 31.20	\$ 561.60	0.1433	1.24
CdAFC	2,580	57	5.32	45	78	\$ 50.07	\$ 2,041.83	\$ 35.82	\$ 791.41	0.1880	1.41
Rainbow trout	748,316	1,556	2.73	481	1,188	\$ 767.13	\$ 31,286.16	\$ 20.1	\$ 41.81	0.0243	0.90
Kamloops trout	159,299	272	2.63	586	228	\$ 147.16	\$ 6,001.67	\$ 22.06	\$ 37.68	0.0233	0.96
<b>Totals/Average</b>	<b>3,914,255</b>	<b>9,460</b>	<b>2.55</b>	<b>353.5</b>	<b>8,437</b>	<b>\$ 5,448.76</b>	<b>\$ 222,220.00</b>	<b>\$ 26.12</b>	<b>\$ 255.54</b>	<b>0.07</b>	<b>1.08</b>

## Appendix 2. Lake Pend Oreille kokanee spawntaking summary, 1998.

Spawntaking site	Total fish	Females spawned	Green eggs	Fecundity	Percent females
Sullivan Springs	88,120	27,497	8,631,046	314	37.36%
Cabinet Gorge	3,876	1,058	324,926	307	34.65%
<b>Totals/Average</b>	<b>91,996</b>	<b>28,555</b>	<b>8,955,972</b>	<b>314</b>	<b>35.41%</b>

Total fish includes male/female prespawn mortality.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**CLARK FORK FISH HATCHERY**

**1998**

**John Thorpe, Fish Hatchery Manager II**

## INTRODUCTION

The Clark Fork Fish Hatchery (CFFH) is a resident species hatchery located on Spring Creek, 1.5 miles northwest of Clark Fork, Idaho. Originally constructed by the Work Project Administration in 1934 and completed in 1938, the CFFH is now funded for operation by Idaho Department of Fish and Game (Department) license fees. Water diverted from Spring Creek provides for incubation and rearing, with flows of 8 to 15 cubic feet per second (cfs) at temperatures averaging 41°F in winter and 48°F in summer. A well provides approximately 100 gallons per minute (gpm) of 45°F water to one bank of incubators. The well water can be directed to fiberglass rearing troughs and concrete vats, or mixed with Spring Creek water in the head box. Rearing units include Heath incubator stacks, concrete and fiberglass early rearing vats, concrete raceways, and earthen broodstock ponds. Approximately 15,000 westslope cutthroat trout *Oncorhynchus clarki lewisi* broodstock are held on station, providing the state's largest captive source of westslope cutthroat eggs. In addition to westslope cutthroat, brook trout *Salvelinus fontinalis*, brown trout *Salmo trutta*, golden trout *O. aguabonita*, Kamloops rainbow trout *O. mykiss*, Arctic grayling *Thymallus arcticus*, and kokanee *O. nerka kennerlyi* are reared for distribution in the waters of the Panhandle Region. A target goal of 125,000 rainbow trout >9 inches are distributed to the put-and-take fishery from March through October. For the 1998 plants, 42,498 of these trout were transported from production hatcheries in southern Idaho and 92,013 fish were grown locally.

## FISH PRODUCTION

Trout production at the CFFH now addresses four different objectives: 1) maintenance of a captive westslope cutthroat trout broodstock of 15,000 adults to spawn at age 4 and 5 years; 2) production of 263,500 westslope cutthroat trout and 270,000 domestic Kamloops trout to six inches or greater for large lake stocking; 3) rearing 60,000 westslope cutthroat trout and various other salmonid species to less than three inches for release in mountain and lowland lakes; and 4) rearing 140,000 rainbow trout for the put-and-take fishery in the Panhandle Region (Appendix 1). Eggs are collected on station (Appendix 2), as well as received from public and private sources.

The broodstock management plan has been altered over the past several years to better serve changing management programs. The broodstock population is an adfluvial strain of westslope cutthroat originally obtained from north Idaho waters. Eggs were collected from April 23 to May 15, 1998. The spawning operation was stopped after two million eggs had been collected, although additional ripe females remained. Current protocol includes a final spawn session where all females are stripped to remove ripe eggs. The average length of the broodstock population observed in 1998 was 12.5 inches (range 11.08-14.19 inches).

During 1998, 145,189 (10,725 lbs) BY96 6-inch-plus westslope cutthroat trout were released three months early to reduce feeding costs. As in previous years, 101,563 (3,930 lbs) BY97 6-inch westslope cutthroat trout were stocked into Hayden Lake in September. Growth rates have continued to produce the same 6-inch fish by September each season. In September, 296,055 (16,050 lbs) domestic Kamloops rainbow trout were released into Hayden Lake.

The mountain lake stocking programs utilized westslope cutthroat trout and domestic Kamloops fry from BY98. Lakes in the Panhandle received 38,141(15.46 lbs) westslope cutthroat trout and 17,250 (12.84 lbs) domestic Kamloops rainbow trout. Lowland lakes were stocked with 26,849 (631 lbs) Henrys Lake brook trout.

There were 189,124 (67,175 lbs) rainbow trout (>9 inches) stocked or transferred by the CFFH in 1998. Of these, 146,626 (53,893 lbs) trout were reared on station, while another 42,498 were received from the American Falls Fish Hatchery.

Annual costs to rear fish from Clark Fork Fish Hatchery are listed in Appendix 3. The total cost to rear fish for 1998 was calculated by averaging the FY97 and FY98 budgets to obtain a cost for calendar year 1998. The costs at Clark Fork included transportation of all put-and-take rainbow trout to the Mullan Hatchery for redistribution. The cost to rear fish on station, and additional costs incurred to deliver these fish to the release site are separated in Appendix 3.

### **HATCHERY IMPROVEMENTS**

- The major improvements to operations during 1998 were some much-needed upgrades to equipment. A new two 1/2-ton diesel-powered fish transport truck was acquired. This vehicle has reduced fuel costs by over 50% during the year.
- We also received a used Pacific fish pump from the Nampa Fish Hatchery. The equipment is a welcome addition to the Clark Fork program and replaces a much older machine that was badly in need of repairs.
- A new, permanent mortality disposal pit was constructed this year. We obtained the top half of a large concrete septic tank and buried it to create a biodegrading leach system. This should eliminate the requirement of digging new pits every few years.
- There were no funds for construction repairs or modifications during 1998.
- Major construction needs include:
  - A high priority requirement for a pump and piping to supply pathogen-free water for rearing broodstock, eggs, and fry from the well drilled in 1989. The well tested at 1,000 gpm and then was capped.
  - Construction of concrete broodstock ponds to replace the earthen ponds now in use.
  - The construction of a heated, weather-tight garage for storage of vehicles and grounds maintenance equipment. The requirement for a covered area for vehicle maintenance still exists. At this time, repairs and modifications on truck-size vehicles must be performed out in the open without even a paved surface under the vehicle.



## **FISH STOCKED AND TRANSFERRED**

The CFFH program distributes fish in the Panhandle Region as directed by Department fishery management. The program includes distributing rainbow trout for put-and-take fisheries; distributing brown, brook and cutthroat trout fingerlings for put-grow-and-take fisheries; distributing brook, cutthroat, golden, and Kamloops trout fry and Arctic grayling to remote sites; and redistributing warm and cool water game fish into the Panhandle Region.

The CFFH personnel stocked 134,511 (51,267 lbs) size three (>9 inches) rainbow trout to waters of the Panhandle Region, north of Coeur d'Alene, from March to October 1998. Of these, 42,498 (13,282 lbs) trout were received from the American Falls Fish Hatchery and 92,013 trout were reared from egg to release at the CFFH and stocked to the put-and-take fishery. In 1998, 54,613 (15,908 lbs) rainbow trout were reared for release from the Mullan Hatchery.

Releases of westslope cutthroat trout and Kamloops rainbow trout were delivered to 19 mountain lakes by backpack and U.S. Forest Service helicopter this year.

There were no westslope cutthroat trout transferred for rearing in net pens on Lake Pend Oreille in 1998. Problems with predators had made the program non-productive the prior year. Subsequent reductions in staffing made it almost impossible to devote time to off station projects. Several volunteers from local sportsmen's groups and the local Conservation Officer had indicated a desire to resurrect the program but timing, weather, and manpower reductions precluded setting net pens again this year.

## **FISH SPAWNING**

The CFFH maintains a captive westslope cutthroat trout broodstock population to provide for needs within the Panhandle Region. Inability to maintain a disease-free population prevents transfer of eggs or fish to other regions. Presently, approximately 15,000 two- to four-year-old brood fish are held to spawn in their fourth and fifth year. This provides a potential for taking two million green eggs, yielding from 1 to 1.5 million eyed-eggs. During past years, the egg requirement has varied substantially. Fish requirements have ranged from over one million "button up" fry for nursery stream release to 150,000 to 350,000 two-year-old, six-inch fish for release in large lakes. To maintain a broad range of flexibility for fishery management staff, the broodstock population has been held to meet the high-end requirement. Excess fry are released to comply with regional preference, when annual population analysis and stocking requirements have been completed.

During the 1998 spawning season, 2,042,712 eggs were collected (Appendix 2). Average fecundity of 2,488 females was 820 eggs/female. A saline diluent was utilized during fertilization, and buffered iodophor disinfection solutions were used to water-harden eggs. A 70% eye-up occurred, resulting in 1,439,090 eyed eggs.

## **FISH FEED**

Production feed was purchased from Rangen Inc. (Buhl, ID) in compliance with Idaho State contracting procedure. The feed projection program uses Haskell's formula with Delta L adjusted for expected monthly water temperature. Data on Spring Creek daily water temperature has been collected since 1980, and feed tests employing a variety of diets, feed delivery techniques, and rearing densities since 1989 have been used to institute the current program. Feed utilized and total cost during 1998 is found in Appendix 4.

## **PUBLIC RELATIONS**

Public relations efforts in 1998 were similar to those of previous years with a high level of interaction with the public. Hatchery personnel made an active effort to talk with as many of them as possible. As always, numerous tours were scheduled and provided to public and private school groups as well as to families. A visitor information pamphlet provides a summary of information to complement the Visitor Information Center and has been well accepted by the public.

The CFFH was utilized again as a site for a Free Fishing Day angler's clinic with 200 participants. Staff from the three local hatcheries, the local Conservation Officer, and volunteers took part in the all-day event. We also opened the hatchery settling pond for fishing. We had selected four- and five-year westslope cutthroat brood fish during the spawning season and stocked those to the settling pond as samples of native Idaho fish. The public actively participated in this Free Fishing Day experience with many younger anglers catching their first fish.

The hatchery staff attended public hearings and sportsmen's club meetings in an effort to inform them of the Department's programs and policies. The mountain lake stocking program was completed in cooperation with the Boundary County Backpackers, the Rocky Mountain Academy, and Department reservists.

## **FISH HEALTH/CONDITION PROFILE**

Due to reductions in manpower, the assessment of fish health condition profiles was not conducted. This program, which was started two years ago to monitor changes concerning different rearing programs to facilitate production of higher quality fish for release, has been suspended.

## **ACKNOWLEDGMENTS**

The CFFH would like to thank the Boundary County Backpackers Club, Rocky Mountain Academy, as well as Panhandle regional personnel for packing fish to mountain lakes. Thanks also to the hatchery staff Bio-aides Sarah Aavedal and John Suhfras.

## Appendix 1. Fish production at the Clark Fork Hatchery, January 1, 1998 to December 31, 1998.

Species/Strain	Source	Beginning number	Beginning pounds	Ending number	Ending pounds	Number stocked	Pounds stocked	Destination
Brook trout, BY97	Henry's Lake	0	0.00	0	0	14,028	318	lowland lakes
Westslope cutthroat, BY93	Clark Fork	5,719	6,650.00	4,468	5,256	0	0	Broodstock
Westslope cutthroat, BY94	Clark Fork	7,289	4,556.00	4,382	3,478	0	0	Broodstock
Westslope cutthroat, BY95	Clark Fork	10,230	4,092.00	9,427	8,893	0	0	Broodstock
Westslope cutthroat, BY96	Clark Fork	133,929	8,641.00	9,954	1,778	145,189	10,725	Lake Pend Oreille
westslope cutthroat, BY97	Clark Fork	593,296	2,181.00	125,483	7,514	286,136	9,004	lowland lakes
Westslope cutthroat, BY98	Clark Fork	0	0	405,933	2,081	475,449	1,040	Mountain lakes,streams
Arctic grayling, BY95	Wyoming	447	67.00	447,287	78	0	0	
Kamloops rainbow,BY96	Hayspur	75,590	4,784.00	0	0	72,217	25,594	Put and Take
Kamloops rainbow, BY97	Hayspur	173,569	70.00	62,102	5,308	96,560	3,400	Hayden Lake
Kamloops rainbow,BY97	American Falls	180,218	507.00	63,293	7,535	509,910	29,500	Lowland Lakes
Kamloops rainbow,BY96	Trout Lodge	59,670	13,566.00	2,080	2,375	46,606	18,707	Put and take
Kamloops rainbow, BY97	Trout Lodge	20,481	196.00	18,323	4,759	0	0	Put and Take
Colorado R rainbow, BY96	Nampa	11,430	728.00	0	0	8,090	1,975	Put and Take
Hayspur rainbow, BY96	American Falls	41,615	19,817.00	0	0	42,498	13,282	Put and Take
Hayspur rainbow, BY96	Hayspur	13,477	1,271.00	0	0	54,422	1,400	Put and Take
Hayspur rainbow, BY98	Hayspur	0	0	172,126	51	0	0	Hayden Lake

## Appendix 2. Spawning summary, Clark Fork westslope cutthroat, January 1, 1998 to December 31, 1998.

Stock	Females spawned	Number of eggs collected	Average fecundity	Percent eye-up	Eyed eggs
Clark Fork	2,488	2,042,017	820	70	1,439,090

## Appendix 3. Cost of fish produced at the Clark Fork Hatchery, January 1, 1998 to December 31, 1998.

Species	Numbers Produced	Pounds Produced	Pondside Cost to Produce	Pondside Cost/1,000	Pondside Cost/lb	Streamside Delivery Cost	Streamside Cost/1,000	Streamside Cost/lb
Henry's Lake brook trout,3-5 inches	14,028	318	\$12,000.00	\$855.43	\$37.74	\$500.00	\$891.07	\$39.31
westslope cutthroat,BY93,BY94, BY95, BY96 >6 inches	157,731	5,261	\$12,000.00	\$76.07	\$2.28	\$1,000.00	\$79.25	\$2.38
westslope cutthroat, BY97, 2-5 inches	411,619	14,334	\$45,000.00	\$109.32	\$3.14	\$3,500.00	\$117.83	\$3.38
westslope cutthroat, BY98, <2 inches	881,382	3,121	\$11,000.00	\$12.48	\$3.52	\$1,000.00	\$13.61	\$3.84
Grayling,>2 inches	287	11	\$2,000.00	\$6,968.64	\$181.81	\$0.00	\$0.00	\$0.00
Hayspur Kamloops CF BY98	453,779	159	\$4,000.00	\$8.81	\$25.16	\$0.00	\$0.00	\$0.00
Hayspur Kamloops AF BY97	573,203	35,766	\$25,000.00	\$43.61	\$0.70	\$4,000.00	\$50.50	\$0.81
Hayspur Kamloops CF BY97	158,662	8,638	\$15,000.00	\$94.54	\$1.74	\$5,000.00	\$126.05	\$2.32
Hayspur Kamloops, BY96	104,555	29,848	\$20,000.00	\$191.28	\$0.67	\$5,000.00	\$239.11	\$0.84
Trout Lodge Kamloops, BY96	57,542	11,211	\$15,000.00	\$260.68	\$1.34	\$9,000.00	\$417.09	\$2.14
Trout Lodge Kamloops, BY97	18,323	4,563	\$10,000.00	\$545.76	\$2.19	\$0.00	\$0.00	\$0.00
Colorado R rainbow, BY96	8,090	1,247	\$12,000.00	\$1,483.31	\$9.62	\$2,000.00	\$1,730.53	\$11.23
Hayspur rainbow, BY98	172,126	51	\$10,000.00	\$58.10	\$196.08	\$0.00	\$0.00	\$0.00
Hayspur rainbow , BY96	13,419	1,909	\$25,000.00	\$1,863.03	\$13.10	\$1,000.00	\$1,937.55	\$13.62
<b>Total</b>	<b>3,024,746</b>	<b>116,437</b>	<b>\$218,000.00</b>	<b>\$72.07</b>	<b>\$1.81</b>	<b>\$27,000.00</b>	<b>\$86.45</b>	<b>\$2.19</b>

Appendix 4. Fish feed used in 1998 at Clark Fork Fish Hatchery.

Size	Source	Pounds	Cost/lb	Total Cost
Rangen Starter #0	Rangen	781.1	\$0.63	\$ 490.77
Rangen Starter #1	Rangen	2,097.4	\$0.55	\$ 1,154.47
Rangen Starter #2	Rangen	5,566.4	\$0.62	\$ 3,457.95
Rangen crumbles #3	Rangen	29,018.3	\$0.61	\$17,746.28
Rangen crumbles #4	Rangen	17,040.6	\$0.39	\$ 6,568.47
Rangen grower 3/32	Rangen	2,666.7	\$0.40	\$ 1,066.68
Rangen grower 1/8	Rangen	14,083.0	\$0.39	\$ 5,490.03
Rangen grower 5/32	Rangen	49,479.8	\$0.39	\$19,155.04
Rangen grower 5/32	Rangen	3,939.5	\$0.43	\$ 1,674.29
Rangen brood 3/16	Rangen	4,864.6	\$0.41	\$ 1,994.65
<b>Totals</b>		<b>129,537.4</b>		<b>\$58,798.62</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**CLEARWATER FISH HATCHERY**

**1998**

**Scott Patterson, Assistant Fish Hatchery Manager**

## **INTRODUCTION**

The Clearwater Fish Hatchery (CFH) is located in the small community of Ahsahka in Clearwater County, Idaho. Ahsahka is a Native American word meaning, "where two rivers join," referring to the confluence of the North Fork of the Clearwater River to the main Clearwater River. The hatchery was built by the Army Corps of Engineers under the United States Fish and Wildlife Service (USFWS) Lower Snake River Compensation Plan (LSRCP) and was completed in 1991. Funding is provided by the USFWS, which owns the facility. The hatchery is operated by the Idaho Department of Fish and Game (Department).

The primary purpose of Clearwater Fish Hatchery is mitigation for anadromous fish losses due to hydroelectric dams. Anadromous fish production has yet to reach full capacity; therefore, the facility can use excess rearing containers for rainbow trout *Oncorhynchus mykiss* production.

The Department funded the resident trout program with \$34,957.00. Permanent staff salaries (estimated at \$32,000.00) were funded by the LSRCP project.

The hatchery water source is a double pipeline from Dworshak Dam, which can supply over 70 cubic feet per second (cfs) of reservoir water to the facility. Two intakes are at the dam. The primary intake is adjustable (5- to 50-feet) to collect surface water, and the secondary intake is about 200 feet below full pool level. This design allows mixing of water to target a specific temperature. About 5% of the rearing capacity are used for rainbow trout production.

## **FISH PRODUCTION**

### **Release Year 1998**

#### **Rainbow Trout**

The CFH produced 216,805 catchable-sized (3.1 fpp) rainbow trout (R1) that were released in 1998. Survival from January 1, 1998 to release was 89%; therefore, only 98% of the requested allocation were met.

The CFH traded 30,000 fish with Nampa. Nampa Fish Hatchery (Nampa) stocked Winchester, Mann Creek and Spring Valley reservoirs with 10,000 fish each for May allocations. In exchange, we stocked Dworshak Reservoir with an equal number of fish planted with the 2-ton truck in remote accesses along the lower third of the reservoir.

#### **Westslope Cutthroat**

The CFH stocked 7,475 fish (6.2 fpp) weighing 1,200 pounds. Survival from eyed-eggs received was 22.3%.

A catchable sized (9- to 10-inch) westslope cutthroat was not produced in 12 to 16 months of rearing. Small groups of fish are not provided with the technical supervision necessary to make these programs efficient.

## **Release Year 1999**

There were 140,382 trout (Hayspur stock) weighing 30,517 pounds (4.6 fpp) are on hand for catchable allocations during 1999 (Appendix 1). Approximately 75,000 fish will be reared at Nampa and transferred to CFH in April 1999 to meet Clearwater Region requested allocations.

### **Hayspur Stock**

The CFH received two groups of eyed eggs from Hayspur. Survival from the first group of 375,000 eggs was 91% to hatch, 46% to first feed, and 31% to date. Survival from the second group of 50,072 eggs was 93% to hatch, 55% to first feeding, and 51% to date. Starting these fish on feed was difficult, with the majority of mortality occurring during the first six weeks of feeding.

### **FISH FEED**

A total of 54,844 pounds of feed was purchased in 1998 for rainbow and cutthroat trout (Appendix 2). Feed was primarily purchased from Rangen Inc. (Buhl, ID), and medicated feed from BioOregon (Warrenton, OR), for an average cost of \$0.38 per pound. Feed conversion for the year was estimated at 1.19. An additional 19,000 pounds of surplus feed was transferred to the project at no cost, for a total of 73,844 pounds of feed fed.

### **FISH STOCKED AND TRANSFERRED**

The CFH personnel stocked 216,805 rainbow trout and 7,475 westslope cutthroat in streams and reservoirs of the Clearwater Region in 1998. The rainbows averaged 3.16 fpp, weighed 68,581 pounds and averaged 9.3 inches in length. The cutthroat trout were planted in three reservoirs and averaged 6.2 fpp, weighed 1,200 pounds and averaged 7.6 inches in length. An additional 2,575 rainbow reared at Dworshak Hatchery were stocked in Soldiers Meadow and Spring Valley Reservoirs.

This year was difficult for fish stocking. High water delayed most of the stream stocking until late June or early July. High temperatures prevented stocking in August and September in Lewiston's Levee Pond, and Fenn Pond on the Selway River. Additional changes occurred with the outlet construction on Moose Creek Reservoir. Moose Creek was stocked in May, but June and October fish were reallocated to other regional waters. Flexibility in release dates and fish numbers was imperative for successful stocking of 29 sites in 127 trips.



## **PUBLIC RELATIONS**

The CFH and its satellites had several thousand visitors during the year.

Hatchery personnel set up a booth at the Kiwanis Kids Spring Fair at Orofino Elementary School. Scheduled tours were given to a group of 96 students from Canada and the Lewis and Clark Headstart School.

Hatchery personnel were involved in the "Stand Down and Listen" week. Presentations were given to the Orofino Chamber of Commerce, local Kiwanis, and the State Hospital North. The hatchery also had an open house during this week and assisted at booths at the Riverside Sports Shop and Wild Bill's Sporting Goods.

The permanent staff also assisted at the Clearwater County Fair and Lumberjack Days in September. Most issues included the zone elk tags and new department funding sources.

Free Fishing Day was a success with the grand opening of Karolyns Pond near the Red River adult trap facility. Hatchery personnel provided a fishing clinic and fish fry for the local kids. A slide show was given at the Northwest Fish Culture Conference on this project. Other fishing activities included assisting Dworshak Hatchery during their annual open house.

## **SPECIAL PROJECTS**

A total of 265 adult size fish, 3- to 8-pounds were recovered from the settling pond. The crew supplemented 12 release sites in 20 trips with these large fish. This was also included in a slide show presented at the Northwest Fish Culture Conference.

The hatchery crew finished the new put-and-take fishing pond using part of the old rearing pond at Red River Satellite. The pond was completed through a cooperative effort with the Idaho Fish and Game Clearwater Region, the Red River District of the Forest Service, CH2M Hill, Hahn Supply, Grassland West, Valeria Yost, Lower Snake Compensation Program, Idaho County Road Department, Mark Vafiades, Pepsi-Cola Company, and Potlatch Corporation.

## **FISH HEALTH**

Fish allocated for fall 1998 stocking were treated with Oxytetracycline (OTC) for columnaris in July at 10g/100 pounds of fish, i.e., Investigational New Animal Drug (INAD) levels. Fish responded to the treatment with mortalities returning to normal during the treatment. Fish were released 100 days post treatment.

Appendix 1. Clearwater Hatchery resident fish production, January 1 through December 31, 1998.

	<b>Number</b>	<b>Weight</b>	<b>Feed Fed</b>	<b>Conversion</b>	<b>Cost/Pound</b>	<b>Cost/1000 Fish</b>
Rainbow on hand 1/1/1998	244,176	37,933				
Cutthroat on hand 1/1/98	13,383	452				
CatchableRBT Liberated	216,825	68,581				
Cutthroat Liberated	7,475	1,200				
Rainbow on hand 12/31/98	140,592	30,517				
<b>Production</b>	<b>364,872</b>	<b>61,913</b>	<b>73,844</b>	<b>1.19</b>	<b>\$.56</b>	<b>\$95.80</b>

Estimated costs include 50% of the FY98 and FY99 budgets, but do not include permanent salaries.

