



1996 ANNUAL RESIDENT HATCHERIES REPORT



May 1997
IDFG 97-13

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.....	1
AMERICAN FALLS HATCHERY.....	3
ASHTON HATCHERY.....	9
CABINET GORGE HATCHERY.....	21
CLARK FORK HATCHERY.....	32
CLEARWATER HATCHERY.....	41
GRACE HATCHERY.....	47
HAGERMAN HATCHERY.....	60
HAYSPUR HATCHERY.....	75
KOOTENAI HATCHERY.....	89
MACKAY HATCHERY.....	126
MCCALL HATCHERY.....	132
MULLAN HATCHERY.....	147
NAMPA HATCHERY.....	152
SANDPOINT HATCHERY.....	168
SAWTOOTH HATCHERY.....	179
FISH HEALTH REPORT.....	184

RESIDENT FISH HATCHERIES 1996 ANNUAL REPORT

Resident fish hatcheries reared and stocked over 27 million fish weighing 1.35 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 \$2.18 million for an average cost of \$3.64 per pound or \$0.08 per fish. Cost varied greatly between the hatcheries. Cabinet Gorge Hatchery had the lowest cost per fish at \$0.017 and American Falls Hatchery had the highest at \$0.92 per fish. This is due to the great diversity in the resident hatchery system goals. Cabinet Gorge Hatchery produces fish during a 6-month growing season to produce an average 2-inch kokanee, and American Falls Hatchery used the entire 12 months of fish production and produced an average 10.2-inch rainbow trout.

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

The Idaho Department of Fish and Game (IDFG) Purchasing Section did not allow convenience contracts this year for fish feeds, and instead mandated annual statewide bids. This resulted in an increase in the base price of fish feed from the 1995 average of \$0.3013 per pound of feed to this years \$0.3714 per pound of feed.

The IDFG Engineering Bureau was kept busy over-seeing contracts for a pipeline replacement, water source reconstruction, and raceway reconstruction at Hagerman Hatchery, and continued work at Hayspur Hatchery. All of these jobs were completed by independent contractors and IDFG engineering crews during 1996.

Five captive broodstocks were maintained and spawned at the resident hatcheries producing over 18 million eggs for various resident programs. These stocks include Kamloops, Colorado River rainbow and Hayspur rainbow trout maintained at Hayspur Hatchery, westslope cutthroat trout at the Clark Fork Hatchery, and westslope cutthroat trout at the Sandpoint Hatchery.

**Idaho Department of Fish and Game
Resident Hatcheries Fish Production
01/01/96 - 12/31/96**

Hatchery	Put-and-Take		Put-Grow-and-Take		Average fish per pound	Feed		Average Length	Total cost	Cost/ 1,000 fish	Cost/ pound
	Number	Pounds	Number	Pounds		Pounds	Costs				
American Falls	267,837	127,868	0	0	2.09	143,538	42,977	10.2	\$248,248	\$926.86	\$1.94
Ashton	144,766	36,957	550,485	8,773	15.20	38,747	13,610	5.27	\$134,560	\$210.00	\$2.95
Cabinet Gorge	0	0	12,330,980	36,924	344.00	34,312	22,708	1.95	\$218,881	\$17.75	\$5.93
Clark Fork	143,877	50,234	2,134,236	30,717	28.14	191,383	78,130	4.45	\$191,999	\$84.28	\$2.37
Clearwater	191,000	60,614	1,400,730	38,206	16.12	107,040	35,250	5.16	^a \$79,372	\$27.72	\$0.80
Grace	315,691	76,414	322,480	32,225	9.31	143,489	51,623	6.20	\$188,124	\$294.76	\$1.73
Hagerman	1,094,844	384,426	2,527,010	100,368	8.80	529,214	199,375	6.40	\$549,683	\$103.91	\$1.13
Mackay	121,030	78,903	3,440,600	38,800	30.26	93,100	36,424	4.19	\$220,659	\$61.95	\$1.87
McCall	0	0	293,790	5,111	57.50	5,208	2,290	3.38	\$31,600	\$85.00	\$6.18
Nampa	694,659	212,011	950,412	34,271	6.68	262,904	91,893	6.90	\$274,072	\$166.67	\$1.11
Sandpoint	0	0	493,636	681	725.00	5,954	3,120	1.46	\$48,120	\$97.24	\$70.66
TOTAL PRODUCED	2,973,704	1,027,427	24,444,077	326,076	20.25	1,554,916	577,400	^b 5.0	\$2,185,318	^b \$79.70	\$3.64

^aDoes not include any permanent salaries.

^bDenotes weighted means.

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

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

AMERICAN FALLS FISH HATCHERY

1996

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

INTRODUCTION

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

The primary objective of the hatchery is to rear 250,000 catchable sized (9- to 12-inch) rainbow trout *Oncorhynchus mykiss*. American Falls Hatchery also produces fingerling (4- to 6-inch) rainbow trout as requested. The number and pounds of fingerling produced varies from year to year.

The hatchery is staffed by three permanent state employees. A six-month temporary employee is hired for the planting season.

Funding for the hatchery operation comes from both license monies and from interest on an American Falls Irrigation District endowment.

The physical layout of the hatchery consists of twenty single-pass 100 ft x 8 ft x 3 ft concrete raceways and a hatchery building containing fourteen 21 ft x 4 ft x 2 ft concrete rearing vats.

Water for the hatchery comes from Reuger Springs located on the hatchery property. These springs flow an average of 20 cubic feet per second (cfs) at a water temperature of 55°F to 58°F.

FISH PRODUCTION

American Falls Hatchery raised Hayspur strain rainbow trout and Trout Lodge Kamloops trout for the 1996 production year. These strains of fish perform very well at this facility.

Various state hatcheries received as transfers 116,240 catchable rainbow trout (53,250 lbs) from American Falls Hatchery (Appendix 1). American Falls Hatchery stocked 151,597 rainbow trout (74,618 lbs) during this period. Total stocked and transferred is 267,837 fish weighing 127,868 pounds (Appendix 2).

Costs for 1996 for various sizes of fish food were \$42,977.48. Feed costs for the year were \$0.336 per pound of fish produced, or \$0.1168 per fish. Production costs overall were \$1.650 per pound of fish produced, or \$0.78 per fish (Appendix

3). This overall cost per pound is up 18% from the previous year because of a 32% increase in the price of fish feed, and because the hatchery reduced production in an attempt to increase the quality of fish produced. Feed conversion for the year averaged 1.1225 pounds of feed per pound of fish produced.

HATCHERY IMPROVEMENTS

- Construction was started on two public nature trails. Three hundred trees and shrubs were planted for a wildlife shelter belt.
- The fish hauling tank on the one-ton truck was upgraded to "Point 4" oxygen diffusion stones.
- A new door and frame were installed in the old shop.
- The vinyl flooring in the office rest room was replaced.
- An underground sprinkler system was finished on the lawn area by hatchery personnel. A timer and electric valves were installed.
- Holes in the stucco on the hatchery building were repaired, and the building was painted.
- The hatchery entrance sign was replaced with one made by Todd Garlie, Fish Culturist.

HATCHERY NEEDS

- A new residence to replace residence #3, or remodeling and re-roofing of that residence.
- Metal siding on the garage for residence #1.
- Metal or vinyl siding on residence #2.
- Repair of the water chiller unit.
- Repair of the automatic feeding system.

PUBLIC RELATIONS

American Falls Hatchery 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.

ACKNOWLEDGEMENTS

This year, the Hatchery Manager I was Bill Doerr. The Assistant Fish Hatchery Manager was David Billman, Todd Garlie was the Fish Culturist, and Scott McNeil was the 6-month Biological Aide.

Appendix 1. Fish transfers, American Falls Hatchery, 1996.

Facility	Number	Pounds	Size (#/lb)
Clark Fork Hatchery	42,600	14,200	3.00
McCall Hatchery	69,660	36,600	1.90
Mackay Hatchery	3,280	2,050	1.60
Ashton Hatchery	700	400	1.75
Totals	116,240	53,250	

Appendix 2. Fish transferred or stocked by region, 1996.

Region	Species	Number	Pounds	Destination
Panhandle	Hayspur rainbow	42,600	14,200	Clark Fork Hatchery
Clearwater		0	0	
Southwest	Kamloops rainbow	69,660	36,600	McCall Hatchery
Magic Valley	Kamloops rainbow	22,074	10,235	Region-wide
Southeast	Kamloops rainbow	89,190	42,148	Region-wide
Upper Snake	Kamloops rainbow	40,333	22,235	Region-wide
		3,280	2,050	Mackay Hatchery
		700	400	Ashton Hatchery
Salmon		0	0	
Totals		267,837	127,868	

Appendix 3. Fish feed used during the 1996 production year, American Falls Hatchery.

Source	Size/type	Pounds	Cost
Rangen	Swimup, Trout & Salmon Starter	39	22.58
Rangen	Trout & Salmon #1 Dry	120	69.48
Rangen	Trout & Salmon #2 Dry	919	532.10
Rangen	Trout & Salmon #3 Dry	1,147	664.11
Rangen	Trout & Salmon #4 Crumble	5,162	1,595.06
Rangen	Trout & Salmon #5 Crumble	2,000	618.00
Rangen	Extr 450 Floating 5/32	48,850.5	15,632.16
Silver Cup	Dry Starter	28	10.75
Silver Cup	#1 Salmon Fry	33	12.67
Silver Cup	#2 Salmon Fry	394	155.24
Silver Cup	#4 Salmon Dry	548.5	186.32
Silver Cup	#5 Extra Coarse Crumble	774	262.77
Silver Cup	5/32 Pellets, Vitamin Boosted	81,523	21,907.24
Silver Cup	3/32 Medicated W/Oxytet	2,000	1,309.00
TOTALS		143,538	\$42,977.48

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

ASHTON FISH HATCHERY

1996

**Mel Sadecki, Fish Hatchery Manager I
Steve Wingert, Assistant Fish Hatchery Manager**

INTRODUCTION

Ashton Fish Hatchery is located in Fremont County, Idaho, approximately two miles southwest of the small community of Ashton. Constructed in 1920 and funded by fishing license dollars, Ashton Hatchery serves as a "specialty station," rearing ten species/strains of trout and salmon, including rainbow trout *Oncorhynchus mykiss*, Colorado rainbow trout, rainbow x cutthroat hybrids, cutthroat trout *O. clarki*, brook trout *Salvelinus fontinalis*, brown trout *Salmo trutta*, golden trout *O. aguabonita*, Arctic grayling *Thymallus arcticus*, Kamloops rainbow trout, and Atlantic salmon *Salmo salar*.

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 704,567 fish (49,357 lbs) were produced at Ashton Hatchery this year, consisting of 550,485 fingerlings (8,773 lbs) and 144,766 catchable sized fish (including holdovers) (36,957 lbs). The total number produced was up from last year, as was the total pounds produced (Appendix 1). The majority of fish requests were met. Production cost (excluding capital outlay and fish transport) was \$134,560.00, with \$13,610.88 spent on fish feed and the remaining \$120,949.12 spent on general hatchery operations and personnel cost. Fish transportation cost was \$4,939.50 for 1996. The average cost per pound of fish produced was \$3.79 (Appendix 1).

Most of the fish reared at Ashton were received as eyed eggs (Appendix 2). Ashton was not able to produce enough catchables to meet regional needs, so it was necessary to bring in catchables from Nampa and American Falls hatcheries.

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 catchable and holdover fish. Feed conversion for catchables and holdovers improved from 1.27 in 1995 to 1.11 in 1996 (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 72.8% from eyed egg to distribution.

Rainbow Trout

Ashton Hatchery produced and stocked 70,021 (23,813 lbs) 10-inch catchable rainbow trout for distribution into area lakes and streams (Appendix 1). In addition, Nampa and American Falls hatcheries transferred in 9,316 (3,626 lbs) catchable rainbow trout to meet regional requests. In November 1995, we received 76,000 Hayspur rainbow trout eggs and 128,000 in December. From these eggs, 45,265 Hayspur rainbow fingerlings, averaging 3 inches, were planted in a number of Upper Snake Region streams. An additional 73,080 (12,644 lbs) of 7.6-inch Hayspur rainbow holdovers were produced for stocking in 1997.

Water flows typically decline from 5.5 cubic feet per second (cfs) to 4.5 cfs during the spring months of heavy production. In order to maintain feeding rates for the catchables, supplemental oxygen has to be injected into the water. For this purpose, up to five Zeigler low head oxygen (LHO) boxes were mounted behind raceway damboards, with all available water channeled through them. Pure oxygen was injected into the boxes, which increased dissolved oxygen concentrations by 1 to 5 ppm.

Colorado River Rainbow Trout

A total of 27,000 Colorado River rainbow trout eggs were received from Hayspur Hatchery in December. A total of 19,197, 3.4-inch Colorado River rainbow trout were stocked in the Salmon River in the autumn of 1996. In addition, 2,050, 4.4-inch Colorado River rainbow trout were stocked at Challis Springs.

Hayspur Hatchery received transfers of 1,665 (500 lbs) 9.1-inch Colorado River rainbow trout from Ashton Hatchery for future broodstock.

Domestic Kamloops Rainbow Trout

No domestic Kamloops rainbow trout plants from this station were requested in 1996.

Rainbow x Cutthroat Hybrids

Ashton Hatchery received approximately 16,700 hybrid eggs from Henrys Lake Hatchery in 1996. From those eggs, 10,961 fingerling were stocked in the Harriman State Park Fish Pond. This plant was not on our request, but was done to assist with research into heat shocking hybrid eggs to produce sterile fish.

Henrys Lake Cutthroat Trout

Henrys Lake shipped 31,900 cutthroat trout eggs to Ashton Hatchery in 1996. From these, 27,050 (85 lbs) of fingerling were planted in Sublette Reservoir, Sand Creek Pond #4, and Blue Creek Reservoir.

Brook Trout

In December 1995, Ashton Hatchery received 345,000 eyed brook trout eggs from Henrys Lake Hatchery for 1996 requests. From these eggs 196,155 (6,205 lbs) fingerlings averaging 4.3 inches were stocked in Henrys Lake during October. The remaining 53,618 fingerlings were stocked in the Magic Valley and Southeast regions.

Brown Trout

The brown trout raised at Ashton Hatchery during 1996 were received as eggs in November and December 1995. Saratoga National Fish Hatchery in Wyoming shipped 59,800 eyed eggs, from which 45,957 (482 lbs) fingerlings were planted.

Atlantic Salmon

No Atlantic salmon were reared at Ashton Hatchery during 1996.

Golden Trout

Golden trout are reared at Ashton Hatchery whenever eggs are available. After several years with no eggs available, the Mt. Whitney Fish Hatchery in California had excess golden trout eggs. We received 49,000 eyed eggs in 1996 and transferred the resulting 37,606 feeding fry to other hatcheries for distribution to mountain lakes.

Arctic Grayling

Arctic grayling are reared at Ashton Hatchery for statewide mountain lake stocking. In May 1996, Ashton Hatchery personnel traveled to Meadow Lake, Wyoming to assist Wyoming Game and Fish in spawning grayling. Green eggs totaling 102,000 were transported to Ashton Hatchery. The eggs were placed in five upwelling incubators. Eye-up was very good (approximately 80%), resulting in 81,600 eyed eggs. Fry were fed 0.4 mm Bio-Kyowa larval fish feed for the first 4 weeks, then switched to BioDiet Starter #2. Growth and survival remained good throughout the rearing period. A total of 48,226 fry (7.8 lbs) were transferred or stocked during the summer of 1996.

HATCHERY IMPROVEMENTS

The finish work on the vats was completed early in the year. Screen frames were fabricated by the Idaho Department of Fish and Game (IDFG) Engineering Bureau and we attached the perforated screen material. The vats were in use during 1996 and helped us keep fish indoors until they had reached a more suitable size for transfer to outdoor tanks.

The asphalt driveway received a seal coat this year which should keep it in good condition for years to come.

The leaks under the outlet structure were sealed and new keyways were installed. This should help us stay within discharge requirements and provide more accurate measurements of total flow through the hatchery.

The IDFG Engineering crew also repaired a leak in the septic tank at residence #1 and installed a new concrete driveway at residence #2.

The pick-up fish tank was remodeled at the Eagle truck shop receiving new lids, new oxygen stones and regulators, and a coat of epoxy paint.

A new 3/4-ton 4x4 pickup arrived this year to replace the 1987 model which will be transferred to Henrys Lake.

Future needs include construction of a large storage area, heated shop/garage east of the quonset hut, septic tank/field work will be needed for both residences, the ditch on the west side of the property will need to be dredged, 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 availability of golden trout eggs was the most obvious change. Numbers of catchable rainbow trout on station were not sufficient to meet requests, requiring us to transfer in 9,613 fish from Nampa and American Falls hatcheries. The only fish transferred from Ashton Hatchery to other facilities in 1996 were Arctic grayling and golden trout fry, and the Colorado rainbow trout broodstock transfers to Hayspur Hatchery.

ASHTON FISH SPAWNING

Ashton Hatchery personnel traveled to Henrys Lake Hatchery to sort and spawn cutthroat trout, rainbow x cutthroat hybrids, and brook trout. Personnel also traveled to Meadow Lake, Wyoming to assist in Arctic grayling spawning.

The Moose Creek kokanee trap was not put in this year.

HENRYS LAKE FISH SPAWNING

The 1996 cutthroat trout run consisted of 5,678 cutthroat and 1,665 hybrid trout totaling 7,343 fish. Cutthroat males numbered 3,515 and cutthroat females numbered 2,163, Hybrid males numbered 978, and 687 females were counted. Average length for male cutthroat was 439 mm and females averaged 447 mm total

length. Combined average cutthroat total length was 443 mm. Hybrid trout males averaged 574 mm and females averaged 565 mm. Combined male and female hybrid trout average length was 569 mm total length.

Cutthroat trout green eggs totaled 2,211,921 from 976 females for an average fecundity of 2,266 eggs per female. Eyed cutthroat trout eggs totaled 1,584,603 for an eye up of 71.6%.

Hybrid trout green eggs totaled 1,945,047 from 762 female cutthroat trout for an average fecundity of 2,552 eggs per female. Eyed hybrid trout eggs totaled 1,252,724 for an eye up of 64.4%

The 1996 brook trout spawning operations started on October 10, with the installation of the ladder, and continued until November 13. Morpholine was used to imprint brook trout in previous years, and a drip system was initiated into the spawning facility on October 3. This being the first year that the Henrys Lake operations were run from Ashton Hatchery, brook trout spawning methods differed from previous years. Gametes were taken and bagged into pools of five at Henrys Lake. Oxygen was added to the milt bags and all were transported to the Ashton Hatchery in coolers. At Ashton, ovarian fluid was taken, the eggs were fertilized, disinfected, measured, and placed into Heath stacks.

A total of 1,342 brook trout ascended the fish ladder. Male brook trout totaled 796 and females totaled 546. Male brook trout averaged 319 mm total length and female brook trout averaged 306 mm total length for a combined male and female brook trout average length of 313 mm total length.

Brook trout green eggs totaled 533,435 from 384 females for an average fecundity of 1,389 eggs per female. Eyed eggs totaled 428,050 for an eye up of 80%.

FISH FEED

A total of 38,747 pounds of fish feed were fed (Appendix 5) to produce 35,482 pounds of gain (Appendix 1) for an average conversion of 1.09:1. All fish were initially fed BioDiet because of the superiority and performance of the feed. Catchable brook trout and holdover rainbow trout were switched to less expensive Rangen's dry diet when they reached fingerling size and holdovers were fed Silver Cup, while other varieties were fed BioDiet until they were stocked. Arctic grayling were started on Bio-Kyowa larval fish feed and switched to BioDiet.

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 IDFG policies. A color-coded map is designed to show where hatchery fish are stocked.

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 225 kids took advantage of free fishing, and all caught fish. The largest fish caught weighed 9.5 pounds, with a 15 to 20 additional fish in the 3 to 5 pound range.

SPECIAL PROJECTS

Fish Marking

The rainbow x cutthroat hybrids for the heat-shocking study were fin-clipped before stocking into the East Harriman Fish Pond. The fish shocked at 28.5°C received left ventral (LV) clips, and the fish shocked at 29.5°C were right ventral (RV) clipped. The controls were not clipped. Adipose clips were given to 20,000 of the 136,488 brook trout stocked in Henrys Lake.

Regional Efforts

Employees were involved in sharptail and sage grouse lek counts. Hatchery personnel assisted with firearms training for Hunter Education in Ashton and worked two days at the big game check station. Ashton personnel also ran the Free Fishing Day program here at the hatchery.

Appendix 1. Fish production and cost.

Species	Size (in)	No. fish	Pound planted	Weight gained in 1996	Cost/lb	Cost/fish	Total cost
Fingerlings produced and stocked							
Colorado rainbow	3.4	19,197	306.3	297.4	17.19	.27	5,113
Colorado rainbow	4.4	2,050	66.5	41.5	25.93	.52	1,076
Hayspur rainbow	3.4	45,265	696.1	666.1	8.69	.13	5,786
rainbow x cutthroat	2.3	10,961	52.8	48.0	42.05	.18	2,018
Henrys Lake cutthroat	2.0	27,050	84.8	74.5	39.73	.11	2,960
brown trout	3.1	45,957	482.0	463.2	13.94	.14	6,459
brook trout	4.3	249,773	7,037.3	6,959.0	5.22	.15	36,332
Arctic grayling	1.0	48,226	11.2	11.0	464.82	.11	5,113
golden trout	1.0	37,606	7.8	7.0	576.71	.11	4,037
Totals/ Average	3.0	486,085	8,744.8	8,567.7	\$8.04	\$.14	\$68,894
Catchables produced and stocked							
Hayspur rainbow	9.5	70,021	23,813	14,157	3.00	.61	42,521
Totals/ Average	9.5	70,021	23,813	14,157	\$3.00	\$.61	\$42,521
Broodstock transferred to Hayspur Hatchery							
Colorado rainbow	9.1	1,665	500	150	8.97	.81	1,346
Totals/ Average	9.1	1,665	500	150	\$8.97	\$.81	\$1,346
Catchables produced for 1997							
Hayspur rainbow	7.5	73,080	0	12,607	1.73	.30	21,799
Totals/ Average	7.5	73,080	0	12,607	\$1.73	\$.30	\$21,799
GRAND TOTAL		630,851	33,057.8	35,481.7	\$3.79	\$.21	\$134,560

Appendix 2. Eggs and fish received and transferred during 1996.

Species	Eggs received	Fish received	Fish transferred	Destination
Arctic grayling	81,600	0	48,226	Statewide
golden trout	49,200	0	37,606	Statewide
Hayspur rainbow	^a 197,875	0	0	Upper Snake Region
Colorado rainbow	^a 27,000	0	0	Salmon River
brown trout	0	0	0	Upper Snake Region
brook trout	^a 415,719	0	0	Henrys Lake
Henrys Lake cutthroat	31,900	0	0	Upper Snake Region
rainbow x cutthroat	16,700	0	0	Snake River
Kamloops	0	9,316	0	Upper Snake Region
Colorado rainbow	0	0	1,665	Hayspur Hatchery
TOTAL	819,994	9,316	87,497	
^a For stocking in 1997.				

Appendix 3. Comparative growth rates, feed conversion, and percent survival for all species reared at Ashton Hatchery, 1996.