Appendix 2. Fish feed purchased and costs for the Clearwater Hatchery rainbow program, January 1 through December 31, 1998.

<b>Source</b>	<b>Feed Size</b>	<b>Pounds</b>	<b>Cost/Pound</b>	<b>Total Cost</b>
Rangen	Coarse Crumble	2,500	\$.3330	\$832.50
Rangen	3/32	45,000	\$.3308	\$14,917.00
Rangen	1/8	5,000	\$.3225	\$1,612.50
BioOregon	2.0mm – med (OTC)	1,276	\$1.52	\$1,471.36
BioOregon	4.0mm – med (OTC)	968	\$1.52	\$1,939.52
<b>Totals</b>		<b>54,844</b>	<b>\$.3788</b>	<b>\$20,772.88</b>

19,000 pounds of feed was transferred to this project at no cost (not included in above table.)

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
GRACE FISH HATCHERY  
1998**

**Steve Wingert, Fish Hatchery Manager  
Dwight Aplanalp, Assistant Hatchery Manager**

## INTRODUCTION

Grace Fish Hatchery (GFH) is owned and operated by the Idaho Department of Fish and Game (Department) and is funded by license sales. The GFH was constructed in 1946 and is located seven miles south of Grace, ID.

The objective of the GFH is to produce catchable and fingerling rainbow trout *Oncorhynchus mykiss* for stocking, primarily in southeast regional waters. The GFH also produces several specialty species of trout of various sizes to meet statewide requests.

Middle and West Whiskey Creek Springs supply water to the GFH. Flow was down approximately 45 gallons per minute from last year with an annual average of 15.4 cubic feet per second (cfs). There is a natural fluctuation in water quantity basically opposite that from run-off and GFH biomass. Flows are at a minimum in May and June and peak in October and November. The GFH biomass is at maximum in May and at minimum in October. Water temperature is a constant 52° F.

Fish rearing space consists of sixteen (3 ft x 1.5 ft x 13 ft) single pass GFH building vats, sixteen (4 ft x 3.5 ft x 40 ft) single pass small raceways, four (4 ft x 3.5 ft x 100 ft) single pass medium raceways, and six (14 ft x 2 ft x 300 ft) large raceways. The water for the large raceways is second-use water from the vats and small and medium raceways that is mixed with fresh water from the middle spring. All GFH water flows through a settling pond before being discharged into Whiskey Creek.

The GFH is staffed with a Fish Hatchery Manager I and an Assistant Fish Hatchery Manager. The GFH Culturist position has been left vacant indefinitely due to budget constraints. Up to two temporary employees may be hired to assist with the various projects.

The Blackfoot River fish trap, which used to be operated by GFH, is no longer being operated due to budget restraints.

## FISH PRODUCTION

The GFH began the 1998 calendar year with 531,450 fish weighing 53,258 pounds. During 1998, 978,215 eggs of various species were received. 1,069,133 fish (118,815 pounds) were planted and 2,000 fish (952 pounds) were transferred during the year. At the end of the year, there were 196,577 fish at (56,574 pounds). This accounts for a total production of 1,253,197 fish (122,311 pounds) (Appendices 1,3).

All of the fish produced at GFH were received as eyed eggs from various state and federal hatcheries (Appendix 2).

Rainbow trout, fingerlings, and catchables combined accounted for 86% of the total pounds produced but only 68% of total cost, or \$1.21 per pound. The specialty species combine for the remaining 14% of the pounds produced and 32% of total cost, or \$3.49 per pound (Appendix 3). This increased cost is due to the higher cost of soft-moist fish food the specialty species require.

Production costs, excluding capital outlay, were \$172,613. The GFH also spent \$14,208 from Ririe Reservoir's budget. The grand total expenditures for 1998 were \$186,821.

Fish food cost for each lot, or group, of fish was used to generate total production cost for that lot. For example, rainbow catchables were fed \$37,333.25, or 57.5% of the total fish food expenditures of \$64,962.68. Administrative costs were total budget minus capital outlay minus fish food cost ( $\$186,821 - \$0 - \$64,962 = \$121,859$ ). Rainbow catchable administrative cost was  $(0.575 \times \$121,859) = \$70,069$ . Therefore, total rainbow catchable production cost was  $(\$70,069 + \$37,333) = \$107,402$  (Appendix 3).

Production cost was also calculated for pondside and streamside amounts. Pondside cost is total budget minus capital outlay minus transportation; streamside includes transportation costs (Appendix 4). These are bottom line figures and are not broken out by species.

There were 1,168,775 fish requested and 1,069,133 planted or, 92%. See appendix 5 for a breakdown by species.

### **Catchable Rainbow Trout**

The GFH started out this calendar year with 275,750 catchable trout. During the year, 187,417 catchable trout were planted into area waters. This leaves a difference of 88,333 fish, which cannot be accounted for through mortality or plant records. The disposition of these fish is unknown. The GFH produced 361,981 catchable rainbow at a weight of 87,849 pounds. During the year 187,417 (79,237 pounds) were planted, 2,000 (952 pounds) were transferred to Ashton Fish Hatchery and 174,564 (54,346 pounds) remain on station for future planting. Two different strains of rainbow were planted: Hayspur (R9), and kamloop (K1). These fish converted 112,919 pounds of fish food at a rate of 1.29 to produce 87,849 pounds of flesh. The total cost of production was \$107,402.

The three lots of rainbow catchables on hand were treated with Oxytetracycline (OTC) feed to combat coldwater disease. All treatments were successful.

### **Rainbow Trout Fingerlings**

During 1998, 707,950 (17,295 pounds) 4-inch rainbow trout fingerlings were planted. All were Hayspur strain (R9) or Trout Lodge (K1). At the end of the year, there were 9,500 fish (28 pounds) on hand. These fish converted 15,685 pounds of food at a rate of 1.10 to produce 17,323 pounds of flesh.

Two lots were treated with OTC feed to combat coldwater disease. The treatment was successful.

### **Brown Trout**

The brown trout *Salmo trutta* (BN) reared at GFH are the Plymouth Rock strain and were received in December 1997 as eyed eggs from Saratoga National Hatchery in Wyoming. The 125,000 eggs received produced 94,640 (1,820 pounds) of 4-inch fingerlings. The Portneuf River below Lava Hot Springs, the Bear River, Marsh Creek, and Chesterfield Reservoirs were planted with Brown Trout.

### **Bear River Cutthroat**

The 40,000 eyed Bear River cutthroat trout *O. clarki ssp. (C7)* eggs were received from Daniels Fish Hatchery in Wyoming. There were 3,116 fish planted as fry into Bloomington Lake. The remaining 36,884 Bear River cutthroat trout cannot be accounted for through mortality or planting records and their disposition is unknown.

### **Bear Lake Cutthroat**

The BY97 Bear Lake cutthroat eggs were received from Utah's Mantua Fish Hatchery. The 22,515 (5,175 pounds) fish were stocked into Daniels, Montpelier, and Little Valley reservoirs. These fish produced 4,247 pounds of flesh and consumed 5,072 pounds of feed to yield a conversion of 1.19.

### **Lake Trout**

Lake trout *Salvelinus namaycush* reared at the GFH were received as eyed eggs from Saratoga National Fish Hatchery and are the Lewis Lake strain.

The 55,000 BY97 eggs were received October 22, 1997. The eggs resulted in 24,135 fish weighing 2,850 pounds, which were planted into Bear Lake in late November.

### **Splake**

Two brood years of splake *Salvelinus fontinalis x S. namaycush* were reared at Grace this year. Both lots were received as eyed eggs from Wyoming's Story Fish Hatchery and are a cross between a Soda Lake brook trout male and a Lewis Lake lake trout female. Splake appear to survive much better when planted at lengths greater than nine inches.

A total of 29,360 BY96 fish were planted; they went to Waha Lake, Ririe Reservoir, and Island Park Reservoir; and 12,000 BY97 splake will go to Island Park and Ririe Reservoirs.

## **HATCHERY IMPROVEMENT**

Needed projects include:

- Cover or bury the spring pond.
- Install new main line from the spring pond to a head box with new lines going to the vats, and to the small, and medium raceways.
- Replace the large raceway headrace with a pipeline and controlling inlet valves to the raceways.
- Replace large raceways or recap concrete walls.

- Install an auxiliary water supply pipe from the main supply line to the small raceway header to increase flow.
- Install a cleaning line on the medium raceways similar to that on the small raceways.
- Replace residence #1 and #3 domestic water lines.
- Paint the 2-stall garage.
- Install baffles or extend air cleaning to the medium raceways.
- Install culverts and grade the driveway.
- Install an underground irrigation system.
- Rewire residences #1 and #3.
- There were no capital purchases or budget for FY98 or FY99.

### **FISH FEED**

Rangen was the only brand of dry diet fed this year. A total of 124,551 pounds, at a cost of \$43,167.88, was fed to the rainbow trout. Bioproducts and Rangen were the suppliers of soft-moist food this year. A total of 22,243 pounds at a cost of \$20,633.68 was fed to the specialty species. The grand total of fish food fed was 151,625 pounds at a cost of \$64,962.68 (Appendix 6). This is an increase of 15,166 pounds and an increase of \$3,534.30 over last year.

### **PUBLIC RELATIONS**

The GFH staff gave several scheduled tours to local area schools and numerous informal tours to interested general public visiting the facility.

The GFH staff assisted with the Free Fishing Day clinics at Kelly Park Pond in Soda Springs and Dingle Gravel Pit near Montpelier.

### **OTHER**

Dwight Aplanalp was promoted to Assistant Hatchery Manager in August of this year. Steve Wingert was promoted to Fish Hatchery Manager in October. This resulted in an all-new crew for the GFH.

Appendix 1. Number and pounds of fish produced, stocked, food fed, and food cost at Grace Fish Hatchery, 1998.

Species/strain Lot #	Number (pounds) on hand 01/01/98	Number planted (pounds)	Number (pounds) on hand 12/31/98	Pounds produced (food fed)	Food Cost/ (Conversion)
Rainbow Catchables	275,750 (45,734)	187,417 (79,237)	174,564 (54,346)	87,849 (112,919)	\$37,333.25 (1.29)
Rainbow Fingerlings	0 0	707,950 (17,295)	9,500 28	17,323 (15,685)	\$6,793.11 (1.10)
Splake 96-WY-SP	31,000 (6,596)	29,360 (12,420)	0 0	5,824 (8,399)	\$7,818.23 (1.44)
Splake 97-WY-SP	15,000 (eggs)	0	12,513 (2,380)	2,380 (3,174)	\$2,573.00 (1.33)
Lake Trout 97-SAR-LT	55,000 (eggs)	24,135 (2,850)	0 0	2,850 (4,322)	\$3,612.35 (1.52)
Cutthroat / Bear L. 97-UT-C5	29,700 (928)	22,515 (5,175)	0 0	4,247 (5,072)	\$4,760.55 (1.19)
Cutthroat / Bear R. 97-WY-C7	0	3,116 (18)	0	18 (89)	\$66.25 (5.01)
Brown Trout 97-SAR-BN	125,000 (eggs)	94,640 (1,820)	0 0	1,820 (1,965)	\$2,005.94 (1.08)
<b>Totals</b>	<b>531,450</b> <b>(53,258)</b>	<b>1,069,133</b> <b>(118,815)</b>	<b>196,577</b> <b>(56,754)</b>	<b>122,311</b> <b>(151,625)</b>	<b>\$64,962.68</b> <b>(1.24)</b>



Appendix 2. Eyed eggs received at Grace Fish Hatchery, 1998.

Species/Strain	Source	Number Received	Date Received
Hayspur rainbow trout (R9)	IDFG Hayspur	73,000	01/06/98
Hayspur rainbow trout (R9)	IDFG Hayspur	75,000	02/02/98
Hayspur rainbow trout (R9)	IDFG Hayspur	90,000	02/09/98
Hayspur rainbow trout (R9)	IDFG Hayspur	15,000	02/17/98
Hayspur rainbow trout (R9)	IDFG Hayspur	75,000	03/23/98
Troutlodge Kams (K1)	Trout Lodge, WA	600,000	05/28/98
Bear River cutthroat trout (C7)	Daniels, WY	40,000	06/02/98
Hayspur rainbow trout (R9)	IDFG Hayspur	10,215	10/25/98
<b>Total</b>		<b>978,215</b>	

Appendix 3. Grace Fish Hatchery fish production costs, 1998.

Species	Size inches	Number produced	Pounds produced	Production cost	Cost/1,000	Cost/lb
Rainbow Catchables	10	361,981	87,849	\$107,402	\$297	\$1.22
Rainbow Fingerling	3	717,450	17,323	\$19,588	\$27	\$1.13
Splake	11	29,360	8,204	\$29,767	\$1,014	\$3.63
Lake Trout	9	24,135	2,850	\$10,436	\$432	\$3.66
Cutthroat, Bear L.	8	22,515	4,247	\$13,656	\$607	\$3.22
Cutthroat, Bear R.	2	3,116	18	\$188	\$60	\$10.44
Brown Trout	3	94,640	1,820	\$5,784	\$61	\$3.18
<b>Total</b>		<b>1,253,197</b>	<b>122,311</b>	<b>\$186,821</b>	<b>\$149</b>	<b>\$1.53</b>
Rainbow		1,079,431	105,172	\$126,990	\$118	\$1.21
Specialty Species		173,766	17,139	\$59,831	\$344	\$3.49

Appendix 4. Pond side and stream side production cost at Grace Hatchery, 1998.

<b>Pounds Produced</b>	<b>Pond side cost</b>	<b>Pond side cost/lb.</b>	<b>Stream side cost</b>	<b>Stream side cost/lb.</b>
122,311	\$209,218	\$1.71	\$222,881	\$1.82

Appendix 5. Fish requested and produced at Grace Hatchery, 1998.

<b>Species</b>	<b>Number requested</b>	<b>Number Planted</b>	<b>% Achieved</b>
Catchable rainbow trout	157,175	187,417	120%
Fingerling rainbow trout	836,350	707,950	85%
Bear Lake cutthroat trout	11,250	22,515	200%
Bear River cutthroat trout	32,000	3,116	10%
Lake trout	0	24,135	60%
Splake	42,000	29,360	70%
Brown Trout	90,000	94,640	105%
<b>Totals</b>	<b>1,168,775</b>	<b>1,069,133</b>	<b>92%</b>

Appendix 6. Fish feed used and cost, Grace Hatchery, 1998.

Source	Diet	Size	Cost/lb	Pounds	Total cost
Rangen	Dry	Starter	\$0.579	427	\$247.23
Rangen	Dry	#1	\$0.579	1,224	\$708.70
Rangen	Dry	#2	\$0.579	3,750	\$2,171.25
Rangen	Dry	#3	\$0.579	5,500	\$3,184.50
Rangen	Dry	#4	\$0.316	7,450	\$2,354.20
Rangen	Extr 450 Bulk	1/8	\$0.32	109,181	\$34,553.12
Rangen	OTC Medicated	#4	\$0.600	1,850	\$1,110.00
<b>SUB-TOTAL</b>				<b>129,382</b>	<b>\$44,329.88</b>
Bio-Oregon	BioDiet	starter #1	\$1.01	74	\$74.74
Bio-Oregon	BioDiet	starter #2	\$1.01	44	\$44.44
Bio-Oregon	BioDiet	starter #3	\$1.01	88	\$88.88
Bio-Oregon	BioDiet	1.0 mm	\$1.091	440	\$480.04
Bio-Oregon	BioDiet	1.3 mm	\$1.061	572	\$606.89
Bio-Oregon	BioDiet	1.5 mm	\$1.00	880	\$880.00
Bio-Oregon	BioDiet	2.0 mm	\$0.996	1,320	\$1,314.72
Bio-Oregon	BioDiet	2.5 mm	\$0.996	2,376	\$2,366.50
Bio-Oregon	BioDiet	3.0 mm	\$0.931	5,412	\$5,038.57
Bio-Oregon	BioDiet	4.0 mm	\$0.932	5,720	\$5,331.04
Rangen	Soft-Moist	1/32	\$0.9725	40	\$38.90
Rangen	Soft-Moist	3/64	\$0.9395	39	\$36.64
Rangen	Soft-Moist	3/32	\$0.763	706	\$538.68
Rangen	Soft-Moist	1/8	\$0.763	4,972	\$3,793.64
<b>SUB-TOTAL</b>				<b>22,243</b>	<b>\$20,633.68</b>
<b>GRAND TOTAL</b>				<b>151,625</b>	<b>\$64,962.68</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**HAGERMAN FISH HATCHERY**

**1998**

**Joe Chapman, Fish Hatchery Manager II  
Walt Rast, Fish Hatchery Manager I  
Kevin Price, Fish Culturist**

## INTRODUCTION

Hagerman Fish Hatchery (HFH) is a state-owned resident trout production facility. The HFH raises several strains of rainbow trout *Oncorhynchus mykiss* and various specialty species for statewide distribution. The HFH is the Idaho Department of Fish and Game's (Department) largest resident trout production facility. Built in 1947 it is located approximately 30 miles west of Twin Falls on the Snake River.

Funding is provided through Department license money. There was approximately \$401,517.00 from Hagerman's budget and approximately \$49,185.00 from the fish transportation budget used to rear and plant fish in the 1998 production year, not including capital outlay expenditures (Appendix 1).

The HFH is staffed with a Hatchery Manager II (Joe Chapman), a Hatchery Manager I (Walt Rast), a Fish Culturist (Kevin Price), and a fish transport operator (Ken Taylor). About 15 months of temporary labor is available for use during the year.

The HFH water supply consists of approximately 52 cubic feet per second (cfs) from Tucker Springs during the winter and 47 cfs during the irrigation season. An additional 69 cfs is supplied from Riley Creek, although the quantity and quality fluctuates seasonally. The Tucker Springs water serves the 2,045 cubic feet of rearing space in the HFH building, 10,530 cubic feet of rearing space in the fingerling ponds, and up to 138,000 cubic feet of rearing space in the large production raceways. Riley Creek water supplies the 165,600 cubic feet of rearing space available in eight additional raceways. The Tucker Springs water is a constant 59°F year-round and Riley Creek fluctuates from 50°F to 67°F annually.

## HATCHERY PRODUCTION

During 1998, HFH stocked 4,243,545 fish weighing 476,566 pounds. Of these, 748,256 were planted 8-inches long and larger, and 3,495,289 were planted smaller than 8-inches long (Appendix 1). About 54% of the total fish planted were stocked in the Magic Valley Region waters (Appendix 2). The majority of the larger fish were Kamloops rainbow trout from Troutlodge Inc., with the balance from Hayspur Fish Hatchery. The 2- to 8-inch fish consisted of rainbow trout, Kamloops trout, Colorado River rainbow trout, and Coho salmon (Appendix 1).

The HFH reared and stocked 3,495,289 fingerlings of a 3,421,200 fingerling request or 102.2% of the requested fingerlings. A total of 748,256 catchables were reared and stocked of a requested 761,050 for 98.3% efficiency. The combined fingerling and catchable stocking to request average was 101.5%.

The 476,566 pounds planted included 263,417 pounds of put-and-take fish averaging 9.4 inches and 213,149 pounds of fingerlings that averaged 5.1 inches. The cost of planting the average 8.9 fish per pound (6.35 inches) was approximately \$0.73 per pound, or \$81.91 per 1,000 fish (Appendix 1).

In addition to the fish reared and planted, an additional 1,490,144 fish (139,569 pounds) were on hand at the HFH on December 31, 1998. These were comprised of 958,413 fish (137,570 pounds) (average 6.97/lb, or 6.9 inches) in the large raceways and 531,731 fingerlings (1,999 pounds) (average 6.97/lb, or 2.0 inches) in the west raceways. The cost of producing the larger fish was \$0.66/lb or \$97.55/1,000, and \$11.12/lb or \$22.82/1,000 for the fingerlings (Appendix 1).

On hand January 1, 1998 were 1,604,000 fish (107,497 pounds). The HFH also received 1,965 pounds of fish from other hatcheries. Consequently, these subtractions yield a net production for 1998 of 3,136,985 fish (506,673 pounds); mortality excluded (Appendix 1).

A total of 10,511,365 eggs and fry were acquired to yield the fish produced. 2,826,360 eggs were purchased, and the balance was acquired from governmental sources at no cost (Appendix 4). Of the 10,511,365 eggs received, 7,350,944 were received for the fish planted, and the balance was used for 1999 production. Some eggs were shipped to Cabinet Gorge Hatchery in 1998 to provide fall fingerlings in 1999. Because of the colder water temperatures there, development can be delayed and eggs will not have to be purchased to meet these fall requests. Also, eggs were sent to Magic Valley Hatchery to alleviate overcrowding concerns here, then transferred to Hagerman Hatchery when they were about 270/lb. (2 inches). Because of the success last year, eggs were again shipped to Magic Valley Hatchery for early rearing and will be transferred here in January and February of 1999.

The overall survival rate improved about 5% this past year, partially due to improved survival with the eggs shipped to Magic Valley Hatchery (Appendix 3). This resulted in a good feed conversion rate again this year (see Fish Feed section).

In addition to the requests from the regions, the HFH crew also hauled and stocked almost 600,000 fish from other sources (Appendix 7). These included 340 white sturgeon (College of Southern Idaho origin); 50 catchable-size golden trout from University of Idaho Aquaculture Station to Carmella Vineyard Pond for a fishing derby; 9,000 channel catfish from Oklahoma; 300 tiger muskies into Dog Creek Reservoir; 29,165 rainbow trout from Whitewater Fisheries; 43,732 excess post-smolt steelhead from Hagerman National Fish Hatchery; and 517,000 surplus steelhead fry from Pahsimeroi Hatchery. The HFH crew also stocked fish for Grace Hatchery.

## **FISH FEED**

The fish produced during fish year 1998 were fed a total of 544,302 pounds of feed acquired from Rangen Inc. and Bioproducts (Appendix 5). The net weight gained during 1998 was 506,673 pounds, which resulted in an overall conversion of 1.07 pounds of feed to produce one pound of fish, not including the weight of the mortalities (Appendix 5).

## **HATCHERY IMPROVEMENTS**

Numerous HFH improvements were completed this year and are listed below:

- The lower section of Riley Creek raceways was enclosed with chicken wire and swinging gates were installed.
- The west raceways were cleaned and all the cracks were patched. In addition, all the intake pipes were painted.
- Valve #3 in the west raceways was repaired.
- The visitors bathroom was made accessible to the handicapped.
- New shower liners were installed in residences #1 and #5.
- Waste concrete was removed at the lower end of L9 to L16 so a roadway enclosure could be constructed there in the future.
- An additional tailrace was constructed at the lower end of L2 to remove more water.
- Concrete walls were constructed at the lower end of L3 to L16 to prevent water from entering the raceway and to prevent vegetation from growing there.
- Construction began on a structure for the traveling screen.
- A three-compartment, stainless-steel hauling tank was purchased.
- A metal rack was placed at the mouth of the Anderson diversion to prevent carp from entering the Riley Creek raceways.

## **PUBLIC RELATIONS**

The HFH received a large number of visitors and sportsmen throughout the year. An estimated 22,000 visitors toured the facility and used the surrounding public grounds this year. The 37 acres of HFH property is surrounded by 880 acres of the Hagerman Wildlife Management Area (WMA). The WMA provides a large variety of outdoor experiences, including fishing and hunting, wildlife viewing, and family picnic uses.

Hatchery personnel were called upon to give numerous school tours during the spring and fall, and several talks were presented to regional personnel and civic groups.

Hatchery personnel also participated in a clinic at Oster #1 on Free Fishing Day.

## FISH TAGGING OPERATIONS

The HFH crew participated in several tagging operations during the year, in which 600,130 fish were marked. Kamloops rainbow trout (Troutlodge origin) were stocked into Brownlee Reservoir at Woodhead Park and Farewell Bend. The purpose of the right ventral clip (RV) marking was to differentiate fingerling rainbow trout from bull trout. This was paid for and is being investigated by Idaho Power biologists.

The investigation continued on Ririe Reservoir to compare return rates of HFH and Nampa Fish Hatchery catchable-sized fish. The purpose of this study was to determine if fish reared at Hagerman on Riley Creek water and possibly infected with the parasite *Sanguinicola sp.* would return as well as fish reared at Nampa. The 11,900 fish stocked from Hagerman were adipose-clipped, then stocked into Ririe Reservoir in May, June, and July. At the same time, Nampa Hatchery also stocked fish there. Nampa Fish Hatchery's fish were given a right ventral clip. This experiment will be expanded to include American Falls Hatchery and investigated at various bodies of water throughout southern Idaho.

Island Park Reservoir received adipose-clipped fingerlings again this year as part of an ongoing study to determine emigration from the reservoir and contribution to the fishery below the reservoir (Appendix 6).

Mormon Reservoir also received fish that were clipped. About 40,000 triploids (sterile) were given an left ventral clip (LV) and a corresponding amount of controls was given an RV clip to determine return-to-creel and costs. Little Camas Reservoir also received sterile and control groups to determine similar objectives.

About 200,000 six-inch rainbow trout (Hayspur origin) were grit-marked using red and green dyes to evaluate their contribution to the fishery in the Snake River east of American Falls.

Also, about 32,000 catchable rainbow trout were ad-clipped and stocked into Chesterfield Reservoir to determine cost and return to creel information. Similarly, 36,000 ad-clipped catchables were stocked into Blackfoot Reservoir in the spring and another 36,000 in the fall to determine return-to-creel information.

## ACKNOWLEDGMENTS

Thanks to the permanent HFH staff of Walt Rast and Kevin Price; to the transport operator Ken Taylor; and to the temporaries Larry Miller and Nina Taylor.

The regional fisheries and enforcement personnel Fred Partridge, Dave Teuscher, Richard Holman, and Gary Hompland also deserve our gratitude. Also, thanks to Niagara Springs and Magic Valley Fish hatcheries personnel for their cooperation this year.



Appendix 1. Costs of fish produced at Hagerman Fish Hatchery 1998. Costs reflect all costs budgeted except capital outlay, plus \$48,185.00 of the fish transportation budget.

	Length in	Number of fish	Weight,	Cost to produce	Cost/
Species/Strain	inches	produced	pounds	and plant	1000
FISH ON HAND JANUARY 1, 1998					
Hayspur rainbow trout	8.31	34,000	8,393		
Hayspur rainbow trout	1.77	361,000	904		
Kamloops rainbow trout (Troutlodge)	5.60	1,186,000	95,111		
Kamloops rainbow trout (Hayspur)	6.68	23,000	3,089		
<b>Totals</b>		<b>1,604,000</b>	<b>107,497</b>		
FISH PLANTED					
Hayspur rainbow trout	9.77	8,700	3,407	\$1,177.92	\$135.39
Kamloops rainbow trout, (TL)	9.42	708,020	248,110	\$92,426.90	\$130.54
Rainbow trout (R1, Hayspur)	9.65	31,536	11,900	\$4,217.31	\$133.73
<b>Subtotals</b>	<b>9.43</b>	<b>748,256</b>	<b>263,417</b>	<b>\$97,822.13</b>	<b>\$130.73</b>
Hayspur rainbow trout	5.10	1,980,735	118,770	\$139,990.49	\$70.68
Kamloops rainbow trout	5.33	1,022,107	68,974	\$75,278.90	\$73.65
Rainbow trout (R1, Hayspur)	6.73	55,390	7,570	\$5,165.93	\$93.26
Colorado River rainbow trout	4.27	66,947	2,245	\$3,961.52	\$59.17
Coho Salmon (WA.)	4.83	304,725	12,050	\$20,396.58	\$66.93
Rainbow trout (T9, Hayspur)	5.50	65,385	3,540	\$4,983.59	\$76.22
<b>Subtotals</b>	<b>Average</b>	<b>5.14</b>	<b>3,495,289</b>	<b>213,149</b>	<b>\$249,777.01</b>
<b>Total Planted</b>	<b>Average</b>	<b>6.35</b>	<b>4,243,545</b>	<b>476,566</b>	<b>\$347,599.14</b>
FISH ON HAND DECEMBER 31, 1998					
Hayspur rainbow trout	8.380	62,800	15,700	\$7,292.99	\$116.13
Hayspur rainbow trout	1.630	190,974	371	\$4,313.83	\$22.59
Kamloops (TL) rainbow trout	6.520	903,708	112,929	\$81,654.04	\$90.35
Kamloops rainbow trout	11.100	16,830	9,900	\$2,588.86	\$153.82
Kamloops rainbow trout	1.800	259,447	647	\$6,471.76	\$24.94
Rainbow trout (T9, Hayspur)	1.000	56,385	22	\$781.38	\$13.86
<b>Totals</b>		<b>1,490,144</b>	<b>139,569</b>	<b>\$103,102.86</b>	<b>\$69.19</b>
TOTAL FISH PRODUCED					
Planted in 1998		4,243,545	476,566		
On Hand December 31, 1998		1,490,144	139,569		
<b>Totals</b>		<b>5,733,689</b>	<b>616,135</b>	<b>\$450,702.00</b>	<b>\$78.61</b>
From other hatcheries		992,704	1,965		
On Hand January 1, 1998		1,604,000	107,497		
<b>Total gained</b>		<b>3,136,985</b>	<b>506,673</b>		

Appendix 2. Fish distribution from Hagerman Fish Hatchery, 1988.

Percent of number planted by Region									
	Number	Pounds	1	2	3	4	5	6	7
<b>Catchables &gt;8 inches</b>									
Hayspur rainbow trout	8,700	3,407	-	-	-	100.0	-	-	-
Kamloops rainbow trout	708,020	248,110	-	-	21.1	45.4	27.0	6.5	-
Rainbow trout (R1)	31,536	11,900	-	-	-	-	100.0	-	-
<b>Subtotal</b>	<b>748,256</b>	<b>263,417</b>	-	-	20.0	44.2	29.8	6.1	-
<b>Fingerlings &lt;8 inches</b>									
Hayspur rainbow trout	1,980,735	118,770	-	-	8.4	59.4	17.9	14.3	-
Kamloops rainbow trout	1,022,107	68,974	-	-	40.8	59.2	-	-	-
Rainbow trout (R1)	55,390	7,570	-	-	-	100.0	-	-	-
Colorado R. Rainbow trout	66,947	2,245	-	-	-	100.0	-	-	-
Coho Salmon	304,725	12,050	-	-	100.0	-	-	-	-
Rainbow trout (T9, TL)	65,385	3,540	-	-	-	100.0	-	-	-
<b>Subtotal</b>	<b>3,495,289</b>	<b>213,149</b>	<b>0.0</b>	<b>0.0</b>	<b>25.5</b>	<b>56.3</b>	<b>10.1</b>	<b>8.1</b>	<b>0.0</b>
<b>Total</b>	<b>4,243,545</b>	<b>476,566</b>	<b>0.0</b>	<b>0.0</b>	<b>24.5</b>	<b>54.2</b>	<b>13.6</b>	<b>7.7</b>	<b>0.0</b>

Appendix 3. Fish survival from eyed-egg to plant, 1998.

Species/Strain	Number planted	Eggs Received	Percent survival
Kamloops trout, Troutlodge	1,082,422	1,570,000	68.94
Kamloops trout, Hayspur	647,705	1,265,331	51.19
Hayspur rainbow trout	1,989,435	3,509,519	56.69
Rainbow trout (R1 Hayspur)	86,926	193,932	44.82
Colorado River rainbow	66,947	245,461	27.27
Coho Salmon (WA.)	304,725	441,776	68.98
Rainbow trout (T9 Troutlodge)	65,385	124,925	52.34
<b>Total</b>	<b>4,243,545</b>	<b>7,350,944</b>	<b>57.73</b>

Appendix 4. Number of eyed-eggs and fry received, species, and source for fish produced in 1998

<b>Eggs/Fry received</b>			
<b>Species/Strain</b>	<b>For Fish Planted</b>	<b>For fish on hand December 31, 1998</b>	<b>Source</b>
<b>Received as eggs</b>			
rainbow/Kamloops	1,570,000	1,144,115	Troutlodge, Washington
rainbow/Kamloops	692,672	433,554	IDFG Hayspur
rainbow/Hayspur	1,835,803	893,626	IDFG Hayspur
rainbow/Hayspur (RR)	245,461	-	IDFG Hayspur
rainbow/Hayspur (R1)	108,843	-	IDFG Hayspur
coho	441,776	589,744	Lewis River Hatchery
Washington Dept. of Fish and Wildlife			
rainbow (T9)	124,925	99,382	Troutlodge(97) & Hayspur(98)
Subtotal eggs	5,019,480	3,160,421	
<b>Received as fry</b>			
rainbow/R9 from Cabinet Gorge	748,316	-	IDFG Hayspur
rainbow/R9 from Magic Valley	925,400		IDFG Hayspur
kamloops (Hayspur) from Cabinet Gorge	159,299		IDFG Hayspur
kamloops (Hayspur) from Magic Valley	413,360		IDFG Hayspur
rainbow/R1 from Hayspur	85,089		IDFG Hayspur
Subtotal fry	2,331,464		
<b>Total</b>	<b>7,350,944</b>	<b>3,160,421</b>	

Appendix 5. Fish feed used during Fish Year 1998 at Hagerman Fish Hatchery.

Size	Source	Pounds	Cost/pound	Cost
Str	Rangens	900	\$0.45	\$404.55
#1	Rangens	6,450	\$0.45	\$2,899.28
#2	Rangens	36,000	\$0.45	\$16,182.00
#2 TM	Rangens	2600	\$0.59	\$1,541.54
#3	Rangens	46,000	\$0.31	\$14,191.00
#3 TM	Rangens	800	\$0.57	\$455.68
#4	Rangen	4,950	\$0.31	\$1,527.08
3/32 in, EXT450Float	Rangens	110,190	\$0.32	\$35,536.28
3/32 IN, TM	Rangens	500	\$0.51	\$255.45
1/8 in, Low P, Float	Rangens	297,890	\$0.31	\$92,345.90
1/8 in, TM	Rangens	1,500	\$0.51	\$766.35
5/32 in, EXT450Float	Rangens	18,940	\$0.31	\$5,776.70
5/32 in, Romet 30	Rangens	13,050	\$0.80	\$10,395.63
<b>subtotal</b>		<b>539,770</b>	<b>\$0.34</b>	<b>\$182,277.44</b>
#1 Soft Moist	Bioproducts	44	\$1.05	\$46.09
#2 Soft Moist	Bioproducts	220	\$1.05	\$230.47
#3 Soft Moist	Bioproducts	352	\$1.05	\$368.76
1.0 Biodiet	Bioproducts	396	\$1.05	\$414.85
1.3 Biodiet	Bioproducts	220	\$0.80	\$176.59
1.5 Biodiet	Bioproducts	660	\$0.80	\$529.78
2.0 Biodiet	Bioproducts	1100	\$0.75	\$828.08
2.5 Biodiet	Bioproducts	660	\$0.75	\$496.85
3.0 Biodiet	Bioproducts	880	\$0.75	\$662.46
<b>subtotal</b>		<b>4,532</b>	<b>\$0.83</b>	<b>\$3,753.93</b>
<b>TOTAL</b>		<b>544,302</b>	<b>\$0.34</b>	<b>\$186,031.37</b>

Appendix 6. Summary of fish marked in 1998 at Hagerman Fish Hatchery.

Date planted	Species	Water	Number	Pounds	Clip
26-Mar	K1	Brownlee Reservoir	62,640	5,800	Right ventral
31-Mar	K1	Brownlee Reservoir	58,300	5,500	Right ventral
30-Apr	R1(R9&K1)	Chesterfield Reservoir	31,536	11,900	Adipose
12-May	K1	Ririe Reservoir	3,900	1,345	Adipose
12-Jun	K1	Ririe Reservoir	4,000	1,600	Adipose
29-Jun	K1	Ririe Reservoir	4,000	1,600	Adipose
27-May	R9	Island Park Reservoir	50,000	2,790	Adipose
26-Aug	R9	Island Park Reservoir	24,975	1,350	Left Ventral
6/3-6/5	K1	Blackfoot Reservoir	35,000	12500	Adipose
9/8&9	K1	Blackfoot Reservoir	36,132	13380	Adipose
22-Jun	R9	Snake R.--Firth	28,500	3000	Grit-marked
22-Jun	R9	Snake R.--Shelley	38,000	4000	Grit-marked
23-Jun	R9	Snake R.--Firth	21,850	2300	Grit-marked
23-Jun	R9	Snake R.--Shelley	12,350	1300	Grit-marked
23-Jun	R9	Snake R.--Blackfoot	15,200	1600	Grit-marked
24-Jun	R9	Snake R.--Blackfoot	34,200	3600	Grit-marked
24-Jun	R9	Snake R.--Tilden	22,800	2400	Grit-marked
25-Jun	R9	Snake R.--Tilden	20,900	2200	Grit-marked
24-Sep	T9	Mormon Reservoir	40,378	2050	Left ventral
24-Sep	R9	Mormon Reservoir	40,522	2057	Right ventral
6-Oct	T9	Little Camas Reservoir	7,407	597	Left Ventral
6-Oct	K1	Little Camas Reservoir	7,540	667	Right ventral
<b>Totals</b>			<b>600,130</b>	<b>83,536</b>	

Appendix 7. Fish stocked by Hagerman Hatchery from other sources, 1998.

DATE	SPECIES	NUMBER	POUNDS	LENGTH	SOURCE	DESTINATION
27-Apr	SH	47,000	24	1.0	Pahsimeroi Hatchery	Fish Creek Reservoir
4-May	SH	100,000	50	1.0	Pahsimeroi Hatchery	Roseworth Reservoir
4-May	SH	220,000	110	1.0	Pahsimeroi Hatchery	Salmon Falls Reservoir
11-May	SH	75,000	40	1.0	Pahsimeroi Hatchery	Mormon Reservoir
11-May	SH	75,000	40	1.0	Pahsimeroi Hatchery	Little Camas Reservoir
2-Jun	R1	21,280	5,600	8.7	Whitewater Fisheries	Lake Walcott
2-Jun	R1	7,885	2,075	8.7	Whitewater Fisheries	Snake R. --Sligars
15-Jun	SH	15,262	4,400	9.0	Hagerman Natl. Fish Hatchery	Roseworth Reservoir
15-Jun	SH	9,855	2,700	8.8	Hagerman Natl. Fish Hatchery	Thorn Creek Reservoir
16-Jun	SH	18,615	5,100	8.8	Hagerman Natl. Fish Hatchery	Lucky Peak Reservoir
28-Aug	TM	300	13	9.5	Pennsylvania	Dog Creek Reservoir
1-Oct	CC	1,000	25	4.5	Oklahoma	Dierkes Lake
1-Oct	CC	2,000	50	4.5	Oklahoma	Murtaugh Lake
1-Oct	CC	2,000	50	4.5	Oklahoma	Wilson Lake
1-Oct	CC	500	13	4.5	Oklahoma	Connor Pond
1-Oct	CC	1,000	25	4.5	Oklahoma	Emerald Lake
1-Oct	CC	2,500	63	4.5	Oklahoma	Dog Creek Reservoir
11/9 & 11/30	WS	340	224	13.5	College of S. Idaho	Snake R.
<b>TOTALS</b>		<b>599,537</b>	<b>20,601</b>			

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**HAYSPUR FISH HATCHERY**

**1998**

**Bob Esselman, Fish Hatchery Manager II  
Doug Young, Assistant Fish Hatchery Manager  
Russ Wood, Fish Culturist**

## INTRODUCTION

Hayspur Fish Hatchery (HSFH) is a license-funded resident salmonid broodstock facility. The mission of the HSFH is production of eyed eggs. Three captive rainbow trout *Oncorhynchus mykiss* broodstocks are maintained on station. These are the Hayspur strain of rainbow trout, the Colorado River rainbow trout, and a Kamloops strain of rainbow trout. Research to develop sterile fish was accommodated. Production lots of triploid rainbows were produced in the fall of 1998. An experiment to test the heritability of catchability was started. The HSFH personnel maintain an on-site, free, public campground, a general season pond fishery, and a trophy wild trout stream fishery.

The HSFH is located on Loving Creek in Blaine County, approximately 40 miles south of Sun Valley. The HSFH property is an odd-shaped 105.12-acre parcel. Fish culture facilities include incubation building, housing, vertical incubator stacks, isolation incubators, moist egg chiller, and egg picking apparatus. The HSFH building has 20 early rearing tanks, 12 covered 24-ft circular ponds, six small raceways, and six large production raceways.

Water sources include the covered Hayspur spring that supplies 3.0 to 5.5 cubic feet per second (cfs) at 52°F (11.6°C), three pumped artesian wells producing 5.0 cfs at 48°F to 52°F (8.9° C to 11.6°C), and 7.4 to 18 cfs of Loving Creek water at 33°F to 73°F (0.6°C to 22.7 °C). The spring and well water are both considered specific pathogen-free (SPF) water supplies.

Three permanent employees (Fish Hatchery Manager II, Assistant Fish Hatchery Manager, and Fish Culturist) and 10 months of temporary biological aide time are assigned to the HSFH. Three biological aides are hired for the spawning season.

## RAINBOW AND KAMLOOPS EYED EGG PRODUCTION

The 1998 spawning season was an eight-month project, with an egg take of 15,088,322 green eggs during the period covered. Spawning begins in September and ends in April, with eggs were taken from 4,690 females producing 12,177,353 eyed-eggs (Appendix 1). Photoperiod manipulation, or light control, has expanded "normal" spawn timing to more closely match egg production with eyed-egg requests. Hayspur rainbow trout eyed-egg production totaled 7,723,604, Kamloops eyed-egg production totaled 4,056,278, and Colorado eyed-egg production totaled 397,471 (Appendix 1). Hagerman, Nampa, American Falls, Grace, Ashton, Clark Fork, Clearwater, Cabinet Gorge, Hagerman National, Magic Valley, and Tucannon hatcheries were shipped eggs per their requests. Cabinet Gorge Fish Hatchery was shipped eggs to provide fry to Hagerman Fish Hatchery through delayed development. Magic Valley Fish Hatchery was shipped trout eggs destined for Hagerman to provide space in Hagerman Fish Hatchery's incubation system for a large lot of coho.



## **RE-DISTRIBUTION OF CATCHABLES**

Fish requested for the Big and Little Wood drainages were reared at Nampa Fish Hatchery, hauled to HSFH, and stocked by HSFH personnel. Semi-tank and trailer loads were hauled as needed to complete our requests. Area waters were stocked with 75,545 rainbows. Kamloops and Hayspur rainbow trout were stocked in area waters (Appendix 3).

## **FISH FEED**

Silver Cup, Inc. and Rangen Inc. provided the 1/4-inch brood feed. This food was ordered with 150 g/ton canthaxathin red additive to enhance egg color and other possible health benefits. Rangen Inc. was the source of early rearing feeds, the food for catchables and for replacement broodstock feeds (Appendix 4).

## **HATCHERY IMPROVEMENTS AND NEEDS**

Improvements to the HSFH during 1998 included:

- Installed security fencing around electrical control panels and pumps at the headbox, and around wells #3 and #4.
- A new computer CPU was set up upgraded to Windows 95.
- Hayspur personnel replaced a ninety-foot effluent line from the hatchery building to brood pond.
- The sewage lift pump was replaced.
- Bird wire enclosure was fabricated for small raceways 5 & 6.
- A new water heater was installed in residence #1.

Needs of the HSFH, listed in order of priority, are:

- Repair the roof of the office/crew quarters/shop building.
- Replace the domestic water system.
- Install an alarm system to monitor water levels and pump function.
- Replace roof of residence #1.

## **BROODSTOCK MANAGEMENT**

The Hayspur rainbow (R9) trout replacement population was developed by using year-class crosses. This year, two-year-olds were crossed with four- and five-year olds. One-male and one-female pairings were performed with 200 pairs. These adult fish were either sacrificed for pathogen sampling or adipose clipped. Marked fish will not be used again for development of a replacement population. Marked fish will be used for future production eggs.

Hayspur's kamloops replacement population was developed by using four-year-old adults of mixed Trout Lodge/Skanes stock and a population of two-year-old adults of Trout Lodge/Skanes stock. Fish used for the replacement population were sacrificed or marked to identify them. Marked fish are used for production egg lots, but not used again for development of a replacement population.

The Colorado River rainbow trout program is to be discontinued. Requests could not justify maintaining this stock of rainbow. The Colorado River rainbow trout replacement population was stocked into Mosquito Flat Reservoir.

Pathogen status was addressed in a couple of ways: Penicillin G injections were given to all broodstock to reduce the possibility of vertical transmission of Coldwater Disease (CWD). The CWD testing in 1998 demonstrated negative results! After reviewing historic Bacterial Kidney Disease (BKD) data and discussion with Department pathologists, a decision was made to cull progeny of females with ELISA values  $>0.11$ . Positive results from virology, Fluorescent Antibody Test (FAT), and Membrane Filtration Fluorescent Antibody Test (MFAT) techniques result in fish being culled. The goal is to effect the BKD status while maintaining genetic material. The trend is very encouraging in that numbers of culled families were low.

## **PUBLIC RELATIONS**

Tours were provided to area schools. Bellevue Elementary, Burley Elementary, Hailey Elementary, Hemingway School (Ketchum), Little Annie's Day Care, Minico High School, Paul Elementary, Shoshone Elementary, Wood River High School, and two home school groups were shown the life cycle of trout and had questions answered. Organized groups that were given tours included Flyfishers of Idaho, Good Sam RV Clubs, Carey Cub Scouts, Camp Rainbow Gold, College of Southern Idaho Aquaculture Program, Project Dare, and 4-H Clubs.

Naples, Wood River High School, Kellogg, Fairfield, Shelley Junior High, Shelley High, Hobbs Middle School, Goodsell Elementary, Jerome Middle School, Murtaugh High School, Kimberly High School, East Minico, and Pioneer Elementary Schools were shipped eyed eggs. Some of the resultant fry were stocked into Adopt-a-Stream projects. Salmon region biologists used ripe adults for spawning demonstrations and anatomy lessons at Challis High School, Leadore, and Brooklyn Elementary. Gebhards Creek, at the Morrison Knudsen Nature Center, was shipped eyed eggs for public viewing of the developmental stages of rainbow trout. Approximately 7,000 individuals visited, camped, and/or fished on HSFH property. Gaver Lagoon continues to gain popularity among a variety of anglers including the physically challenged and children. Hayspur staff made an effort on Free Fishing Day to ensure every child caught a fish.

The HSFH campground benefited from the efforts of volunteer Camp Hosts. Travis and Sherry Dilleha volunteered time to answer questions, give directions, clarify regulations, tidy outhouses, clean up litter, provide fishing tips, assist with stocking fish, report violations, and generally enhance the image of the Department.

## **SPECIAL PROJECTS**

### **Triploid (3N) and Tetraploid (4N) Project**

The HSFH reared 735 fish, which were hydrostatically shocked on November 26, 1996 to induce tetraploidy. These fish were sorted and individually PIT tagged. Blood work done at Washington State University identified individuals as Tetraploid. 200 samples were sent to WSU. 27 fish were found to be 4N. On December 10, 1998, a 4N female was fertilized with a 2-year-old normal diploid male. This cross resulted in 481 eyed eggs. The HSFH had 454 progeny at the end of the period covered. These fish will be reared to 2- to 3-inches and evaluated for ploidy.

Hayspur implemented production of triploid R9's (T9) in the fall of 1998. Experimentation with the Hatchery Evaluation biologists developed parameters to induce triploidy (Appendix 5). Dave Teuscher demonstrated the appropriate temperature, duration, and minutes after fertilization (MAF); 494,497 eggs were treated during the period covered. 355,534 eyed T9's were shipped (Appendix 6). Eye-up rates were 80.7% for the period covered. Hatcheries that were shipped eggs will perform blood sampling to determine triploid induction rates.

### **Wetland Project**

As of August 2, 1998 the wetland project was two years old. This project was conducted to create open water on the wetland areas of the HSFH property. For the second year in a row, a wet spring and summer made for more water than expected in the new ponds and surrounding areas.

Duck weed (*Lemna minor*) was replanted in all the ponds. Japanese millet (*Echinochloa crus gall; var.*), was replanted to provide bank stabilization and food for wildlife. Areas adjacent to the ponds were mowed in order to prepare for a fall, dormant seeding of Great Basin wild rye (*Elymus cinereus*), Altai wild rye (*Elymus augustus*), Alcar tall wheat grass (*Elytrgia elongata*), and Alfalfa (*Medicago savita*). These species were planted by Terry Gregory to provide nesting cover. Coyote willows (*Salix sps.*) were planted by HSFH personnel for bank stabilization. The HSFH personnel treated the thistles with the herbicide Trimec™ and by uprooting the plants with shovels.

There seemed to be an increase in nesting waterfowl in the spring as well as more wetland birds and animals. Waterfowl hunters and waterfowl utilized the habitat in the fall.