Species	Average monthly length increase	Average conversion	Percent survival
rainbow (catchables)	.495	1.11	89.2
rainbow (fingerlings)	.576	1.04	59.6
brook trout	.468	0.90	72.2
brown trout	.468	0.84	76.8
Colorado rainbow	.372	1.08	71.1
cutthroat	.365	0.90	84.8
rainbow x cutthroat	.477	1.02	65.6
golden trout	^a --	^a --	76.4
Arctic grayling	.384	1.36	59.1
Holdover for 1997 stocking			
rainbow	.498	1.04	
^a Planted as first feeding fry.			

Appendix 4. Origin of fish stocked or transferred in 1996.

Species	Source	Eggs	Fish	Destination	Stocked	Transferred	Size (in)
domestic Kamloops	Nampa	--	8,616	Upper Snake Region	8,616	--	10.0
domestic Kamloops	American Falls	--	700	Upper Snake Region	700	--	10.0
Hayspur rainbow	Hayspur	^a 128,000	--	Upper Snake Region	70,021	--	9.5
Hayspur rainbow	Hayspur	^a 76,000	--	Upper Snake Region	45,265	--	3.4
Arctic grayling	Meadow Lake, Wyoming	81,600	--	Statewide	8,900	39,326	1.0
Colorado rainbow	Hayspur	^a 25,721	--	Hayspur	--	1,665	9.1
Colorado rainbow	Hayspur	27,000	--	Salmon River	19,197	--	3.4
brown trout	Saratoga NFH	^a 59,800	--	Upper Snake Region	45,957	--	3.1
golden trout	Mt. Whitney, California	^a 49,000	--	Statewide	--	37,606	1.0
Henry's Lake cutthroat	Henry's Lake	31,900	--	Upper Snake Region	27,050	--	2.0
rainbow x cutthroat	Henry's Lake	16,700	--	Upper Snake Region	10,961	--	2.3
Total stocked or transferred					486,440	78,597	
^a Received prior to 1996.							

Appendix 5. Feed use.

Size	Source	Pounds	Cost/lb	Total cost
#1 moist	Bioproducts	132.3	1.1610	153.60
#1 moist	Bioproducts	44.1	1.3000	57.40
#2 moist	Bioproducts	220.5	1.1610	256.00
#3 moist	Bioproducts	88.2	1.1610	102.40
B-400 larval	Biokyowa	2.2	40.9100	90.00
Shipping	Biokyowa	2.2	0.4550	1.00
#1 starter	Rangens	6.0	0.5900	3.54
#1 starter	Rangens	100.0	0.4500	45.00
#2 starter	Rangens	2,900.0	0.5900	1,711.00
#2 starter	Rangens	1,300.0	0.4500	585.00
#3 starter	Rangens	3,700.0	0.5900	2,183.00
#3 starter	Rangens	1,500.0	0.4500	675.00
3/32 pellet	Rangens	2,500.0	0.2423	605.75
1/8 pellet	Rangens	800.0	0.3088	247.04
1/8 pellet	Rangens	17,000.0	0.2423	4,119.10
Shipping	Rangens	6.0	0.2448	1.47
#1 soft moist	Silver Cup	300.0	0.7000	210.00
#2 soft moist	Silver Cup	100.0	0.7000	70.00
2.0 mm pellet	Silver Cup	4,000.0	0.3500	1,400.00
3.0 mm pellet	Silver Cup	4,054.0	0.2700	1,094.58
Totals		38,747.3		\$13,610.88

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CABINET GORGE FISH HATCHERY

1996

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

INTRODUCTION

Cabinet Gorge Hatchery 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 hatchery was constructed in 1985 and was co-funded by Washington Water Power (WWP), Bonneville Power Administration (BPA), and Idaho Department of Fish and Game (IDFG). The hatchery is operated by IDFG. The primary purpose for Cabinet Gorge Hatchery 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 hatchery 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 hatchery. After its completion in 1952, artesian springs began appearing along the Clark Fork River at the present site of the hatchery. The hatchery water supply consists of approximately 4.4 cubic feet per second (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) was utilized to incubate eggs until December 15, 1995. At that time, a mixture of the two water sources allowed incubation and feed training water to be kept around 50°F (range 45.8°F to 50.4°F). Production water ranged from 38.8°F to 49.5°F.

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

Rearing Facilities

Rearing facilities at the hatchery include 192 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with

a maximum capacity of 110,000 kokanee eggs each. The 64 concrete raceways have a rearing space of 31,000 cubic feet. Approximately one-third of each raceway is enclosed by the hatchery building. 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, 1996 and December 31, 1996, Cabinet Gorge Hatchery produced a total of 12,330,698 fish weighing 36,924 pounds (Appendix 1). On January 3, 1997, a total of 4,051,111 Lake Pend Oreille kokanee eggs and newly-hatched fry were on hand (Appendix 2).

A total of 34,312 pounds of feed produced 34,637 pounds of gain for an overall feed conversion of .99. Total production cost (less capital outlay) was \$218,881, resulting in a cost per pound of fish of \$5.93, cost per inch of fish of \$0.0083, and \$17.75 per thousand fish (Appendix 1).

Lake Pend Oreille Kokanee

General Rearing

Fertilized eggs were brought to the hatchery building and disinfected in 100 ppm Argentyne for 15 minutes. After enumeration by volumetric displacement, the green eggs were placed into upwelling incubators and gently rolled until eye-up. At eye-up the majority of the eggs were sorted and counted with the Jentsorter JHC-114 model sorter. The remaining eggs were not handled and were allowed to incubate until 1,200 thermal units (TU's) had accumulated. At 1,200 TU's, the sac fry were sorted in an attempt to determine the cause of premature hatch in the upwelling incubators. Swim-up fry were allowed to swim out of the incubators into the raceways at 1,670 to 1,690 temperature units. Feed training began at 1,690 to 1,710 temperature units.

Kokanee were feed-trained at approximately 50°F using Rangen's Soft-Moist Starter and, following feed contract changes, 1/32-in pellet or Rangen's Trout and Salmon Starter #1. After this initial feed training, the fish were reared on Rangen's Soft-Moist 1/32-in and Rangen's Trout and Salmon Starter #1 and #2 depending on fish release size objectives. These size objectives have changed from about 1.3 fry inches (1986) when the hatchery began operations to the present request of 2 inches

at release. To meet this request, the hatchery capacity has been reduced from 30 million 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 1996 rearing season to achieve a universally sized 2-inch fry. The fish were reared using 42 monthly temperature units per inch of growth. For the second consecutive season, fish were not starved or overfed to attain the average 2-inch size parameter at release. After approximately 6 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 10,845,304 kokanee fry were produced at an average length of 2.16 inches and an average weight of 331.24 fish per pound. These fish gained 30,834 pounds from 30,132 pounds of feed, resulting in a conversion rate of 0.98:1.0. Fish feed production cost was \$5.87 per pound, \$0.0082 per inch, and \$17.72 per thousand.

Survival of green eggs to feeding fry was estimated at 88.2% (1995, 90.0%). Survival from first feeding to release was estimated at 98.0% (1995, 96.1%), resulting in survival from green egg to release of 85.5% (1995, 86.4%).

Fish Marking

No fish were marked this year due to lack of funding.

Fish Liberations

On July 15, 1996, 4,349,686 fish were released from the Cabinet Gorge Hatchery into the Clark Fork River. On June 18-19, 1996, 4,520,724 kokanee fry were released into Sullivan Springs. On June 20, 1996, 1,278,340 kokanee fry were released along the north shore of Lake Pend Oreille. Lucky Peak Reservoir received 184,301 fry and Spring Creek received 512,253 fry.

Numbers at release were based upon Jensorter counter/sorter inventory numbers at eye-up minus mortality and on inventory weights of fry sorted raceways prior to release. All fish were off feed for three full days before inventory pound counts were taken. Pound counts were completed on all raceways one to three days prior to fish being loaded onto the transport vehicles or being released into the Clark Fork River. All raceways were displaced onto the transport trucks during the Sullivan Springs release to double check inventory numbers. All raceways were displaced onto

the transport trucks during the Lake Pend Oreille north shore release to check against inventory numbers. Weight displacements were performed to support current fish inventory numbers on hand at the time of release. No weight displacements were conducted prior to releasing the fish into the Clark Fork River via the fish bypass system. A few of the Clark Fork River raceways were inventoried prior to release during the rearing season.

The Clark Fork River release group were liberated at night directly into the ladder via the fish bypass system. Only three raceways were released at one time. The entire release took less than two hours.

To facilitate rapid outmigration, the Cabinet Gorge Dam (WWP) cooperated by providing flushing water flows of 38,000 cfs during the release and for eight hours thereafter.

The Sullivan Springs release group was transported in IDFG tankers (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 IDFG patrol cabin. Two tankers made eight releases during the period of June 18-19, 1996.

The north shore release group, Spring Creek release group, and the Lucky Peak release group were transported in IDFG tankers (3,000-gallon capacity) on June 20, 1996. Loading densities were kept below 0.60 pounds per gallon. Fish were planted at the Lighthouse boat ramp, the Boat Basin boat ramp, and the Trestle Creek boat ramp, in Spring Creek adjacent to Clark Fork Hatchery, and in Lucky Peak Reservoir. The two tankers made three trips on one day to complete the plants.

Rainbow Trout

On May 16, 1996, a total of 1,455,317 Hayspur rainbow trout were transported from Cabinet Gorge Hatchery to the Hagerman Fish Hatchery. The fish averaged 359 fish per pound and had attained a length of 1.91 inches in length. On July 9, 1996, a total of 30,077 Colorado River rainbow trout were transported and planted into Deer Creek (15,038) and Meadow Creek (15,039). The fish averaged 228 fish per pound and had attained a length of 2.22 inches.

HATCHERY IMPROVEMENTS

Repairs and Improvements

- OSHA safety materials purchased in 1995 with capital outlay funds continued to be installed during the 1996 season and will be completed in 1997.
- Backyard fencing material purchased in 1995 for residences #1 and #2 will be installed during the summer of 1997. The fencepost holes were completed during the fall of 1996.
- The Jentsorter JHC-114 was purchased during the 1996 season.
- The Lotus 2.01 computer software was upgraded to Lotus 3.4A.
- The Residence #1 deck porch was extended, sanded, and resurfaced. The Residence #2 deck porch was sanded and resurfaced.
- Two hatchery picnic tables were prepared for refinishing and will be completed in 1997.
- A new Delta unifence table saw was purchased and assembled.
- A new Landa pressure washer was purchased.
- Pump #5 was repaired by R.C. Worst and reinstalled.
- A new back-up generator (Generac) was delivered and is stored in the new building which was constructed in 1995.
- The Sullivan Springs gravels and log jump structures were replaced during July and August. Funding for the project was acquired from Washington Water Power, Lake Pend Oreille Idaho Club, and one grant.
- New fish release piping was purchased and utilized at the Sullivan Springs trap during the 1996-1997 spawning season.
- New carpeting was installed in Residence #2.
- All department vehicles, tractors, and small engines were serviced regularly and repaired as needed.
- The existing hatchery back-up generator was serviced regularly.

- New batteries were purchased and installed in the 1/2-ton pickup truck.
- The raceways on the north side of the building were painted with Carboline 2-part epoxy paint. The south side will be completed in 1997.
- Concrete repairs were completed on many of the raceways prior to painting. Some additional work still needs to be completed. In addition, all of the cleaning baffle barrel bolt holes had brass inserts installed and were sealed with Carboline paint.

HATCHERY RECOMMENDATIONS

Inadequate amounts of available warm water (50°F) during the production months remains 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 and only a total of 19.4 cfs can be backed up by the generator should a power failure occur.

FISH SPAWNING

Fish Trapping

The Clark Fork River fish trap was in operation from October 15 to the second week of January 1997. The first adult kokanee entered the trap on October 20, and trapping and spawning continued through early January. There were 56 fish trapped. Spawntaking and mortality records indicated 25.00% of the spawning run was female (14).

The Sullivan Springs trap collected 56,057 fish. Of these, 10,464 were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records and mortality records indicated 32.01% of the spawning run was female.

Spawntaking and Eggs Received

Clark Fork River kokanee spawntaking began on November 26, 1996 and continued to December 18, 1996. Spawntaking activities occurred from November 4, 1996 to January 3, 1997 at the Sullivan Springs fish trap.

A total of 4,051,111 green fertilized kokanee eggs were collected during the 1996-1997 spawning season. Of those, 3,300 (987,650 in 1995) were obtained from 11 female kokanee at Cabinet Gorge Hatchery, and 4,047,811 (11,795,344 in 1995) were obtained from 13,188 female kokanee at the Sullivan Springs trap.

FISH FEED

The fish produced during 1996 were fed a total of 34,312 pounds of feed. All fish feed was acquired from Rangen's, Inc. The overall conversion was 0.99 pounds of feed to produce 1 pound of fish, not including the weight of mortality (Appendix 2).

PUBLIC RELATIONS

Cabinet Gorge Hatchery is recognized by the surrounding communities as the major contributor of kokanee to the Lake Pend Oreille fishery. The importance of this lake fishery to the local economy is presently estimated at over five million dollars. The hatchery 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 placed on the hatchery. 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 hatchery.

A total of 200 people signed our guest registration book this year. An estimated 700 visitors toured the hatchery during the 1996 season. In addition, tours were given to school groups and other organizations.

ACKNOWLEDGMENTS

We 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 Sportsmens Association, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season.

Appendix 1. Production summary, all species, 1996.

Species	Number	Pounds	Length	Feed fed	Feed cost	Annual cost	Cost/lb of fish	Cost/1,000 fish	Cost/inch of fish	Conversion
Pend Oreille late kokanee	10,845,304	32,742	2.16	30,132	\$19,941.36	\$192,216.20	\$5.87	\$17.72	\$0.0082	0.98
Hayspur rainbow trout	1,455,317	4,050	1.91	3,947	\$2,612.12	\$25,178.46	\$6.22	\$17.30	\$0.0091	1.07
rainbow trout	30,077	132	2.22	233	\$154.20	\$1,486.34	\$11.26	\$49.42	\$0.0223	1.86
Totals/ Average	12,330,698	36,924	2.13	34,312	\$22,707.68	\$218,881.00	\$5.93	\$17.75	\$0.0083	0.99

Appendix 2. Lake Pend Oreille kokanee Spawntaking summary, 1996.

Spawntaking site	Total fish	Females spawned	Green eggs	Fecundity	Percent females
Sullivan Springs	56,057	13,188	4,047,811	307	32.01%
Cabinet Gorge	56	11	3,300	300	25.00%
Totals/Average	56,113	13,199	4,051,111	307	32.00%
Total fish includes male/female prespawn mortality.					

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CLARK FORK FISH HATCHERY

1996

**John Thorpe, Fish Hatchery Manager II
Daniel Beers, Assistant Fish Hatchery Manager
Brian Malaise, Assistant Fish Hatchery Manager
Dwight Aplanalp, Fish Culturist**

INTRODUCTION

The Clark Fork Hatchery is a resident species hatchery located on Spring Creek, 1.5 miles northwest of Clark Fork, Idaho. Approximately 15,000 westslope cutthroat trout *Oncorhynchus clarki lewisi* broodstock are held on station, providing the state's largest captive source of westslope cutthroat trout 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 long are distributed to the put-and-take fishery from March through October. For the 1996 plants, 33,674 of these trout were transported from production hatcheries in southern Idaho, and 95,141 fish were grown locally. Originally constructed by the Work Project Administration in 1934 and completed in 1938, the Clark Fork Hatchery is now funded for operation by Idaho Department of Fish and Game (IDFG) 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.

FISH PRODUCTION

Trout production at the Clark Fork Hatchery 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 288,500 westslope cutthroat trout and 270,000 domestic Kamloops rainbow trout to 6 inches or greater for large lake stocking; 3) rearing 60,000 westslope cutthroat trout and various other salmonid species to less than 3 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 had been altered over the past several years to better serve changing management programs. The broodstock population is an adfluvial strain of westslope cutthroat trout originally obtained from north Idaho waters. Eggs were collected from April 29 through May 15, 1996. The spawning operation was stopped after two million eggs had been collected, although additional ripe females remained. Current protocol includes a final session where all females are

stripped to remove ripe eggs. The average length of the broodstock population observed in 1996 was 12.5 inches (range 10.5 to 14.5 inches).

During 1996, 49,359 (3,926 lbs) brood year 1994 6-inch plus westslope cutthroat trout were released in June. As in previous years, 100,028 (4,000 lbs) brood year 1995 6-inch westslope cutthroat trout were stocked into Hayden Lake in September. Growth rates up until this year have continued to improve, producing the same 6-inch fish earlier each season. During October, 40,085 (2,210 lbs) 5.4-inch brood year 1995 westslope cutthroat trout were transferred into net pens in Lake Pend Oreille for rearing to release in 1997. In September, 271,626 (8,805 lbs) of domestic Kamloops rainbow trout were released into Hayden Lake.

The mountain lake stocking programs utilized Arctic grayling, golden trout, westslope cutthroat trout, and domestic Kamloops fry from brood year 1996. Lakes in the Panhandle and Clearwater regions received 1,906 (1.0 lbs) Arctic grayling, 3,923 (1.0 lbs) golden trout, 44,347 (28.93 lbs) westslope cutthroat trout, and 5,338 (4.75 lbs) domestic Kamloops rainbow trout. Lowland lakes were stocked with 18,018 (383 lbs) Henrys Lake brook trout.

There were 177,551 (63,374 lbs) rainbow trout >9 inches long stocked or transferred by the Clark Fork Hatchery in 1996. Of these, 143,877 (50,234 lbs) trout were reared from eggs on station, while another 33,674 were transferred in from the American Falls Hatchery.

Annual costs to rear fish from Clark Fork Hatchery are listed in Appendix 3. Total cost to rear fish for 1996 was calculated by averaging the FY95 and FY96 budgets to obtain a cost for calendar year 1996. The costs included transportation of all put-and-take rainbow trout to the Mullan Hatchery for redistribution (5,940 miles and 18 man days) and sorting, special handling, and construction of special holding facilities for the hatchery trout evaluation on the Coeur d'Alene and St. Joe rivers (19 man days).

HATCHERY IMPROVEMENTS

Major facility improvements by hatchery personnel included the painting of all hatchery buildings and residences and major repair to residence #1. The repair consisted of removal and replacement of the mud sill, floor joists, studs and siding on the northwest corner.

There was no funding for construction repairs or modifications during 1996.

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, that tested at 1,000 gpm and was then 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 Clark Fork Hatchery program distributes fish in the Panhandle Region as directed by IDFG 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.

Clark Fork Hatchery personnel stocked 128,815 (46,467 lbs) size 3 (>9 inches) rainbow trout to waters of the Panhandle Region, north of Coeur d'Alene, from March to October 1996. Of these, 33,674 (13,140 lbs) trout were received from the American Falls Hatchery, and 95,141 (33,327 lbs) trout were reared from egg to release at the Clark Fork Hatchery and stocked to the put-and-take fishery. In 1996, 48,736 (16,907 lbs) rainbow trout were reared for release from the Mullan Hatchery.

Releases of Arctic grayling, golden trout, westslope cutthroat trout, and Kamloops rainbow trout were delivered to 22 mountain lakes by backpack this year.

During October and November 1996, 40,085 brood year 1995 westslope cutthroat trout were transferred to net pens in Lake Pend Oreille for rearing to release in May 1997.

FISH SPAWNING

The Clark Fork Hatchery 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, 2- to 4-year-old brood fish are held to spawn in their fourth and fifth year. This provides a potential for taking 2 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 1 million "button up" fry for nursery stream release to 150,000 to 350,000, 2-year-old, 6-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 1996 spawning season, 2,040,853 eggs were collected (Appendix 2). Average fecundity of 2,905 females was 703 eggs/female. A saline diluent was utilized during fertilization, and buffered iodophor disinfection solutions were used to water-harden eggs. A 66% eye-up occurred, resulting in 1,348,519 eyed eggs.

FISH FEED

Production feed was changed from Bioproducts, Inc. (Warrenton, Oregon) to Rangen, Inc. (Buhl, Idaho) in April 1996 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 utilizing a variety of diets, feed delivery techniques, and rearing densities since 1989 have been utilized to institute the current program. Feed utilized and total cost during 1996 is found in Appendix 4.

The production feed at the Clark Fork Hatchery for the past seven years has been BioDry 4000 based on superior growth in feed studies completed in 1989. It has been with that feed that the growth in westslope cutthroat trout has been improved to allow release in 14 months rather than 22 months of rearing. There has been some concern that the use of a different feed would not give the same growth. From July to November, an informal feed comparison was conducted testing growth of westslope cutthroat trout using the Rangen's feed (extruded floating feed and a sinking version) alongside Bioproducts BioDiet feed. Both of these feeds are available under the new contract although not of equal cost. The results were interesting but not very conclusive. Six groups of swim-up fry were observed for evaluation; two

groups fed BioDiet starter and four groups fed Rangen starter from July 2, 1996 to November 20, 1996. The difference in growth between any group was less than 0.02 inches over the entire period. That would seem to indicate that there would be no change in hatchery performance. The other test involved westslope cutthroat trout averaging 3.96 inches who were fed BioDiet pellets, Rangen extruded feed, and Rangen sinking feed. A comparison of Rangen sinking vs BioDiet, as well as Rangen extruded vs BioDiet, was run from June 21, 1996 through October 31, 1996. In both tests the growth increase was twice as great in the BioDiet group (1.81 in vs 0.92 in). In the period of approximately three months, the fish fed the contract dry feed were 0.92 inches shorter than the fish fed BioDiet. Feed comparisons in past years did not reveal any significant difference in growth between fish fed BioDiet or BioDry 4000 feed.

PUBLIC RELATIONS

Public relations efforts in 1996 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 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 hatchery staff attended public hearings and sportsmen's club meetings in an effort to get the Department's programs and policies out. The mountain lake stocking program was completed with cooperation from the Boundary County Backpackers, the Rocky Mountain Academy, and Idaho Department of Fish and Game reservists.

ACKNOWLEDGMENTS

We would like to thank the Boundary County Backpackers Club, Rocky Mountain Academy, as well as Panhandle and Clearwater regional personnel for packing fish to mountain lakes.

Thanks to the hatchery staff of Bio-aides Lonnie Laurent and John Suhfras.

Appendix 1. Fish production at the Clark Fork Hatchery, January 1, 1996 to December 31, 1996.

Species/Strain	Source	Beginning number	Beginning pounds	Ending number	Ending pounds	Number stocked	Pounds stocked	Destination
brook trout, BY96	Henrys Lake	0	0	7,299.00	264.00	18,018	383	lowland lakes
westslope cutthroat, BY91	Clark Fork	3,668	3,668	0	0	0	0	broodstock
westslope cutthroat, BY92	Clark Fork	5,875	5,341	1,053	1,120	0	0	broodstock
westslope cutthroat, BY93	Clark Fork	17,306	6,656	6,405	4,927	9,611.00	5,333.00	lowland lakes, broodstock
westslope cutthroat, BY94	Clark Fork	9,825	901	8,843	3,685	0	0	broodstock
westslope cutthroat, BY95	Clark Fork	669,976.00	3,494.00	106,377	7,598	441,759	11,213	Lake Pend Oreille, Hayden Lake
westslope cutthroat, BY96	Clark Fork	0	0	512,628.00	2,240.00	438,443	1,142	Mountain and lowland Lakes
westslope cutthroat, BY94	Montana	43,576	2,030	0	0	49,359	3,926	Lake Pend Oreille
golden trout, BY96	Mt. Whitney, CA	0	0	0	0	3,923	1	Mountain lakes
Arctic grayling, BY95	Wyoming	1,311.00	6.00	576	28	0	0	
Arctic grayling, BY96	Wyoming	0	0	0	0	1,906	1	Mountain lakes
Kamloops rainbow, BY94	Hayspur	142,069	17,806	0	0	122,155	41,439	Put and take
Kamloops rainbow, BY95	Hayspur	112,520.00	36.00	149,466	14,815	271,626.00	8,805.00	Hayden, Jewell lakes
Kamloops rainbow, BY96	Trout Lodge	0	0	77,190	150	0	0	Put and take
Colorado R rainbow, BY95	Nampa	0	0	8,837	1,098	0	0	Put and take
Hayspur rainbow, BY95	American Falls	0	0	41,752	16,538	0	0	Put and take
Hayspur rainbow, BY94	American Falls	39,410.00	11,625.00	0	0	33,674.00	13,140.00	Put-and-take
Hayspur rainbow, BY95	Hayspur	35,540.00	11.00	0	0	0	0	combined

Appendix 2. Spawning summary, Clark Fork westslope cutthroat trout, January 1, 1996 to December 31, 1996.

Stock	Females spawned	Number of eggs collected	Average fecundity	Percent eye-up	Eyed eggs
Clark Fork	2,905	2,040,853	703	66	1,348,519

Appendix 3. Cost of fish produced at the Clark Fork Hatchery, January 1, 1996 to December 31, 1996.

Species	Numbers produced	Pounds produced	Cost to produce	Cost/1,000	Cost/lb
Henrys Lake brook trout, 3-5 inches	25,317	647	17,000	531.25	24.11
westslope cutthroat, BY92, BY93, BY94 >6 inches	75,271	4,063	15,000	1,500.90	7.41
westslope cutthroat, BY9, 2-5 inches	548,136	15,317	45,000	183.06	2.52
westslope cutthroat, BY96, <2 inches	951,071	3,382	23,000	20.23	4.71
Grayling, <2 inches	1,906	1	5,000	941.44	625.00
Hayspur Kamloops, BY94	170,891	40,540	15,000	503.83	2.02
Hayspur Kamloops, BY95	421,095	23,426	40,000	118.33	1.56
trout lodge Kamloops, BY96	77,190	150	7,000	62.21	194.44
Hayspur rainbow trout, BY94	33,674	1,515	16,000	145.86	0.68
Total	2,304,551	89,041	\$192,000	\$83.31	\$2.16

Appendix 4. Fish feed used in 1996 at the Clark Fork Hatchery.

Size	Source	Pounds	Cost/lb	Total cost
BioDiet starter #1	Bioproducts	39.8	1.05	41.78
BioDiet starter #2	Bioproducts	149.8	1.12	167.45
BioDiet starter #3	Bioproducts	97.9	.82	80.28
BioDiet 1.3 mm	Bioproducts	2,949.3	.55	1,620.77
BioDiet 1.5mm	Bioproducts	4,362.8	.61	2,648.36
BioDiet 2.5mm	Bioproducts	5,876.8	.61	3,854.85
BioDiet 3.0mm	Bioproducts	3,174.2	.69	2,190.21
BioDiet brood 6.0 mm	Bioproducts	4,570.0	.61	2,806.47
BioDry 4000 2.5 mm	Bioproducts	670.1	.48	321.65
BioDry 4000 3.0 mm	Bioproducts	2,543.6	.48	1,220.93
BioDry 4000 4.0 mm	Bioproducts	1,429.0	.48	685.92
Rangen starter #0	Rangen	1,360.0	.50	677.49
Rangen starter #1	Rangen	4,070.0	.62	2,506.89
Rangen starter #2	Rangen	3,483.9	.63	2,210.98
Rangen crumbles #3	Rangen	17,837.7	.64	11,416.12
Rangen crumbles #4	Rangen	10,630.1	.39	4,193.67
Rangen grower 3/32	Rangen	15,304.6	.42	6,405.45
Rangen grower 1/8	Rangen	60,665.0	.35	21,250.41
Rangen brood 5/32	Rangen	44,287.7	.24	10,481.21
Rangen brood 3/16	Rangen	7,880.3	.43	3,349.13
Totals		191,382.6		\$78,130.02

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CLEARWATER FISH HATCHERY

1996

Scott Patterson, Assistant Fish Hatchery Manager

INTRODUCTION

The Clearwater Hatchery is located in the tiny 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, who also owns the facility. The hatchery is operated by the Idaho Department of Fish and Game (IDFG).

The primary purpose for Clearwater 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 IDFG funded the resident trout program with \$44,122.50 that included operations (\$4,400), temporary personnel (\$4,000), and fish feed (\$35,249.50). Fish feed was purchased from the Nampa (\$18,276.70), Hagerman (\$9,990.00), and Clearwater (\$6,982.8) budgets. Permanent staff salaries (estimated at \$30,000) 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 fixed about 200 feet below full pool level. This design allows mixing of water of different temperatures.

FISH PRODUCTION

Release Year 1996

Clearwater Hatchery produced 191,000 catchables that were released in 1996. Survival from January 1, 1996 to release was nearly 100%. Catchables were produced from 109,180 eyed Kamloops rainbow trout eggs received from Trout Lodge in June 1995, and 207,553 eyed rainbow trout eggs received from Ennis National Fish Hatchery in July 1995. Overall, 92.3% of the Trout Lodge eggs and 43.4% of the Ennis eggs survived to release. The Trout Lodge fish were 3.41 fish/lb (9.02 inches) and converted feed at a 2.7 rate. The Ennis fish were 2.9 fish/lb (9.5 inches) and converted feed at a 1.88 rate.

Fingerling production was 35,300 Kamloops rainbow trout produced from 81,360 eyed Kamloops eggs received from Hayspur Hatchery on December 7, 1996.

The Kamloops were 8.98 fish/lb (6.3 inches) and converted feed at a 1.01 rate. Survival to hatching was 91%, to ponding 86%, but only 43.4% to release. Most of the mortality occurred during feeding training in 36°F to 38°F water temperatures.

Fry production was 1,060,000 rainbow trout from 1,364,519 eyed eggs received from Hayspur Hatchery between November 17 and December 27, 1995. A total of 135,000 fry at 2,900 fish per pound were transferred to Nampa Hatchery on March 7, 1996, and 925,000 fry at 2,670 fish/lb were transferred to Hagerman Hatchery on March 21 and April 19, 1996. Survival from eyed egg to transfer was estimated at 77.7%. Feed conversion was estimated at 1.08. Most of the mortality occurred during feeding training in 36°F to 38°F water temperatures.

Release Year 1997

A total of 305,571 rainbow trout weighing 60,864 (7.93 inches) are on hand for catchable allocations during 1997 (Appendix 1). Rainbow trout were produced from 393,041 eyed eggs received from Hayspur Hatchery between November 17 and December 27, 1995. Survival to hatching was 91.6%, to ponding 84.2%, and to January 1, 1997 (sub-catchable) was 77.7%. Feed conversion was estimated at 1.00.

FISH FEED

A total of 107,040 pounds of feed was purchased in 1996 for rainbow trout production (Appendix 2). Feed was purchased for an average of \$0.33 per pound from Rangen, Inc. (Buhl, Idaho) and Bioproducts (Warrenton, Oregon). Conversion for the year was estimated at 1.20.

FISH STOCKED AND TRANSFERRED

The Clearwater Hatchery personnel stocked a total of 240,432 catchable rainbow trout in streams and lakes in the Clearwater Region during 1996. These fish were 3.47 fish/lb, weighed 69,337 pounds, and averaged 9.0 inches in length. Flexibility in release dates, fish size, and numbers of fish released was imperative for successful stocking of 30 sites in 121 trips (Appendix 3).

A total of 35,300 fingerling was stocked in the Clearwater and Salmon rivers. These fish were 8.98 fpp, weighed 3,930 pounds, and averaged 6.3 inches in length.

The stocking requests for Clearwater Hatchery were 215,400 fish, although catchable production was only 191,000. Nampa Hatchery transferred 40,020 fish

weighing 11,800 pounds (3.4 fish/lb) to Clearwater Hatchery. These fish were used to meet our May requests and redistributed for Nampa Hatchery requests where load limit restrictions and limited access occurred. An additional 9,375 fish weighing 3,750 pounds (2.5 fish/lb) were stocked for the Dworshak Hatchery Complex.

PUBLIC RELATIONS

The Clearwater Hatchery had hundreds of "walk-in" visitors from as far away as Edinburgh, Scotland. Construction of the visitor's center is complete, although the displays are not.

Hatchery personnel gave presentations to the Kelly Creek Fly Casters and area elementary schools. Special tours were provided to the University of Idaho Outward Bound program, Lewis-Clark State College Ichthyology class, Orofino Elementary fourth graders, and Cottonwood Junior High. The hatchery crew participated in Orofino High Schools "Career Day," in both the spring and fall semesters, providing work experience in fisheries. Two newspapers, the Clearwater Tribune and the Lewiston Tribune, wrote articles about the hatchery stocking programs.

Ryan Cocco from Wilmington, Delaware, was impressed with Idaho fishing. His parents wrote a letter and sent a picture of a 4-pound fish he caught from Five-Mile Pond.

SPECIAL PROJECTS

A total of 1,034 adult size fish, 2 to 8 pounds, were recovered from the settling ponds. The Clearwater Hatchery crew supplemented 14 release sites in 37 trips with these large fish.

Two new stocking areas, Dobbys Pond and Tolo Lake, were added to our stocking requests. Cold Spring Pond, a third new area, was canceled due to the flood damage in February 1996.

Four requests were made for kids fishing derbies, two during National Fishing week in June for Dworshak and Kooskia hatcheries, another in June for Dixie Days (Five-Mile Pond) and Hordemann Pond in April.

Appendix 1. Clearwater Hatchery resident fish production, January 1 through December 31, 1996.

	Number	Weight	Feed Fed	Conver - sion	Cost/ pound	Cost/ 1,000 fish
Sac-fry on hand: 1/1/96	1,838,920	370				
Fish on hand: 1/1/96	189,100	20,153				
Catchable fish received	49,395	15,550				
Eggs received	0	0				
Fry (R1) transferred	1,060,000	392				
Fingerling fish (K1) liberated	35,300	3,930				
Catchable fish liberated	240,432	69,337				
Fish on hand: 12/31/96	305,393	60,864				
Production	1,591,730	98,820	107,040	1.20	\$0.446	\$27.72
Estimated costs do not include permanent salaries.						

Appendix 2. Fish feed usage and costs for the Clearwater Hatchery rainbow trout program, January 1 through December 31, 1996.

Source	Formulation	Feed size	Pounds	Cost/ pound	Total cost
Bioproduct	BioDry 1000	1.5	3,850	0.75	1,312.50
Bioproduct	Steelhead	2.0	5,000	0.31	1,550.00
Bioproduct	Steelhead	2.5	5,000	0.31	1,550.00
Rangen	Soft Moist Starter	Swim up	440	0.70	308.00
Rangen	Trout Starter	#1	350	0.53	185.00
Rangen	Trout Starter	#2	2,000	0.65	1,100.00
Rangen	Trout Starter	#3	1,500	0.60	900.00
Rangen	Trout Production	3/32	8,000	0.33	2,640.00
Rangen	Trout Production	1/8	80,900	0.32	25,704.00
Totals			107,040	\$0.33	\$35,249.50

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

GRACE FISH HATCHERY

1996

**Robert Hill, Fish Hatchery Manager I
Robert Morris, Assistant Fish Hatchery Manager
Paul Martin, Fish Culturist**

INTRODUCTION

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

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

Middle and West Whiskey Creek springs supply water to the hatchery. Flow was up somewhat from the prior drought years. There is a natural fluctuation in water quantity basically opposite of that from run-off and hatchery biomass. Flows are at a minimum during May and June and peak in October and November. Hatchery biomass is at a maximum in May and at a 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 hatchery 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 of the hatchery effluent water flows through a settling pond before being discharged into Whiskey Creek.

The hatchery is staffed with a Fish Hatchery Manager I, an Assistant Fish Hatchery Manager, and a Fish Culturist. Up to two temporary employees may be hired to assist with the various projects.

The operation of a fish trap on the Blackfoot River is also the hatchery's responsibility. The trap is located just upstream of the Highway 34 bridge, which is about one mile upstream of Blackfoot Reservoir. Operation of the trap occurs from early April through early June.

FISH PRODUCTION

Grace Hatchery began the 1996 calendar year with 855,849 fish weighing 43,955 pounds. During 1995, 662,500 eggs of various species were received. A total of 727,665 fish, at a weight of 112,755 pounds, were planted or transferred during the year. At the end of the year there were 333,625 fish weighing 49,010 pounds. This accounts for a total production of 1,991,289 fish and 121,910 pounds (Appendix 1).

Rainbow production, fingerlings and catchables combined, accounted for 88% of the total pounds produced but only 77% of total cost. The specialty species combined for the remaining 12% of the pounds produced from 23% of total cost.

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

A total of 121,910 pounds of fish were produced from 143,489 pounds of food for a conversion of 1.18. Refer to Appendix 1 for a description of fish production for Grace Hatchery for 1996.

Production cost, excluding capital outlay, was \$188,124. Total fish food expenditure was \$51,623, or 27% of the budget. The average cost per pound produced was \$1.54, and the average cost per 1,000 fish was \$166.00 (Appendix 3). The average cost per pound of rainbow trout was \$1.34; the specialty species averaged \$3.08 a pound.

Catchable Rainbow Trout

Grace Hatchery produced 315,691, 10-inch catchable rainbow trout that weighed 76,414 pounds. During the year, 185,425 (66,870 lbs) were planted and 333,625 (49,010 lbs) were on hand at the end of the year for 1997 planting. Three different strains of rainbow were planted: Hayspur, Mt. Lassen, and Kamloops. Five rivers and streams in the Southeast Region were planted with equal numbers of worm-trained and untrained catchables; all were jaw-tagged. The trained fish were fed for five days with 50% of their daily ration consisting of worms. This was part of the Department's food training experiment conducted by Jeff Dillon. Dike Lake was planted with 300 adipose-clipped Mt. Lassen rainbow trout in October to determine whether the aerators kept the lake open enough to keep it from winter killing.

Rainbow Trout Fingerlings

During 1996, 322,480 (32,225 lbs) rainbow trout fingerlings were planted. Spring fingerlings accounted for 131,750 (8,885 lbs) and fall fingerlings accounted for 190,730 (23,340 lbs). The majority of the spring fingerlings were Mt. Lassen rainbow trout and all of the fall fingerlings were Hayspur rainbow trout.

Brown Trout

The brown trout *Salmo trutta* reared at Grace Hatchery are the Plymouth Rock strain and were received in December 1995 as eyed eggs from Saratoga National

Hatchery in Wyoming. The 60,000 eggs received produced 59,500 (910 lbs) 3.5-inch fingerlings. The Portneuf River, below Lava Hot Springs, was planted with 18,500 fish. The remainder were scatter-planted into the Bear River from Utah to Wyoming.

Another 120,000 Plymouth Rock brown trout eyed eggs were received December 1996 from Saratoga National Hatchery to fill 1997 requests.

Bear River Cutthroat

All of the 11,660 Bear River cutthroat trout *O. clarki ssp.* were planted into Montpelier Reservoir during June. These fish were held over winter to gain size to replace catchable rainbows. They were received as eyed eggs June 7, 1995 from Daniels Hatchery in Wyoming. Wyoming developed this broodstock by obtaining wild fish from numerous upper Bear River tributaries. This strain would be the logical fish to plant in Idaho Bear River tributaries. These eggs were received to fill the requests for fine-spotted and Bear Lake cutthroat trout. We were unable to obtain eggs from Wyoming in 1996.

Bear Lake Cutthroat

To replace the Bear River cutthroat, 32,500 eyed Bear Lake cutthroat eggs were received from Utah's Mantua Hatchery. During the year, 10,100 (65 lbs) were planted into Bear River tributaries. The remaining 15,900 will be planted into Montpelier Reservoir replacing catchable rainbow.

Rainbow x Cutthroat Hybrids

Henry's Lake Hatchery shipped 65,000 eyed rainbow x cutthroat eggs to Grace Hatchery in April 1996. These eggs were received as early as possible to produce as large a fall fingerling as possible. A total of 62,660 (685 lbs) fingerlings were planted into four southeastern Idaho reservoirs.

Lake Trout

Both lots of lake trout *Salvelinus namaycush* reared at the hatchery were received as eyed eggs from Saratoga National Fish Hatchery and are the Lewis Lake strain. Of the lot received in 1995, 33,180 (1,975 lbs) were planted into Lucky Peak Reservoir and 16,600 will be planted there in the spring of 1997. Payette Lake will

receive 1,000 of these fish also, and they will be adipose-clipped. The eggs received in 1996 are all destined for Lucky Peak Reservoir.

Splake

Two lots of splake *Salvelinus fontinalis* x *S. namaycush* were reared at Grace this year. Both lots were received as eyed eggs from Wyoming's Story Hatchery and are a cross between a Soda Lake brook trout male and a Jenny Lake lake trout female. Splake appear to survive much better when planted at lengths greater than 9 inches. A total of 17,460 fish from eggs received December 1994 were held over and planted at 14 inches in June and July 1996.

Of the eggs received in December 1995, 25,200 have been planted and 6,650 are being held for spring 1997 plants.

Another 35,000 splake eggs, from the same cross, were received December 1996 to fill 1997 and 1998 requests.

HATCHERY IMPROVEMENTS

There were three capital purchases made during the year: a 3/4 ton 4x4 pickup, a canopy for the pickup, and a push mower.

Needed projects include:

- Cover or bury the spring pond.
- Install a new main line from the spring pond to a head box with new lines going to the vats and 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.
- 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 hatchery building and two-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.

FISH STOCKED AND TRANSFERRED

Grace Hatchery was scheduled to produce and stock 155,700, 10-inch catchable rainbow. During the year, 185,425 catchables were planted (Appendix 4).

A total of 165,730 fingerling rainbow were requested and 322,480 were planted. The reason for the large discrepancy was that eggs for spring fingerlings were purchased from Mt. Lassen prior to receiving the request. Numbers were based on the 1995 request. The 1996 request was greatly reduced; the excess fish went to American Falls Reservoir and the Snake River above American Falls Reservoir.

There were a total of 135,370 brown, cutthroat, and lake trout and splake requested. A total of 157,100 were planted. The request for cutthroat was not met because the original request was edited to hold 15,000 for planting in 1997.

Grace Hatchery also planted 30,323 brook trout for Ashton Hatchery. These were scattered into three creeks draining into Grays Lake, Corral Creek, and the Little Blackfoot River.

FISH FEED

This was a real fun year to keep track of the different diets of fish food fed. Murray was originally awarded the soft-moist feed contract. The quality of their larger soft-moist pellets did not meet specifications so the contract was switched to Bioproducts. We started the year with Rangens soft-moist so, as you can see in Appendix 3, three brands of soft-moist were fed. The soft-moist was fed exclusively to the specialty species and totaled 17,375 pounds at a cost of \$11,939.74.

Rangens was the only brand of dry diet fed this year. A total of 126,114 pounds, at a cost of \$39,683.26, was fed to the rainbow trout. The grand total of fish food fed was 143,489 pounds at a cost of \$51,623.00 (Appendix 5).

PUBLIC RELATIONS

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

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

SPECIAL PROJECTS

Blackfoot River Trap

The Blackfoot River weir and trap were installed March 20. The low flows made for easy installation. The first fish was trapped April 10. Seventeen Yellowstone cutthroat trout and one rainbow trout were trapped prior to the trap flooding out on April 24. The trap remained flooded until June 18. Attempts were made to trap more fish but the run had passed. Southeast Region fisheries personnel electrofished at the Blackfoot River Wildlife Management Area (WMA) and gathered approximately 40 adult Yellowstone cutthroat trout. The fish were transported and held in a spring-fed creek south of Soda Springs. Hatchery personnel checked the adults, but all females were spawned out. No eggs were taken in 1996.

Other

The Assistant Hatchery Manager position was left vacant for five months. Robert Morris, Nampa Hatchery Fish Culturist, was promoted and filled the vacant position in January 1996.

Appendix 1. Number and pounds of fish produced, stocked, food fed, and food cost at Grace Hatchery, 1996.

Species/strain Lot #	Number (pounds) on hand 01/01/95	Number planted (pounds)	Number (pounds) on hand 12/31/96	Pounds produced (food fed)	Food Cost/ Conversion
Rainbow/Kamloops catchables	203,359 (39,466)	185,425 (66,870)	333,625 (49,010)	76,414 (93,705)	\$28,702 (1.23)
Rainbow (R4 and R9) fingerlings	381,800 (804)	322,480 (32,225)	0	31,421 (32,233)	\$10,906 (1.03)
Splake 94-WY-SP	18,452 (3,415)	17,460 (6,315)	0	2,900 (3,798)	\$2,189 (1.31)
Splake 95-WY-SP	30,000 (0)	25,200 (1,550)	6,650 (1,110)	2,660 (2,803)	\$2,125 (1.05)
Lake trout 95-SAR-LT	150,000 (40)	33,180 (1,975)	16,600 (2,440)	4,375 (5,731)	\$4,195 (1.31)
Lake trout 96-SAR-LT	0	0	35,000 (25)	25 (19)	\$19 (0.76)
Cutthroat/Bear River 95-WY-C7	12,238 (230)	11,660 (2,160)	0	1,930 (2,089)	\$1,192 (1.08)
Cutthroat/Bear Lake 96-UT-C5	0	10,100 (65)	15,900 (525)	590 (987)	\$984 (1.67)
Brown trout 95-WY-BN	60,000 (0)	59,500 (910)	0	910 (1,080)	\$675 (1.19)
Rainbow x cutthroat hybrids/ Henrys L. 96-HL-RC	0	62,660 (685)	0	685 (1,044)	\$636 (1.52)
Totals	855,849 (43,955)	727,665 (112,755)	407,775 (53,110)	121,910 (143,489)	\$51,623 (1.18)

Appendix 2. Eyed eggs received at Grace Hatchery, 1996.

Species/Strain	Source	Number received	Date received
Hayspur rainbow trout	IDFG Hayspur	85,000	01/31/96
Hayspur rainbow trout	IDFG Hayspur	10,500	02/23/96
Hayspur rainbow trout	IDFG Hayspur	29,100	03/03/96
Henrys Lake rainbow x cutthroat hybrids	IDFG Henrys Lake	65,000	04/16/96
Kamloops rainbow trout	Troutlodge, WA	53,500	05/09/96
Bear Lake cutthroat trout	Mantua, UT	32,500	06/11/96
Hayspur rainbow trout	IDFG Hayspur	108,900	10/21/96
Lewis Lake lake trout	Saratoga NFH	40,000	10/23/96
Hayspur rainbow trout	IDFG Hayspur	88,000	11/12/96
Plymouth Rock brown trout	Saratoga NFH	120,000	11/20/96
Soda x Jenny splake	Story, WY	35,000	11/27/96
Total		667,500	

Appendix 3. Fish production costs, 1996.