## **Loving Creek**

Last years' partnership project of a stock water gap was seeded with native grasses. The fenced riparian area responded well with tall grasses replacing dirt. Mr. Robert Gardner, our cooperative neighbor, was pleased with the project as well (personal communication).

On February 7, twenty cubic yards of ¾-inch to 2-inch gravel were placed in two locations in Loving Creek. These gravel areas are thought to enhance spawning sites on the rehabilitated reach of the creek. Regional assistance and volunteers included: Fred Partridge, Chuck Warren, Terry Gregory, Dan Gralenski, Cory Cress, Craig Riddle and Russell Beams. A conveyor belt and front-end loader (provided by Terry Gregory) were used to transport gravel to the stream. Manpower used shovels to spread the gravel. Work was done while the ground was frozen and snow-covered to minimize damage to the native grasses. Seven pairs of wild rainbows were observed using these areas in March and April.

Angler comments in the voluntary sign-in log indicate good fishing, high catch rates, and project support. Waterfowl and waterfowl hunters utilized the habitat. Birdwatchers, including commercial groups from Sun Valley (by the busload), have made the area a destination.

## **Miscellaneous**

The HSFH personnel assisted regional staff with check station duty, artificial simulated animal (ASA) duty, depredation complaints, Big Wood River and Silver Creek electrofishing surveys, Sage Grouse lek counts, enforcement, and winter elk feeding. Sperm from kamloop rainbow trout was bagged and transported to Henrys Lake to generate hybrids via delayed fertilization. Eyed eggs in excess of requests were stocked in the Big Wood river downstream of the Stanton Crossing bridge. Rainbow eggs totaling 1,640,931 and kamloop eggs totaling 181,979 were stocked. Value of these eggs at current contract price was \$27,329.70.

## **ACKNOWLEDGMENTS**

The efforts of Biological Aides Alicia Duzinski, Dustin Strom, Duncan Oswald, Tom Kent, Mary Rosen, and Dustin Kindt need to be recognized. They worked hard and produced a lot of product to make fishing better.

The HSFH would like to thank the people who helped out during the spawning season: Chuck Alexander, Doug Burton, Marcus Day, Roger Elmore, Brad Farner, Kevin Fish, Travis Jackson, Brad Jones, Pete Lundberg, Doug Munson, Fred Partridge, Jeremy Redding, Kurt Schilling, Brent Snider, Bill Stutz, Dave Teuscher, Tom Tighe, Doug Megargle, Rod Beus, Sharon Landin, Marty Schlieb, and Russ Wood.

Appendix 1. Egg production summary of Hayspur Fish Hatchery, 1998.

Species	Total green eggs <sup>a</sup>	Total eyed eggs
Kamloops rainbow trout	<sup>a</sup> 5,071,374	4,056,278
Hayspur rainbow trout	9,539,089	7,723,604
Colorado River rainbow trout	477,859	397,471
<b>Totals</b>	<b>15,088,322</b>	<b>12,177,353<sup>b</sup></b>

<sup>a</sup>Total is displaced (volumetric) of both good and bad eggs taken in 1998.

<sup>b</sup>Total does not include triploid eggs.

Appendix 2. Eyed egg shipment summary from Hayspur Fish Hatchery, 1998.

Hatchery	<sup>a</sup> Species	Total eggs shipped	<sup>b</sup> Estimated value
American Falls	R9	174,761	\$ 2,621.42
	K1	653,786	\$ 9,806.79
Ashton	R9	208,096	\$ 3,121.44
	RR	128,944	\$ 1,934.16
Cabinet Gorge	R9	1,144,104	\$17,161.56
	K1	217,596	\$ 3,263.94
Clark Fork	K1	233,854	\$ 3,507.81
Clearwater	R9	485,172	\$ 7,277.58
Grace	R9	510,469	\$ 7,567.04
Hagerman	R9	3,033,851	\$45,507.77
	K1	1,251,295	\$18,769.43
	RR	35,346	\$ 530.19
Nampa	R9	477,735	\$ 7,166.03
	K1	123,543	\$ 1,853.15
	RR	211,313	\$ 3,169.70
Sawtooth	R9	16,500	\$ 247.50
<sup>c</sup> Other	R9	7,935	\$ 119.03
	K1	5,632	\$ 84.48
	RR	1,100	\$ 16.50
<b>Totals</b>		<b>8,921,032</b>	<b>\$133,815.52</b>

<sup>a</sup>R9=Hayspur rainbow trout. K1=Kamloops rainbow trout. RR=Colorado river rainbow trout.

<sup>b</sup>At contract value of \$15.00/1,000 eggs.

<sup>c</sup>Eggs used for educational programs.

Appendix 3. Hayspur Fish Hatchery stocking summary, 1998.

Fish Size	Number of Fish	Pounds of Fish
Catchables*	61,214	26,477.35
Fingerlings	109,866	825.43
<b>Totals</b>	<b>171,080</b>	<b>27,302.78</b>

\*Includes adult brood fish stocked (2,550 fish at 4,656 pounds).

Appendix 4. Hayspur Fish Hatchery Feed Summary, 1998.

**Silver Cup**

<b>Date</b>	<b>Size</b>	<b>Amount/pounds</b>	<b>Cost</b>
2/11/98	¼ in. Brood pellet	12,240	\$ 3,733.20
06/06/98	¼ in. Brood pellet	11,560	\$ 3,525.80
08/27/98	¼ in. Brood pellet	11,600	\$ 3,538.00
12/10/98	¼ in. Brood pellet	13,840	\$ 3,944.40
<b>Totals</b>		<b>49,240</b>	<b>\$14,741.40</b>

**Rangens**

<b>Date</b>	<b>Size</b>	<b>Amount/ pounds</b>	<b>Cost</b>
01/23/98	Extruded 450 floating 1/8	50	\$ 15.50
	Extruded 450 floating 1/8	500	\$ 150.00
02/24/98	Trout/Salmon starter #3	50	\$ 28.12
	Trout/Salmon starter #4 crumble	100	\$ 30.24
03/19/98	Trout/Salmon starter #2	50	\$ 28.12
05/01/98	Extruded 450 floating 5/32	1,000	\$ 300.00
	Trout grower #4 crumble	150	\$ 45.36
	Trout/Salmon starter #3	100	\$ 56.24
05/30/98	Extruded 450 floating 5/32	1,000	\$ 300.00
	Extruded 450 floating 1/16	200	\$ 94.00
	Trout grower #4 crumble	100	\$ 30.24
06/30/98	Extruded 450 floating 1/16	150	\$ 70.50
	Extruded 450 floating 3/32	250	\$ 77.50
	Extruded 450 floating 5/32	750	\$ 225.00
07/11/98	Extruded 450 floating 5/32	2,000	\$ 600.00
08/08/98	Extruded 450 floating 1/8	500	\$ 155.00
10/17/98	Extruded 450 floating 1/8	200	\$ 62.00
	Extruded 450 floating 5/32	500	\$ 150.00
	Extruded floating 3/16	100	\$ 30.00
10/22/98	Extruded 450 floating 3/16	650	\$ 195.00
12/29/98	Extruded 450 floating 3/16	500	\$ 150.00
	Extruded 450 floating 3/32	50	\$ 15.50
<b>Totals</b>		<b>8,950</b>	<b>\$2,808.32</b>

Appendix 5. Egg data for tetraploid & triploid project at Hayspur Fish Hatchery, 1998.

<b>Pressure and heat shock groups</b>	<b>Total green eggs Eggs utilized</b>	<b>Percent Eyed up</b>	<b>Percent survival To stocking</b>	<b>Percent induction 4N or 3N</b>
8500 psi	9,382	46.69%	7.98%	5.00%
9000 psi	16,756	29.30%	5.48%	0.00%
30.5c	14,627	85.68%	70.19%	0.00%
31.5c	20,003	77.78%	64.77%	0.00%
3N(12-20)	12,571	84.92%	66.79%	77.78%
3N(14-20)	12,299	84.10%	69.24%	85.68%

Appendix 6. Triploid egg data from Hayspur Fish Hatchery, 1998.

<b>Heat shock &amp; MAF</b>	<b>Total green eggs/ Treatment</b>	<b>Percent eye-up</b>	<b>Percent of controls</b>
26c 10 MAF	3,424	60.80%	118.5%
26c 15 MAF	2,838	55.10%	103.8%
26c 20 MAF	2,876	58.7%	105.6%
28c 10 MAF	2,648	78.2%	78.2%
28C 15 MAF	2,746	43.1%	81.2%
28c 20 MAF	2,813	44.4%	80.0%
con 10 MAF	2,372	51.3%	
con 15 MAF	2,536	53.1%	
con 20 MAF	2,813	55.6%	

Note: MAF= Minutes after fertilization.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**MACKAY FISH HATCHERY**

**1998**

**Phil Coonts, Fish Hatchery Manager I  
Robert Hoover, Assistant Fish Hatchery Manager  
Mel Hughes, Fish Culturist**



## INTRODUCTION

The Mackay Fish Hatchery is a specialty fish production facility located approximately 12 miles north of Mackay in Custer County, Idaho. The hatchery produces salmonids of various species and strains, from 1- to 16-inches in length, for statewide distribution. Funding is obtained under contract from the Wallup-Breaux Act for wages and from state license monies for fish feed and operational costs.

The hatchery is staffed with three full-time employees and two part-time employees who share 18 months of temporary time. Wages, including benefits, cost \$115,700 for the permanent employees and \$24,000 for the temporary employees, totaling \$139,700 in personnel costs.

Included in the year's production were 16 lots of fish, comprised of 6 species and 11 different strains.

Rainbow trout *Oncorhynchus mykiss*

Arlee (Ennis NFH. MT) (2 year classes)

Kamloops (Troutlodge, WA)

Cutthroat trout *O. clarki*

Westslope (McCall) (2 year classes)

Henrys Lake

Brown trout *Salmo trutta*

Crawford (Paint Blank SFH, VA) (2 year classes)

Rainbow x Cutthroat trout hybrids

Henrys Lake cutthroat females x Hayspur SFH rainbow males

Kokanee salmon *O. nerka kennerlyi*

Early (Payette Lk.)

October (Roaring Judy Hatchery, CO)

Grayling *Thymallus arcticus*

## WATER SUPPLY

Water for hatchery production is provided by three collection springs in an artesian area at the hatchery. The area is fenced off, has been dug out, and filled with cobblestones. The water volume available for hatchery production remained consistent with previous years. Flows ranged from 18- to 24-cubic feet per second (cfs). Lowest flows occur during February, while highest flows occur during July. Since the 1983 earthquake, temperatures have varied between the three different springs supplying the hatchery, one at 50°F, one at 51°F, and one at 54°F. Incubation temperature is 51°F.

## **HATCHERY IMPROVEMENTS**

A Nampa company refurbished 19 of the early-rearing troughs. They repaired and sprayed new gel-coats on all of the troughs. A Boise firm repaired the stocking tank on the GMC truck. The tank was originally a milk tank intended for stationary use, not meant for transport. New plugs were made and installed for the wastewater piping system from the large raceways, making their use much faster and easier. A new system of fastening the belt feeders to its stands were implemented, making placement and removal much faster and easier. Shelves were built in the feed and utility room. An Arco Company truck, using state highway gravel, graveled the hatchery roadways.

## **FUTURE NEEDS**

Residence #3 needs the old wood siding replaced. Residences #2 and #3 need garages built or upgraded. A fish-proof screen needs to be installed at the end of the large raceway tailrace to keep feral fish out of the tailrace.

## **FISH STOCKED**

Fingerlings of various species and strains were stocked in five regions of the state (Appendix 1). These put-grow-and-take fish numbered 2,395,050 fish weighing 25,184 pounds.

Catchable rainbow trout (10 inches +) were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 81,690 and weighed 45,150 pounds. Catchable brown trout, numbering 5,080 fish and weighing 3,500 lbs., were planted into Horsethief Reservoir.

The hatchery also reared 22,800 cutthroat, 11,500 rainbow, and 6,000 grayling fry for planting into twenty-nine high mountain lakes of the Magic Valley and Upper Snake regions. Four-wheelers, pack-stock, and foot travel were used to plant these fish.

The fish transport trucks assigned to Mackay Hatchery traveled on 83 fish stocking trips during the year, planting 94 different waters, and traveling 35,000 miles. Transport tankers assigned to Fish Transportation hauled seven loads of fish for the hatchery during the year.

## **FISH FEED**

Fish feed used during the year totaled 89,644 pounds at a cost of \$37,881. Feed conversion averaged 1.07 pounds of feed for every pound of fish produced. Feed cost per pound of fish produced was \$0.45.

BioDiet, Rangen, and Sterling Silver Cup feed were used, depending upon the stock of fish and specifications of the feed contract. All feeds used and amounts are shown in Appendix 3.

## **FISH MARKING**

Of the one million cutthroat planted into Henrys Lake, 101,200 were adipose-fin clipped prior to stocking. Of the 250,000 rainbow fingerlings planted into Island Park Reservoir, 60,000 were left ventral fin clipped. A crew of four did the clipping during the second week of August.

## **PUBLIC RELATIONS**

Approximately 800 people toured the hatchery during the year. The hatchery's remote location does not attract large crowds of people. Most visitors come to fish in the diversion pond below the hatchery. Scheduled tours were given to Mackay and Arco elementary school classes, Boy Scout groups, and FFA groups. The hatchery is assisting Mackay High School in an aquaculture program. The hatchery crew and the local conservation officer participated in Idaho's "Adopt a Highway" litter control program. Six miles of Highway 93 along Mackay Reservoir are cleaned biannually. Assistance was also provided to the Hunter Education Program at Mackay School.

## **ACKNOWLEDGEMENTS**

During 1998, the Mackay Hatchery crew included Adam Broussard, Bob Evans, and Jason Rheinhardt, Biological Aides. Without their excellent assistance, we could not have accomplished all that we did during the year. Their care and concern enabled the hatchery to produce the quality of fish we do. Mel Hughes, Fish Culturist, Mick Hoover, Assistant Hatchery Manager, and Phil Coonts, Hatchery Manager, round out the hatchery's personnel.

Appendix 1. Fish Production at Mackay Fish Hatchery, January 1 to December 31, 1998.

Species/ Strain	Lot Number	Source	Received as	Number/lbs Received or Carried Over	Yield Number/ pounds	Destination
Arlee rainbow trout	7-EN-RA	Ennis NFH	eyed eggs	90,725/ 25,560	81,690/ 45,150	'98 catchables
Arlee rainbow trout	8-EN-RA	Ennis NFH	eyed eggs	129,000/ 1,000	100,657/ 35,545	'99 catchables
Arlee rainbow trout	8-EN-RA	Ennis NFH	eyed eggs	280,000/ eyed eggs	266,250/ 5,325	'98 Island Park fing.
Arlee rainbow trout	9-EN-RA	Ennis NFH	eyed eggs	174,000/ eyed eggs	~150,000 fry	'00 catchables
Henry's Lk cutthroat	8-U-ID-C3	Henry's Lk	eyed eggs	1,400,000/ eyed eggs	1,074,450/ 8,168	'98 Henry's Lk high mt lakes
rainbow X cutthroat	8-U-ID-RC	Henry's Lk Hayspur H.	eyed eggs	438,000/ eyed eggs	331,850/ 2,740	'98 Henry's Lk '98 Horsethief Res
westslope cutthroat trout	7-U-ID-C2	McCall H.	fry	18,993/ 311	18,700/ 935	'98 Payette Lk '98 Fish Lk
westslope cutthroat trout	8-U-ID-C2	McCall H.	fry	27,815/ 136	27,580/ 431	'99 Payette Lk
Crawford brown trout	6-PB-BN	Paint Bank SFH Virginia	eyed eggs	5,119/ 2,133	5,080/ 3,500	Horsethief Res
Crawford brown trout	7-PB-BN	Paint Bank SFH Virginia	eyed eggs	243,071/ 338	242,000/ 4,096	'98 Reg 4,5
Crawford brown trout	7-PB-BN	Paint Bank SFH Virginia	eyed eggs	6,900/ 8.6	6,722/ 2,585	'99 Camas Cr
Payette Lk kokanee	7-U-ID-KE	Payette Lk	green eggs	500,000/ 426	484,600/ 3,920	'98 Dworshak
Deadwood kokanee	8-U-ID-KE	Deadwood Res	green eggs	1,700,000/ green eggs	1,000,000/ 500	'98 Island Park '98 Lucky Peak
grayling	8-GR	Ashton SFH	fry	6,500/ 2	6,000/ 6.2	Reg 4,6 high mt. Lakes
Kamloops rainbow	8-Y-WA-K1	Troutlodge	eyed eggs	25,000/ eyed eggs	11,500/ 17	Reg 4,6 high mt. lakes

Appendix 2. Mackay Stocking Summary, 1998.

Lot Number	Number Planted	Pounds Planted	Size Planted
7-EN-RA	81,690	45,150	catchable
6-PB-BN	5,080	3,500	catchable
8-U-ID-C3	1,051,650	8,168	fingerling
8-U-ID-RC	331,850	2,740	fingerling
8-EN-RA	266,250	5,325	fingerling
7-PB-BN	242,009	4,096	fingerling
7-U-ID-C2	18,700	935	fingerling
7-U-ID-KE	484,600	3,920	fingerling
8-U-ID-C3	22,800	29	fry
8-K1	11,500	17	fry
8-GR	6,000	6	fry
<b>TOTAL FISH PLANTED</b>		<b>TOTAL POUNDS PLANTED</b>	
Fingerlings	2,395,050	25,184	
High Mountain Fry	40,300	52	
Catchables	86,770	48,650	
<b>TOTALS</b>	<b>2,522,120</b>	<b>73,886</b>	

Appendix 3. Mackay Fish Hatchery Fish Feed Used Jan. 1, 1998 through Dec. 31, 1998

	<b>Pounds Used</b>	<b>Cost</b>
<b>Bioproducts Biodiets</b>		
Starter #1	330	\$ 429.00
Starter #2	1,468	\$ 1,908.00
Starter #3	2,907	\$ 3,779.00
Grower 1.0	340	\$ 442.00
Grower 1.3	3,253	\$ 3,448.00
Grower 1.5	1,870	\$ 1,982.00
Grower 4.0	88	\$ 55.00
<b>Sub Totals</b>	<b>10,256</b>	<b>\$ 12,043.00</b>
<b>Silver Cup Feeds</b>		
Grower #3	43	\$ 17.00
Grower #4	128	\$ 51.00
Sinking 3/32	660	\$ 251.00
Sinking 1/8	396	\$ 98.00
Sinking 5/32	26,433	\$ 7,137.00
<b>Sub Totals</b>	<b>27,660</b>	<b>\$ 7,554.00</b>
<b>Rangen Feeds</b>		
Trout Starter #1	1,000	\$ 197.00
Trout Starter #2	5,650	\$ 631.00
Semi-moist 0	200	\$ 491.00
Semi-moist #1	780	\$ 2,582.00
Grower #3	6,966	\$ 2,201.00
Grower #4	2,303	\$ 755.00
Extr. 350 3/32	6,786	\$ 2,470.00
Extr. 450 5/32	25,808	\$ 8,117.00
Extr. 450 ¼	2,235	\$ 703.00
<b>Sub Totals</b>	<b>51,728</b>	<b>\$ 18,147.00</b>
<b>TOTALS</b>	<b>89,644</b>	<b>\$ 37,744.00</b>

Appendix 4. Lot Histories – 1998 Totals Only, Mackay Fish Hatchery

Lot	# of Fish	lbs. gained	lbs feed	conv.	\$ feed fed	\$/lb fish	\$/fish
7-EN	81,690	19,300	34,692	1.80	\$ 9,821.00	\$ 0.51	\$ 0.120
8-EN	266,250	4,900	5,225	1.07	\$ 2,243.00	\$ 0.46	\$ 0.008
8-EN	100,657	35,303	26,381	0.75	\$ 9,234.00	\$ 0.26	\$ 0.092
8-RC	311,850	2,474	2,975	1.20	\$ 1,943.00	\$ 0.79	\$ 0.006
6-PB	5,080	1,400	2,236	1.60	\$ 605.00	\$ 0.43	\$ 0.119
7-PB	242,000	4,100	3,439	0.84	\$ 3,456.00	\$ 0.84	\$ 0.014
7-PB	6,722	2,585	2,254	0.87	\$ 644.00	\$ 0.25	\$ 0.096
7-KE	484,600	3,920	3,720	0.95	\$ 4,254.00	\$ 1.09	\$ 0.009
8-KE	1,000,000	375	340	0.91	\$ 300.00	\$ 0.80	\$ 0.000
7-C2	18,993	765	970	1.27	\$ 470.00	\$ 0.61	\$ 0.025
8-C2	27,580	426	581	1.36	\$ 261.00	\$ 0.61	\$ 0.009
8-C3	1,051,650	8,168	6,831	0.84	\$ 4,513.00	\$ 0.55	\$ 0.004
<b>Totals</b>	<b>3,597,072</b>	<b>83,716</b>	<b>89,644</b>	<b>1.07</b>	<b>\$37,744.00</b>		

Lot Histories of Fish Carried Over from 1997, With 1998 Costs Added In, Mackay Fish Hatchery.

Lot	# of Fish	lbs. gained	lbs feed	conv.	\$ feed fed	\$/lb fish	\$/fish
6-PB	5,080	3,233	3,795	1.17	\$ 1,682.00	\$ 0.52	\$ 0.331
7-EN	52,480	1,640	1,430	0.87	\$ 330.00	\$ 0.20	\$ 0.006
7-EN	81,690	45,150	40,122	0.89	\$ 16,120.00	\$ 0.36	\$ 0.197
7-C2	18,700	935	1,263	1.35	\$ 745.00	\$ 0.80	\$ 0.040
<b>Totals</b>	<b>157,950</b>	<b>50,958</b>	<b>46,610</b>	<b>0.91</b>	<b>\$ 18,877.00</b>		

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**McCALL SUMMER CHINOOK HATCHERY  
(Resident Program)**

**1998**

**Steven T. Kammeyer, Assistant Hatchery Manager**

## INTRODUCTION

McCall Summer Chinook Fish Hatchery (MFH) is located within the city limits of McCall, approximately 1/4-mile downstream of Payette Lake, adjacent to the North Fork of the Payette River. This facility was renovated by the U.S. Army Corps of Engineers in 1979. The hatchery's primary objective is to produce one million summer chinook salmon *Oncorhynchus tshawytscha* smolts annually. Anadromous funding is provided through the Lower Snake River Compensation Program (LSRCP). Facility's secondary objectives pertain to resident programs. Funding for the resident fisheries program (April 1 to September 30) is provided from Idaho Department of Fish and Game (Department) license sales revenue.

Payette Lake provides all of MFH water requirements. Two water intakes are available, which provide limited water temperature control through mixing. The surface intake is located at Lardo Dam at the outlet of Payette Lake. The subsurface intake extends approximately 1/4-mile into Payette Lake at a depth of 50 feet. A 2-foot diameter constriction in the 3-foot diameter mainline limits maximum flow capacity to 20 cubic feet per second (cfs).

Incubation capacity consists of 26 8-tray Heath-style incubator stacks. Additional incubators can be plumbed into 4 of the early rearing vats if more space is required. Rearing of resident fry is accomplished utilizing several of the 14 indoor vats. Each early rearing vat is 40-feet long and 4-feet wide. Outside rearing space consists of two concrete ponds 196 ft x 101 ft x 4 ft which are used exclusively for summer chinook salmon. Outdoor ponds are joined to a common collection basin, 101 ft x 15 ft x 4 ft, which is used to hold catchable size rainbow trout for redistribution in the summer.

Major resident program objectives are:

- Operate Fish Lake satellite trap for the collection of westslope cutthroat trout *O. Clarki lewisi* eggs.
- Hatch and rear westslope cutthroat, rainbow trout *O. Mykiss*, rainbow-cutthroat hybrids, domestic kamloop, golden trout *O. aquabonita* and Arctic grayling *Thymallus arcticus* fry for stocking into high mountain lakes in the Panhandle, Clearwater, and Southwest regions; as well as lakes in the McCall subregion.
- Redistribute up to 80,000 catchable-size rainbow trout annually.
- Maintain and provide technical assistance for Payette Lake net pens.
- Maintain the statewide high mountain lakes stocking request database.
- Provide assistance to McCall subregional personnel as needed and available.



## FISH PRODUCTION

### Fish Lake Broodstock

Westslope cutthroat trout used for high mountain lake requests and stocking into Payette Lake are obtained from the naturalized broodstock-spawning project at Fish Lake. Fish Lake is located approximately seven miles west of McCall. It is on Little Creek, a tributary to the Little Salmon River. The satellite facility is equipped with two 6-ft x 22-ft x 4-ft concrete holding ponds, a 4-ft x 12-ft x 4-ft fish trap and a velocity barrier. Westslope cutthroat trout trapping and spawning operations typically extend from early April through May.