Species	Size inches	Number produced	Pounds produced	Production cost	Cost/1,000	Cost/lb
Rainbow/Kamloops catchables	10	519,050	76,414	105,142	203	1.38
Fingerling rainbow trout	7	322,480	31,421	39,571	123	1.26
Splake	14	17,460	2,900	7,649	438	2.64
Splake	6	31,850	2,660	7,585	238	2.85
Lake trout	9	49,780	4,375	15,116	304	3.46
Lake trout	1	35,000	25	1,384	39	55.36
Cutthroat, Bear R.	8	11,660	1,930	3,922	336	2.03
Cutthroat, Bear L.	3	26,000	590	3,714	143	6.30
Brown trout	4	59,500	910	2,040	34	2.24
Rainbow X cutthroat hybrids	3	62,660	685	2,001	32	2.92
Totals		1,135,440	121,910	\$188,124	\$166	\$1.54

Appendix 4. Fish requested and produced at Grace Hatchery, 1995.

Species	Number requested	Number Planted	% achieved
Catchable rainbow trout	155,700	185,425	119%
Spring fingerling rainbow trout	5,610	162,360	2.894%
Fall fingerling rainbow trout	160,120	160,120	100%
Fingerling rainbow x cutthroat hybrids	12,570	62,660	498%
Fingerling brown trout	41,000	59,500	145%
Bear River cutthroat trout	32,000	21,760	68%
Lake trout	34,000	33,180	98%
Splake	15,800	42,660	270%
Totals	456,800	727,665	159%

Appendix 5. Fish feed used and cost, Grace Hatchery, 1996.

Manufacturer	Diet	Size	Cost/lb	Pounds fed	Cost
Rangens	Dry	Starter	0.45	250	112.50
Rangens	Dry	# 1	0.49377	605	298.73
Rangens	Dry	# 2	0.50691	1,360	689.40
Rangens	Dry	# 3	0.50468	5,290	2,669.75
Rangens	Dry	# 4	0.30495	11,070	3,375.84
Rangens	Dry	Coarse Crumble	0.30767	6,650	2,046.03
Rangens	Dry	1/8 bags	0.2682	1,750	469.35
Rangens	Dry	1/8 Bulk	0.2363	7,000	1,654.10
Rangens	Extruded	1/8 450 bags	0.32	750	240.00
Rangens	Extruded	400 Bulk	0.28536	33,590	9,585.33
Rangens	Extruded	450 Bulk	0.32081	57,799	18,542.23
Subtotals	Dry			126,114	\$39,683.26
Rangens	Soft-Moist	Starter	0.7449	132	98.33
Rangens	Soft-Moist	1/32 in	0.6815	308	209.90
Rangens	Soft-Moist	3/64in	0.6498	660	428.87
Rangens	Soft-Moist	1/16 in	0.6182	1,540	952.03
Rangens	Soft-Moist	3/32 in	0.5979	470	281.01
Rangens	Soft-Moist	1/8 in	0.5979	3,412	2,040.30
Subtotals	Soft-Moist			6,522	\$4,010.17
Silver Cup	Soft-Moist	# 1	0.7	50	35.00
Silver Cup	Soft-Moist	# 2	0.7	150	105.00

Manufacturer	Diet	Size	Cost/lb	Pounds fed	Cost
Silver Cup	Soft-Moist	# 4	0.59	2,250	1,327.50
Silver Cup	Soft-Moist	3/32	0.52	2250	1,170.00
Silver Cup	Soft-Moist	1/8	0.52	750	390.00
Silver Cup	Soft-Moist	5/32	0.52	500	260.00
Subtotal	Silver Cup			5,950	\$3,287.50
Bioproducts	BioDiet	str # 1	0.97976	53	52.08
Bioproducts	BioDiet	str # 2	1.14318	44	50.30
Bioproducts	BioDiet	str # 3	1.14318	44	50.30
Bioproducts	BioDiet	1.0 mm	1.08864	88	95.80
Bioproducts	BioDiet	1.3 mm	1.06364	44	46.80
Bioproducts	BioDiet	1.5 mm	0.99676	309	308.00
Bioproducts	BioDiet	2.5 mm	0.94834	1,146	1,086.80
Bioproducts	BioDiet	3.0 mm	0.93006	529	492.00
Bioproducts	BioDiet	4.0 mm	0.92970	2,646	2,459.99
Subtotal	BioDiet			4,903	\$4,642.07
Totals	All Diets			143,489	\$51,623.00

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
HAGERMAN FISH HATCHERY
1996**

Joe Chapman, Fish Hatchery Manager II

INTRODUCTION

Hagerman Fish Hatchery is a state-owned resident trout production facility. The hatchery raises several strains of rainbow trout *Oncorhynchus mykiss* and various specialty species for statewide distribution. Hagerman Hatchery is the Idaho Department of Fish and Game's (IDFG) 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 IDFG license money. There was approximately \$452,833.00 from Hagerman's budget and approximately \$96,850.00 from the fish transportation budget used to rear and plant fish in the 1996 production year, not including capital outlay expenditures (Appendix 1).

The hatchery is staffed with a Hatchery Manager II (Joe Chapman), a Hatchery Manager I (Walt Rast), and two Fish Culturists (Kevin Price and Michele Baer). This past year, fish culturist Dave Costas was promoted to a hatchery manager with the state of New Hampshire and was replaced by Michele Baer, who took a lateral transfer from Rapid River Hatchery. Two permanent transport operators (Ken Taylor and Ralph Taylor) are also based at this hatchery. About 16 months of temporary labor are available for use during the year.

The hatchery water supply consists of approximately 52 cubic feet per second (cfs) from Tucker Springs and approximately 69 cfs 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 hatchery 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 1996, Hagerman Hatchery stocked 4,476,064 fish weighing 508,870.5 pounds. Of these, 1,061,544 were planted 8 inches long and larger, and 3,414,520 were planted smaller than 8 inches long (Appendix 1). About 56% of the total fish planted were stocked in the Magic Valley Region waters (Appendix 2). The larger fish were rainbow trout from Haypur Hatchery and Kamloops rainbow trout of various strains, while the 2- to 8-inch fish consisted of rainbow trout, Kamloops trout, steelhead, Colorado River rainbow trout, and cutthroat x rainbow hybrids (Appendix 1).

The 508,870.5 pounds planted included 371,126 pounds of put-and-take fish averaging 9.3 inches and 137,744.5 pounds of fingerlings that averaged 4.5 inches. The cost of planting the average 8.8 fish per pound (6.4 inches) was approximately \$0.91 per pound, or \$103.91 per 1,000 fish (Appendix 1).

In addition to the fish reared and planted, an additional 2,291,738 fish weighing 71,964 pounds were on hand at the hatchery on December 31, 1996. These were comprised of 667,547 fish weighing 69,381 pounds (average 9.62/lb, or 6.1 inches) in the large raceways, and 1,624,191 fingerlings weighing 2,583 pounds (average 629/lb, or 1.5 inches) in the west raceways. The cost of producing the larger fish was \$1.18/lb or \$122.28/1,000, and \$1.15/lb or \$1.83/1,000 for the fingerlings (Appendix 1).

During 1996, 2,364,558 fish weighing 4,372 pounds were received from other hatcheries. On hand January 1, 1996 were 3,179,248 fish weighing 109,340 pounds. Consequently, these subtractions yield a net production for 1996 of 1,223,996 fish weighing 467,122.5 pounds, mortality excluded (Appendix 1).

A total of 15,432,378 eggs and fry were acquired to yield the fish produced. A total of 2,912,755 eggs were purchased, and the balance were acquired from governmental sources at no cost (Appendix 4). A total of 2,212,813 fish were transferred into the Hagerman Hatchery from Clearwater and Cabinet Gorge hatcheries to ease the loading during the spring and to help meet the fall size requirements (Appendix 4). Because of the colder water at the other hatcheries, development can be delayed and these eggs can help meet the fall fingerling requests. Without them, the state would have to purchase eggs. Also, 1,051,214 fish were transferred here from other hatcheries in the fall of 1995 after the new Tucker Springs pipeline construction was completed (Appendix 4).

In addition to the requests from the regions, the hatchery crew also stocked 781,090 fish weighing 72,931 pounds for Niagara Springs, Hagerman National, Sawtooth, Clear Springs and Dworshak hatcheries throughout the year (Appendix 5). Also, the transportation crew hauled fish for Grace, American Falls, and Mackay hatcheries.

FISH FEED

The fish produced during fish year 1996 were fed a total of 529,241 pounds of feed acquired from Rangens, Inc. and Bioproducts (Appendix 6). The net weight gained during 1996 was 467,122.5 pounds, which resulted in an overall conversion of 1.13 pounds of feed to produce 1 pound of fish, not including the weight of the

mortalities (Appendix 1). The floating, low-phosphorus 1/8-in pellet used to feed the larger fish required some adaptations to the previous feeding methods, but has proven to be more efficient and resulted in less feed waste and minimal Bacterial Gill Disease (BGD). In early spring of this year, feed costs went up due to the new state contract. Large feed increased about 30%, while the small feed decreased slightly. Overall, feed costs increased about 25% compared to last year, while production requests and the hatchery budget remained essentially the same.

HATCHERY IMPROVEMENTS

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

- A new concrete intake dam for Tucker Springs water in the large pipeline was installed after the old wooden one broke in February.
- An air cleaning system was installed in the west raceways by the hatchery crew and the large raceways' air delivery system was reconstructed. Also, a new air-blower motor was purchased after the old one broke.
- The domestic water line from the pumphouse to the storage tank was replaced after it broke.
- Aluminum screens were built for the west raceways to facilitate the moving of smaller fish from the hatchery building.
- The office interior and visitors bathroom were painted, and raceway numbers were repainted by community service workers.
- Safety roll bars were constructed on the John Deere tractor and the feed tug.
- A new door was installed on the hatchery building storage room.
- The inflow caps on the west raceways were replaced with plastic elbows.
- The fiberglass tank on the 2 1/2 ton diesel was repaired.
- The discharge chute on the new 2-ton diesel truck tank was enlarged to make fish discharge easier.
- The first phase of the visitor self-guided tour display was completed.

- Some new trees and shrubs were planted around the hatchery.
- A heat pump drain line was installed for residence #5.
- Two leaking compartments in the fish hauling transport trailer were repaired, and the rear axle of this trailer was fitted with an air-ride suspension system.
- The fish pump was removed from the truck, and it was mounted on and reinstalled on a more powerful truck to make it more efficient.

PUBLIC RELATIONS

Hagerman Hatchery receives a large number of visitors and sportsmen throughout the year. An estimated 20,000 visitors toured the facility and used the surrounding public grounds this year. The 37 acres of hatchery 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, watchable 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.

FISH TAGGING OPERATIONS

The hatchery crew participated in several tagging operations during the year. The feed-training evaluation was continued on five of the Magic Valley Region waters that Hagerman planted: Rock Creek, South Fork Boise River, Cassia Creek, Trapper Creek, and the Little Wood River (Appendix 7). The purpose of this evaluation was to determine if fish fed a diet of fishing bait (worms), several days prior to release, would return to the creel faster than those fed the standard fish feed. Last years results showed promise. The feed-trained group returned to the creel 23% higher overall. However, the timing of the returns was variable, with no consistent pattern among the four plants. Preliminary data from this year's evaluation (1996) showed a major benefit in the larger streams (South Fork of the Boise River =1.85:1), but poor and inconsistent benefits in the others with an overall return of 10% higher for the food-trained groups. In conclusion, in small streams with no habitat, fast water, and lots of fishing effort, the benefits appear to be negligible. However, in larger streams with good habitat, the benefit could be great.

One of the more interesting projects was the stocking of 40 sturgeon obtained from the College of Southern Idaho Hatchery into upper Riley Creek to control aquatic vegetation and consequently decrease the number of snails and resultant *Sanquinicola* sp. in fish reared on Riley Creek water. Early predictions that they would not move downstream were rapidly dismissed as we witnessed about one-half of them in the raceways within two weeks. Although we did not have a bad year for aquatic vegetation last year, that result could not be attributed to the sturgeon. I think some have migrated out of the upper creek into the Anderson ponds and Riley Creek Impoundment. All were PIT-tagged and externally marked, and three have died to date. These fish will be observed over the next year to note movement and benefits. We did not quantify the vegetation beforehand, and are not certain how many will have to be stocked to see any benefits. However, a local fish farmer has had excellent success with them in controlling the vegetation in his canal.

Adipose-clipped fish from a Colorado River rainbow trout stock were planted into the Snake River, Little Wood River, and Dog Creek Reservoir. The purpose of this investigation was to determine if a river-strain rainbow trout would return to the fishery better than our other stocks. Regional fishery personnel will be evaluating these fish this year.

An investigation was begun on Ririe Reservoir to compare return rates of Hagerman Hatchery and Mackay Hatchery "jumbo's." The purpose of this study was to determine if fish reared at Hagerman on Riley Creek water and possibly infected with *Sanquinicola* sp. would return as well as fish reared at Mackay Hatchery. The fish at Hagerman were adipose-clipped, while Mackay's fish were given a right ventral clip. Early results reveal the fish from Mackay Hatchery returning at an 18% higher rate. Upper Snake Region fishery personnel should have more information on this in the spring of 1997.

Island Park Reservoir received adipose-clipped fingerlings this year as part of an ongoing study to determine emigration from the reservoir and contribution to the fishery below the reservoir (Appendix 7).

ACKNOWLEDGMENTS

Thanks to the permanent hatchery staff of Walt Rast, Michele Baer, and Kevin Price; to the transport operators Ken Taylor and Ralph Taylor; and to the temporaries Vince Decker, Chris Burris, and Jeff Seggerman.

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

Appendix 1. Costs of fish produced at Hagerman Fish Hatchery, 1996. Costs reflect all costs budgeted except capital outlay plus \$96,850.00 of the fish transportation budget.

Species/Strain	Number of fish produced	Weight, pounds	Cost to produce and plant	Cost/1,000 fish
FISH ON HAND JANUARY 1, 1996				
rainbow x cutthroat hybrids, 5.65 in	104,263	8,457		
Kamloops rainbow trout (Trout Lodge), 7.8 in	272,356	56,619		
Hayspur rainbow trout, 1.22 in	1,680,159	1,367		
Kamloops rainbow trout (TL), 5.56 in	311,697	24,150		
Kamloops rainbow trout (TL), 4.89 in	810,773	42,656		
Totals	3,179,248	109,340		
FISH PLANTED				
Catchables 8 inches and larger				
Hayspur rainbow trout, 9.2 in	133,928	43,850	50,021.15	373.49
Hayspur rainbow trout, 9.8 in	15,400	6,203	7,310.78	474.73
Kamloops rainbow trout (TL), 9.4 in	912,216	321,073	260,714.65	285.80
Subtotals	1,061,544	371,126	\$318,046.58	\$299.61
Fingerlings smaller than 8 inches				
Hayspur rainbow trout, 5.0 in	1,399,023	77,250	85,750.55	61.29
Hayspur rainbow trout, 3.3 in	116,800	1,900	2,253.70	19.30
Kamloops rainbow trout, 4.8 in ^a	767,458	38,712.5	45,568.72	59.38
rainbow x cutthroat hybrids, 4.9 in	165,439	8,970	604.65	3.66
steelhead, 2.4 in	865,210	5,312	6,266.39	7.24
Colorado River rainbow trout, 5.0 in	100,590	5,600	6,596.20	65.57
Subtotals, average 4.5 in	3,414,520	137,744.5	\$147,040.21	\$43.06
Totals, average 6.4 in	4,476,064	508,870.5	\$465,086.79	\$103.91
FISH ON HAND DECEMBER 31, 1996				
Catchables 8 inches and larger				
Hayspur rainbow trout, 9.75 in	33,300	13,320	15,665.97	470.45
Fingerlings smaller than 8 inches				
Hayspur rainbow trout, 7.8 in	44,123	9,388	11,048.63	250.41
Hayspur rainbow trout, 1.45 in	1,429,017	1,948	2,308.67	1.61
Kamloops rainbow trout (TL), 5.6 in	590,124	46,673	54,913.33	93.05
Kamloops rainbow trout (Hayspur), 1.93 in	195,174	635	659.61	3.38
Totals	2,291,738	71,964	\$84,596.21	\$36.91

Appendix 1. Continued.

Species/Strain	Number of fish produced	Weight, pounds	Cost to produce and plant	Cost/1,000 fish
TOTAL FISH PRODUCED				
Planted in 1996	4,476,064	508,870.5		
On hand December 31, 1996	2,291,738	71,964		
Totals	6,767,802	580,834.5		
From other hatcheries	-2,364,558	-4,372		
On hand December 31, 1995	-3,179,248	-109,340		
Total Gained	1,223,996	467,122.5		
^a These were Hayspur stock, but also include 86,188 Ennis, Montana stock.				

Appendix 2. Fish distribution from Hagerman Fish Hatchery, 1996.

			Percent of number planted by Region						
	Number	Pounds	1	2	3	4	5	6	7
Catchable larger than 8 inches									
Hayspur rainbow trout	133,928	43,850	-	-	-	33.9	66.1	-	-
rainbow trout	15,400	6,203	-	-	-	35.1	-	64.9	-
Kamloops rainbow trout	912,216	321,073	-	-	28.0	40.2	26.2	5.6	-
Subtotal	1,061,544	371,126	0.0	0.0	24.1	39.3	30.8	5.8	0.0
Fingerlings smaller than 8 inches									
Hayspur rainbow trout	1,399,023	77,250	-	-	34.2	45.0	5.4	15.4	-
rainbow trout	116,800	1,900	-	-	-	-	-	100.0	-
Kamloops rainbow trout	767,458	38,712.5	-	-	18.3	55.9	15.1	10.7	-
rainbow x cutthroat	165,439	8,970	-	-	-	42.7	57.3	-	-
steelhead	865,210	5,312	-	-	-	100.0	-	-	-
Colorado River rainbow trout	100,590	5,600	-	-	-	100.0	-	-	-
Subtotal	3,414,520	137,744	0.0	0.0	18.1	61.4	8.49	12.1	0.0
Total	4,476,064	508,870	0.0	0.0	19.5	56.1	13.7	10.7	0.0

Appendix 3. Fish survival from eyed egg to plant, 1996.

Species/Strain	Number planted	On hand December 31, 1996	Total produced	Percent survival
Kamloops trout, Trout Lodge	912,216	590,124	1,502,340	64.96
Kamloops trout, Ennis	86,188	0	86,188	52.57
Kamloops trout, Hayspur	681,270	195,174	876,444	50.59
Hayspur rainbow trout	1,665,151	1,506,440	3,171,591	38.68
rainbow x cutthroat, Henrys Lake	165,439	0	165,439	31.72
steelhead, Sawtooth Hatchery	865,210	0	865,210	85.19
Colorado River rainbow trout	100,590	0	100,590	44.18
Total	4,476,064	2,291,738	6,767,802	43.85

Appendix 4. Numbers of eyed eggs and fry received, species, and source for fish produced in 1996.

Species/Strain	Eggs received		
	For fish planted	For fish on hand December 31, 1996	Source
rainbow/Kamloops	411,355	1,326,360	Trout Lodge, Washington
rainbow/Kamloops	1,382,388	350,196	IDFG Hayspur
rainbow/Kamloops	163,944	0	USFWS, Ennis, Montana
rainbow/Kamloops	3,644,912	2,236,917	IDFG Hayspur
rainbow x cutthroat hybrids	521,515	0	IDFG Henrys Lake
steelhead	1,015,684	0	IDFG Sawtooth Hatchery
Subtotal eggs	8,254,798	3,913,473	
Received as fry			
Hayspur rainbow trout	1,419,393	0	IDFG Cabinet Gorge Hatchery
Hayspur rainbow trout	793,500	0	IDFG Clearwater Hatchery
Subtotal fry	2,212,893	0	
Received as fingerlings			
rainbow/Kamloops	538,839	0	American Falls Hatchery (Trout Lodge, Washington)
rainbow/Kamloops	209,655	0	Nampa Hatchery (Trout Lodge, Washington)
rainbow/Kamloops	230,000	0	Grace Hatchery (Trout Lodge, Washington)
rainbow/Hayspur	72,720	0	Mackay Hatchery (IDFG Hayspur)
Subtotal fingerlings	1,051,214	0	
Total	11,518,905	3,913,473	

Appendix 5. Source, number, and species of fish planted from non-resident hatcheries.

Source	Number	Pounds	Species
Clear Springs Trout Company	201,868	21,990	rainbow trout
Clear Springs Trout Company	112,909	6,375	Kamloops rainbow trout
Dworshak National Fish Hatchery	74,133	11,650	Mt. Shasta rainbow trout
Hagerman National Fish Hatchery	169,578	16,310	steelhead
Niagara Spring Hatchery	149,040	4,600	steelhead
Sawtooth Hatchery	66,022	11,120	steelhead
College of Southern Idaho	40	261	white sturgeon
Dunn's Catfish Farm	7,500	625	channel catfish
Totals	781,090	72,931	

Appendix 6. Fish feed used during Fish Year 1996 at Hagerman Hatchery.

Size	Source	Pounds	Cost/pound	Cost
Soft-Moist starter	Rangens	450	0.5624	253.08
#1	Rangens	4,000	0.5624	2,249.60
#1 TM	Rangens	50	0.5696	28.48
#2	Rangens	10,750	0.5624	6,045.80
#2 TM	Rangens	515	0.5696	293.34
#3	Rangens	27,300	0.5624	15,353.52
#3 TM	Rangens	1,000	0.5696	569.60
#4	Rangens	600	0.3024	181.44
1/16 in, float	Rangens	64,820	0.4700	30,465.40
3/32 in, pellet	Rangens	3,900	0.3722	1,451.58
3/32 in, TM	Rangens	1,800	0.4970	894.60
1/8 in, Low P, float	Rangens	91,380	0.2397	21,903.79
1/8 in, Low P, float	Rangens	260,580	0.3400	88,597.20
1/8 in, TM	Rangens	1,400	0.4970	695.80
Subtotal		468,545	\$0.3607	\$168,983.23
BioDry				
#0 Trout Starter	Bioproducts	300	0.445	133.50
#0 Salmon Starter	Bioproducts	280	0.8350	233.80
#1 Salmon Starter	Bioproducts	400	0.7525	301.00
#2 Salmon Starter	Bioproducts	1,100	0.5434	597.75
#3 Salmon Starter	Bioproducts	1,650	0.5660	934.00
BioDiet				
#1	Bioproducts	44	0.4450	43.08
#2	Bioproducts	132	0.8155	107.64
2.5 Grower TM	Bioproducts	792	1.746	1,382.83
3.0 Grower TM	Bioproducts	748	1.666	1,246.17
BioDry Steelhead				
1.0	Bioproducts	1,000	0.5625	562.50
1.3	Bioproducts	4,750	0.5300	2,517.50
1.5	Bioproducts	10,850	0.5314	5,765.75
2.5	Bioproducts	15,000	0.3550	5,325.00
BioDry 500				
2.5	Bioproducts	12,500	0.2976	3,712.5

Appendix 6. Continued.

Size	Source	Pounds	Cost/pound	Cost
BioDry 1000				
1.0	Bioproducts	3,100	0.5087	1,577.00
1.3	Bioproducts	2,400	0.5414	1,299.25
1.5	Bioproducts	2,150	0.5364	1,153.25
2.5	Bioproducts	3,500	0.3316	3,500.00
Subtotal	Bioproducts	60,696	\$0.5007	\$30,392.52
Total	Bioproducts and Rangen	529,241	\$0.3767	\$199,375.75

Appendix 7. Summary of fish marked in 1996.

Date planted	Species ^a	Water	Number	Pounds	Clip
May 10	K1	Mormon Reservoir	4,830	1,650	Left maxillary
May 10	K1	Ririe Reservoir	2,500	1,000	Adipose
May 31	R9	Island Park Reservoir	82,100	1,955	Adipose
May 31	K1	Island Park Reservoir	25,200	622	Adipose
Jun 11	K1	Ririe Reservoir	2,525	1,000	Adipose
Jun 13	WS	Upper Riley Creek	40	260.5	4th ant. scute on left side
Jul 1	R9 & K1	South Fork Boise River	500	236	Jaw tags
Jul 1	R9 & K1	Cassia Creek	500	236	Jaw tags
Jul 1	R9 & K1	Trapper Creek	500	236	Jaw tags
Jul 2	R9 & K1	Rock Creek	500	236	Jaw tags
Jul 2	R9 & K1	Little Wood River	500	236	Jaw tags
Jul 10	K1	Ririe Reservoir	2,498	1,850	Adipose
Aug 29	K1	Ririe Reservoir	2,723	2,475	Adipose
Oct 23	RR	Snake River - Bell Rapids	13,950	900	Adipose
Oct 23	RR	Snake River - King Hill	18,300	1,000	Adipose
Oct 24	RR	Snake River - Glens Ferry	15,500	1,000	Adipose
Dec 4	RR	Dog Creek Reservoir	9,900	500	Adipose
Dec 4	RR	Little Wood River	12,870	650	Adipose
Totals			195,436	16,042.5	

^aK1=Kamloops rainbow trout, R9=Hayspur rainbow trout, WS=white sturgeon, RR=Colorado River rainbow trout.

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

HAYSPUR FISH HATCHERY

1996

**Bob Esselman, Fish Hatchery Manager II
Doug Young, Assistant Fish Hatchery Manager
Paul Dorman, Fish Culturist**

INTRODUCTION

Hayspur Fish Hatchery is a license-funded resident salmonid broodstock facility. 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. Since facility renovation in 1989, eyed egg production to meet the requests of resident programs has been a priority. An on-site free public campground, a general season pond fishery, and a trophy stream fishery are maintained by hatchery personnel.

The hatchery is located in Blaine County, approximately 40 miles south of Sun Valley on Loving Creek. The hatchery property is an odd shaped 105.12-acre parcel. Fish culture facilities include an incubation building housing vertical incubator stacks, isolation incubators, moist egg chiller, and egg picking apparatus. The hatchery building has 20 early rearing tanks; 12 covered 24-ft circular ponds, 6 small raceways, and 6 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). Both the spring and well water are considered to be Specific Pathogen Free (SPF).

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 Hayspur Hatchery. Usually, three biological aides are hired for the spawning season and one for the summer stocking season.

RAINBOW AND KAMLOOPS EYED EGG PRODUCTION

The 1996 spawning season was a seven-month project, with an egg take of 12,039,032 green eggs during the period covered. Eggs were taken from 3,707 females. A total of 9,052,377 eyed eggs were produced (Appendix 1). Photoperiod manipulation, or light control, has expanded "normal" spawn timing to more closely match egg production with eyed egg requests. Light control seemed to "work" this season. Only three-year-old rainbows and Kamloops were manipulated. We have found two-year-olds respond poorly to photoperiod manipulation. Hayspur rainbow trout eyed egg production totaled 6,605,447, Kamloops eyed egg production totaled 1,708,967, and Colorado eyed egg production totaled 737,963 (Appendix 1). Hagerman, Nampa, American Falls, Grace, Ashton, Clark Fork, Mackay, Clearwater, Cabinet Gorge, Sawtooth, and Hayspur hatcheries were shipped eggs as per their

requests. Cabinet Gorge hatchery was shipped eggs in excess of requests or to provide fry to Hagerman Hatchery through delayed development. Value to the Department of these eyed egg shipments equates to \$135,702.17 at the current contract price of \$15.00/1,000 eggs (Appendix 2).

RE-DISTRIBUTION OF CATCHABLES

Fish requested for the Big and Little Wood drainages were reared at Nampa Fish Hatchery, hauled to Hayspur, and stocked by Hayspur personnel. This new program, driven by whirling disease ramifications, started off tough and became easier. Prior to altering raceways and providing them with pathogen-free water, we traveled to Nampa, loaded fish, and then stocked area waters. Long days were common. After engineering completed modifications, semi-tank and trailer loads were hauled as needed to complete our requests. A total of 56,336 Kamloops rainbow trout were stocked in area waters (Appendix 3).

FISH FEED

Silver Cup and Rangen 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 hatchery during 1996 included:

- Raceways E and F headboxes were altered to exclude Loving Creek water.
- A lift station, pump, and piping to provide re-use water (from 12 circular ponds) to raceways E and F was installed.
- Research and development tanks were obtained from the Eagle Sockeye project to accommodate the sterile fish project.
- The interior of the crew quarters was painted.
- The submersible pump for well #4 was replaced.

- Native water birch *Betula occidentalis* obtained from the Nature Conservancy and aspen *Populus tremuloides* from the Soil Conservation Service were planted along the Loving Creek area.

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

- Increase operating budget to recover the loss of \$57,400 during FY 95. Approximately \$40,000 would be appropriate and would eliminate the current charges to other hatcheries.
- Provide security fencing around electrical control panels and pumps. Public safety and liability issues need to be addressed pertaining to the extreme electrical danger of 480-volt three-phase power.
- Install bird wire over small raceways where broodstock replacements are reared to maintain SPF status by providing a barrier to herons, kingfishers, otters, and mink.
- 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.

BROODSTOCK MANAGEMENT

The 1996 year was notable in that two-year-old Hayspur rainbow trout and Kamloops reared at Hayspur (rather than Nampa) were used. Fish and egg size were affected. Average egg size in two year olds was reduced from 389 eggs per ounce (13.14 eggs/ml) to 453 eggs per ounce (15.3 eggs/ml).

The Hayspur rainbow trout replacement population was developed by using year class crosses. This year, three year olds were crossed with six year olds. Feral fish were electrofished from Loving Creek and used in 7% of the 200 one male by one female pairings. We will have to look at this activity as we now have potential to have both rainbow trout and Kamloops in the creek. In the past, it was thought these fish were desirable as providing gametes from the founding population and demonstrating survival in the wild.

Hayspur's Kamloops replacement population was developed by using three-year-old adults of Trout Lodge stock and a mixed year class population of four- to seven-year-old adults of Skane's/Gloyd Springs 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 replacement population was developed by using year class crosses. Differential marks by year class are necessary. Currently, three year classes (BY92, BY93, and BY94) are in one circular pond. These fish represent adults trapped and spawned in the Colorado system. These fish demonstrate characteristics of swimming away from humans, they feed primarily in the middle of the water column, show a lot of red during breeding readiness, and seem to have well developed teeth. Most of the regional managers have requested a few and are evaluating the performance of these fish.

Pathogen status was addressed in a couple of ways. Oxytetracycline injections of all females was performed to reduce the vertical transmission of Coldwater Disease. After reviewing historic Bacterial Kidney Disease (BKD) data and discussion with Department pathologists, it was decided to cull progeny of females with ELISA values >0.11. The goal is to affect the BKD status while maintaining genetic material. The trend is encouraging.

PUBLIC RELATIONS

Hayspur personnel continued the weekly local radio stocking/fishing report. Angler and fishing guide responses to the radio show were positive. The report outlined waters to be stocked, usually a note on a local fishery, and a tip or encouragement to take a kid fishing.

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, and 4-H Clubs.

Naples, Hailey, Kellogg, and Stanley schools were shipped eyed eggs. The resultant fry were stocked into Adopt-a-Stream projects. Gebhards Creek at the Morrison Knudsen Nature Center was shipped eyed eggs for public viewing of the developmental stages of rainbow trout. The Salmon, Magic Valley, and Upper Snake regions fisheries personnel utilized adults and eggs for spawning demonstration and salmonid anatomy in area schools. A "shadow" program experience was given to Mavis Irwin, a student at the Idaho School for the Deaf and Blind and her interpreter Heather Fultz.

Approximately 7,000 individuals visited, camped, and/or fished on hatchery property. Gaver Lagoon continues to gain popularity among a variety of anglers including the physically challenged and children.

The Hayspur campground benefited from the efforts of a volunteer Camp Host couple. 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, and generally enhance the image of the Department.

SPECIAL PROJECTS

Wetland Project

Pothole blasting for the Hayspur Wetland Project took place on August 1-2, 1996. This project was conducted in order to create some open water areas of the lower wetland areas of the Hayspur property. The area had become choked with emergent vegetation and nesting habitat was almost entirely eliminated. Before any blasting, hatchery employees contacted and consulted with other IDFG personnel, concerning such issues as sensitive plant and animal species, amphibians, feasibility, and overall wildlife benefits. On-site inspections were conducted by IDFG Plant Ecologist Mabel Jankowski-Jones, Regional Habitat Biologist Terry Gregory, Regional Wildlife Biologist Mike McDonald, and Regional Information Specialist Mike Todd. Other technical advice and procedures were provided by Regional Waterfowl Biologist Dean Rose (Pocatello) and Regional Environmental Biologist Dave Parrish (Jerome). No special concerns were seen in dealing with sensitive plants or wildlife that may be impacted by the blasting.

Hayspur personnel contacted state and federal agencies in order to obtain the permits to conduct the blasting. A wetlands alteration permit was obtained from the U.S. Army Corps of Engineers. Other contacted agencies were Idaho Water Resources and Blaine County Planning and Zoning.

The Idaho Department of Fish and Game's Habitat Improvement Program allotted \$5,000.00 for the blasting. Because this project was considered a public works program, Pheasants Forever was asked to pay for the project and IDFG would then reimburse them. The initial group of five ponds cost \$2,500.00. Jerry Dilly and his crew from Superior Blasting in Boise were contracted to do the work.

The crew from Superior Blasting arrived on Thursday, August 1 and started work at approximately 10:30 a.m. Because of the lack of knowledge dealing with explosives by IDFG personnel, planning of the charges was left to the blasting crew.

IDFG personnel identified pond sites. The holes for charges were dug with a Mustang light duty tractor fitted with an hydraulic auger. The holes for the ponds were approximately seven feet apart and three feet deep. Charges of ten pounds of fertilizer and diesel fuel mix in waterproof plastic bags, a nitroglycerin charge, and delay timers were used to get the desired affect. A total of 1,500 pounds of explosives was used to create five ponds with interconnecting canals.

This project could not have been done without the diligent work and help of Terry Gregory, Kevin Price, Dean Rose, Mike Todd, Mike McDonald, Dave Parrish, Dave Musil, Paul Dorman, Bob Esselman, Tom Hemker, Dave Skinner, and the crew from Superior Blasting. Other IDFG personnel that helped were Tesa Severson and Mandy Warren. Kevin Price also provided five goose nesting platforms for the project.

Hayspur Tetraploid (4N) Project

This experimental project, started on February 2, 1996, was undertaken in cooperation with Hatchery Evaluation personnel Jeff Dillon and Chuck Alexander. If successful, an all male tetraploid broodstock would be maintained. They would be used to fertilize diploid females to produce triploid fish. The resultant triploid fish would be utilized for stocking in areas where a fertile diploid hatchery product was not desirable.

Four pressure treatment groups and two controls were evaluated for this experiment. The four pressure groups were developed with a hydrostatic pressure chamber. The pressure groups consisted of 8000 psi, 8500 psi, 9,000 psi, and 9,500 psi (Appendix 5).

A total of 92,063 Hayspur rainbow trout green eggs were used. A total of 56,044 green eggs were used in the pressure treatment groups, while the remainder were controls.

Application of the pressure did not appear to effect early egg development. All of the pressure groups entered the eyed stage at 17 days (340 TU's) which is normal for Hayspur rainbow trout production eggs at 52°F. Hatching also occurred normally at approximately 30 days or 600 TU's at 52°F. Upon hatching, an increase in fish deformities was noted.

Two control groups were utilized for this project. One was a control group for the 9,000 psi pressure group and the other for the 9,500 psi group. The eggs were taken on the same day as the experimental groups and from the same lots of eggs. A total of 36,019 eggs were used. The control groups average eye up rate was 76.67%, similar to regular production lots at that time of year.

Fish growth generally was similar to normal Hayspur rainbow trout production fish. After the fish had grown to 3 inches total length, lethal blood sampling was performed. Sampling for tetraploidy occurred on July 10, 1996. A total of 161 samples were taken from the experimental groups.

Blood analysis was performed at WSU by Gary Thorgaard and Paul Wheeler on the July 11, 1996. The resultant analysis showed that tetraploidy was induced in 1 of 161 fish sampled or 0.62%. A total of 95.03% of sampled fish were diploid and the rest were either "mosaic" or unidentifiable.

The 4,857 Hayspur rainbow trout used in this experiment were stocked into Lava Lake on August 5, 1996. These fish averaged 40.23 fish per pound (fpp) when stocked and weighed 121.17 pounds. They averaged 3.95 inches when stocked.

Hayspur Triploid (3N) and Tetraploid (4N) Project

The lack of tetraploidy in the early 1996 tetraploid project fish was a concern. Further study suggested the application of pressure or heat at a specific point in cell division was late. A new project to possibly create triploid (3N) and tetraploid (4N) fish was undertaken on November 26, 1996. A total of 88,456 green eggs were utilized for this project. The results will be available soon and will be published in the Hayspur 1997 Annual Report.

Loving Creek

The Flyfishers of Idaho continue their active role on a rehabilitated reach of Loving Creek on hatchery property. A water gap is being planned. The proposed water gap will control a neighbor's livestock access and enhance riparian habitat and water quality upstream of the project. Mature water birch attained from the Nature Conservancy and aspen from the Blaine County Soil Conservation Service were planted on the project. Angler comments in the voluntary sign-in log indicate good fishing, high catch rates, and project support. Waterfowl and waterfowl hunters utilized the project.

Loving Creek was trapped this spring to provide "wild" rainbow trout to displace the request for brown trout in the Little Wood River. Hayspur personnel started trapping on March 21, 1996 for spring spawning rainbow trout on Loving Creek. Despite a strong wild rainbow trout population, only 10 adult females and 5 adult males were trapped. One female was spawned. Apparently the population does not

make a "run" per se. The trapping project will be continued and evaluated over the next few seasons.

A total of 1,980 eggs were taken. The eye-up rate was 1.26%, and a total of 25 fry were produced.

Miscellaneous

Hayspur Hatchery personnel assisted regional staff with check station duty, depredation complaints, Big Wood River electrofishing surveys, an elk sightability survey, and winter elk feeding. Hayspur personnel conducted sentinel tests of Colorado rainbow trout in an effort to better understand potential impacts of whirling disease. We also assisted Salmon Region with a brook trout eradication project in Valley Creek. Hayspur Hatchery responded to a salvage operation on the Bellevue Canal. Hayspur provided manpower for a Middle Fork of the Salmon River sampling trip which provided the Department with some of the most comprehensive information collected in that drainage.

ACKNOWLEDGMENTS

The efforts of Biological Aides Mountie Morris, Stephanie Swift, and Edward "Mud" Watters during the spawning season are to be commended. They worked hard, kept a sense of humor, and generated a lot of eyed eggs. Teresa Severson worked the summer stocking season.

We acknowledge the people who helped out during the spawning season: Chuck Alexander, Mike Anderson, Jeff Dillon, Roger Elmore, Kevin Fish, Brian Ledgerwood, Jeremy Olsen, Steve Kammeyer, Doug Munson, Fred Partridge, Mike Reed, Kurt Schilling, Brent Snider, Bill Stutz, Russ Wood, and Chuck Warren.

Appendix 1. Egg production summary, 1996.

Species	Total green eggs ^a	Total eyed eggs
Kamloops rainbow trout	2,329,809	1,708,967
Hayspur rainbow trout	8,863,768	6,605,447
Colorado River rainbow trout	845,455	737,963
Totals	12,039,032	9,052,377
^a Total is displaced (volumetric) of both good and bad eggs taken in 1996. Totals do not include total green eggs (1,980) or eyed eggs (25) taken from Loving Creek fish in the spring of 1996.		

Appendix 2. Eyed egg shipment summary, 1996.

Hatchery	Species ^a	Total eggs shipped	Estimated value ^b
American Falls	R9	32,162	482.43
	K1	8,000	120.00
Ashton	R9	238,205	3,580.56
Cabinet Gorge	RR	50,000	750.00
Clark Fork	R9	626,002	9,390.03
	K1	486,782	7,301.73
Grace	R9	344,050	5,160.75
Hagerman	R9	4,943,117	74,146.76
	K1	1,198,989	17,984.84
	RR	401,555	6,023.33
Hayspur	R9	17,645	264.68
Mackay	R9	185,445	2,781.68
Nampa	R9	216,321	3,244.82
	K1	14,696	220.44
	RR	219,069	3,286.04
Sawtooth	RR	64,272 ^c	964.08
Other ^d	R9	2,000	--
	K1	500	--
	RR	3,067	--
Totals		9,052,377	\$135,702.17

^aR9=Hayspur rainbow trout, K1=Kamloops rainbow trout, RR=Colorado River rainbow trout.
^bAt contract value of \$15.00/1,000 eggs.
^cIncludes 35,616 green eggs shipped to Sawtooth.
^dEggs used for educational purposes.

Appendix 3. Hayspur stocking summary, 1996.

Fish size	Number of fish	Pounds of fish
Catchables ^a	57,358	22,288.06
Fingerlings	27,557	681.25
Totals	84,915	22,969.31
^a Includes adult brood fish stocked (1,022 fish at 2,081 pounds).		

Appendix 4. Hayspur feed summary, 1996.

Date	Size	Amount/Pounds	Cost/Total
Bioproducts			
02/05/96	BioDiet Starter	20	44.20
02/05/96	BioDry 1000/1.0 mm	50	24.75
Total		70	\$68.95
Rangens			
03/05/96	1/4 inch Brood	11,750	3,717.70
05/06/96	Trout/Salmon Starter #2	50	28.12
	Trout/Salmon Starter #3	50	28.12
	Trout Grower #4 Crumble	50	15.12
05/13/96	Extruded 450 Floating 1/16	200	94.00
06/04/96	Trout Grower #4 Crumble	150	45.36
	Extruded 450 Floating 1/16	200	94.00
06/27/96	Trout Grower #4 Crumble	300	90.72
07/25/96	Trout Gower #4 Crumble	150	45.36
	Trout Production 3/32 Pellet	450	125.46
	Extruded 450 Floating 1/16	50	33.18
08/27/96	Trout Production 1/8 Pellet	400	103.68
	Trout Production 3/32 Pellet	200	51.84
09/17/96	Extruded 450 Floating 1/8	500	155.00
	Extruded 450 Floating 5/32	500	150.00
10/25/96	Extruded 450 Floating 1/8	100	31.00
11/16/96	Extruded 450 Floating 5/32	1,000	300.00
Total		16,100	\$5,108.66
Silver Cup			
05/06/96	Soft-Moist #2	50	35.00
	Soft-Moist #3	50	29.50
	Soft-Moist #4	50	29.50
05/09/96	Soft-Moist #2	50	35.00
07/19/96	Brood Pellets	10,520	2,998.20
10/02/96	Brood Pellets	12,060	3,437.10
Total		22,780	\$6,564.30
TOTALS		38,950	\$11,741.91

Appendix 5. Egg data for tetraploid (4N) project.

Pressure group	Date taken	Total eggs utilized	Percent eye-up	Percent survival to hatch	Percent induction to tetraploidy
8,000 PSI	2/13	9,703	17.00%	14.46%	0%
8,500 PSI	2/02	11,942	48.63%	45.28%	0%
9,000 PSI	2/02	20,501	29.40%	24.52%	0%
9,500 PSI	2/08-13	13,898	2.59%	1.25%	.62%

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

KOOTENAI FISH HATCHERY

1996

**John T. Siple, Assistant Hatchery Manager
Susan C. Ireland, Fishery Biologist, Kootenai Tribe of Idaho**

INTRODUCTION

The Kootenai Fish Hatchery is located in Boundary County, Idaho, approximately three miles west of Bonners Ferry in extreme north Idaho. Construction of the facility was completed during the spring of 1991 as a resident fish mitigation measure under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program [Section 900 (g) (1) 1987 (H); Action Plan, section 1403 (7.5)]. Funding for this facility was provided by Bonneville Power Administration (BPA) under the auspices of the Northwest Power Planning and Conservation Act (P.L. 96-501,1980).

Staff at the Kootenai Hatchery during 1996 included an Assistant Hatchery Manager (Idaho Department of Fish and Game) and three permanent Kootenai Tribal fisheries personnel. During 1996, the Kootenai Hatchery staff spawned one white sturgeon *Acipenser transmontanus* and produced approximately 200 larvae that perished before going on to feed. Therefore, no young-of-the-year (YOY) sturgeon from the 1996 year class were reared at the Kootenai Fish Hatchery. Hatchery personnel reared 5 white sturgeon from the 1992 brood year and approximately 4,000 white sturgeon from the 1995 brood year, as well as approximately 300 certified disease-free rainbow trout *Oncorhynchus mykiss*. The Kootenai Hatchery was established for experimental rearing of Kootenai River white sturgeon as part of a BPA project evaluating the status and reproductive viability of white sturgeon in the Kootenai River. In the 1995 draft recovery plan for the Kootenai River white sturgeon, implementation of the conservation aquaculture program at the Kootenai Hatchery has been identified as a Priority 1 recovery objective to prevent extinction and minimize additional loss of genetic variability to the population.

In addition to performing aquaculture duties, all Kootenai Hatchery personnel contributed considerable time and effort to the monitoring and evaluation of natural spawning of white sturgeon in the Kootenai River periodically from May through October 1996. The Kootenai Hatchery staff also collected habitat use, movement, and migration data using sonic telemetry gear in the Kootenai River in Idaho and British Columbia, as well as in Kootenay Lake, British Columbia from May through October 1996.

Hatchery Design

The Kootenai Hatchery is a metal pole building, 17.8 m long and 12.5 m wide, housing egg incubation jars, a variety of rearing tanks, an office, laboratory space, a back-up diesel generator (to maintain electricity during utility failure), and a water level

activated alarm siren/phone dialer. Rearing tanks in the Kootenai Hatchery during 1996 included:

- nine rectangular tanks (2.44 m length x 0.56 m wide x 0.31 m high)
- one rectangular tank (1.60 m length x 0.60 m wide x 0.40 m high)
- four circular tanks (3.06 m diameter x 1.53 m high)
- one circular tank (1.53 m diameter x 1.22 m high)
- eleven circular tanks (1.02 m diameter x 0.43 m high)
- two circular tanks (1.42 m diameter x 0.61 m high)
- and four circular tanks (1.83 m diameter x 0.76 m high)

Water Supply

The Kootenai Hatchery has two water supply systems; Kootenai River water and Bonners Ferry city water. A new double primary pump system was designed for the Kootenai Hatchery and installed during May of 1993 (Siple and Anders 1993). This intake system contains two electric 7.5-horsepower submersible pumps, each in a separate 8-inch diameter steel pipe. One pump runs for 24 hours before the system automatically switches to the second pump for the next 24 hours. A third pump (portable gasoline 8-hp) was also purchased for further water reliability in the event that both primary electrical pumps fail simultaneously, or in case of generator failure during a power outage. This gas-powered pump can deliver up to 190 gallons per minute (gpm) depending on river surface elevation. On June 10, 1996, two electric 10-horsepower pumps were installed to replace the 7.5-horsepower pumps. The impellers on the smaller pumps were ruined as a result of the silt entering the hatchery during extremely high spring runoff. The new 10-horsepower pumps are designed to operate the same as the 7.5-horsepower pumps, but can deliver 225 gallons per minute.