The Fish Lake trap operated from March 27 through May 25, 1998. A total of 136 westslope cutthroat trout were trapped. Of these, 45 were males (33.1%) and 91 were females (66.9%). Average total lengths for males and females were 368.4 mm and 366.9 mm, respectively.

During the years 1986 through 1996, westslope cutthroat trout stocked back into Fish Lake as future broodstock were fin-clipped for identification. Of the 136 returning adults in 1998, 49 fish with fin clips (36%) returned to the trap. The percentage of marked fish returning to the trap has generated a significant trend indicating a probable loss of natural recruitment to the population.

Spawn-taking operations took place from April 24 to May 22, 1998. A total of 76 females were spawned in 8 lots to produce a green egg take of 75,800 eggs (Appendix 1). Average fecundity was 997.2 eggs per female. The average eye-up for these eggs was 90.2%, resulting in 68,400 eyed-eggs. Of these, approximately 67,900 were initially ponded and available for hatchery programs.

Thirteen green females were released along with 15 males above the trap to spawn naturally. These fish represented a cross-section of the entire run. Also, all spawned females were released above the trap to allow them to spawn out their last few eggs naturally. In the past, females were spawned twice to ensure all eggs were collected.

Excess westslope cutthroat trout fry not needed in the high mountain lakes program in 1997 were used as Fish Lake broodstock. This provided a total of 40,500 unmarked westslope cutthroat trout fry at an average size of 300 fpp for stocking in the fall of 1998. These fish were scatter planted around the lake and inlet channel on September 15 (14,750 @ 335.9 fpp), 19 (12,730 @ 296.1 fpp) and 25 (13,020 @ 266.4 fpp). Replacement broodstock from BY97 were further supplemented with approximately 5,000 Fish Lake cutthroat trout which were overwintered at Mackay Hatchery. These fish were stocked on May 26, 1998 at an average size of 20 fpp, 132 mm total length (TL).

Hatchery personnel assisted fisheries biologist Paul Janssen and his bio-aide Chris Buelow in electrofishing Fish Lake on October 20, 21 and 30 in order to determine a population size for the lake. Mark recapture data determined the westslope cutthroat population size to be 877 +/- 93 fish (95% CI). Approximately 90% of the fish sampled represented two age classes (1+ and 2+). Fish, which were overwintered at Mackay Hatchery and then released this spring, appeared to have poor survival.

## **High Mountain Lake Stocking**

Size is critical to the efficiency of the high mountain lake stocking program. A desirable stocking size is 600 to 1,200 fpp. Shipments of all species into MFH are attempted to coincide with westslope cutthroat trout production from Fish Lake so all species may be stocked in the same time frame, reducing the amount of flight time needed to complete fish plants.

Species available and used for high mountain lake stocking in 1998 included: westslope cutthroat trout, domestic kamloop, and rainbow-cutthroat hybrids (Appendix 2). Means of stocking included backpacking, aerial plants, and truck plants. All of the high mountain lakes plants were distributed within the six-month resident funding period.

Requests for westslope cutthroat, domestic kamloop, and rainbow cutthroat hybrids were completely met for all regions. However, no golden trout or Arctic grayling were available this year which is why not all requests were met. Requests met for individual regions ranged from 69.9% to 100% and depended on how many Arctic grayling and golden trout were requested (Appendix 3).

A total of 136 lakes (93.8% of requests) were stocked with 132,500 fry (86.7% of requests) in 1998 (Appendix 6). Of these, 110 were stocked at a total cost of \$3,922.00 in flight time, or \$35.65 per lake stocked in this manner. Volunteers stocked 24 lakes resulting in a savings to the Department of approximately \$617.00 in comparable flight time costs. An additional 26,170 westslope cutthroat trout were stocked into Deadwood Reservoir on September 10, 1998. Feed costs for all resident fry reared totaled \$400.40. Feed conversions for all species reared averaged 1.04 (Appendix 4).

Following the completion of high mountain lake stocking flights, remaining excess kamloops fry (5,200) and rainbow cutthroat hybrid fry (1,500) were stocked into Lake Fork Creek. An additional 200 rainbow cutthroat trout fry were provided for a stocking demonstration on Cascade Lake.

## **Catchable Redistribution**

During the period May 19 to August 20, 1998 a total of 71,775 catchable-size domestic kamloop were stocked into 32 water bodies in the McCall vicinity (Appendix 5). An additional 200 catchables were transferred out of MFH for the Free Fishing Day clinic located in Council. All of these fish were reared at Nampa Hatchery and then transferred to MFH. A total of 3,445 miles were driven at an approximate cost of \$3,250.00 to complete 76 stocking trips.

In addition to the routine catchable redistributions, MFH personnel also assisted McCall regional personnel by transporting tiger muskie from Columbia Basin Fish Hatchery, WA and from a private vendor outside Mackay to Little Payette Lake. Hatchery personnel also transported bass collected by Trout Unlimited members in Hells Canyon to Little Payette Lake.

### Payette Lake Net Pens

This was the eighth year for net pen production of trout in Payette Lake. The net pen project was designed to be sponsored and operated by the community with technical assistance provided by MFH personnel. Again, Nampa Hatchery provided catchable domestic kamloop for rearing. Two nets, approximately 28 feet deep, were loaded with a total of 10,000 fish (3.1 fpp @ 9.3 inch TL). No significant fish mortalities were experienced, however osprey in the area did use the nets as a feeding area periodically.

Currently the McCall chapter of Trout Unlimited (TU) is providing the primary community support for this project and has committed to continue its support through the year 2000. Trout Unlimited members organized a schedule of several local businesses to perform daily feeding chores. On July 25, TU sponsored a fishing day off the net pen dock to remove pike minnows. Fifty kids accompanied by adults caught approximately 200 pike minnows, which were collected and disposed. Trout Unlimited also maintained a gumball machine next to the net pens so individuals could purchase small amounts of feed to give to the fish. Unfortunately, someone knocked the gumball machine into the lake on July 5 and it was out of action until late July. The cost of the feed purchased in 1998 was equally divided between TU and MFH.

Total production from the net pens in 1998 was approximately 9,800 domestic kamloops or 5,711 pounds released (approximately 2,430 pounds of gained weight). To accomplish this, a total of 3,200 pounds of feed was fed out with an experienced conversion of 1.32. Fish grew well under net pen rearing conditions. Net pens were initially loaded on June 18, 1998. The first mid-summer release of 2,000 fish occurred on July 21 at an average size of 2.4 fpp (10.0 inch TL). Another 1,200 fish were released on August 12 at an average size of 1.88 fpp (11.0 inch TL). The final release from both nets occurred on September 10, 1998 and numbered approximately 4,800 fish at an average size of 1.44 fpp (12.0 inch TL).

Total costs incurred as part of the net pen project in 1998 were estimated at \$3,025.00; of this, TU and community businesses contributed approximately \$1,250.00 in donated labor and feed purchases. The cost estimate for MFH was \$1,775.00 which included personnel costs for set-up, removal, cleanup, construction of new wooden net frames and purchase of one half of the feed used.

On May 26, 1998, MFH personnel assisted Mackay Hatchery with the stocking of 13,000 westslope cutthroat trout into Payette Lake and 5,000 into Fish Lake. These fish represented a cross section of Fish Lake cutthroat spawned in 1997, which were overwintered at Mackay Hatchery. These fish exhibited a wide size variation, but overall averaged approximately 20 fpp (5.0 inch TL). MFH transferred 27,950 westslope cutthroat trout (395 fpp) to Mackay Fish Hatchery on September 3, 1998 to overwinter. These fry represented a random cross-section of the spawn take at Fish Lake in 1998 and tentatively are scheduled to be scatter planted into Payette Lake and Fish Lake in spring 1999.

## **HATCHERY/PROGRAM IMPROVEMENTS**

Resident hatchery program improvements in 1998 included:

- Construction and replacement of the wooden net support frames for the Payette Lake net pens.
- Woody debris was removed from the area surrounding the Fish Lake spillway.
- Dam boards for the ladder leading to the Fish Lake trap were replaced.
- Topographical maps used for identifying lakes on high mountain lake flights were replaced.
- Topographical maps for approximately one-half of the lakes stocked by MFH were scanned into computer files.
- Historic mountain lake stocking records of MFH through 1968 were organized and standardized.

## **PUBLIC RELATIONS**

One fish stocking presentation was made for approximately 60 outdoor school sixth graders on Cascade Lake. Joel Patterson assisted Trout Unlimited members with catching bass from Hells Canyon and then transported the fish to Little Payette Lake for stocking. Again, MFH personnel assisted with Free Fishing Day activities held at Rowland Pond and conducted numerous tours through the hatchery facility for visitors.

## **ACKNOWLEDGEMENTS**

Accomplishments made through the resident program in 1998 would not have been possible without the support of the entire staff at MFH. I wish to thank Gene McPherson, MFH Fish Manager II, for his advice and assistance on various resident projects as well as for generously allowing anadromous funded personnel to work on resident projects. Individuals assisting on resident endeavors at MFH in 1998 included: Joel Patterson, MFH Fish Culturist, and seasonal temporaries Bob Welch, Randy Martinez, Ryan Kinzer, Stu Chamberlain, and Nathan Campbell.

Appendix 1. Results of Fish Lake westslope cutthroat trout spawn take 1998 at McCall Fish Hatchery

<b>Females Spawned</b>	<b>Green eggs taken</b>	<b>Percent eye-up</b>	<b>Eyed eggs available</b>	<b>Average fecundity</b>
76	75,800	90.2	68,400	997.2

Appendix 2. Species stocked out, by region, as part of the high mountain lake program 1998 at McCall Fish Hatchery.

<b>Region</b>	<b>Westslope cutthroat</b>	<b>Domestic kamloop</b>	<b>Rbt x C3 hybrid</b>	<b>Total stocked</b>	<b>Total lakes stocked</b>
Panhandle	13,750	10,000		23,750	7
Clearwater	26,000	5,500		31,500	31
Southwest(3B)	13,300	5,500	10,500	29,300	41
Southwest(3M)	25,250	19,200	3,500	47,950	57
<b>Totals</b>	<b>78,300</b>	<b>40,200</b>	<b>14,000</b>	<b>132,500</b>	<b>136</b>

Note: Table only includes fry stocked as part of high mountain lake program.

Appendix 3. High mountain lake stocking requests by region, 1998 at McCall Fish Hatchery.

<b>Region</b>	<b>Initial request (all species)</b>	<b>Stocked/ transferred (all species)</b>	<b>Percent of request met</b>
Panhandle	34,000	23,750	69.9
Clearwater	31,500	31,500	100.0
Southwest (3B)	31,800	29,300	92.1
Southwest (3M)	55,450	47,950	86.5
<b>Totals</b>	<b>152,750</b>	<b>132,500</b>	<b>86.7</b>

Note: 100% of requests were not met as golden trout and arctic grayling were not available.

Appendix 4. Feed usage and conversion data, McCall Fish Hatchery 1998.

Species	Stocked/ transferred	Feed used	Weight gained	Conversion	Cost per Lb. gain	Cost per 1000 fish	Total feed cost
<b>Fry Redistribution</b>							
Westslope Cutthroat (all sources)	132,420	173.3	169.9	1.02	\$1.41	1.81	\$240.02
Domestic Kamloop	45,400	62.3	67.6	0.92	\$1.28	1.90	\$86.29
Rbt x C3 hybrid	15,700	53.5	39.4	1.36	\$1.88	4.72	\$74.10

Note: Data includes all fry stocked and transferred.

**Payette Lake Net Pens**

Domestic Kamloop	9,800	3,200	2,430	1.32	\$0.71	\$176.98	\$1,734.00
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Note: Data reflects total net pen production.

Appendix 5. Total production and distribution, McCall Fish Hatchery 1998.

Species	Eggs/ fish Received	Fish stocked out	Pounds gained	Cost per Lb. gained	Cost/ 1000 fish stock/ produced
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**High Mountain Lake Program**

Westslope cutthroat	160,400	78,300	69.57		
Domestic Kamloops	47,800	40,200	53.75		
Rbt x C3 Hybrid	18,100	14,000	32.39		
<b>Subtotal</b>	<b>226,300</b>	<b>132,500</b>	<b>155.71</b>	<b>\$25.19</b>	<b>\$29.60</b>

Note: Cost based on flight time expenses of \$3,922.

**Payette Lake Net Pen Program**

Domestic Kamloops	10,000	9,800	2,430	\$1.24	\$308.67
<b>Subtotal</b>	<b>10,000</b>	<b>9,800</b>	<b>2,430</b>	<b>\$1.24</b>	<b>\$308.67</b>

Note: Cost based on estimated \$3,025 program expenses (IDFG \$1,775; Trout Unlimited & Volunteers \$1,250).

**Catchable Redistribution Program**

Domestic Kamloops	77,975	71,775	N/A	N/A	\$45.28
<b>Subtotal</b>	<b>77,975</b>	<b>71,775</b>	<b>N/A</b>	<b>N/A</b>	<b>\$45.28</b>

Note: Cost based on MFH transportation expenses of \$3,250.

**Additional Fry Redistribution**

Westslope Cutthroat	N/A	54,120	106.81	\$1.36	\$2.69
Domestic Kamloops	N/A	5,200	15.35	\$1.24	\$3.68
Rbt x C3 hybrid	N/A	1,700	8.54	\$1.48	\$7.45
<b>Subtotal</b>	<b>N/A</b>	<b>61,020</b>	<b>130.7</b>	<b>\$1.36</b>	<b>\$2.90</b>

Note: Cost based on feed expenses of approximately \$177.21.

<b>TOTAL</b>	<b>N/A</b>	<b>275,095</b>	<b>2,716.41</b>	<b>\$15.18</b>	<b>\$149.86</b>
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Note: Cost based on average MFH resident budget of \$41,225.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
MULLAN FISH HATCHERY**

**1998**

**Mary Van Broeke, Laborer**



## **INTRODUCTION**

The Mullan Fish Hatchery (MUFH) is a resident species redistribution station located four miles east of Mullan, Idaho. The Shoshone County Sportsmen's Association owns the MUFH buildings and grounds. Shoshone County funds maintenance of the physical plant. The Idaho Department of Fish and Game (Department) funds personnel costs, production costs, and equipment with fishing and hunting license fee revenue. The facility operates as a satellite of the Clark Fork Hatchery, with one temporary employee on station year-round.

The hatchery receives water from the South Fork of the Coeur d'Alene River and the Little North Fork of the Coeur d'Alene River. Two 6 ft x 65 ft concrete raceways, as well as one 12 ft x 65 ft concrete raceway and three 30 ft x 100 ft dirt ponds, are used to hold fish prior to stocking into the Coeur d'Alene and St. Joe river drainages. One dirt pond has been developed as a show pond complete with a visitor's access deck, information board, and a feed dispenser.

The Mullan facility plays a vital role in supporting the put-and-take rainbow trout *Oncorhynchus mykiss* fishery. From this location, daily trips are made onto the Coeur d'Alene and St. Joe rivers from May to September, providing the frequent stocking service needed to support such a fishery.

## **HATCHERY IMPROVEMENTS**

There were no major hatchery improvements during 1998. The facility continues to operate with minimal funding for operations only.

The main hatchery building (a large two-story structure) was prepared and painted by the laborer assigned to the hatchery.

Contractors funded by Environmental Services for Industry and Government (EVS) Consultants completed modifications and an upgrade to the electrical wiring in the hatchery. This provides power for an extensive research project operated out of the Mullan Hatchery.

## **FISH STOCKED OR TRANSFERRED**

Approximately 55,000 rainbow trout 9-inches long were released in waters of the Coeur d'Alene, St. Joe, and St. Maries river drainages from May to September to support a put-and-take fishery. All trout released from the MUFH were reared at the Clark Fork Hatchery. Fish were reared to full release size and then transported from Clark Fork to Mullan for redistribution. The hatchery worker loaded the fish into a 500-gallon pick-up truck mounted tank and delivered them to hundreds of miles of stream. The distribution schedule requires eight to 10-hour trips, four to five days each week or 59 days on the road out of 70 available working days in the summer season. While lake stocking is usually accomplished with single large releases, river stocking is much more labor intensive. Even relatively small numbers of fish require multiple stops to distribute the fish effectively for sportsmen's access.

## **PUBLIC RELATIONS**

The MUFH is located adjacent to a popular Shoshone County "day use" park. As a direct result, the hatchery receives a much higher visitor load than would be expected due to its remote location. The hatchery serves the highest number of visitors of any hatchery in the Panhandle Region, with over 4,300 people touring the grounds in 1998.

The hatchery maintains a covered visitor information center with a map of stocking areas and information about the special harvest regulations in the Coeur d'Alene River and St. Joe River drainages.

On June 6, one of the dirt rearing ponds was stocked with rainbow trout to provide fishing for a Free Fishing Day clinic. Personnel from the Panhandle Region, U.S. Forest Service, and the Shoshone County Sportsmen's Association provided training and advice to more than 80 participants that day with over 160 rainbow trout caught. The location was particularly beneficial in providing access for persons having limited mobility. As usual, the Fishing Clinic received good reviews in the local newspaper and boosted the Department's image in the Silver Valley.

## **SPECIAL PROJECTS**

### **Water Quality Studies**

The MUFH, for the third year, assisted in a rearing and survival assessment for westslope cutthroat trout *O. clarki lewisi* and rainbow trout in the South Fork Coeur d' Alene River. This work is part of a major research project evaluating toxicity and water quality degradation following mining activity in the Silver Valley. Personnel from EVS conducted the study utilizing fry provided from the Sandpoint Fish Hatchery.

### **Hatchery Trout Evaluation**

A hatchery trout evaluation was conducted on both the St. Maries River and Big Creek (St. Joe River) during 1998. The study was undertaken to evaluate the return rate for rainbow trout stocked to the put-and-take fishery. The results are provided in Appendix 1.

Appendix 1. Number of trout planted, tagged and returned from the St. Maries River and Big Creek (St. Joe River), Idaho, 1998.

<b>Water</b>	<b>Number planted</b>	<b>Number tagged</b>	<b>Mean length</b>	<b>Number returned</b>	<b>Percentage returned</b>
St Maries River	4,800	300	255	21	7.0
Big Creek	1,025	100	270	8	8.0

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**NAMPA FISH HATCHERY**

**1998**

**Rick Alsager, Fish Hatchery Manager II  
Dan Baker, Assistant Fish Hatchery Manager  
Bob Turik, Fish Culturist**

## INTRODUCTION

Nampa Fish Hatchery (NFH) is a resident trout rearing facility located one mile south of Nampa. The NFH water is supplied by eight pump-assisted artesian wells. A maximum flow of 40 cubic feet per second (cfs) of 59°F water is available for fish production. Built in 1975 and purchased by the Idaho Department of Fish and Game (Department) in 1982, fish rearing facilities consist of a hatchery building/dorm containing 4 early rearing vats and a feed storage room. Outside rearing tanks include 16 fry raceways, 3 fingerling/broodstock raceways, and 10 production raceways. Sixteen upwelling incubators are available for use in the fry raceways for eyed-egg incubation. A settling pond treats flows from the production units before discharge into Wilson Springs Ponds and Wilson Springs Drain.

## FISH PRODUCTION

The NFH produced 2,865,363 fish (250,907 pounds) during the 1998 fish year. Fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout *Oncorhynchus mykiss* comprised 80% of the fish stocked from NFH. In addition, brown trout *Salmo trutta* and Lahontan cutthroat trout *O. clarki henshawi* were produced at NFH during 1998 (Appendix 1). Another 3,000 fish (350 pounds) were produced at NFH and given to schools for dissection, and department personnel for various research programs. These fish were not included in overall production numbers.

The total number of each species/strain stocked is listed in Appendices 2, 3, and 4. A total of 3,581,634 eyed eggs were received during the 1998 fish year (Appendix 5).

## FISH STOCKED/TRANSFERRED

The NFH personnel stocked or transferred 1,726,903 fish (234,074 pounds), during the 1998 fish year. A total of 388 plant sites were stocked by NFH during 1998. The Southwest Region received 360,378 catchable trout (123,805 pounds).

A total of 248,085 catchable trout (74,970 pounds) were transferred to other hatcheries throughout the state (Appendix 4). Fingerlings transferred from NFH included 5,000 brown trout (31.25 pounds). No broodstock fish were reared at NFH during the 1998 season.

## Fish Transportation

Fish transport operators stationed at NFH stocked waters in all regions throughout the state of Idaho and transferred fish to and from 25 different state and national fish hatcheries. They transferred endangered chinook salmon *Oncorhynchus tshawytscha* from Eagle Fish Hatchery to

Manchester Fish Hatchery (National Marine Fisheries Service [NMFS] operated near Silverdale, WA). A trip was also made to Oklahoma (Alva State Fish Hatchery) to pick up channel catfish (*Ictalurus punctatus*) fingerlings which were stocked in reservoirs throughout Idaho. Tiger muskie fingerlings were transported from Tionesta Fish Hatchery in Pennsylvania and stocked into Upper Snake and Magic Valley regions. The transport operators stationed at NFH made 150 trips totaling 48,900 miles during 1998.

The NFH's transport operators stocked rainbow trout fingerlings from Lyons Ferry Fish Hatchery (196,900 fish, 5,114 pounds) into the Clearwater Region waters. They also stocked chinook salmon and B-run steelhead smolts from Clearwater Fish Hatchery and assisted with the transportation of chinook salmon smolts from McCall Fish Hatchery. Our drivers assisted in transporting and stocking surplus A-run adult steelhead from Oxbow Fish Hatchery; 200 steelhead were released into the Boise River.

### **Brown Trout**

Brown trout eyed eggs were received from Saratoga National Fish Hatchery. A shipment of 67,392 eyed eggs arrived in December of 1997. From this group, a total of 50,880 fingerlings were released in the Panhandle and Southwest regions for an overall survival rate of 75.5% from eyed egg to plant (Appendix 3). Due to budget constraints the brown trout will be released as fry plants in 1999.

### **Lahontan Cutthroat Trout**

During the 1998 fish year, NFH stocked 294,315 Lahontan cutthroat trout into lakes and reservoirs located in the Southwest and Upper Snake regions. All Lahontan cutthroat eggs were received from Omak Fish Hatchery in Washington. The Southwest Region fish were stocked as fry and fingerlings (Appendices 2 and 3), while the Upper Snake Region's fish were stocked as fingerlings into Mud Lake Reservoir (Appendix 3). Estimated survival from eyed egg to fingerling was 51.6%. Low survival was due to handling problems during shipping. One egg shipping box arrived a day late after being shipped to Oakland, CA. This program will also be modified to fry plants in 1999.

### **Colorado River Rainbow Trout**

The NFH reared Colorado River rainbow trout. Eyed eggs were received from Hayspur Fish Hatchery in January to produce a catchable trout by late fall. These fish were stocked in larger rivers in the Southwest and Clearwater regions. They grew slowly, reaching a length of six inches by October, and were planted as fingerlings.

The Colorado River rainbow trout performed similar to the cutthroat and brown trout at NFH. Of the 135,927 eyed eggs received, 94,880 fingerlings were stocked. This gave us an overall survival of 69.8%. The Colorado River fingerling program will be discontinued during 1999.

## **SPECIAL STUDIES**

The NFH assisted resident research biologists with a Mt. Lassen rainbow trout triploid study. This is the second year of the study. A third group of big catchables was added to the triploid and control groups. Overall, these groups performed similarly under hatchery rearing conditions. The triploid group had a slightly higher mortality from hatch to feeding fry (triploids: 66.0% survival, controls: 83.0% survival and big catchables: 81.0% survival). The three groups were jaw-tagged before release, 200 from each group. Nineteen streams were identified throughout the state and catchables were stocked May through August. Tag returns are still being reported, but initial results as of December 10, 1998, showed a slightly lower return to creel for the triploid group. Of the 3,800 catchables stocked from each group, 566 jaw tags were returned from the "Biggie" catchables, 498 jaw tags were reported from the "control" group and 398 jaw tags were reported from the "triploid" group. Dave Teuscher from the Magic Valley Region was the project leader for this study in 1998.

## **FISH FEED**

A total of 267,782 pounds of feed was fed during 1998 at a cost of \$96,338 (Appendix 6). Rangen Inc. made up 96% of the feed purchased by weight, with Bioproducts making up the remaining 4% (Appendix 6). The overall feed conversion was 1.07 pounds of feed fed to produce one pound of fish.

## **FISH SPAWNING**

### **Early Kokanee**

The NFH continues to operate the early kokanee salmon *O. nerka kennerlyi* trapping and spawning project. Numbers of kokanee at Deadwood Reservoir increased during 1997 and were expected to increase in 1998. The Deadwood River kokanee spawning project resumed in 1998 after the project was moved to the North Fork Payette River above Payette Lake in 1997. Egg take goals were set at seven million green eggs to meet the Dworshak mitigation. 1.75 million eggs were to be shipped to Mackay and 5.25 million eggs were to be shipped to Cabinet Gorge Hatchery. For this reason, the spawning operation was moved from Deadwood Reservoir after the peak of the kokanee run to trap the peak of the Payette Lake run.

The kokanee population rebounded in Deadwood Reservoir since the low run in 1996. The kokanee weir structures were installed on Wild Buck, Trail and Basin creeks on August 18 and 19. The main weir across the Deadwood River was installed the following week, after the reservoir water level dropped. This allowed us to install the weir below Wild Buck Creek. Trapping and spawning ran smoothly through September 4. The egg take for Mackay Hatchery had been filled with four spawning days; with 2,324 females spawned achieving a total egg take of 1,750,000

green eggs, average fecundity was 753 eggs per female. September 6 brought the first major storm of the fall. The Deadwood River rose two feet over a very short time. Three personnel cleaned the weir continuously from midnight until 2:00 AM. The decision was then made to pull the pickets in the weir to avoid having the weir washout and possibly damaged. This proved to save the weir framework, but allowed several thousand kokanee to escape upstream. The pickets were replaced in the morning after the high water started to drop. The river remained muddy for two days. As the water began to clear it became obvious the peak of the run had passed. The next four spawning days included trying to recapture kokanee as they tried to run up Wild Buck Creek. An attempt was also made to electroshock the Deadwood River, running the kokanee downstream to the weir. These attempts were labor-intensive but still productive. A total of 2,199 females were spawned and 1,562,521 green eggs were shipped to Cabinet Gorge. The Morrison Knudsen Nature Center received 200 adult kokanee for viewing at the Nature Center's ponds. Salmon and Steelhead Days received 100 pair of kokanee for educational purposes.

All fish were spawned at the trap site. A green egg yield of 3,312,521 eggs was taken from 4,523 females for a fecundity rate of 732 eggs per female (Appendix 8). Average total length of kokanee females was 362 mm, with males averaging 366 mm (Appendix 9).

Eggs were shipped to Mackay and Cabinet Gorge hatcheries via fixed-wing aircraft. Shipping techniques were similar to those used during previous years. The Department contracted the flying service with McCall Air Taxi.

## **HATCHERY IMPROVEMENTS**

Several important improvements were implemented at NFH during 1998:

- Landscaping around residences #2 and #3 was improved.
- 1989 GMC 1-ton truck was replaced with a 1998 Dodge 1-ton.
- Improved NFH building and grounds to meet handicap codes.
- Purchased a Kawasaki mule.
- Painted interior of residence #2
- Fixed slide gates on bulk storage feed bins.
- Installed new front screen door, repaired roof shingles, and replaced windows at residence #3.



NFH improvements scheduled for 1999 include:

- Paint exterior of residences #2 and #3. New siding is needed.
- Reorganize upper and lower shops.
- Modify bird screening over B-pond headbox to improve access.
- Build visitor information display.

## **PUBLIC RELATIONS**

As in past years, NFH was a focal point for many visitors, tours, and special groups. In 1998, an estimated 4,000 tourists visited the NFH. Most visitations came through the late spring and summer months. A total of 72 guided tours were given to area school, church, and boy scout groups. The NFH is becoming more involved in the job shadow program; during 1998, 12 students participated in one- or two-day job shadow programs. Nine slide show presentations were given at area schools, and one was given at the Northwest Fish Culture Conference. The disabled veterans were allowed to fish the settling pond five times during the summer months. Twelve other disabled groups from the Nampa area were allowed to fish the settling pond through the summer. The settling pond was also opened to fishing on Free Fishing Day. The NFH and Southwest Regional personnel hosted the Free Fishing Day clinic, which saw 350 visitors/fishermen, with an estimated 800 fish caught. Radio station KIZN 92.3 broadcast live from the Free Fishing Day event. The largest fish caught was a five-pound rainbow trout and several others weighed over four pounds. Free Fishing Day at NFH was enjoyed by many and needs to be continued in the future. We felt the "kids only" session from 8:00 a.m. to noon continues to be very popular and successful. NFH personnel participated in "Stand Down To Listen" during the first week of July. Hatchery personnel ran information booths at the Les Bois horse track on two afternoons, two days at the Karcher Mall, two days at the Boise Towne Square Mall, and one day at a Boise Hawks Baseball game. An "open house" was also available at Nampa Hatchery to encourage the public to express their concerns with department programs.

## **ACKNOWLEDGEMENTS**

The NFH staff for 1998 included Rick Alsager, Fish Hatchery Manager II; Dan Baker, Assistant Fish Hatchery Manager; Bob Turik, Fish Culturist; Gary Ady, Fish Transport Operator; and Dick Bittick, Fish Transport Operator. Bio-aides for 1998 included Chad Knee and Greg Kollman. Howard Garwick, Tony Cameron and Chuck Kiester assisted with the kokanee spawning operation. Five area students assisted with fin clipping projects during 1998. Four high school students assisted hatchery personnel through a work study program. Volunteers have also helped on a number of projects throughout the year donating over 207 hours of time.

Appendix 1. Fish requested and produced at Nampa Fish Hatchery, 1998.

Species/Strain	Size	Production Goal	Actual Production	% of goal Achieved
Lahontan cutthroat trout (C6)	1-3 inches	78,000	164,035	210.30%
Brown trout (BN)	2-3 inches	50,000	50,880	101.76%
Lahontan cutthroat trout (C6)	3-5 inches	75,000	130,280	173.71%
Hayspur rainbow trout (R9)	3-5 inches	70,000	71,200	101.71%
Kamloops trout (K1)	3-5 inches	40,000	37,885	94.71%
Rainbow trout (R1)	3-5 inches	400,000	506,475	126.62%
Colorado River rainbow trout (RR)	4-6 inches	81,000	94,880	117.14%
Mt. Lassen rainbow trout (R4)	8-12 inches	15,600	38,285	245.42%
Kamloops trout (K1)	8-12 inches	523,650	548,571	104.76%
Rainbow trout (R9)	8-12 inches	65,000	74,259	114.24%
<b>Totals</b>		<b>1,398,250</b>	<b>1,716,750</b>	<b>122.78%</b>

Appendix 2. Fry production at Nampa Fish Hatchery, 1998.

Species/Strain	Source And Date	Number Received	Yield Number	Yield Pounds	% Survival egg to plant	Destination
Lahontan cutthroat trout	Omak 5/97	275,000	164,035	276	59.6%	Southwest Region
<b>Totals</b>		<b>275,000</b>	<b>164,035</b>	<b>276</b>	<b>59.6%</b>	

Appendix 3. Fingerling production at Nampa Fish Hatchery, 1998.

Species/strain	Source	Date	Number Received	Yield Number	Yield Pounds	% Survival egg to plant	Destination
Hayspur rainbow trout	Hayspur	12/97	34,430	28,660	1200	83.24%	Magic Valley Region
Brown trout	Saratoga NFH	12/97	67,392	50,880	318	75.50%	Southwest Region Clark Fork Hatchery
Colorado R. rainbow trout	Hayspur	1/98	135,927	94,880	4,055	69.80%	Southwest Region Clearwater Region
Hayspur rainbow trout	Hayspur	2/98-3/98	135,000	108,275	1,091	80.20%	Upper Snake Region
Hayspur R9/K1 mix	Hayspur	2/98-3/98	190,985	153,170	1,540	80.20%	Upper Snake Region
Kamloops trout	Hayspur	2/98-3/98	405,959	325,555	4,208	80.19%	Upper Snake Region Magic Valley Region
Lahontan cutthroat trout	Omak	5/98	295,800	130,280	1,330	44.04%	Southwest Region Upper Snake Region
<b>Totals</b>			<b>1,265,493</b>	<b>891,700</b>	<b>13,742</b>	<b>70.46%</b>	

Appendix 4. Catchable production at Nampa Fish Hatchery, 1998.

Species/strain	Source	Date	Number Received	Yield Number	Yield Pounds	% Survival egg to plant	Destination
<sup>a</sup> Kamloops trout	Troutlodge	9/96	2,800	2,200	1,000	78.6%	Southwest Region
<sup>a</sup> Rainbow trout	Hayspur	3/97	30,900	20,822	7,855	67.4%	Southwest Region
Kamloops trout	Troutlodge	6/97-9/97	687,902	546,371	178,850	70.4%	Southwest Region Transfer to McCall Transfer to Sawtooth Transfer to Hayspur
Rainbow trout	Hayspur	10/97	85,996	63,490	16,380	73.8%	Southwest Region Transfer to Sawtooth Transfer to Hayspur
Rainbow trout	Mt. Lassen	7/97	53,257	38,285	15,971	71.9%	Statewide Study
<b>Totals</b>			<b>860,855</b>	<b>671,168</b>	<b>220,056</b>	<b>78.0%</b>	

<sup>a</sup>Production fish carried over from 1997.

Appendix 5. Eyed-eggs received at Nampa Hatchery January 1 to December 31, 1998.

Date Received	Species/Strain	Source	Number	Destination	Expected Yield	Cost/1000 eggs
1/20/98	Colorado River rainbow trout	Hayspur	108,777	SW Reg, C Reg	65,000	N/C
1/26/98	Colorado River rainbow trout	Hayspur	27,150	SW Reg	16,000	N/C
2/17/98	Kamloops trout	Hayspur	98,491	US Reg	75,000	N/C
2/17/98	rainbow trout	Hayspur	50,818	MV Reg	40,000	N/C
2/23/98	Kamloops trout	Hayspur	87,230	US Reg	50,000	N/C
2/23/98	rainbow trout	Hayspur	86,360	MV Reg, US Reg	50,000	N/C
3/2/98	rainbow trout, Kamloops trout	Hayspur	193,715	US Reg	115,000	N/C
3/11/98	rainbow trout, Kamloops trout	Hayspur	215,330	US Reg	140,000	N/C
5/5/98	Lahontan cutthroat trout	Omak	570,800	SW Reg, US Reg	153,000	N/C
6/9/98	Kamloops trout	Troutlodge	249,420	SW Reg, HFH	175,000	\$16.50
7/13/98	Kamloops trout	Troutlodge	348,837	SW Reg, SFH, HFH, MFH	250,000	\$15.00
8/10/98	Kamloops trout	Troutlodge	133,120	CFH	75,000	\$16.50
9/29/98	Kamloops trout	Troutlodge	319,045	SW Reg, SFH	200,000	\$16.00
10/23/98	rainbow trout	Hayspur	85,996	MV Reg, SFH	70,000	N/C
11/9/98	rainbow trout	Hayspur	326,260	SW Reg	250,000	N/C
11/23/98	rainbow trout, Kamloops trout	Hayspur	393,180	SE Reg	250,000	N/C
11/23/98	brown trout	Saratoga	56,290	SW Reg	45,000	N/C
12/15/98	rainbow trout	Hayspur	150,565	SW Reg, MV Reg	110,000	N/C
12/15/98	Kamloops trout	Hayspur	80,250	SW Reg	60,000	N/C

Destination Key	
C Reg	Clearwater Region
CFFH	Clark Fork Fish Hatchery
CFH	Clearwater Fish Hatchery
HSFH	Hayspur Fish Hatchery
MV Reg	Magic Valley Region
MCFH	McCall Fish Hatchery
P Reg	Panhandle Region
SE Reg	Southeast Region
SFH	Sawtooth Fish Hatchery
SW Reg	Southwest Region
US Reg	Upper Snake Region

Appendix 6. Nampa Fish Hatchery feed costs, 1998.

Supplier/Source	Size/Type	# Boxes/Bags	Pounds	Price/lb	Feed charge
<b>Biodiet</b>					
soft-moist	starter #1	13 boxes	572	1.13	\$645.50
soft-moist	starter #2	31 boxes	1,364	1.11	\$1,511.60
soft-moist	starter #3	35 boxes	1,540	1.17	\$1,805.80
soft-moist	1.0 mm	10 boxes	440	1.18	\$517.50
soft-moist	1.3 mm	16 boxes	704	0.96	\$672.78
soft-moist	1.5 mm	34 boxes	1,496	0.86	\$1,287.20
Biodry 1000	1.0 mm	36 sacks	1,800	0.96	\$1,732.50
Biodry 1000	1.3 mm	48 sacks	2,400	0.56	\$1,350.00
Biodry 1000	1.5 mm	12 sacks	600	0.30	\$180.00
Medicated TM	1.5 mm	4 boxes	176	1.85	\$324.92
		<b>Totals</b>	<b>11,092</b>		<b>\$10,027.80</b>
<b>Rangen</b>					
Dry crumble	Starter #1	6 sacks	300	0.46	\$ 138.00
Dry crumble	Starter #2	30 sacks	1,500	0.46	\$ 690.00
Dry crumble	Starter #3	120 sacks	6,000	0.32	\$ 1,920.00
Dry crumble	Starter #4	294 sacks	14,700	0.32	\$ 4,704.00
450 floating	1/16-in pellet	201 sacks	10,050	0.47	\$4,723.50
450 floating	3/32-in pellet	28 sacks	1,400	0.32	\$448.00
450 floating	1/8-in. pellet	120 sacks	6,000	0.32	\$1,920.00
450 floating	5/32-in pellet	2 sacks	100	0.32	\$32.00
450 floating	3/32-in pellet	bulk	29,940	0.33	\$9,880.20
450 floating	1/8-in pellet	bulk	160,290	0.31	\$49,689.90
450 floating	5/32-in.pellet	bulk	7,000	0.32	\$2,240.00
450 floating med	3/32-in pellet	52 sacks	2,600	0.52	\$1,352.00
450 floating med	1/8-in pellet	156 sacks	7,800	0.51	\$3,978.00
451 floating med	1/8-in pellet	bulk	9,010	0.51	\$4,595.10
		<b>Totals</b>	<b>256,690</b>		<b>\$ 86,310.70</b>
		<b>Grand Totals</b>	<b>267,782</b>		<b>\$96,338.50</b>

Appendix 7. Total net fish production at Nampa Fish Hatchery, 1994 through 1998.

Year	Put-and-Take		Put-Grow-andTake		Total Number	Total Pounds	Feed		Feed Conversion
	Number	Pounds	Number	Pounds			Pounds	Cost	
1994	308,023	146,978	793,065	55,014	1,101,088	201,992	220,544	\$72,340	1.09
1995	567,147	193,309	783,722	42,336	1,350,869	235,645	261,589	\$76,793	1.11
1996	694,659	212,011	950,412	34,271	1,645,071	246,282	262,902	\$91,893	1.07
1997	556,718	188,208	693,859	19,006	1,250,577	207,214	240,140	\$94,502	1.12
1998	692,706	228,005	2,172,659	22,901	2,865,363	250,907	267,782	\$96,338	1.07

Appendix 8. Total cost of net fish production at Nampa Fish Hatchery, 1994 through 1998.

Year	Total Cost Through Grow-out				Mean Length In Inches	Total Cost Through Stocking			
	Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ inch		Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ Inch
1994	\$258,010	\$234.32	\$1.28	\$0.029	8.06	\$291,650	\$264.87	\$1.44	\$0.028
1995	\$271,156	\$200.77	\$1.15	\$0.033	7.93	\$304,695	\$225.30	\$1.29	\$0.037
1996	\$274,072	\$166.60	\$1.11	\$0.027	7.50	\$310,851	\$188.96	\$1.26	\$0.031
1997	\$308,979	\$247.07	\$1.49	\$0.043	7.79	\$342,063	\$273.52	\$1.65	\$0.048
1998	\$279,045	\$ 97.39	\$1.11	\$0.023	7.30	\$329,161	\$114.88	\$1.31	\$0.027

Appendix 9. Kokanee egg take at Deadwood Reservoir, Nampa Fish Hatchery, 1998.

Lot Number	Spawn Date	Female Spawned	Green Eggs	Eyed Eggs	% eye-up
<b>Mackay</b>					
1	8/28/98	589	425,000	NA	NA
2	8/31/98	502	400,000	NA	NA
3	9/2/98	494	393,000	NA	NA
4	9/4/98	739	532,000	NA	NA
	<b>Subtotal:</b>	<b>2,324</b>	<b>1,750,000</b>		
<b>Cabinet Gorge</b>					
5	9/7/98	887	657,000	NA	NA
6	9/9/98	708	483,117	NA	NA
7	9/11/97	260	180,299	NA	NA
8	9/15/97	344	242,105	NA	NA
	<b>Subtotal:</b>	<b>2,199</b>	<b>1,562,521</b>	<b>1,020,345</b>	<b>78.9%</b>
<b>Totals</b>		<b>4,523</b>	<b>3,312,521</b>	<b>NA<sup>a</sup></b>	<b>NA<sup>a</sup></b>

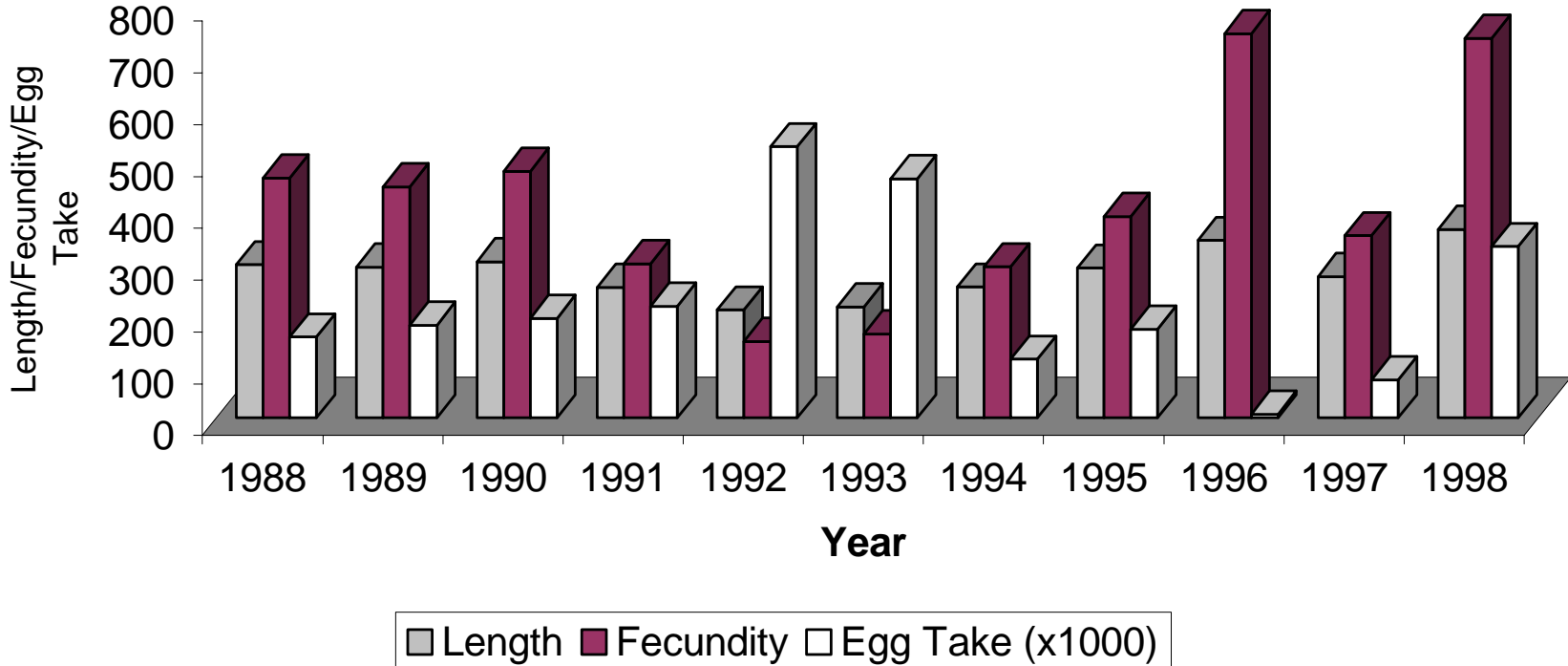
<sup>a</sup>Eyed-eggs were not enumerated at Mackay Hatchery before they were ponded.

Appendix 10. Kokanee spawning length, fecundity, egg take (x1000), Nampa Fish Hatchery, 1988 – 1998.

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## Kokanee Spawning Spawning Summary (1988-1998)



**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**SANDPOINT FISH HATCHERY**

**1998**

**John R. Thorpe, Fish Hatchery Manager II**



## **INTRODUCTION**

The Sandpoint Fish Hatchery (SFH) is located in Bonner County on the south shore of the Pend Oreille River, about two miles south of the town of Sandpoint. A limited water supply restricted production, resulting in high fish production costs. Public relations with local sportsmen's groups (Bonner County Sportsmen's Association, Trout Unlimited, and Lake Pend Oreille Idaho Club) are major benefits to the station. Duties include managing a small-scale specialty station rearing rainbow trout *Oncorhynchus mykiss*, westslope cutthroat trout *O. clarki lewisi*, chinook salmon *O. tshawytscha*, kokanee salmon *O. nerka kennerlyi*, and Kootenai white sturgeon *Acipenser transmontanus*; managing a net pen rearing program; and operating or helping in north Idaho egg-taking programs.

Staffing at the SFH was eliminated from the budget in 1994. Personnel from the Clark Fork Hatchery have provided all fish, cultural, and maintenance duties. The SFH was closed in 1985 but was reopened in 1990 in response to public demand in the Panhandle Region. The SFH is license-funded, with \$13,500.00 allocated for operation in FY98. All funding was removed in September 1998.

### **Water Supply**

The SFH water supply consists of 500 to 600 gallons per minute (gpm) at 7°C from Murphy Spring #3. Springs #1, #2, and #4 have not been developed for SFH use, although their discharge is included in the four cubic feet per second (cfs) water right. The SFH flow fluctuates seasonally, with lowest flows in late summer and highest flows in early spring.

The Idaho Department of Fish and Game (Department) was deeded the springs in 1928. However, this deed did not include property ownership of the surrounding land. The easement agreement states the Department will provide a two-inch domestic line to the landowners in exchange for a collection reservoir and pipeline right-of-way from the springs to the SFH.

The water right to spring #2 has been waived to the South Side Sewer District in the amount of 300 gpm. This water may be reclaimed for SFH use if needed.

### **Rearing Facilities**

The SFH rearing facilities include 8 Heath 8-tray incubators, 18 cement vats (15 ft x 2.5 ft x 3 ft) inside the SFH building, and 2 outdoor concrete raceways (100 ft x 5 ft x 2 ft). Two vats have been modified with heaters and recirculation pumps for warm water rearing. The carrying capacity of the SFH ranges from 880 pounds (2.5 million) of 1-inch fish to 12,800 pounds (25,500) of 10-inch fish.

Off-site SFH rearing facilities include 8 net pen frames and 11 net pens (20 ft x 20 ft x 20 ft) with assorted mesh sizes ranging from 1/4-inch to 1 1/4-inch. A carrying capacity for net pens has not been established, but limiting capacity to 1,000 pounds per pen has shown good results. These pens have been utilized at private marinas around Lake Pend Oreille.

The SFH buildings consist of one nursery/shop/office complex, one storage shed, garage/crew quarters, and a residence. A one-stall garage with carport provides covered storage for regional equipment.

### **Hatchery Improvements**

The SFH improvements during 1998 included:

- The Department Engineering crew repaired the main water supply pipeline in the spring. The remains of the old suspension bridge, as well as the old pipe, were removed and the damaged pipe section replaced with new pipe and buried. The supply line will be much more secure from natural disaster and the unsafe bridge crossing has been removed.

Needed SFH improvements include:

- A new water collection system at spring #3 to collect the water now bypassing the spring box.
- Improved weatherization, as well as an alternative heating system, in the SFH building. The present electric heating cost averages \$600 to \$800/month. That level of heating does not provide a comfortable working environment, it only slows the ice formation on the walls and floors.
- A drainage system to carry ground water away from the walls of the residence. The basement stays damp most of the year, and has water flowing across the floor during spring thaw.

### **HATCHERY OPERATIONS**

The main water supply line was reconnected prior to April 1998. Water was slowly reintroduced to the system to prevent damage to joints or valves and to watch for breaks in the piping over the past year. The majority of the piping was in very good shape after being dry for over a year. In fact, the only damaged section was in a PVC to iron junction in the domestic supply to the residence.

The hatchery was utilized to incubate and rear disease-free domestic Kamloops rainbow trout and westslope cutthroat fry for release in mountain lakes. There were 20,000 domestic kamloops eggs and 50,000 westslope cutthroat trout eggs purchased from commercial sources.