Kootenai River water is pumped into a head-box at approximately 947 L/min. From there, water is distributed (by gravity flow) for egg incubation, larval and juvenile rearing, and holding pre- and post-spawning broodstock. The gravity-fed city water is first dechlorinated through two activated charcoal canisters, then flows through a column packed with aeration media (shot shell wads) and then into a head-box for distribution.

Kootenai River water temperature varies by season from a low of 1°C in the winter and as warm as 23°C in the summer (Anders 1991). The city water temperature also varies seasonally (Siple and Anders 1993). During 1996, Kootenai River water temperature in the hatchery ranged from 1°C to 17°C.

River water temperature ranges in the Kootenai Hatchery in 1996 included:

<u>Month</u>	<u>Temperature ranges (Celsius)</u>
January	2-4
February	1-5
March	2-5
April	5-8
May	7-11
June	9-16
July	13-17
August	13-16
September	12-15
October	7-10
November	5-9
December	3-4

City water was used in the hatchery during 1996 as the source for incubating eggs and rearing early life stages. Larval rearing tanks, originally filled with city water, are gradually switched to river water following completion of egg hatch.

An electric water heater can be used for city and river water in the winter, increasing the water temperature to 17°C in three rearing tanks. An additional heat pump (heater/chiller) can be used for additional control of water temperature in the hatchery. However, this chiller has a limited capacity for heating or chilling 3-4 gpm for two rearing tanks using a recirculation system.

Kootenai Hatchery Water Quality

Water quality parameters (dissolved oxygen, hardness, pH, alkalinity, temperature) of river water in the Kootenai Hatchery were measured monthly during 1996 (Appendix 1). All water quality parameter values fell within suggested ranges according to U.S. Fish and Wildlife Service water quality standards for cold water aquaculture (Piper et al. 1982).

Utility Failures

Power outages at the Kootenai Hatchery during 1996:

<u>Date</u>	<u>Cause</u>
4/23/96	Power failure
4/30/96	Power failure (2 times)
5/01/96	Power failure
6/10/96	Changed pumps
7/17/96	Power failure
9/09/96	Power failure
9/13/96	Power failure
9/21/96	Electrical storm
10/18/96	Power failure
11/13/96	Power failure
11/18/96	Power failure
11/22/96	Power failure
11/23/96	Power failure
11/24/96	Power failure (3 times)
11/27/96	Power failure
11/29/96	Power failure
12/03/96	Power failure
12/14/96	Power failure

FISH PRODUCTION

White Sturgeon

Brood Year 1992

One hundred and fifty-one age 4 (brood year 1992) white sturgeon were on hand on December 31, 1996 at the Sandpoint Hatchery, as were five age 4 fish (brood year 1992) at the Kootenai Hatchery.

Brood Year 1993

On December 31, 1996, 131 age 3 white sturgeon (brood year 1993) were being held at the University of Idaho Aquaculture Research Institute.

Brood Year 1995

During 1995, the Kootenai Hatchery staff spawned 6 white sturgeon (2 females and 4 males). Approximately 45,000 larvae were produced, and 17,772 YOY were reared. During 1996, white sturgeon were culled to reduce stress and the possibility of disease outbreak due to high densities, leaving approximately 4,000 brood year 1995 sturgeon at the Kootenai Hatchery on December 31, 1996. Culling was necessary to meet the goals of the Kincaid Breeding Plan included in the draft recovery plan for the Kootenai River white sturgeon (Kincaid 1993). The breeding plan outlines specific numbers of white sturgeon to be raised for the preservation stocking program, as well as ways to reduce potentially detrimental effects of captive culture, including culling to maintain fish at low rearing densities.

Brood Year 1996

During 1996, nine males and two females were taken to the Kootenai Hatchery. Due to the late spring runoff with high water and cold water temperatures, as well as limitations on take, collection of broodstock in 1996 proved difficult. The spawning status of both females was suboptimal, and hatchery staff was only able to collect eggs from one female. Most of the 61,000 eggs were not viable and only 200 hatched but did not survive past one week. Therefore, no brood year 1996 sturgeon were reared at the Kootenai Hatchery.

Rainbow Trout

On December 31, 1996, approximately 300 certified disease-free rainbow trout (House Creek stock) were on hand at the Kootenai Hatchery. This stock of rainbow trout was acquired because they were the only federally certified disease-free trout available in Idaho. Eggs were attained from the College of Southern Idaho in 1995, where this stock has been annually certified as disease-free since 1978. In addition to meeting federally mandated conservation needs for endangered Kootenai River

white sturgeon, the Kootenai Hatchery provides an opportunity for aquaculture training for Kootenai Tribal members.

HATCHERY IMPROVEMENTS

On November 6, 1996, construction began on a new 128 ft x 40 ft outbuilding. This building was to provide protection from both the elements and predation. On December 30, 1996, the new outbuilding collapsed as a result of a combination of heavy snowfall followed by a warming trend. The outbuilding damaged four 20-ft outdoor fish culture tanks beyond repair. No white sturgeon or rainbow trout were lost due to the collapse. Fish in the outdoor tanks were moved inside the main hatchery. The tanks and building will be replaced in 1997.

FISH HEALTH

Brood Year 1992

Kootenai Hatchery

Health of brood year 1992 fish at the Kootenai Hatchery was excellent during the entire year of 1996. No symptoms of bacterial, fungal, or viral diseases were observed with the fish. No fish were tested for presence of white sturgeon iridovirus (WSIV) because no symptoms were observed, and testing requires sacrificing fish.

University of Idaho Hatchery

No fish from brood year 1992 or 1995 were present or taken to the University of Idaho Hatchery during 1996.

Sandpoint Hatchery

During 1996, no symptoms of bacterial, fungal, or viral diseases were observed with brood year 1992 held at the Sandpoint Hatchery. No fish reared in the Sandpoint

Hatchery during 1996 were tested for presence of WSIV because no symptoms were observed, and testing requires sacrificing fish.

Brood Year 1993

University of Idaho

Health of brood year 1993 at the University of Idaho Aquaculture Research Institute was excellent during all of 1996. No symptoms of bacterial, fungal, or viral diseases were observed from the 1993 brood year.

Sandpoint Hatchery

During 1996, no symptoms of bacterial, fungal, or viral diseases were observed in the 1993 brood year fish held at the Sandpoint Hatchery. No fish reared in the Sandpoint Hatchery during 1996 were tested for presence of WSIV because no symptoms were observed, and testing requires sacrificing fish.

Brood Year 1995

Kootenai Hatchery

Health of brood year 1995 white sturgeon was excellent in the Kootenai Hatchery during 1996. No symptoms of bacterial, fungal, or viral diseases were observed with these fish. No brood year 1995 white sturgeon were captive anywhere except the Kootenai Hatchery during 1996.

Rainbow Trout

Health of rainbow trout at the Kootenai Hatchery was very good during all of 1996. No evidence of any bacterial, fungal, or viral diseases was observed for rainbow trout during 1996.

FISH STOCKED AND TRANSFERRED

No fish were stocked or transferred during 1996.

FISH SPAWNING

During 1996, two female white sturgeon and nine male white sturgeon were transported to the Kootenai Hatchery. Due to the late spring runoff with high water and cold temperatures, as well as limitations on take, collection of 1996 broodstock proved difficult. The spawning status of both females was considered to be suboptimal. Hatchery staff was only able to collect eggs from one female (PIT tag 7F7D3F5418), although egg collection was attempted on both females. Eggs were removed by hand-stripping, a technique for white sturgeon, which greatly reduces the stress of the formerly used cesarean surgery egg removal technique.

Spawn #1, July 8, 1996

Hormone injections to induce spawning began on July 8, 1996. The first female (PIT tag 7F7D3F547F) was injected with a primary dose of 10% of a 0.1 mg/kg body weight dose of luteinizing hormone releasing hormone analogue (LHRHa) at 2100 hours. Twelve hours later (July 9, 0900 hours) she was given a resolving dose of 90% of the 0.1 mg/kg body weight LHRHa. Prior to the induction injections, she was placed by stretcher into a 1.0 m x .67 m x 3.0 m covered fiberglass spawning tank. This spawning tank allowed the fish to be injected under water thereby reducing stress and handling, while making for easier observation while waiting for ovulation.

Ovulation was expected between 24 to 48 hours post-resolving injection. A total of 70 eggs were observed near the bottom of the spawning tank approximately 33 hours post-resolving dose injection (July 10, 1800 hours). The eggs did not appear to be viable. They were not sticky, circular, and firm like normal, viable eggs. Egg collection was attempted, but all the eggs collected from the oviduct were broken and pulpous. She was returned to the recovery tank.

Spawn #2, July 11, 1996

Hormone injections to induce the second spawning began on July 11, 1996. The second female (PIT tag 7F7D3F5418), like the first, was injected with a primary

dose of 10% of a 0.1 mg/kg body weight dose of LHRHa on July 11 at 2100 hours. Twelve hours later (July 12, 0900 hours), she was given a resolving dose of 90% of the 0.1 mg/kg body weight LHRHa. Prior to the induction injections she was placed by stretcher into a 1.0 m x .67 m x 3.0 m covered fiberglass spawning tank. This spawning tank allowed the fish to be injected under water, which reduces stress and handling. This also makes for easier observation while waiting for ovulation.

Sperm from males 1 (7F7D273E51), 2 (7F7E6A3E6E), and 3 (7F7E643C4) was checked for motility at 1900 hours on July 13. A sperm sample from each male was checked by microscope for motility and time of death. Sperm remained active with exposure to water for two to five minutes. White sturgeon sperm motility of two minutes and greater is considered optimal (Conte et al. 1988).

Ovulation was expected between 24 to 48 hours post-resolving injection on July 13. Approximately 150 dark eggs were observed approximately 32 hours post-resolving dose injection near the bottom of the spawning tank. These eggs were similar to the eggs from the first spawning episode and were considered to be suboptimal. We continued to observe her until 2110 hours on July 13. Egg collection was initiated, although ovulation was not ideal. Under normal conditions, egg collection is initiated when large quantities of sticky eggs (1,000–1,500) are observed in the bottom of the holding tank.

The total egg take from spawn 2, all hand stripping, was 61,805 eggs on July 14 at 0100 hours. Eggs were de-adhesed for approximately 1.5 hours. Eggs were then volumetrically measured, and added to MacDonald incubation jars. Water flow through the incubation jars was increased at 48 hours post-fertilization to roll the eggs and reduce chances of fungal infection and clumping. Ambient city water temperature was approximately 11°C. Hatching began nine days post-fertilization on ambient city water. Total hatching from the second spawn produced 200 larvae that did not survive past one week. Consequently, no sturgeon from the 1996 brood year were produced at the Kootenai Hatchery.

FISH FEED

Rangen Soft-Moist fish feed was used at the Kootenai Hatchery for rearing early life stages of white sturgeon from the 1995 brood year (Appendix 3). Rangen trout feed was fed to rainbow trout in the Kootenai Hatchery during 1996.

PUBLIC RELATIONS

Numerous tours of the Kootenai Hatchery were given to public and private groups during 1996. Tour groups included citizens, school groups, as well as BPA and U.S. Fish and Wildlife Service personnel.

RECOMMENDATIONS

General aquaculture recommendations for 1996 include:

1. Efficient broodstock collection should be a priority to minimize handling of wild broodstock and maximize benefits of conservation aquaculture to the endangered Kootenai River white sturgeon population. Collection efforts should concentrate on representing male and female white sturgeon broodstock from the widest range of time and location possible.
2. Arrangements should be made to ensure rearing of endangered juvenile white sturgeon in at least one additional facility as a safety precaution.
3. Arrangements should be made to consider long-term gene banking of "excess" juvenile white sturgeon in case of need for future supplemental research purposes, or as potential broodstock in this population's next generation if necessary.
4. Arrangements should be made to make "excess" white sturgeon available for research to better understand white sturgeon ontogeny and reproductive biology. Such research can provide insight into early life mortality factors that appear to be limiting or prohibiting natural recruitment in the Kootenai River.
5. Further refine hand stripping egg removal techniques using females with normally developed ovaries.
6. Broodstock collected should continue to be transported to the facility as soon as possible to reduce stress.
7. Conduct aquaculture operations consistent with the USFWS Breeding Plan to Preserve Genetic Variability of the Kootenai River White Sturgeon (Kincaid 1993).
8. Do not make any unnecessary transfers of fish to and from or within the Kootenai Hatchery.

9. Continue arrangements with University of Idaho Aquaculture Research Institute to provide fish and samples of white sturgeon tissues and blood for genetic and experimental aquaculture research.
10. Continue to provide hands-on experience with all aspects of white sturgeon aquaculture to fisheries personnel from regional fisheries agencies, tribes, and universities.
11. Install high flow sand filtration system to alleviate future problems with silt entering the Kootenai Hatchery.

Fish health recommendations for 1996 include continuing cooperative disease work with U.S. Fish and Wildlife Service, Canadian Ministry of Fisheries and Oceans, British Columbia Ministry of Environment, Land, and Parks, Idaho Department of Fish and Game Eagle Fish Health Lab, Clear Springs, and U.C. Davis Fish Pathology laboratories in testing for and researching effects of white sturgeon viruses, as well as developing disease protocol for release of hatchery reared sturgeon.

ACKNOWLEDGMENTS

During 1996, the Kootenai Fish Hatchery crew included John Siple, Larry Aitken, Robert Aitken, Ron Tenas, George Earle, and Ralph Bahe. The Kootenai Tribe Fisheries Program and the Idaho Department of Fish and Game thanks the Bonneville Power Administration for funding this project and research and operations of the Kootenai Hatchery. Special thanks to the College of Southern Idaho for providing rainbow trout for broodstock feeding and University of California-Davis for providing technical assistance throughout the year. Also, a special thanks to all the volunteers that assisted during broodstock collection in 1996.

LITERATURE CITED

- Anders, P.J. 1991. White sturgeon movement patterns and habitat utilization in the Kootenai River system, Idaho, Montana, and British Columbia. MS Thesis. Eastern Washington University. 157 pp.
- Conte et al. 1988. Hatchery Manual for the White Sturgeon *Acipenser transmontanus* Richardson, with application to other North American Acipenseridae. Cooperative Extension, University of California, Division of Agriculture and natural resources. Publication 3322.
- Kincaid, H. 1993. Breeding Plan to Preserve the Genetic variability of the Kootenai River White Sturgeon. Final Report. Bonneville Power Administration, U.S. Fish and Wildlife Service.
- Northwest Power Planning Council Columbia River Basin Fish and Wildlife Program. 1987.
- Piper, et al. 1982. Fish Hatchery Management. Department of Interior, U.S. Fish and Wildlife Service. ISBN 0-913235-03-2.
- Siple, J., and P.J. Anders. 1995. Kootenai River White Sturgeon Studies. Report B. Annual Hatchery Report. BPA Project No. 88-64. In prep.
- Siple, J., and P.J. Anders. 1993. Kootenai River White Sturgeon Studies. Report B. Annual Hatchery Report. BPA Project No. 88-64.
- Siple, J. 1992. Kootenai River Fisheries Investigations and Experimental Culture. Annual Hatchery Report. BPA Project No. 88-65.
- Siple, J.T., and G. Aitken. 1991. Kootenai River Fisheries Investigations and Experimental Culture. Annual Hatchery Report. BPA Project # 88-64.

SVL ANALYTICAL, INC.

One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT	: Kootenai Tribe of Idaho	SVL JOB No.	: 62064
		SVL SAMPLE No.:	122440
CLIENT SAMPLE ID:	HATCHERY 9/96		
Sample Collected:	9/03/96 7:00		
Sample Receipt :	9/03/96	Matrix:	WATERS
Date of Report :	9/30/96		

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Alkalinity(310.1	94.0	mg CaCO3/L	1	2320	9/12/96	3
HCO3 (310.1)	94.0	mg CaCO3/L	1	2320	9/12/96	3
TDS	114	mg/L	1	160.1	9/03/96	1
TSS	<0.1	mg/L	1	160.2	9/10/96	1
Calcium	28.3	mg/L	1	200.7	9/13/96	1
Chloride	1.3	mg/L	1	300.0	9/04/96	1
Hardness	101	mg CaCO3/L	1	200.7	9/13/96	1
Potassium	2.09	mg/L	1	200.7	9/13/96	1
Magnesium	7.30	mg/L	1	200.7	9/13/96	1
Ammonia as N	<0.1	mg/L	1	350.3	9/06/96	1
Nitrite-N	<0.05	mg/L	1	300.0	9/04/96	1
Nitrate-N	0.10	mg/L	1	300.0	9/04/96	1
Ortho-Phos. as P	<0.2	mg/L	1	300.0	9/04/96	1
Sulfate, SO4	13.5	mg/L	1	300.0	9/04/96	1
Aluminum	0.067	mg/L	1	200.7	9/13/96	1
Arsenic	<0.04	mg/L	1	200.7	9/13/96	1
Cadmium	<0.0001	mg/L	1	213.2	9/12/96	1
Chromium	<0.005	mg/L	1	200.7	9/13/96	1
Copper	0.003	mg/L	1	200.7	9/13/96	1
Iron	0.047	mg/L	1	200.7	9/13/96	1
Mercury	<0.0002	mg/L	1	245.2	9/11/96	1
Manganese	0.004	mg/L	1	200.7	9/13/96	1
Lead	0.001	mg/L	1	239.2	9/12/96	1
Selenium	<0.04	mg/L	1	200.7	9/13/96	1
Zinc	0.009	mg/L	1	200.7	9/13/96	1
Total Phenols	10.5	ug/L	1	420.1	9/11/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: James R. James Date 9/30/96
9/30/96 12:22

SVL ANALYTICAL, INC.

One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT	: Kootenai Tribe of Idaho	SVL JOB No.	: 62064
		SVL SAMPLE No.:	122507
CLIENT SAMPLE ID:	HATCHERY 9/96		
Sample Collected:	9/03/96 7:00		
Sample Receipt	: 9/03/96	Matrix:	SOIL
Date of Report	: 9/30/96	As Received Basis	

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Arsenic	4.12	mg/kg	2	200.7T	9/27/96	1
Copper	8.63	mg/kg	1	200.7	9/27/96	1
Lead	2.17	mg/kg	2	200.7T	9/27/96	1
Selenium	3.86	mg/kg	2	200.7T	9/27/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: James R. Dennis Date 9/30/96
9/30/96 12:22

Part I Prep Blank and Laboratory Control Sample

Client :Kootenai Tribe of Idaho				SVL JOB No. :62064				
Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R	Analysis Date	
Aluminum	200.7	WATER	mg/L	0.065	1.00	1.01	101.0	9/13/96
Arsenic	200.7	WATER	mg/L	<0.04	1.00	1.00	100.0	9/13/96
Calcium	200.7	WATER	mg/L	0.016	1.00	1.04	104.0	9/13/96
Chromium	200.7	WATER	mg/L	<0.005	1.00	0.979	97.9	9/13/96
Copper	200.7	WATER	mg/L	<0.003	1.00	0.992	99.2	9/13/96
Iron	200.7	WATER	mg/L	0.058	1.00	1.02	102.0	9/13/96
Hardness	200.7	WATER	mg/L	0.22	6.62	6.65	100.5	9/13/96
Potassium	200.7	WATER	mg/L	<0.76	10.0	8.77	87.7	9/13/96
Magnesium	200.7	WATER	mg/L	0.044	1.00	0.987	98.7	9/13/96
Manganese	200.7	WATER	mg/L	<0.002	1.00	1.00	100.0	9/13/96
Selenium	200.7	WATER	mg/L	<0.04	1.00	0.97	97.0	9/13/96
Zinc	200.7	WATER	mg/L	0.007	1.00	0.991	99.1	9/13/96
Cadmium	213.2	WATER	mg/L	<0.0001	0.0050	0.0052	104.0	9/12/96
Lead	239.2	WATER	mg/L	<0.001	0.050	0.051	102.0	9/12/96
Mercury	245.2	WATER	mg/L	<0.0002	0.0049	0.0047	95.9	9/11/96
Chloride	300.0	WATER	mg/L	<0.2	95.0	93.8	98.7	9/04/96
Nitrite-N	300.0	WATER	mg/L	<0.05	3.65	3.70	101.4	9/04/96
Nitrate-N	300.0	WATER	mg/L	<0.05	6.32	6.49	102.7	9/04/96
Ortho-Phos. as P	300.0	WATER	mg/L	<0.2	9.44	9.79	103.7	9/04/96
Sulfate, so4	300.0	WATER	mg/L	<0.3	149	156	104.7	9/04/96
Alkalinity(310.1	2320	WATER	mg/L	<1.0	174	180	103.4	9/12/96
HCO3 (310.1)	2320	WATER	mg/L		N/A		N/A	9/13/96
Ammonia as N	350.3	WATER	mg/L	<0.1	10.8	10.4	96.3	9/06/96
Total Phenols	420.1	WATER	ug/L	<5.0	266	292	109.8	9/11/96
TDS	160.1	WATER	mg/L	<10	905	954	105.4	9/03/96
TSS	160.2	WATER	mg/L	<0.1	52.6	48.0	91.3	9/10/96
SVOC by GC/MS	8270	WATER	ppm		N/A		N/A	9/08/96

LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Part I Prep Blank and Laboratory Control Sample

Client :Kootenai Tribe of Idaho					SVL JOB No. :62064		Analysis	
Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R	Date	
Arsenic	200.7T	SOIL	mg/kg	<0.29	N/A	N/A	9/27/96	
Copper	200.7	SOIL	mg/kg	<0.44	N/A	N/A	9/27/96	
Lead	200.7T	SOIL	mg/kg	<0.29	N/A	N/A	9/27/96	
Selenium	200.7T	SOIL	mg/kg	<0.29	N/A	N/A	9/27/96	

LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Part II Duplicate and Spike Analysis

Client :Kootenai Tribe of Idaho				SVL JOB No. :62064					
Test Method Matrix	QC SAMPLE ID		Duplicate		Matrix Spike			Test Date	
	Units	Result	Result	RPD%	Result	SPK ADD	%R		
Al	200.7 WATERS	1 mg/L	0.067	0.070	4.4	1.05	1.00	98.3	9/13/96
As	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.00	1.00	100.0	9/13/96
Ca	200.7 WATERS	1 mg/L	28.3	28.7	1.4	50.3	20.0	110.0	9/13/96
Cr	200.7 WATERS	1 mg/L	<0.005	<0.005	UDL	0.946	1.00	94.6	9/13/96
Cu	200.7 WATERS	1 mg/L	0.003	0.005	50.0	0.975	1.00	97.2	9/13/96
Fe	200.7 WATERS	1 mg/L	0.047	0.049	4.2	9.84	10.0	97.9	9/13/96
Hdns	200.7 WATERS	1 mg/L	101	102	1.0	235	N/A	N/A	9/13/96
K	200.7 WATERS	1 mg/L	2.09	1.05	66.2	28.0	N/A	N/A	9/13/96
Mg	200.7 WATERS	1 mg/L	7.30	7.38	1.1	26.6	N/A	N/A	9/13/96
Mn	200.7 WATERS	1 mg/L	0.004	0.004	0.0	0.966	1.00	96.2	9/13/96
Se	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.00	1.00	100.0	9/13/96
Zn	200.7 WATERS	1 mg/L	0.009	0.010	10.5	0.949	1.00	94.0	9/13/96
cd	213.2 WATERS	1 mg/L	<0.0001	<0.0001	UDL	0.0052	0.0050	104.0	9/12/96
Pb	239.2 WATERS	1 mg/L	0.001	0.001	0.0	0.023	0.0200	110.0	9/12/96
Hg	245.2 WATERS	1 mg/L	<0.0002	<0.0002	UDL	0.0010	0.0010	100.0	9/11/96
Cl	300.0 WATERS	1 mg/L	1.3	1.4	7.4	3.4	2.00	105.0	9/04/96
NO2-N	300.0 WATERS	1 mg/L	<0.05	<0.05	UDL	2.10	2.00	105.0	9/04/96
NO3-N	300.0 WATERS	1 mg/L	0.10	0.10	0.0	2.26	2.00	108.0	9/04/96
OPO4-P	300.0 WATERS	1 mg/L	<0.2	<0.2	UDL	7.73	8.00	96.6	9/04/96
SO4	300.0 WATERS	1 mg/L	13.5	13.6	0.7	24.3	10.0	108.0	9/04/96
ALK	2320 WATERS	1 mg/L	94.0	94.3	0.3	N/A	N/A	N/A	9/12/96
HCO3	2320 WATERS	1 mg/L	94.0	94.3	0.3	N/A	N/A	N/A	9/12/96
NH3-N	350.3 WATERS	1 mg/L	<0.1	<0.1	UDL	0.98	1.00	98.0	9/06/96
Phenol	420.1 WATERS	1 ug/L	10.5	N/A	N/A	20.2	10000	0.1	9/11/96
TSS	160.2 WATERS	1 mg/L	<0.1	<0.1	UDL	N/A	N/A	N/A	9/10/96

LEGEND:

RPD% = ((SAM - DUP)/((SAM + DUP)/2)) * 100 Duplicate may be MSD for organics. UDL = Both SAM & DUP not detected.
 SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 45 = Result more than 4X the Spike Added
 QC Sample 1: SVL SAM No.: 122440 Client Sample ID: HATCHERY 9/96

Part II Duplicate and Spike Analysis

Client :Kootenai Tribe of Idaho						SVL JOB No. :62064			
Test Method Matrix	QC SAMPLE ID		Duplicate		Matrix Spike			Test Date	
	Units	Result	Result	RPD%	Result	SPK ADD	%R		
As 200.7T SOIL	2 mg/kg	4.12	N/A	N/A	15.4	11.7 A	96.4	9/27/96	
Cu 200.7 SOIL	2 mg/kg	8.63	N/A	N/A	72.4	73.1 A	87.2	9/27/96	
Pb 200.7T SOIL	2 mg/kg	2.17	N/A	N/A	7.31	5.85 A	87.9	9/27/96	
se 200.7T SOIL	2 mg/kg	3.86	N/A	N/A	6.17	2.92 A	79.1	9/27/96	

LEGEND:

RPD% = (|SAM - DUP|/((SAM + DUP)/2)) * 100 Duplicate may be MSD for organics. UDL = Both SAM & DUP not detected.

SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

QC Sample 1: SVL SAM No.: 122440 Client Sample ID: HATCHERY 9/96

QC Sample 2: SVL SAM No.: 122507 Client Sample ID: HATCHERY 9/96



September 16, 1996

Preston Kinne
Kootenai Tribe of Idaho
P.O. Box 1269
Bonner Ferry, Idaho

Re: Organics Analytical Results

Dear Mr. Kinne:

Enclosed are the results of the Phenols (SVOC-8270) analysis on the one water sample (Hatchery 9/96) submitted on 9/03/96.

The results of this analysis failed to detect any trace of phenolic compounds present in the hatchery water. The reporting limits tabulated in the attached sample reports (10-50 $\mu\text{g}/\text{L}$ ppb) represent the standard limits of quantitation for these compounds by this method. These sample results were also evaluated for trace level phenol content (below normal quantitation limits, approximately 1.0 ppb) which failed to measure any phenolic compounds present.

The total phenols analysis performed on this sample indicated approximately 10 ppb of total phenols present. The results of this colorimetric determination (standard hatchery analytical parameter) were not confirmed by this more specific analysis i.e., 8270.

Please call if you have any questions, refer to SVL Job # 62064.

Sincerely yours,

A handwritten signature in cursive script that reads "James R. Jarvis".

James R. Jarvis
TPO
Organics Department

JRJ

An Inc. 500 Company

One Government Gulch • P.O. Box 929 • Kellogg, Idaho 83837-0929 • (208) 784-1258, FAX (208) 783-0891

SVL ANALYTICAL, INC.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837 * Phone: (208) 784-1258 * Fax: (208) 783-0891

REPORT OF ANALYTICAL RESULTS

Client Sample ID: Hatchery 9/96

Method:

SVL Job #: 62064

Semi-volatile Organics - Phenols Only (SW-846 8270)

SVL Sample ID: W122440

Client:

Sample Matrix: Water

Kootenai Tribe of Idaho

Date Sampled: 09/03/96

Date Extracted: 09/11/96

Sample Volume (mls): 700

Date Analyzed: 09/12/96

Final Extraction Volume (mls): 1.0

GPC Clean-up?: NO

Dilution Factor: 1.0

Analyst: PAS

Units: ug/L (ppb)

#	COMPOUND NAME	CAS Number	REPORTING LIMIT	SAMPLE CONCENTRATION
1	Phenol	108-95-2	14	ND
2	2-Chlorophenol	95-57-8	14	ND
3	2-Methylphenol	95-48-7	14	ND
4	3 & 4-Methylphenol	106-44-5	14	ND
5	2-Nitrophenol	88-75-5	14	ND
6	2,4-Dimethylphenol	105-67-9	14	ND
7	2,4-Dichlorophenol	120-83-2	14	ND
8	4-Chloro-3-methylphenol	59-50-7	29	ND
9	2,4,6-Trichlorophenol	88-06-2	14	ND
10	2,4,5-Trichlorophenol	95-95-4	14	ND
11	2,4-Dinitrophenol	51-28-5	71	ND
12	4-Nitrophenol	100-02-7	71	ND
13	4,6-Dinitro-2-methylphenol	534-52-1	71	ND
14	Pentachlorophenol	87-86-5	71	ND

SURROGATE RECOVERIES

COMPOUND NAME	% RECOVERY	QC LIMITS
Nitrobenzene-d8 (BS-1)	34%	35 - 114
2-Fluorobiphenyl (BS-2)	34%	43 - 116
Terphenyl-d14 (BS-3)	21%	33 - 141
2-Fluorophenol (AS-1)	28%	21 - 100
Phenol-d6 (AS-2)	33%	10 - 94
2,4,6- Tribromophenol (AS-3)	38%	10 - 123

COMMENTS:

Reviewed by: Juan R. Garcia Date: 9/16/96

ND = Not detected at stated reporting limit.

SVL ANALYTICAL, INC.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837 * Phone: (208) 784-1258 * Fax: (208) 783-0891

REPORT OF ANALYTICAL RESULTS

Method:

Semi-volatile Organics - Phenols Only (SW-846 B270)

Client:

Kootenai Tribe of Idaho

Sample Volume (mls): 1000

Final Extraction Volume (mls): 1.0

Dilution Factor: 1.0

Client Sample ID: Prep Blank

SVL Job #: 62064

SVL Sample ID: W122438P

Sample Matrix: Water

Date Sampled: NA

Date Extracted: 09/11/96

Date Analyzed: 09/12/96

GPC Clean-up?: NO

Analyst: PAS

Units: ug/L (ppb)

#	COMPOUND NAME	CAS Number	REPORTING LIMIT	SAMPLE CONCENTRATION
1	Phenol	108-95-2	10	ND
2	2-Chlorophenol	95-57-8	10	ND
3	2-Methylphenol	95-48-7	10	ND
4	3 & 4-Methylphenol	106-44-5	10	ND
5	2-Nitrophenol	88-75-5	10	ND
6	2,4-Dimethylphenol	105-67-9	10	ND
7	2,4-Dichlorophenol	120-83-2	10	ND
8	4-Chloro-3-methylphenol	59-50-7	20	ND
9	2,4,6-Trichlorophenol	88-06-2	10	ND
10	2,4,5-Trichlorophenol	95-95-4	10	ND
11	2,4-Dinitrophenol	51-28-5	50	ND
12	4-Nitrophenol	100-02-7	50	ND
13	4,6-Dinitro-2-methylphenol	534-52-1	50	ND
14	Pentachlorophenol	87-86-5	50	ND

SURROGATE RECOVERIES

COMPOUND NAME	% RECOVERY	QC LIMITS
Nitrobenzene-d8 (BS-1)	37%	35 - 114
2-Fluorobiphenyl (BS-2)	38%	43 - 116
Terphenyl-d14 (BS-3)	32%	33 - 141
2-Fluorophenol (AS-1)	35%	21 - 100
Phenol-d6 (AS-2)	39%	10 - 94
2,4,6-Tribromophenol (AS-3)	40%	10 - 123

COMMENTS:

Reviewed by: James D. Gunnis Date: 9/16/96

ND = Not detected at stated reporting limit.

SVL ANALYTICAL, INC.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837 * Phone: (208) 784-1258 * Fax: (208) 783-0891

QUALITY CONTROL REPORT : LCS / LCSD *

Client Sample ID: Lab Control Samples

Method:

Semi-volatile Organics (SW-846 8270)

SVL Job #: 62064

SVL Sample ID: W122439C/D

Client:

Kootenai County Landfill

Sample Matrix: Reagent Water

Date Sampled: NA

Date Extracted: 09/11/96

Date Analyzed: 09/12/96

GPC Clean-up?: NO

Analyst: PAS

Units: ug/L (ppb)

Sample Volume (mls): 1000

Final Ext. Vol. (mls): 1.0

Dilution Factor: 1.0

#	COMPOUND NAME	SPIKE CONC.	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS % REC.	LCSD % REC.	RPD **
1	1,2,4-Trichlorobenzene	100.0	ND	73.3	75.3	73%	75%	2%
2	Acenaphthene	100.0	ND	69.0	71.4	69%	71%	2%
3	2,4-Dinitrotoluene	100.0	ND	70.6	75.6	71%	76%	5%
4	Pyrene	100.0	ND	55.8	61.3	56%	61%	6%
5	N-Nitroso-Di-n-propylamine	100.0	ND	79.8	84.2	80%	84%	4%
6	1,4-Dichlorobenzene	100.0	ND	67.5	65.6	68%	66%	2%
7	Pentachlorophenol	100.0	ND	75.8	85.0	76%	85%	8%
8	Phenol	100.0	ND	59.2	58.9	59%	59%	0%
9	2-Chlorophenol	100.0	ND	61.7	62.3	62%	62%	1%
10	4-Chloro-3-Methylphenol	100.0	ND	68.5	77.6	68%	78%	9%
11	4-Nitrophenol	100.0	ND	34.0	45.7	34%	46%	21%

QC LIMITS	
RPD	REC.
20	39-98
20	46-118
20	24-96
20	26-127
20	41-116
20	36-97
20	9-103
20	12-89
20	27-123
20	23-97
20	10-80

SURROGATE RECOVERIES

COMPOUND NAME	LCS % REC.	LCSD % REC.	QC LIMITS
Nitrobenzene-d8 (BS-1)	40%	39%	35 - 114
2-Fluorobiphenyl (BS-2)	36%	29%	43 - 116
Terphenyl-d14 (BS-3)	28%	32%	33 - 141
2-Fluorophenol (AS-1)	32%	31%	21 - 100
Phenol-d6 (AS-2)	39%	38%	10 - 94
2,4,6-Tribromophenol (AS-3)	43%	41%	10 - 123

COMMENTS: None

ND = Not detected

* LCS / LCSD = Laboratory Control Sample / Laboratory Control Sample Duplicate

** RPD = Relative Percent Difference

Reviewed by: James L. Jarvis Date: 9/16/96

HATCHERY SAMPLES

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client: Kootenai Tribe of Idaho
 Contact: Preston Kinne
 Address: County Rd 38A
 Bonners Ferry, ID 83805
 Phone Num (208) 267-3519
 Fax Number (208) 267-2960

- NOTES:
- 1) Specify QC samples if desired.
 - 2) Ensure proper container packaging.
 - 3) Ship samples promptly following collection.

Table 1. -- Matrix Type

1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
 6 = Waste, 7 = Other (Specify)

FOR SVL USE ONLY
 SVL JOB #
62064

Lab Name: SVL Analytical, Inc. (208) 784-1258 FAX (208) 783-0891		Analyses Required										SVL Quote No.: Q30411.10 2 Week Turnaround (TAT) QC Level II							
Address: One Government Gulch, Kellogg, ID 83837-0929												Comments							
Sample ID	Collection		Miscellaneous			Preservative(s)					Metals Dissolved (200.7 / 213.2 / 239.2 / 245.2)	Anions (300.0), Alkalinity (2320), Ammonia (350.3)	Inorganic Miscellaneous (420.1 / 160.2)	Monthly Normal	Monthly Special	8220 SVOC Metals Only	150 gnd 9/4/96	Treat all 4 samples as same sample site is, "hatchery 9/96" gnd 9/4/96	
	Date	Time	Collected by: (init.)	Matrix Type From Table 1	No. of Containers	Sample Filtered? Y/N	Unpreserved (Ice Only)	HNO3	HCL	H2SO4									NAOH
Hatchery 9/96 1. H-O-102	9/3/96	0700	PK	1	3	N	X												Dissolved metals to be filtered/preserved by SVL
2. H-O 103				1	3	N	X												200.7 = Al, As, Ca, Cr, Cu, Fe, K, Mg, Mn, Se, & Zn
3. H-O 104				1	3	N	X												213.2 = Cd, 239.2 = Pb, 245.2 = Hg
4. H-I 105				1	3	N	X												Anions
5. H-I 106				1	3	N	X												300.0 = NO2-N, NO3-N, PO4-P, & SO4
6. H-I 107				1	3	N	X												Total Alk & HCO3 = 2320
7.				1	3	N	X												NH3-N = 350.3
8.				1	3	N	X												Inorg. Misc.
9.				1	3	N	X												Phenol = 420.1
COC FOR HATCHERY SAMPLES ONLY																	TSS = 160.2		
Disinfectant by: <u>P. Kinne</u>																	Inorganics samples must be collected in		
Date: <u>9/3/96</u> Time: <u>1400</u>																	1.0 liter plastic (P) bottle.		
Received by: <u>Dorothy Collins</u>																	Date: <u>9/03/96</u> Time: <u>14:30</u>		
Method _____ Ship samples for over-night delivery.																	Date: _____ Time: _____		

112

SVL ANALYTICAL, INC.

One Government Gulch • P.O. Box 929 • Kellogg, Idaho 83837-0929 • Phone: (208)784-1258 • Fax: (208)783-0391

REPORT OF ANALYTICAL RESULTS

CLIENT : Kootenai Tribe of Idaho	SVL JOB No. : 61476
CLIENT SAMPLE ID: HATCHERY INLET	SVL SAMPLE No.: 117356
Sample Collected: 7/08/96 14:00	
Sample Receipt : 7/09/96	Matrix: WATERS
Date of Report : 7/25/96	

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Alkalinity(310.1	84.8	mg CaCO3/L	1	2320	7/10/96	3
HCO3 (310.1)	84.8	mg CaCO3/L	1	2320	7/10/96	3
TSS	5.10	mg/L	1	160.2	7/10/96	1
Calcium	25.1	mg/L	1	200.7	7/19/96	1
Chloride	1.1	mg/L	1	300.0	7/09/96	1
Hardness	89.2	mg CaCO3/L	1	200.7	7/19/96	1
Potassium	<0.76	mg/L	1	200.7	7/19/96	1
Magnesium	6.46	mg/L	1	200.7	7/19/96	1
Ammonia as N	<0.1	mg/L	1	350.3	7/11/96	1
Nitrite-N	<0.05	mg/L	1	300.0	7/09/96	1
Nitrate-N	0.10	mg/L	1	300.0	7/09/96	1
Ortho-Phos. as P	<0.2	mg/L	1	300.0	7/09/96	1
Sulfate, SO4	11.0	mg/L	1	300.0	7/09/96	1
Aluminum	<0.021	mg/L	1	200.7	7/19/96	1
Arsenic	<0.04	mg/L	1	200.7	7/19/96	1
Cadmium	<0.0001	mg/L	1	213.2	7/23/96	1
Chromium	<0.005	mg/L	1	200.7	7/19/96	1
Copper	<0.003	mg/L	1	200.7	7/19/96	1
Iron	<0.024	mg/L	1	200.7	7/19/96	1
Mercury	<0.0002	mg/L	1	245.2	7/18/96	1
Manganese	<0.002	mg/L	1	200.7	7/19/96	1
Lead	0.002	mg/L	1	239.2	7/23/96	1
Selenium	<0.04	mg/L	1	200.7	7/19/96	1
Zinc	0.006	mg/L	1	200.7	7/19/96	1
Total Phenols	7.	ug/L	1	420.1	7/25/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Joe Costello Date 7-26-96
 # Send 4 samples / sampling
 7/25/96 16:32

Post-it® Fax Note	7571	Date	# of pages
To	Preston Kinne	From	M. Bendich
Co./Dept.	Kootenai Tribe	Co.	SVL Analytical
Phone #		Phone #	
Fax	(208) 267-2960	Fax #	

SVL ANALYTICAL, INC.

One Government Gulch • P.O. Box 929 • Kellogg, Idaho 83837-0929 • Phone: (208)784-1258 • Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT	: Kootenai Tribe of Idaho	SVL JOB No.	: 61476
CLIENT SAMPLE ID:	HATCHERY OUTLET	SVL SAMPLE No.:	117357
Sample Collected:	7/08/96 14:00		
Sample Receipt	: 7/09/96	Matrix:	WATERS
Date of Report	: 7/25/96		

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Alkalinity(310.1	85.0	mg CaCO3/L	1	2320	7/10/96	3
HCO3 (310.1)	85.0	mg CaCO3/L	1	2320	7/10/96	3
TSS	2.90	mg/L	1	160.2	7/10/96	1
Calcium	26.5	mg/L	1	200.7	7/19/96	1
Chloride	1.1	mg/L	1	300.0	7/09/96	1
Hardness	93.9	mg CaCO3/L	1	200.7	7/19/96	1
Potassium	<0.76	mg/L	1	200.7	7/19/96	1
Magnesium	6.76	mg/L	1	200.7	7/19/96	1
Ammonia as N	<0.1	mg/L	1	350.3	7/11/96	1
Nitrite-N	<0.05	mg/L	1	300.0	7/09/96	1
Nitrate-N	0.11	mg/L	1	300.0	7/09/96	1
Ortho-Phos. as P	<0.2	mg/L	1	300.0	7/09/96	1
Sulfate, SO4	11.0	mg/L	1	300.0	7/09/96	1
Aluminum	0.022	mg/L	1	200.7	7/19/96	1
Arsenic	<0.04	mg/L	1	200.7	7/19/96	1
Cadmium	<0.0001	mg/L	1	213.2	7/23/96	1
Chromium	<0.005	mg/L	1	200.7	7/19/96	1
Copper	<0.003	mg/L	1	200.7	7/19/96	1
Iron	<0.024	mg/L	1	200.7	7/19/96	1
Mercury	<0.0002	mg/L	1	245.2	7/18/96	1
Manganese	<0.002	mg/L	1	200.7	7/19/96	1
Lead	<0.001	mg/L	1	239.2	7/23/96	1
Selenium	<0.04	mg/L	1	200.7	7/19/96	1
Zinc	0.003	mg/L	1	200.7	7/19/96	1
Total Phenols	<5.0	ug/L	1	420.1	7/25/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED, 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Joe Costello Date 7-26-96
7/25/96 16:32

Part I Prep Blank and Laboratory Control Sample

Client :Kootenai Tribe of Idaho				SVL JOB No. :61476			
Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R	Analysis Date
Aluminum	200.7	WATER	mg/L	<0.021	1.00 1.01	101.0	7/19/96
Arsenic	200.7	WATER	mg/L	<0.04	1.00 1.01	101.0	7/19/96
Calcium	200.7	WATER	mg/L	<0.015	1.00 1.04	104.0	7/19/96
Chromium	200.7	WATER	mg/L	<0.005	1.00 1.02	102.0	7/19/96
Copper	200.7	WATER	mg/L	<0.003	1.00 1.03	103.0	7/19/96
Iron	200.7	WATER	mg/L	<0.024	1.00 1.04	104.0	7/19/96
Hardness	200.7	WATER	mg/L	<0.18	6.62 6.71	101.4	7/19/96
Potassium	200.7	WATER	mg/L	<0.76	10.0 9.68	96.8	7/19/96
Magnesium	200.7	WATER	mg/L	<0.035	1.00 1.00	100.0	7/19/96
Manganese	200.7	WATER	mg/L	<0.002	1.00 1.02	102.0	7/19/96
Selenium	200.7	WATER	mg/L	<0.04	1.00 1.05	105.0	7/19/96
Zinc	200.7	WATER	mg/L	<0.002	1.00 1.02	102.0	7/19/96
Cadmium	213.2	WATER	mg/L	<0.0001	0.0500 0.0462	92.4	7/23/96
Lead	239.2	WATER	mg/L	<0.001	0.050 0.048	96.0	7/23/96
Mercury	245.2	WATER	mg/L	<0.0002	0.0049 0.0049	99.8	7/18/96
Chloride	300.0	WATER	mg/L	<0.2	155 165	106.5	7/09/96
Nitrite-N	300.0	WATER	mg/L	<0.05	3.65 3.66	100.3	7/09/96
Nitrate-N	300.0	WATER	mg/L	<0.05	6.32 6.42	101.6	7/09/96
Ortho-Phos. as P	300.0	WATER	mg/L	<0.2	9.44 9.64	102.1	7/09/96
Sulfate, SO4	300.0	WATER	mg/L	<0.3	124 120	96.8	7/09/96
Alkalinity(310.1	2320	WATER	mg/L	<1.0	174 181	103.7	7/10/96
HCO3 (310.1)	2320	WATER	mg/L		N/A	N/A	7/19/96
Ammonia as N	350.3	WATER	mg/L	<0.1	17.0 16.6	97.6	7/11/96
Total Phenols	420.1	WATER	ug/L	<5.0	266 270	101.5	7/25/96
TSS	160.2	WATER	mg/L	<0.1	109 105	96.7	7/10/96

LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

7/26/96 8:46

Part II Duplicate and Spike Analysis

Client :Kootenai Tribe of Idaho				SVL JOB No. :61476					
Test Method	Matrix	QC SAMPLE ID		Duplicate		Matrix Spike		Test Date	
		Units	Result	Result	RPD%	Result	SPK ADD		%R
Al	200.7 WATERS	1 mg/L	0.022	<0.021	200.0	1.01	1.00	98.8	7/19/96
As	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.00	1.00	100.0	7/19/96
Ca	200.7 WATERS	1 mg/L	26.5	26.1	1.5	45.9	20.0	97.0	7/19/96
Cr	200.7 WATERS	1 mg/L	<0.005	<0.005	UDL	0.999	1.00	99.9	7/19/96
cu	200.7 WATERS	1 mg/L	<0.003	<0.003	UDL	1.02	1.00	102.0	7/19/96
Fe	200.7 WATERS	1 mg/L	<0.024	<0.024	UDL	10.0	10.0	100.0	7/19/96
Hdms	200.7 WATERS	1 mg/L	93.9	92.6	1.4	223	N/A	N/A	7/19/96
K	200.7 WATERS	1 mg/L	<0.76	<0.76	UDL	29.5	N/A	N/A	7/19/96
Mg	200.7 WATERS	1 mg/L	6.76	6.67	1.3	26.4	N/A	N/A	7/19/96
Mn	200.7 WATERS	1 mg/L	<0.002	<0.002	UDL	0.997	1.00	99.7	7/19/96
Se	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.03	1.00	103.0	7/19/96
Zn	200.7 WATERS	1 mg/L	0.003	0.003	0.0	1.01	1.00	100.7	7/19/96
Cd	213.2 WATERS	1 mg/L	<0.0001	0.0004	200.0	0.0037	0.0050	74.0	7/23/96
Pb	239.2 WATERS	1 mg/L	<0.001	<0.001	UDL	0.020	0.0200	100.0	7/23/96
Hg	245.2 WATERS	1 mg/L	<0.0002	<0.0002	UDL	0.0010	0.0010	99.0	7/18/96
Cl	300.0 WATERS	1 mg/L	1.1	1.1	0.0	5.1	4.00	98.5	7/09/96
NO2-N	300.0 WATERS	1 mg/L	<0.05	<0.05	UDL	3.86	4.00	96.5	7/09/96
NO3-N	300.0 WATERS	1 mg/L	0.11	0.10	9.5	3.94	4.00	95.8	7/09/96
OPO4-P	300.0 WATERS	1 mg/L	<0.2	<0.2	UDL	10.5	10.0	105.0	7/09/96
SO4	300.0 WATERS	1 mg/L	11.0	11.0	0.0	20.7	10.0	97.0	7/09/96
ALK	2320 WATERS	1 mg/L	85.0	84.9	0.1	N/A	N/A	N/A	7/10/96
HCO3	2320 WATERS	1 mg/L	85.0	84.9	0.1	N/A	N/A	N/A	7/10/96
NH3-N	350.3 WATERS	1 mg/L	<0.1	<0.1	UDL	0.99	1.00	99.0	7/11/96
Phenol	420.1 WATERS	1 ug/L	<5.0	<5.0	UDL	N/A	N/A	N/A	7/25/96
TSS	160.2 WATERS	1 mg/L	2.90	3.20	9.8	N/A	N/A	N/A	7/10/96

LEGEND:

RPD% = $(|SAM - DUP| / ((SAM + DUP) / 2)) * 100$; Duplicate is MSD for organics. UDL = Both SAM & DUP not detected.
 SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 45 = Result more than 4X the Spike Added
 QC sample 1: SVL SAM No.: 117357 Client Sample ID: HATCHERY OUTLET

117 FROM SVL ANALYTICAL 208 783 089 7-26-1996 11:11AM

HATCHERY SAMPLES

Client: Kootenai Tribe of Idaho
 Contact: Preston Kinne
 Address: County Rd 38A
Bonnets Ferry, ID 83805
 Phone Num (208) 267-3519
 Fax Number (208) 267-2960

CHAIN OF CUSTODY RECORD

Page _____ of _____

- NOTES:
- 1) Specify QC samples if desired.
 - 2) Ensure proper container packaging.
 - 3) Ship samples promptly following collection.