Hatchery maintenance is provided by Clark Fork Hatchery personnel in most cases. The utilization of individuals sentenced to community service by the local courts has been very beneficial at this site. These individuals often possess mechanical skills that are not available in the biologists we have on staff. They also increase our gross manpower total rather than simply reposition personnel.

A cooperative effort with EVS Consultants of Seattle, WA has infused additional funding for operation during 1998. In exchange for rearing 67 westslope cutthroat from the Coeur d'Alene River, the consulting firm has paid the electric charges (heat and light) for the hatchery and shop. Clark Fork personnel will in return spawn these fish in the spring of 1999 and deliver eggs from these adults for toxicology work at The Mullan Hatchery.

The Department Panhandle Region North District Conservation Officers maintain an equipment storage garage at the SFH.

## **PUBLIC RELATIONS**

The use of the Sandpoint Hatchery as a public site has been very limited throughout the past year. The hatchery grounds were used for several group gatherings, including the annual Bonner County Sportsmen's Association picnic. Tours and education outreach have been severely restricted by the lack of assigned personnel.

The projects for aquarium rearing of native fish species are usually centered out of this facility. The travel to deliver feed or disease-free fish is much easier to coordinate from this centrally located facility.

Unfortunately, we were forced to turn away numerous requests for school tours. None of these groups could visit the other Bonner County fish hatcheries due to the extensive travel required.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**SAWTOOTH FISH HATCHERY**

**1998**

**Roger Elmore, Fish Culturist**

## INTRODUCTION

Sawtooth Fish Hatchery (STFH) is a U.S. Fish and Wildlife Service Lower Snake River Compensation Plan (LSRCP) hatchery and has been in operation since 1985. The Idaho Department of Fish and Game (Department) operates this facility. The primary goal of the STFH is to trap; spawn, raise, and release spring chinook salmon *Oncorhynchus tshawytscha*. Also, adult steelhead *Oncorhynchus mykiss* are trapped and spawned, with the eyed eggs and fry being sent to other hatcheries for hatching and growout. In 1990, a program to stock rainbow trout *Oncorhynchus mykiss* into the surrounding area waters for improved angling opportunities began. In 1998, STFH personnel stocked high mountain lakes with rainbow trout, westslope cutthroat trout *Oncorhynchus clarki lewisi*, and Arctic grayling *Thymallus arcticus*. All high mountain lakes were stocked with fry.

## FISH STOCKING

Nampa Fish Hatchery supplied STFH with rainbow trout (K1 and R9 strain) for stocking. The total number of fish received at STFH was 87,677 and a total of 70,825 fish were stocked. Based on 31 sample counts done on fish destined for lakes and ponds, fish averaged 2.93 fish per pound (fpp) and 9.43 inches in length. Based on 39 sample counts, fish destined for the Salmon River, Valley Creek, and the Yankee Fork Ponds, averaged 3.09 fpp and 9.30 inches in length. The majority of fish, totaling 27,850, were stocked into the main Salmon River (Appendix 1). National Marine Fisheries Service permit #908, which allows the river to be stocked, does not allow fish greater than 250 mm in length to be stocked into the Salmon River, Valley Creek, or the Yankee Fork Ponds. All fish stocked at these sites have been marked by adipose fin clipping. Fishing regulations allow only marked fish to be kept, thereby protecting wild rainbow trout.

All fish were adipose clipped by personnel at the Nampa Fish Hatchery. Fish were clipped and then delivered to STFH 21 days later to allow for withdrawal of MS-222, used to anesthetize the fish, so the fish would be safe for human consumption.

Fish feed was purchased from Rangen Inc. A total of 5,000 pounds of 1/8 inch-size pellets were fed throughout the course of the summer. Total cost of fish feed was \$1,572.50. Tourists purchased \$950.00 of feed through the coin feeders to help offset the feed cost.

Pettit Lake received 3,000 Hayspur strain (R9) rainbow trout that were right ventral clipped and stocked into Pettit Lake. The purpose of this is to determine how many fish survive over winter and what impacts, primarily predation, they may have on young sockeye salmon. A different type of mark will be applied to the fish being stocked in future years to differentiate year classes. In addition, Alturas Lake was stocked with the R9 strain, however the fish were not marked. Mosquito Flats Reservoir received the only stocking of fingerlings with 2,725 stocked averaging 71.0 fpp. All other locations received the K1 strain of rainbows.

New for 1998 was the stocking of Squaw Creek Pond. This pond was built as a cooperative effort between the Department and Thompson Creek Mining Company as a steelhead smolt acclimation pond. After the release of the steelhead, the pond was stocked and ready for fishing beginning on Memorial Day weekend. The pond proved to be a popular fishery at the start of summer, but fishing pressure declined later in the summer.

Weekly notices informing the public of the latest stocking locations are distributed to local businesses and are posted at the STFH. Also, a repeating message can be heard over the local radio transmitter containing stocking information and current news about STFH. Stocking information is available by dialing the 1-800-ASK-FISH telephone number.

The "Fishing Sawtooth Valley" brochure got its third revision in as many years and continues to improve each year. 5,000 copies were printed and about 4,000 were distributed in 1998. This brochure provides valuable information about where to catch fish in the area, as well as color photos to educate the public about protected species such as bull trout. A short narrative describing the plight of anadromous fish is included in the brochure. The entire back of the brochure is a map indicating where STFH stocks fish. This helpful brochure serves the approximately one million visitors to the Sawtooth National Recreation Area.

Once again STFH sponsored a Kid's Fishing Day at the Sawtooth Display Pond on Free Fishing and Camping Day, June 6, 1998. The turnout was good with 45 children participating. The weather was cool and rainy, but the fishing was great; every youngster caught a fish. Fishing poles, bait and lures were provided by the Department Information and Education Bureau. Drinks and snacks were provided by the STFH. Shelley Cooke, Sawtooth FH Visitor Information Specialist Bio-Aide, put together the successful program. Other Department employees helping were Gary Gadwa and Paul Valcarce, Stanley Conservation Officers; Sylvia Hamilton, STFH Fishery Technician; and Ken Hartz, Department Reservist. Other area helpers included Cpl. Wes Stewart and Cpl. Brad Strom of the Idaho State Police, Roland Miller, U.S. Forest Service, and Chris Cullen, Custer County Deputy Sheriff.

### **MOUNTAIN LAKE STOCKING**

The STFH personnel stocked high mountain lakes in the Salmon Region with fixed-wing aircraft or by hiking. A total of 76 lakes were stocked with 59,550 cutthroat trout and 2,000 grayling. Cost of stocking was \$1,975.00 or \$29.50 per lake. Volunteers stocked nine lakes, donating 36 hours of time to the Department. The remainder of the project was funded by resident state money with cooperation from the USFWS. The Westslope Trout Co. of Ronan, MT supplied the cutthroat trout eggs and Ashton Fish Hatchery supplied the grayling fry. This is a very popular program and allows anglers to take ownership in some of the local lakes.

## **PLANS FOR 1999**

Permit #908 expired on December 31, 1998. Application for renewal for a five-year period has been completed. Numbers of fish stocked and stocking strategy for 1999 will be similar to 1998.

Development of an Internet web page, which can be accessed through the Department's web site, is planned. Current stocking information and answers to frequently asked questions will be provided.

For the second straight year, the request numbers for Alturas Lake have been reduced. This year's reduction is from 12,000 per year to 8,600 per year.

Stocking of mountain lakes for the past three years has consisted of double stockings to catch up on a lack of available fish prior to this time. Now that stocking has caught up, 1999 should consist of a single rotation with 35,000 cutthroat, 2,500 grayling, and 1,500 golden trout (if available) to be stocked primarily in lakes of the White Cloud area.

Plans are to participate in Free Fishing Day again.

## **ACKNOWLEDGEMENTS**

The STFH would like to thank Rick Alsager and the Nampa Hatchery crew for their cooperation in making 1998 successful. Special thanks go to Dick Bittick and Gary Ady for transporting fish from Nampa. Paul Valcarce was responsible for improving the already popular "Fishing Sawtooth Valley" brochure.

Jay Pravecek, Tom Curet, and his crew provided valuable assistance clipping adipose fins. Margaret Harvie kept anglers busy by stocking most of the fish.

Gary Gadwa and Mel Sadecki contributed to the success of mountain lake stocking.

Appendix 1. Planting sites and numbers of catchable rainbow trout stocked in the Salmon Region by Sawtooth Fish Hatchery during May through September 1998.

<b>Site</b>	<b>Number</b>
Salmon River	27,850
Valley Creek	3,000
Perkins Lake	2,000
Pettit Lake	2,640
Grouse Lake	100
Yankee Fork Ponds	4,000
Little Bayhorse Lake	2,000
Squaw Creek Pond	1,120
Kelly Creek Pond	1,265
Mosquito Flats Reservoir	2,725
Stanley Lake	16,450
Alturas Lake	7,675
<b>Totals</b>	<b>70,825</b>



**IDAHO DEPARTMENT OF FISH AND GAME**

**RESIDENT HATCHERIES**

**FISH HEALTH REPORT**

**1998**

**Douglas R. Burton  
Fishery Pathologist**

## INTRODUCTION

The Resident Hatchery Pathologist's primary duties are to provide fish health inspection and diagnostic services to the Idaho Department of Fish and Game's (Department) resident fish hatcheries. These same services are provided to Department fishery managers and biologists around the state and occasionally to private individuals or companies where the information or relationship is of benefit to the Department. The resident and anadromous hatchery pathologists, (Douglas R. Burton and A. Douglas Munson, respectively) work closely together, often assisting each other in their respective programs and coordinating efforts when those programs overlap. Both individuals are American Fisheries Society-certified Fish Health Inspectors.

The resident hatchery pathologist is the Investigational New Animal Drug (INAD) monitor for the Department resident hatcheries. This is the process by which the Federal Food and Drug Administration will allow the limited use of certain drugs and chemicals that are not currently labeled for use on food fish. The Western Regional INAD Program, a cooperative group of western states, commercial growers, and native tribes, was discontinued at the end of 1997. The Department petitioned the U.S. Fish and Wildlife Service (USFWS) to be included in the Service's INAD program. The petition was granted, and the Department's drug use via the USFWS program began in June 1998.

The resident pathologist and Eagle Fish Health Laboratory personnel examined 91 cases for the Department resident hatchery programs during 1998: 50 routine inspections (including 21 inspections of feral brood stock) and 39 diagnostic cases. The resident program also handled two wild fish survey inspections, eight research cases, and two diagnostics for private individuals. A summary of the work at each Department hatchery, as well as the results of all sampling done at those hatcheries, are as follows.

## AMERICAN FALLS

No significant clinical disease or fish losses occurred at American Falls Hatchery in 1998. The hatchery was visited twice, during which time the pathologist visually surveyed the production raceways and discussed programs and activities with the hatchery manager, but chose not to necropsy any fish for laboratory analysis.

This was the second full production year in which bacterial coldwater disease (CWD), caused by *Flavobacterium psychrophilum*, was kept under control by good hatchery management instead of chemical therapy. The hatchery staff deserves commendation for this excellent work! The strain of *F. psychrophilum* that is endemic to this hatchery was showing early signs of antibiotic resistance to oxytetracycline (OTC). Specifically, increasingly higher doses of the drug were necessary to control clinical disease episodes. The longer this facility can avoid using OTC, the better the chance that full drug resistance can be avoided. *Flavobacterium psychrophilum* is present and can again become a disease problem if conditions are allowed to favor an epizootic.

## ASHTON HATCHERY

Ashton Hatchery was visited three times in 1998, with fish samples taken on two of those occasions. The Henrys Lake brook trout and the Hayspur rainbow trout were inspected in July (Appendix A). No pathogens were detected from the brook trout, but a carrier level of bacteria (*Aeromonas hydrophila* and a *Pseudomonas* species) were detected in the rainbow. The brook trout were checked again in August. Bacterial gill disease was the diagnosis, with a secondary internal infection of the same bacteria (*Aeromonas cavaie*), isolated from the gills. Densities were reduced and the problem resolved. No other significant disease problems were reported.

Hatchery personnel reported that *Gyrodactylus*, a monogenetic trematode, was present during the year, but never at levels that required treatment. *Gyrodactylus* infestations are historic problems at this facility, and will continue as long as there remains open water between the springs and the hatchery intake. Another concern with the open water intake is *Myxobolus cerebralis*, the causative agent of whirling disease. Numerous waters in the vicinity contain the parasite, so there is a significant possibility the hatchery water source may become contaminated.

## CABINET GORGE HATCHERY

Cabinet Gorge Hatchery was visited by both the Resident and Anadromous Pathologists in 1998. Only one disease episode was reported in Hayspur rainbow trout fingerling. These fish were examined and diagnosed with *Pseudomonas* and *Aeromonas* septicemias (Appendix B). An oxytetracycline (OTC) feed treatment was applied with good results. Inspection sampling was done on both the Whatcom Lake and Sullivan Springs kokanee fry and on the Priest Rapids Fall Chinook (twice). No pathogens were detected in any of the kokanee. At the first inspection, subclinical levels of *Aeromonas* were isolated, and a single *Renibacterium salmoninarum* (RS) organism was detected by fluorescent antibody test (FAT) from one of ten fish. The second inspection sampling involved a statistically significant number of fish (60). No pathogens were detected from the second sampling, including RS. No clinical bacterial kidney disease (BKD) has been reported on this hatchery since the discontinuation of the captive brood stock program in 1994.

The spawning kokanee at Sullivan Springs and at the Clark Fork River ladder were sampled in November. Condition of the fish appeared very good, with an observed occurrence of internal parasites (encysted cestodes or nematodes in the swim bladder) similar to past years. Samples were negative for replicating viruses, and no spores of *M. cerebralis* were detected. *Renibacterium* antigen was detected in one of 12 pooled (x5) Sullivan Springs samples, and in two of 12 pooled (x5) Clark Fork River samples, using the Enzyme-Linked Immunosorbent Assay (ELISA). Optical densities of all positive samples were very low, indicating very low levels of antigen. These findings are consistent with previous years.

## CLARK FORK HATCHERY

The resident pathologist sampled fish at Clark Fork Hatchery twice, in May and November. In addition, hatchery personnel shipped samples to the laboratory on four occasions (Appendix C). The four-year-old cutthroat brood stock was sampled and no pathogens, (viruses, *Renibacterium*,

or *Myxobolus*) were detected. Juvenile cutthroat and Kamloops rainbow were diagnosed with motile gram-negative bacterial septicemias, most frequently caused by *F. psychrophilum*, *Aeromonas* species, or *Pseudomonas* species. Kamloops juveniles were treated for CWD (*F. psychrophilum*) with OTC-medicated feed under INAD protocols. The cutthroat juveniles were treated with OTC-feed for motile *Aeromonas/Pseudomonas* infections under the existing drug label. Response to these treatments was generally good.

The open water supply at Clark Fork Hatchery contains a population of brook trout that has historically tested positive for Infectious Pancreatic Necrosis virus (IPNV) and RS. Clinical IPN and BKD have both been confirmed on the hatchery in past years, and the fact that neither was detected in 1998 is no reason to assume the pathogens or diseases were not present. Fish may not have been sampled at the appropriate time to confirm the pathogens. Very little can be done to eliminate the threat of these diseases until significant changes can be made in the water source for the hatchery.

### **CLEARWATER HATCHERY**

The resident fishery pathologist performed one inspection examination of the Hayspur-strain rainbow trout at Clearwater Hatchery (Appendix D). A chronic case of CWD was diagnosed, which hatchery personnel chose not to treat with any drug therapy.

Clearwater Hatchery's resident trout production is important to fishing quality in the Clearwater Region. In addition, Clearwater can stock healthy rainbow trout in Dworshak Reservoir (the hatchery's own water source), instead of relying on fish from other sources which may or may not carry unwanted pathogens. However, the program is secondary to the Clearwater Hatchery's primary goal of rearing anadromous fish species. Care must be given to keep the two programs as isolated as possible to avoid the transmission of pathogens.

### **GRACE HATCHERY**

Six diagnostic and two inspection cases were examined at Grace Fish Hatchery in 1998 and all but one inspection involved Hayspur-strain rainbow trout. The one exception involved Saratoga-strain lake trout, from which no pathogens were detected (Appendix E).

One lot of Hayspur rainbow fry were examined because they were experiencing elevated mortality in the hatchery vats. Moderate levels of *Shewanella putrefaciens* were isolated. This bacterium is probably not a primary pathogen and may have been a contaminant from the fish's gastrointestinal tracts. Losses moderated without treatment. Spring catchable rainbow trout were inspected and found to carry a light infection of *F. psychrophilum* with no clinical signs of disease. Five other diagnostic cases of Hayspur rainbow were examined over the course of the year and all involved clinical CWD (*F. psychrophilum*). One case had a concurrent infection of *A. hydrophila*, which allowed the use of OTC-medicated feed under the existing label. Three cases resulted in OTC treatments under INAD protocols. The final case was a follow-up check of a group of fish which had already been treated and in which the mortality rate improved without a further treatment.

Bacterial coldwater disease and bacterial gill disease are the only serious problems that are normally expected at Grace Hatchery. Both are often directly related to overloading or overcrowding conditions. Improved hatchery management in these areas does not guarantee that disease will not occur, but should significantly reduce the probability. The new hatchery manager and the pathologist will work together toward this goal.

## HAGERMAN HATCHERY

Twenty-two diagnostic cases were examined from Hagerman State Fish Hatchery in 1998 (Appendix F). The peculiar losses in the hatchery vats occurred again and an etiologic agent continues to elude identification. Fish on feed for 7-10 days suddenly go off feed and move to the bottom of the vat. Fecal casts sometimes appear, and mortality shortly follows. Affected vats seem totally random, both within the physical structure of the hatchery and within lots of fish. Changes in feeding practice initially seemed to reduced the number of groups effected, but have not eliminated the problem.

Losses in the outside raceways involved a combination of pathogens in most cases. Infectious Hematopoietic Necrosis Virus (IHNV) was isolated twice, once in combination with a low level of *F. psychrophilum* (CWD), and once with a multiple infection of *F. psychrophilum*, *A. hydrophila*, and *Flavobacterium columnare*. The hatchery personnel, without calling on the Eagle Fish Health Laboratory (Lab) for diagnostic confirmation, observed several additional IHN episodes. The bright side to this situation is that the overall percentage of loss to IHN in 1998 was again down when compared with previous years. This is probably due to a combination of the completion of bird netting over the large raceways, improvement in the gate system for the bird netting, reconstruction of the Tucker Springs portion of the large raceway headrace, and management efforts to grow the fish larger in the small raceways. The worst losses came during spring and early summer, when Hayspur-strain rainbow trout were loaded the heaviest and were moved to the large raceways at smaller size. *Flavobacterium psychrophilum* was the most common pathogen outside the hatchery building, isolated from fish in 12 of 19 cases. Several of those cases involved carrier or chronic levels of the bacterium rather than a significant epizootic. Each case that did involve losses serious enough to warrant drug therapy also involved concurrent infections of *Aeromonas* or *Pseudomonas* bacteria. Therefore, use of OTC-medicated feed was legal under the existing label and did not require use of the INAD process. Responses to treatments were moderate to excellent in reducing mortalities. *Flavobacterium columnare* was isolated three times, also in combination with *F. psychrophilum*, *Aeromonas*, *Pseudomonas*, or a combination of the three.

Furunculosis, caused by the bacterium *Aeromonas salmonicida*, was diagnosed in four cases, all of which involved the same lot of Trout Lodge Kamloops held in different raceways on Riley Creek water. The fish were treated successfully with Romet-30, because the isolate did not respond well to OTC *in vitro*. This was the first documented outbreak of Furunculosis at Hagerman State Hatchery since 1982, although the pathogen is not uncommon in the Hagerman Valley. Hopefully, this will prove to be an isolated incident rather than from an established reservoir in Riley Creek above the hatchery. If the latter becomes true, this would be another argument to change the production goals of Hagerman Hatchery and to avoid rearing fish on this water source.

## HAYSPUR HATCHERY

The resident hatchery pathologist's work at Hayspur Hatchery involved considerable effort to inspect brood stock and brood stock replacement lots, and to inject the adult brood stock with Penicillin-G (Appendix G). One clinical episode of CWD was diagnosed in the brood year 1998 rainbow trout. The fish were treated with OTC-medicated feed with good results. These fish are not intended for human consumption, thus there was no need to use an INAD protocol.

The brood year 1996 (BY96) lot of Hayspur-strain rainbow trout was inspected in March. No viruses, *Myxobolus* spores, *Nucleospora* inclusions, or significant bacteria were detected. The fish did test positive for RS antigen by ELISA (two of twelve 5-fish pools at very low levels). These fish were all held on spring/well water in the small raceways, which are in very close proximity to an open pond. Efforts have been made to exclude birds from these raceways using some light-to moderate-weight netting, although larger mammalian predators (e.g., otters or mink) can still penetrate the nets. Investment in some type of solid predator enclosure around these raceways would greatly benefit the program if replacement brood stocks continue to be kept at Hayspur. Early inspection of the BY96 Kamloops lot was inadvertently neglected, but those fish were later included in the inspection of spawning fish. The Colorado River brood fish population was not inspected because it was anticipated that the program would be discontinued at the end of the season. No replacement fish for this population were on hand.

All adult spawning fish, except for the Colorado River population, were injected with Penicillin-G. The dose level was 3000 IU/lb., and was applied approximately one month prior to spawning. The purpose of the injections was to inhibit transmission of *F. psychrophilum*, either horizontally within the pond, or via the eggs to the next generation. This was the first year that Penicillin-G was used exclusively for this purpose, instead of OTC. Penicillin-G was chosen in an attempt to use an injectable drug therapy, which is not likely to cause future antibacterial resistance to OTC, the only drug currently available to treat most bacterial septicemias in food fish. The brood fish at Hayspur Hatchery are a contained population and no injected fish will ever be used for human consumption.

Intensive sampling and culling of the replacement brood stock pairings continued to be the health priority at Hayspur Hatchery. Ovarian fluids were collected from every female for virology and for RS analysis by the ovarian cell pellet fluorescent antibody test (OCPFAT). Sixty females from each set of pairings were sacrificed for ELISA. Eggs from individual females were held in isolation until the test results were available. If the parent female tested positive for any virus or for RS by OCPFAT, the resulting group of eggs was culled. The culling criterion for RS antigen detected by ELISA was set at an optical density (OD)  $\geq 0.110$ , but the hatchery manager was given the option of culling eggs from any positive fish at his discretion. Results from these samplings are as follows:

### Hayspur Rainbow

The Hayspur-strain rainbow brood stock replacement spawning began on October 15, 1998, and ended January 5, 1999. Ovarian fluids from 197 females were tested for viruses and RS by FAT. Sixty of those same females were sacrificed for ELISA. No viruses were detected from any fish. *Renibacterium salmoninarum* organisms were detected in ovarian fluids of two individuals by OCPFAT at very low levels (one organism in 30 microscope fields). One of 60 fish

(1.7%) tested positive for RS by ELISA. (Unfortunately, the OCPFAT-positive fish were not in the group that was sacrificed for ELISA, so there is no correlating data for the tests). Eggs from all three RS-positive fish were culled. Detection of RS by ELISA was down from 8 of 60 in 1997, but was up by OCPFAT (0 of 200 in 1997). No RS had been detected in the ovarian fluids since discontinuing use of the membrane filtration method (MFAT) at the end of 1996.

An attempt was made to determine the carrier state of *F. psychrophilum* in this population at the end of the spawning season by inoculating ovarian fluid from 12 spawning females on tryptone yeast extract (TYE) agar medium. The bacterium has been detected by this method in the past, but none was detected from these fish. This gives some indication the pre-spawning injection of Penicillin-G was effective, but there were no controls available to give an indication of what the prevalence might have been without the injection. This suggests a line of research that may be followed in the next season.

### **1997-1998 Hayspur Kamloops**

Kamloops spawning at Hayspur overlaps the end of the calendar year. The 1997 portion of the 1997-1998 kamloops spawning season was reported in the Department's 1997 Annual Resident Hatcheries Report. In brief summary, three egg-takes were completed with 88 females sampled. No viruses were detected and no RS positives had been detected by OCPFAT. The ELISA tests had found one fish out of 30 positive for RS antigen at an optical density below the culling criteria. Three more egg-takes from 80 more females were completed in January and February 1998 (Appendix G). No viruses were detected. One fish was found positive for RS by OCPFAT, and two (out of 30 sampled), were positive by ELISA with optical densities slightly above the culling criteria. Again, the OCPFAT-positive individual was not in the group tested by ELISA. Eggs from all three RS-positive females were culled. Total RS detection for the season (1 of 168 by OCPFAT and 3 of 60 by ELISA for a total of 4 [2.4%]), was down from the previous season total (9 of 128, or 7.0%)

A single pond of brood kamloops fish was not injected with either OTC or Penicillin-G. (It had been intended to inject the fish in that pond with Penicillin-G, but light control did not work in delaying maturation, and the fish were ready to spawn before the injections could be applied). Ovarian fluids from 23 of those fish were streaked on TYE agar near the end of the spawning season. Six fish (26.1%) were found to carry *F. psychrophilum*. This gives some justification to the effort expended in injecting Hayspur Hatchery brood fish with some antibiotic.

### **1998-1999 Hayspur Kamloops**

The 1998-1999 kamloops spawning season began on October 29, 1998. Four egg-takes from 118 females were completed by the end of December. No viruses were detected from the ovarian fluids. Two fish were positive for RS by OCPFAT and 18 of 40 were positive by ELISA (10 of which were above the culling criteria). Both of the OCPFAT-positive fish were tested by ELISA, but neither was positive by the latter method. It is possible that this increase in RS detection is due to the change in pre-spawning injection from OTC to Penicillin-G. There is no literature reporting Penicillin-G efficacy against RS, while there is some non-scientific evidence that injection of OTC to Hayspur brood fish can reduce RS antigen detection by ELISA (see the Department's 1995 Resident Fish Hatcheries Annual Report).

## HENRYS LAKE HATCHERY

Fish health inspection samples were taken from spawning cutthroat trout at Henrys Lake Fish Hatchery from March 5 through May 4, 1998 (Appendix H). Ovarian fluids were collected by hatchery personnel and shipped to the Eagle Laboratory where they were tested for viruses (399 females in 57 seven-fish pools) and RS by OCPFAT (1,435 females in 205 seven-fish pools). A group of 60 fish (both males and females) were sacrificed for kidney FAT, virology, bacteriology (12 fish), and *Myxobolus* tests. No viruses were detected in any of the samples (both tissues and ovarian fluid). *Renibacterium salmoninarum* was detected by OCPFAT in three ovarian pools but no organisms were detected in the kidney FAT samples. Eggs from the positive pools were discarded. Bacteriology samples taken from three of 12 fish showed carrier-level infections of *F. psychrophilum*. No *Myxobolus* spores were detected in this sample by the digestion method, although this population was confirmed positive for *M. cerebralis* in 1996.

The Department Fisheries Bureau decided that, for financial reasons, no brook trout would be reared in 1999. Therefore, the egg-take and brood stock sampling that has historically been done at Henrys Lake in the fall was not done this year.

## MACKAY HATCHERY

Mackay Fish Hatchery was visited once in 1998, when inspection samples were taken from kokanee salmon, rainbow trout, and brown trout (Appendix I). Tests included virology, bacteriology, kidney FAT for RS, and WHD. No reportable pathogens were detected from any population, although a carrier state of *Pseudomonas* was detected in the Payette Lake-strain kokanee salmon. No *M. cerebralis* spores were detected in any population. Production fish at Mackay Hatchery have never tested positive for *M. cerebralis*, but the parasite has been found in fish from the settling pond. This proximity to the production raceways must cause some doubt if the hatchery is truly free of the parasite, although the prevalence and levels of infection may never be high enough to detect.

## McCALL HATCHERY RESIDENT PROGRAM

The spawning westslope cutthroat trout run at Fish Lake was so dismally poor in 1998 that no samples were taken. The RS antigen detection by ELISA from this population was fairly constant in the previous five years, ranging from 70 to 90%. But it is uncertain what, if any, direct impact that RS is having on this population, since no signs of clinical disease have ever been detected from spawning fish. Environmental problems (high temperatures, low oxygen, late-summer algae blooms, etc.), poaching, or something else may be the cause of the decline in this population. If this genetic stock is still desirable for Department programs, it may be necessary to transplant it to some other rearing situation.



## NAMPA HATCHERY

The number of cases examined at Nampa in 1998 was reduced from that in 1997, from eight to 11. Bacterial coldwater (*F. psychrophilum*) and motile aeromonad septicemia (primarily *A. hydrophila* and *A. sobria*), continue to be the most common diseases diagnosed in kamloops/rainbow trout, while the *Aeromonas* and *Pseudomonas* found in the brown trout may or may not be the cause of losses (Appendix J). Not all episodes were severe enough to warrant treatment. Oxytetracycline was used to treat motile aeromonads under the existing label. No INAD protocols were used to treat fish during 1998.

Contact has been maintained with toxicology experts at Wright State University to help identify the mystery "blue-green" algae which sometimes causes losses at Nampa Fish Hatchery. However, this syndrome has not been seen since 1995, when that contact was first made. We will follow up on this if, or when, the problem occurs again.

Nampa Hatchery personnel operate the early kokanee salmon spawning weir on the Deadwood River, upstream of Deadwood Reservoir. Eggs are taken, fertilized, and shipped green to hatcheries other than Nampa for incubation and rearing. Both Mackay Hatchery and Cabinet Gorge Hatchery received these eggs in 1998. To avoid redundancy, fish health survey results for the spawning adults will be recorded here only. A total of 60 fish were sampled, (both males and females). No replicating viruses were detected, nor were any spores of either *M. cerebralis* or *Ceratomyxa shasta*. *Renibacterium* antigen was detected at very low levels in two of 12 pools (x5) of kidney tissue, but no signs of clinical BKD were detected. This low-level carrier state of RS is consistent with previous years' results.

## SANDPOINT HATCHERY

Sandpoint Hatchery's main pipeline, which collapsed on December 31, 1996, was finally repaired in 1998. Westslope cutthroat trout eggs were obtained from a certified disease-free source in Montana, and the resulting fry have been held in hopes of establishing a broodstock population to replace the fish that were lost when the pipe collapsed. These fish were very small at the end of the year, and so have not yet been inspected by the pathologist.

## ACKNOWLEDGMENTS

Douglas R. Burton was the resident health pathologist in 1998. He wishes to acknowledge his anadromous counterpart, Doug Munson, and his supervisor, Keith Johnson, for their assistance in the field and for sharing their considerable knowledge with him. The efforts of Fishery Technologists Sharon Landin, Roberta Scott, Carla Hogge, and Erica Balken, are greatly appreciated. Their timely and accurate results from the laboratory are essential in diagnosing and treating fish health problems in the field. He also wishes to acknowledge the Hatchery Managers and personnel with whom he worked. Their cooperation is greatly appreciated, and he sincerely hopes he has been able to benefit their programs. Finally, it is with deep regret that the passing of Eagle Fish Health Laboratory's Secretary, Dorothy Baker, must be reported. Dorothy was a significant asset to the Lab Team and a bright spot in everyone's day. She is sincerely missed. Elaine Cavanaugh was hired to fill the vacancy and is quickly "learning the ropes."

## Appendix A. Summary report of Eagle Fish Health Laboratory results for Ashton Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Henry's Lake	Brook trout	98-232	-	-		-	-	-	-		-				IX: NPD; VIRO 0/60, FAT 0/60, BACTE 0/4, WHD 0/60
1998	Hayspur	Rainbow trout	98-233	-	-		-	-	-	-		-				IX: MAS; VIRO 0/20, FAT 0/20, Aeromonas hydrophila 2/4, Pseudomonas spp. 2/4, WHD 0/20
1997	Henry's Lake	Brook trout	98-257	-	-			-	-	-						DX: BGD, MAS; VIRO 0/5, Aeromonas cavaie--gill 2/2, Kidney/spleen 3/4

## Appendix B. Summary report of Eagle Fish Health Laboratory results for Cabinet Gorge Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Hayspur	Rainbow trout	98-031	-	-			-	-	-						IX: Pseudomonas, MAS; VIRO 0/10, P. paucimobilis 6/8, A. hydrophila 2/8.
1997	Priest Rapids	Fall Chinook	98-032	-	-		+	-	-	-						IX: RS. MAS; VIRO 0/10, FAT 1/10, A. hydrophila 3/8
1997	Whatcom Lake	Kokanee	98-159	-	-		-	-	-	-						IX: NPD; VIRO 0/20, FAT 0/20, BACTE-NSG
1997	Sullivan Springs	Kokanee	98-160	-	-		-	-	-	-						IX: NPD; VIRO 0/20, FAT 0/20, BACTE-NSG
1997	Priest Rapids	Fall Chinook	98-161	-	-		-	-	-	-						IX: PSEUDOMONAS; VIRO 0/60, FAT 0/66, P. fluorescens 1/4-light
Brood	Sullivan Springs	Kokanee	98-425	-	-		+				-					IX: RS; VIRO 0/60, ELISA 1/12 (x5, low), WHD 0/60
Brood	Clark Fork River	Kokanee	98-426	-	-		+				-					IX: RS; VIRO 0/60, ELISA 2/12 (x5, very low), WHD 0/60

## Appendix C. Summary report of Eagle Fish Health Laboratory results for Clark Fork Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1994	Clark Fork (Brood)	Cutthroat trout	98-162	-	-		-					-				IX: NPD; VIRO 0/150, FAT 0/150 WHD 0/12
1998	Hayspur	Kamloops trout	98-190	-	-			-	-	+						DX: CWD; VIRO 0/10, <i>Flavobacterium psychrophilum</i> 8/8
1997	Clark Fork	Cutthroat trout	98-198	-	-			-	-	-						DX: MAS, BACTEREMIA; VIRO 0/8, <i>Aeromonas hydrophila</i> 8/8, <i>Flavobacterium odoratum</i> 1/8
1998	Clark Fork	Cutthroat trout	98-403	-	-			-	-	-						DX: PSEUDOMONAS, BACTEREMIA; VIRO 0/10 <i>Pseudomonas cepacia</i> 8/8 <i>Citrobacter</i> spp. 2/8, Gram-positive bacteria 8/8
1997	Hayspur	Kamloops trout	98-427	-	-			-	-	+						DX: CWD, MAS; VIRO 0/9, <i>F. psychrophilum</i> 8/8, <i>A. hydrophila</i> 7/8
1997	Clark Fork	Cutthroat trout	98-428	-	-			-	-	+						DX: CWD, PSEUDOMONAS; VIRO 0/10, <i>F. psychrophilum</i> 8/8, <i>P. fluorescens</i> 4/8
1998	Clark Fork	Cutthroat trout	98-459	-	-			-	-	+						DX: CWD, BACTEREMIA; VIRO 0/10, <i>F. psychrophilum</i> 3/8, <i>A. hydrophila</i> 1/8 <i>Pseudomonas</i> spp. 1/8

Appendix D. Summary report of Eagle Fish Health Laboratory results for Clearwater Hatchery Resident Program, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Hayspur	Rainbow trout	98-429	-	-			-	-	+						IX: CWD; VIRO 0/8, <i>Flavobacterium psychrophilum</i> 4/8

## Appendix E. Summary report of Eagle Fish Health Laboratory results for Grace Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1998	Hayspur	Rainbow trout	98-073	-	-			-	-	-						DX: BACTEREMIA; VIRO 0/5, <i>Shewanella putrefaciens</i> 4/4
1997	Saratoga	Lake trout	98-074	-	-		-	-	-	-						IX: NPD; VIRO 0/20, FAT 0/12, BACTE 0/8
1997	Hayspur	Rainbow trout	98-075	-	-		-	-	-	+		-				IX; CWD; VIRO 0/20, FAT 0/22, <i>Flavobacterium psychrophilum</i> 1/8, <i>Nucleospora</i> 0/4, WHD 0/20
1997	Hayspur	Rainbow trout	98-152					-	-	+						DX: CWD, MAS; <i>F. psychrophilum</i> 23/24, <i>A. hydrophila</i> 14/24, <i>Enterobacter</i> spp. 21/24
1998	Hayspur	Rainbow trout	98-181					-	-	+						DX: CWD; <i>F. psychrophilum</i> 2/4
1998	Hayspur	Rainbow trout	98-182					-	-	+						DX: CWD; <i>F. psychrophilum</i> 4/4
1998	Hayspur	Rainbow trout	98-256	-	-			-	-	+						DX: CWD; VIRO 0/10, <i>F. psychrophilum</i> 3/4, <i>Citrobacter freundii</i> 1/4
1998	Hayspur	Rainbow trout	98-339	-	-			-	-	+						DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5

Appendix F. Summary report of Eagle Fish Health Laboratory results for Hagerman State Hatchery, January 1 – December 31,1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Trout Lodge	Kamloops trout	98-019	-	-			-	-	-						DX: MAS, COLUMNARIS; VIRO 0/10, <i>Aeromonas hydrophila</i> 7/10, <i>Flavobacterium columnare</i> 7/10, <i>Acinetobacter</i> spp. 7/10
1998	Hayspur	Rainbow trout	98-039	-	-			-	-	+						DX: CWD, MAS; VIRO 0/5, <i>Flavobacterium psychrophilum</i> 4/4, <i>Aeromonas sobria</i> 3/4 <i>Shewanella putrefaciens</i> 3/4
1998	Hayspur	Kamloops trout	98-040	-	-			-	-	+						DX; MAS, CWD; VIRO 0/5, <i>A. hydrophila</i> 2/4 <i>F. psychrophilum</i> 1/4
1998	Hayspur	Rainbow trout	98-041	-	-			-	-	+						DX: CWD, PSEUDOMONAS; VIRO 0/5, <i>F. psychrophilum</i> 4/4 <i>Pseudomonas chlororaphis</i> 1/4
1998	Hayspur	Rainbow trout	98-042	-	-			-	-	-						DX: MAS; VIRO 0/5, <i>A. hydrophila</i> 2/4
1997	Trout Lodge	Kamloops trout	98-043	+	-			-	-	+						DX: IHN, CWD; IHNV 1/1(x5), IPNV 0/5, <i>F. psychrophilum</i> 1/4
1998	Hayspur	Kamloops trout	98-076	-	-			-	-	+						DX: MAS, CWD; VIRO 0/5, <i>A. caviae</i> 3/4 <i>F. psychrophilum</i> 3/4
1997	Trout Lodge	Kamloops trout	98-077	+	-			-	-	+						DX: IHN, CWD, MAS, COLUMNARIS; IHNV 1/1(x5), IPNV 0/5 <i>F. psychrophilum</i> 4/4, <i>A. hydrophila</i> 3/4 <i>F. columnare</i> 2/4
1998	Colorado River	Rainbow trout	98-105	-	-											DX: ENV. GILL DISEASE; VIRO 0/10,

Appendix F. Summary report of Eagle Fish Health Laboratory results for Hagerman State Hatchery, January 1 – December 31, 1998  
(Continued).

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1998	Hayspur	Rainbow trout	98-106					-	-	+						DX: COLUMNARIS ,CWD, BACTERIAL SEPTICEMIA; <i>F. columnare</i> 3/8, <i>F. psychrophilum</i> 1/8, <i>Chromobacterium</i> spp. 3/8
1997	Trout Lodge	Kamloops trout	98-107	-	-			+	-	+						DX: FURUNCULOSIS, CWD; VIRO 0/5 <i>Aeromonas salmonicida</i> 4/4 <i>F. psychrophilum</i> 1/4
1998	Trout Lodge	Kamloops trout	98-170	-	-											DX:NPD; VIRO 0/5
1998	Trout Lodge	Kamloops trout	98-171	-	-											DX:NPD; VIRO 0/10
1998	Trout Lodge	Kamloops trout	98-172	-	-			-	-	-						DX: NPD; VIRO 0/5, BACTE-NSG
1998	Hayspur	Rainbow trout	98-173	-	-			-	-	-						DX: PSEUDOMONAS; VIRO 0/5 <i>Pseudomonas</i> spp. 3/4
1997	Hayspur	Rainbow trout	98-174	-	-			-	-	+						DX: MAS, CWD; VIRO 0/5, <i>A. caviae</i> 2/4, <i>F. psychrophilum</i> 2/4
1997	Trout Lodge	Kamloops trout	98-175	-	-			+	-	-						DX: FURUNCULOSIS; <i>Aeromonas salmonicida</i> 4/16
1997	Trout Lodge	Kamloops trout	98-185					+	-	-						DX: FURUNCULOSIS; VIRO SAMPLES LOST, <i>Aeromonas salmonicida</i> 4/8
1997	Trout Lodge	Kamloops trout	98-221					+	-	+	-					DX: FURUNCULOSIS, CWD, MAS; <i>Aeromonas salmonicida</i> 4/12, <i>F. psychrophilum</i> 4/12, <i>A. sobria</i> 5/12, PKX 0/4



Appendix F. Summary report of Eagle Fish Health Laboratory results for Hagerman State Hatchery, January 1 - December 31, 1998  
(Continued).

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1998	Hayspur	Kamloops trout	98-467	-	-			-	-	-						DX: BACTEREMIA; VIRO 0/5, Probable <i>Pseudomonas</i> 4/4
1998	Hayspur	Rainbow trout	98-468	-	-			-	-	+						DX: CWD, PSEUDOMONAS; VIRO 0/5, <i>F. psychrophilum</i> 2/4, <i>P. mallei</i> 2/4
1998	Trout Lodge	Kamloops trout	98-469	-	-			-	-	+						DX: CWD; VIRO 0/2, <i>F. psychrophilum</i> 2/2

## Appendix G. Summary report of Eagle Fish Health Laboratory results for Hayspur Hatchery, January 1-December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Hayspur	Kamloops trout	98-001	-	-		-									IX: NPD; VIRO 0/12, ELISA 0/10, FAT 0/12
Brood	Hayspur	Kamloops trout	98-012	-	-		+									IX: RS; VIRO 0/28, ELISA 2/10, FAT 1/28
Brood	Hayspur	Kamloops trout	98-015							+						IX: CWD (carrier); <i>Flavobacterium psychrophilum</i> 6/23 from ovarian fluids
Brood	Hayspur	Kamloops trout	98-021	-	-		-									IX: NPD; VIRO 0/40, ELISA 0/10, FAT 0/40
1996	Hayspur	Rainbow trout	98-069	-	-		+	-	-	-		-				IX: RS; VIRO 0/60, FAT 1/60, ELISA 2/12 (x5, both very low), BACTE 0/20, <i>Nucleospora</i> 0/6
Brood	Hayspur	Rainbow trout	98-385	-	-		+									IX: RS; VIRO 0/20, FAT 0/20, ELISA 1/10
1998	Hayspur	Rainbow trout	98-400	-	-			-	-	+						DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/5
Brood	Hayspur	Rainbow trout	98-401	-	-		-									IX: NPD; VIRO 0/30, FAT 0/30, ELISA 0/10
Brood	Hayspur	Kamloops trout	98-402	-	-		+									IX: RS; VIRO 0/20, FAT 1/20, ELISA 2/10
Brood	Hayspur	Rainbow trout	98-417	-	-		-									IX: NPD; VIRO 0/50, FAT 0/50, ELISA 0/10
Brood	Hayspur	Kamloops trout	98-422	-	-		+									IX: RS; VIRO 0/30, FAT 0/30, ELISA 3/10
Brood	Hayspur	Rainbow trout	98-423	-	-		+									IX: RS; VIRO 0/50, FAT 2/50, ELISA 0/10

## Appendix G. Summary report of Eagle Fish Health Lab results for Hayspur Hatchery, January 1 – December 31, 1998 (Continued).

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Hayspur	Kamloops trout	98-436	-	-		+									IX: RS; VIRO 0/50, FAT 0/50, ELISA 7/10
Brood	Hayspur	Rainbow trout	98-443	-	-		-									IX: NPD; VIRO 0/30, FAT 0/30, ELISA 0/10
Brood	Hayspur	Kamloops trout	98-450	-	-		+									IX: RS; VIRO 0/18, FAT 1/18, ELISA 6/10
Brood	Hayspur	Rainbow trout	98-460	-	-		-			-						IX: NPD; VIRO 0/12, FAT 0/12, ELISA 0/10, BACTE (ovarian fluid) 0/12
Brood	Hayspur	Rainbow trout	99-003	-	-		-									IX: NPD; VIRO 0/5, FAT 0/5

## Appendix H. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Cutthroat trout	98-055				-									IX NPD; FAT 0/189
Brood	Henrys Lake	Cutthroat trout	98-056	-	-		-									IX: NPD; VIRO 0/35, FAT 0/154
Brood	Henrys Lake	Cutthroat trout	98-064				-									IX NPD; FAT 0/70
Brood	Henrys Lake	Cutthroat trout	98-065	-	-		-									IX: NPD; VIRO 0/35, FAT 0/70
Brood	Henrys Lake	Cutthroat trout	98-078				-									IX NPD; FAT 0/70
Brood	Henrys Lake	Cutthroat trout	98-079	-	-		-									IX: NPD; VIRO 0/35, FAT 0/70
Brood	Henrys Lake	Cutthroat trout	98-087				-									IX NPD; FAT 0/70
Brood	Henrys Lake	Cutthroat trout	98-088	-	-		-									IX: NPD; VIRO 0/35, FAT 0/70
Brood	Henrys Lake	Brook trout	98-101	-	-		-	-	-	+		-				IX: CWD (carrier); VIRO 0/60, FAT 0/60, WHD 0/60, <i>Flavobacterium psychrophilum</i> 3/12
Brood	Henrys Lake	Brook trout	98-102				-									IX NPD; FAT 0/70
Brood	Henrys Lake	Brook trout	98-103	-	-		-									IX: NPD; VIRO 0/35, FAT 0/70

Appendix H. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 1998  
(Continued).

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Brook trout	98-119				-									IX NPD; FAT 0/70
Brood	Henrys Lake	Brook trout	98-120	-	-		-									IX: NPD; VIRO 0/70, FAT 0/70
Brood	Henrys Lake	Brook trout	98-127				-									IX: NPD; FAT 0/70
Brood	Henrys Lake	Brook trout	98-128	-	-		-									IX: NPD; VIRO 0/70, FAT 0/70
Brood	Henrys Lake	Brook trout	98-133	-	-		-									IX: NPD; VIRO 0/70, FAT 0/70
Brood	Henrys Lake	Brook trout	98-134				+									IX: RS; FAT 2/10 (x7)
Brood	Henrys Lake	Brook trout	98-150				+									IX: RS; FAT 1/9 (x7)
Brood	Henrys Lake	Brook trout	98-151	-	-		-									IX: NPD; VIRO 0/14, FAT 0/49

## Appendix I. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Payette Lake	Kokanee salmon	98-141	-	-		-	-	-	-		-				IX:PSEUDOMONAS; VIRO 0/60, FAT 0/60, WHD 0/60 <i>Pseudomonas</i> spp. 3/8
1997	Arlee	Rainbow trout	98-142	-	-		-	-	-	-		-				IX:NPD; VIRO 0/60, FAT 0/60 BACTE 0/8, WHD 0/60
1997	Paint Bank	Brown trout	98-143	-	-		-	-	-	-		-				IX:NPD; VIRO 0/20, FAT 0/20, BACTE 0/4, WHD 0/20

Appendix J. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery, January 1 – December 31, 1998.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Trout Lodge	Kamloops trout	98-016	-	-			-	-	+						DX:MAS, CWD; VIRO 0/10, <i>Aeromonas caviae</i> 1/8, <i>Flavobacterium psychrophilum</i> 1/8, <i>Acinetobacter</i> spp. 1/8
1997	Trout Lodge	Kamloops trout	98-017	-	-			-	-	+						DX: MAS, CWD; VIRO 0/5, <i>A. sobria</i> 1/4 <i>F. psychrophilum</i> 8/8
1997	Mt. Lassen	Rainbow trout	98-018	-	-			-	-	+						DX: PSEUDOMONAS, CWD; VIRO 0/5, <i>Pseudomonas</i> spp. 1/4, <i>F. psychrophilum</i> 1/4
1997	Saratoga	Brown trout	98-038	-	-			-	-	-						DX: MAS; VIRO 0/10 <i>A. sobria</i> 2/8, <i>Pseudomonas</i> spp. 2/8
1997	Trout Lodge	Kamloops trout	98-090					-	-	+						DX: CWD; <i>F. psychrophilum</i> 1/4
1998	Hayspur	Rainbow trout	98-210	-	-			-	-	+						DX: MAS, CWD; VIRO 0/5 <i>A. sobria</i> 5/5, <i>F. psychrophilum</i> 5/5
1998	Colorado River	Rainbow trout	98-227	-	-			-	-	+						DX: MAS, CWD; VIRO 0/12, <i>A. sobria</i> 9/12, <i>F. psychrophilum</i> 8/12
Brood	Deadwood Reservoir	Kokanee salmon	98-330	-	-		+					-	-			IX: RS; VIRO 0/60, ELISA 2/12 (x5), WHD 0/60, CSH 0/60
1998	Trout Lodge	Kamloops trout	98-461					-	-	-						DX:MAS; VIRO 0/6, <i>A. hydrophila</i> 1/6, B.G. ALGAE 0/5

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