Table 1. -- Matrix Type

1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
 6 = Waste, 7 = Other (Specify)

FOR SVL USE ONLY
 SVL JOB #
61476

Lab Name: **SVL Analytical, Inc.** (208) 784-1258 FAX (208) 783-0891
 Address: **One Government Gulch, Kellogg, ID 83837-0929**

Sample ID	Collection		Miscellaneous			Preservative(s)					Analyses Required			SVL Quote No.: Q30411.10 2 Week Turnaround (TAT) QC Level II 7/9/96 - PKmezet until 7/17 No one else knows - spoke with Gary Mantalar Bi-Mantalar? Common Samples only 1,000mc Analyze Type of Phenols please AISE		
	Date	Time	Collected by: (init.)	Matrix Type From Table 1	No. of Containers	Sample Filtered ? Y/N	Unpreserved (Ice Only)	HNO3	HCL	H2SO4	NAOH	Other (Specify)	Metals Dissolved (300.7/213.2/239.2/245.2)		Anions (300.0), Alkalinity (3320), Ammonia (330.3)	Inorganic Miscellaneous (420.1/100.2)
Hatchery water	7/8/96	1400	PK	1	3	N	X						IP	IP	IP	Dissolved metals to be filtered/preserved by SVL 300.7 = Al, As, Ca, Cr, Cu, Fe, K, Mg, Mn, Se, & Zn 213.2 = Cd, 239.2 = Pb, 245.2 = Hg Anions 300.0 = NO2-N, NO3-N, PO4-P, & SiM Total AR & HCO3 = 2130 NH3-N = 350.3 Inorg. Misc Phenol = 420.1 TSS = 100.2 Inorganics samples must be collected in 1.0 liter plastic (P) bottle.
Hatchery out				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	
				1	3	N	X						IP	IP	IP	

COC FOR HATCHERY SAMPLES ONLY

Relinquished by: PK Kinne Date: 7/8/96 Time: 15:30 Received by: [Signature]
 Relinquished by: _____ Date: _____ Time: _____ Received by: _____
 Delivery Method _____ Ship samples for over-night delivery. (copy to JH DSS) SVL-COC 5/94

REPORT OF ANALYTICAL RESULTS

CLIENT : Kootenai Tribe of Idaho SVL JOB No. : 61476
 CLIENT SAMPLE ID: HATCHERY INLET SVL SAMPLE No.: 117356
 Sample Collected: 7/08/96 14:00
 Sample Receipt : 7/09/96 Matrix: WATERS
 Date of Report : 7/25/96

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Alkalinity(310.1	84.8	mg CaCO3/L	1	2320	7/10/96	3
HCO3 (310.1)	84.8	mg CaCO3/L	1	2320	7/10/96	3
TSS	5.10	mg/L	1	160.2	7/10/96	1
Calcium	25.1	mg/L	1	200.7	7/19/96	1
Chloride	1.1	mg/L	1	300.0	7/09/96	1
Hardness	89.2	mg CaCO3/L	1	200.7	7/19/96	1
Potassium	<0.76	mg/L	1	200.7	7/19/96	1
Magnesium	6.46	mg/L	1	200.7	7/19/96	1
Ammonia as N	<0.1	mg/L	1	350.3	7/11/96	1
Nitrite-N	<0.05	mg/L	1	300.0	7/09/96	1
Nitrate-N	0.10	mg/L	1	300.0	7/09/96	1
Ortho-Phos. as P	<0.2	mg/L	1	300.0	7/09/96	1
Sulfate, SO4	11.0	mg/L	1	300.0	7/09/96	1
Aluminum	<0.021	mg/L	1	200.7	7/19/96	1
Arsenic	<0.04	mg/L	1	200.7	7/19/96	1
Cadmium	<0.0001	mg/L	1	213.2	7/23/96	1
Chromium	<0.005	mg/L	1	200.7	7/19/96	1
Copper	<0.003	mg/L	1	200.7	7/19/96	1
Iron	<0.024	mg/L	1	200.7	7/19/96	1
Mercury	<0.0002	mg/L	1	245.2	7/18/96	1
Manganese	<0.002	mg/L	1	200.7	7/19/96	1
Lead	0.002	mg/L	1	239.2	7/23/96	1
Selenium	<0.04	mg/L	1	200.7	7/19/96	1
Zinc	0.006	mg/L	1	200.7	7/19/96	1
Total Phenols	7.	ug/L	1	420.1	7/25/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Joe Costello Date 7-26-96
 7/25/96 16:32

SVL ANALYTICAL, INC.

One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT	: Kootenai Tribe of Idaho	SVL JOB No. :	61476
CLIENT SAMPLE ID:	HATCHERY OUTLET	SVL SAMPLE No.:	117357
Sample Collected:	7/08/96 14:00		
Sample Receipt :	7/09/96	Matrix:	WATERS
Date of Report :	7/25/96		

Determination	Result	Units	Dilution	Method	Analysis	
					Date	Reference
Alkalinity(310.1	85.0	mg CaCO3/L	1	2320	7/10/96	3
HCO3 (310.1)	85.0	mg CaCO3/L	1	2320	7/10/96	3
TSS	2.90	mg/L	1	160.2	7/10/96	1
Calcium	26.5	mg/L	1	200.7	7/19/96	1
Chloride	1.1	mg/L	1	300.0	7/09/96	1
Hardness	93.9	mg CaCO3/L	1	200.7	7/19/96	1
Potassium	<0.76	mg/L	1	200.7	7/19/96	1
Magnesium	6.76	mg/L	1	200.7	7/19/96	1
Ammonia as N	<0.1	mg/L	1	350.3	7/11/96	1
Nitrite-N	<0.05	mg/L	1	300.0	7/09/96	1
Nitrate-N	0.11	mg/L	1	300.0	7/09/96	1
Ortho-Phos. as P	<0.2	mg/L	1	300.0	7/09/96	1
Sulfate, SO4	11.0	mg/L	1	300.0	7/09/96	1
Aluminum	0.022	mg/L	1	200.7	7/19/96	1
Arsenic	<0.04	mg/L	1	200.7	7/19/96	1
Cadmium	<0.0001	mg/L	1	213.2	7/23/96	1
Chromium	<0.005	mg/L	1	200.7	7/19/96	1
Copper	<0.003	mg/L	1	200.7	7/19/96	1
Iron	<0.024	mg/L	1	200.7	7/19/96	1
Mercury	<0.0002	mg/L	1	245.2	7/18/96	1
Manganese	<0.002	mg/L	1	200.7	7/19/96	1
Lead	<0.001	mg/L	1	239.2	7/23/96	1
Selenium	<0.04	mg/L	1	200.7	7/19/96	1
Zinc	0.003	mg/L	1	200.7	7/19/96	1
Total Phenols	<5.0	ug/L	1	420.1	7/25/96	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Joe Costello Date 7-26-96
 7/25/96 16:32

Part I Prep Blank and Laboratory Control Sample

Client :Kootenai Tribe of Idaho				SVL JOB No. :61476				Analysis Date
Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R		
Aluminum	200.7	WATER	mg/L	<0.021	1.00	1.01	101.0	7/19/96
Arsenic	200.7	WATER	mg/L	<0.04	1.00	1.01	101.0	7/19/96
Calcium	200.7	WATER	mg/L	<0.015	1.00	1.04	104.0	7/19/96
Chromium	200.7	WATER	mg/L	<0.005	1.00	1.02	102.0	7/19/96
Copper	200.7	WATER	mg/L	<0.003	1.00	1.03	103.0	7/19/96
Iron	200.7	WATER	mg/L	<0.024	1.00	1.04	104.0	7/19/96
Hardness	200.7	WATER	mg/L	<0.18	6.62	6.71	101.4	7/19/96
Potassium	200.7	WATER	mg/L	<0.76	10.0	9.68	96.8	7/19/96
Magnesium	200.7	WATER	mg/L	<0.035	1.00	1.00	100.0	7/19/96
Manganese	200.7	WATER	mg/L	<0.002	1.00	1.02	102.0	7/19/96
Selenium	200.7	WATER	mg/L	<0.04	1.00	1.05	105.0	7/19/96
Zinc	200.7	WATER	mg/L	<0.002	1.00	1.02	102.0	7/19/96
Cadmium	213.2	WATER	mg/L	<0.0001	0.0500	0.0462	92.4	7/23/96
Lead	239.2	WATER	mg/L	<0.001	0.050	0.048	96.0	7/23/96
Mercury	245.2	WATER	mg/L	<0.0002	0.0049	0.0049	99.8	7/18/96
Chloride	300.0	WATER	mg/L	<0.2	155	165	106.5	7/09/96
Nitrite-N	300.0	WATER	mg/L	<0.05	3.65	3.66	100.3	7/09/96
Nitrate-N	300.0	WATER	mg/L	<0.05	6.32	6.42	101.6	7/09/96
Ortho-Phos. as P	300.0	WATER	mg/L	<0.2	9.44	9.64	102.1	7/09/96
Sulfate, SO4	300.0	WATER	mg/L	<0.3	124	120	96.8	7/09/96
Alkalinity(310.1	2320	WATER	mg/L	<1.0	174	181	103.7	7/10/96
HCO3 (310.1)	2320	WATER	mg/L		N/A		N/A	7/19/96
Ammonia as N	350.3	WATER	mg/L	<0.1	17.0	16.6	97.6	7/11/96
Total Phenols	420.1	WATER	ug/L	<5.0	266	270	101.5	7/25/96
TSS	160.2	WATER	mg/L	<0.1	109	105	96.7	7/10/96

LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Part II Duplicate and Spike Analysis

Client :Kootenai Tribe of Idaho						SVL JOB No. :61476			
Test Method	Matrix	QC SAMPLE ID		Duplicate		Matrix Spike		%R	Test Date
		Units	Result	Result	RPD%	Result	SPK ADD		
Al	200.7 WATERS	1 mg/L	0.022	<0.021	200.0	1.01	1.00	98.8	7/19/96
As	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.00	1.00	100.0	7/19/96
Ca	200.7 WATERS	1 mg/L	26.5	26.1	1.5	45.9	20.0	97.0	7/19/96
Cr	200.7 WATERS	1 mg/L	<0.005	<0.005	UDL	0.999	1.00	99.9	7/19/96
Cu	200.7 WATERS	1 mg/L	<0.003	<0.003	UDL	1.02	1.00	102.0	7/19/96
Fe	200.7 WATERS	1 mg/L	<0.024	<0.024	UDL	10.0	10.0	100.0	7/19/96
Hdms	200.7 WATERS	1 mg/L	93.9	92.6	1.4	223	N/A	N/A	7/19/96
K	200.7 WATERS	1 mg/L	<0.76	<0.76	UDL	29.5	N/A	N/A	7/19/96
Mg	200.7 WATERS	1 mg/L	6.76	6.67	1.3	26.4	N/A	N/A	7/19/96
Mn	200.7 WATERS	1 mg/L	<0.002	<0.002	UDL	0.997	1.00	99.7	7/19/96
Se	200.7 WATERS	1 mg/L	<0.04	<0.04	UDL	1.03	1.00	103.0	7/19/96
Zn	200.7 WATERS	1 mg/L	0.003	0.003	0.0	1.01	1.00	100.7	7/19/96
Cd	213.2 WATERS	1 mg/L	<0.0001	0.0004	200.0	0.0037	0.0050	74.0	7/23/96
Pb	239.2 WATERS	1 mg/L	<0.001	<0.001	UDL	0.020	0.0200	100.0	7/23/96
Hg	245.2 WATERS	1 mg/L	<0.0002	<0.0002	UDL	0.0010	0.0010	99.0	7/18/96
Cl	300.0 WATERS	1 mg/L	1.1	1.1	0.0	5.1	4.00	98.5	7/09/96
NO2-N	300.0 WATERS	1 mg/L	<0.05	<0.05	UDL	3.86	4.00	96.5	7/09/96
NO3-N	300.0 WATERS	1 mg/L	0.11	0.10	9.5	3.94	4.00	95.8	7/09/96
OPO4-P	300.0 WATERS	1 mg/L	<0.2	<0.2	UDL	10.5	10.0	105.0	7/09/96
SO4	300.0 WATERS	1 mg/L	11.0	11.0	0.0	20.7	10.0	97.0	7/09/96
ALK	2320 WATERS	1 mg/L	85.0	84.9	0.1	N/A	N/A	N/A	7/10/96
HCO3	2320 WATERS	1 mg/L	85.0	84.9	0.1	N/A	N/A	N/A	7/10/96
NH3-N	350.3 WATERS	1 mg/L	<0.1	<0.1	UDL	0.99	1.00	99.0	7/11/96
Phenol	420.1 WATERS	1 ug/L	<5.0	<5.0	UDL	N/A	N/A	N/A	7/25/96
TSS	160.2 WATERS	1 mg/L	2.90	3.20	9.8	N/A	N/A	N/A	7/10/96

LEGEND:

RPD% = $(|SAM - DUP| / ((SAM + DUP) / 2)) * 100$

Duplicate is MSD for organics.

UDL = Both SAM & DUP not detected.

SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

QC Sample 1: SVL SAM No.: 117357 Client Sample ID: HATCHERY OUTLET

HATCHERY SAMPLES

CHAIN OF CUSTODY RECORD

Page _____ of _____

Client: Kootenai Tribe of Idaho
 Contact: Preston Kinne
 Address: County Rd 38A
Bonnars Ferry, ID 83805
 Phone Num (208) 267-3519
 Fax Number (208) 267-2960

NOTES:

- 1) Specify QC samples if desired.
- 2) Ensure proper container packaging.
- 3) Ship samples promptly following collection.

Table 1. -- Matrix Type

1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
 6 = Waste, 7 = Other (Specify)

FOR SVL USE ONLY
 SVL JOB #
61476

Lab Name: SVL Analytical, Inc. (208) 784-1258 FAX (208) 783-0891		Analyses Required										SVL Quote No.: Q30411.10 2 Week Turnaround (TAT)				
Address: One Government Gulch, Kellogg, ID 83837-0929												QC Level II				
Sample ID	Collection		Miscellaneous			Preservative(s)					Metals Dissolved (200.7 / 213.2 / 239.2 / 245.2)	Anions (300.0), Alkalinity (320), Ammonia (350.3)	Inorganic Miscellaneous (420.1 / 160.2)	Comments		
	Date	Time	Collected by: (init.)	Matrix Type From Table 1	No. of Containers	Sample Filtered? Y/N	Unpreserved (Ice Only)	HNO3	HCL	H2SO4					NAOH	Other (Specify)
1/ Hatchery water	7/12/96	1400	PK	1	3	N	X						IP	IP	IP	7/10/96 del J set up pos Normal Monthly Done Samples only 1, 2, 3, 4 Analyze Type of Phenols please Also Dissolved metals to be filtered/preserved by SVL 200.7 = Al, As, Ca, Cr, Cu, Fe, K, Mg, Mn, Se, & Zn 213.2 = Cd, 239.2 = Pb, 245.2 = Hg Anions 300.0 = NO2-N, NO3-N, PO4-P, & SO4 Total Alk & HCO3 = 2320 NH3-N = 350.3 Inorg Misc Phenol - 420.1 TSS = 160.2 Inorganics samples must be collected in 1.0 liter plastic (P) bottle
2/ Hatchery cut				1	3	N	X						IP	IP	IP	
3.				1	3	N	X						IP	IP	IP	
4.				1	3	N	X						IP	IP	IP	
5.				1	3	N	X						IP	IP	IP	
6.				1	3	N	X						IP	IP	IP	
7.				1	3	N	X						IP	IP	IP	
8.				1	3	N	X						IP	IP	IP	
9.				1	3	N	X						IP	IP	IP	

COC FOR HATCHERY SAMPLES ONLY

Relinquished by: PK/ina Date: 7/18/96 Time: 15:30 Received by: _____ Date: _____ Time: _____
 Relinquished by: _____ Date: _____ Time: _____ Received by: [Signature] Date: 7/19/96 Time: 4:15

Delivery Method _____ Ship samples for over-night delivery.
 (copy to J.D. Seay)
 7/19/96 SVL-COC 5/94

122

Appendix 2. Numbers of brood year 1992 and 1995 white sturgeon held and reared at the Kootenai Hatchery during 1996.

Month of 1995	Number of 1995 brood year	Number of 1992 brood year
January	17,692	5
February	16,991	5
March	16,091	5
April	15,617	5
May	15,001	5
June	14,891	5
July	13,998	5
August	12,997	5
September	11,999	5
October	10,100	5
November	8,100	5
December	4,101	5

Appendix 3. Fish feed used at the Kootenai Hatchery.

Size	Source	Pounds	Cost/lb	Total cost
Rangen Soft-Moist 1/32-inch	Rangen	150	.7676	\$115.14
Rangen Soft-Moist 3/64-inch	Rangen	500	.7135	\$356.75
Rangen Soft-Moist 3/16-inch	Rangen	450	.7019	\$315.86
Rangen Soft-Moist 3/32-inch	Rangen	450	.6595	\$296.78
Rangen Soft-Moist 1/8-inch	Rangen	650	.6595	\$428.68
Rangen Soft-Moist 5/32-inch	Rangen	550	.6595	\$362.73
Rangen Dry Feed Starter	Rangen	10	.5321	\$5.32
Rangen Dry Feed # 1	Rangen	5	.5321	\$2.66
Rangen Dry Feed # 2	Rangen	5	.5321	\$2.66
Totals	Rangen	2,770	-	\$1,886.58

Appendix 4. Fish production at the Kootenai Hatchery, January 1 to December 1, 1996.

Species/Strain	Beginning number	Beginning pounds	Ending number	Ending pounds	Number stocked	Number transferred	Destination
Kootenai white sturgeon, BY92	5	33	5	46	0	0	Kootenai River
Kootenai white sturgeon, BY95	17,692	217.9	4,101	1025.25	0	0	Kootenai River
Totals	17,697	250.9	4,106	1071.25	0	0	

Appendix 5. Cost of fish produced at the Kootenai Hatchery, January 1 to December 31, 1996.

Species/Strain	Number produced	Pounds produced	Cost to produce	Cost/1,000	Cost/lb
Kootenai white sturgeon, BY92	5	46	\$2,788.00	\$55,760.00	\$6,060.87
Kootenai white sturgeon, BY95	4,101	1025.25	\$20,855.66	\$5,085.51	\$1,271.38
Totals	4,106	1071.25	\$23,643.66	\$60,845.51	\$7,332.25

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

MACKAY FISH HATCHERY

1996

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

INTRODUCTION

Included in the year's production were 13 lots of fish, comprised of 5 species and 9 different strains.

Rainbow trout *Oncorhynchus mykiss*
Hayspur (ID) (2 year classes)
Arlee (Ennis National Fish Hatchery, MT)

Cutthroat trout *O. clarki*
Westslope (McCall) (2 year classes)
Henrys Lake

Brown trout *Salmo trutta*
Plymouth Rock (Saratoga, WY) (2 year classes)
Crawford (Paint Bank Hatchery, VA)

Rainbow x Cutthroat trout hybrids
Henrys Lake cutthroat females x Ennis NFH rainbow males

Kokanee salmon *O. nerka kennerlyi*
Early (Deadwood) (2 year classes)
October (Roaring Judy Hatchery, CO)

The hatchery also reared 650 Hayspur rainbow trout fingerlings from Nampa Hatchery and 500 Henrys Lake cutthroat trout fingerlings in a five-month whirling disease exposure study. These fish were exposed for different lengths of time in the whirling disease-infected waters of Copper Basin. They were kept in 1-m circular tanks, outside of the hatchery building.

WATER SUPPLY

Water for hatchery production is provided by three collection springs in an artesian area at the hatchery. The area is fenced off and has been dug out, then filled with cobblestone. 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 49°F, one at 51°F, and one at 54°F. Incubation temperature is 51°F.

HATCHERY IMPROVEMENTS

The 1996 GMC truck tank was modified to allow easier off loading of scattered plants and the tank lids were replaced. The sunshades received new vinyl covers replacing the worn-out canvas. A waste oil station was built to make the storage and transfer of used oil more convenient. Cement parking barriers were installed in place of the old treated timbers.

FUTURE NEEDS

Replacement nursery troughs are needed. The current 35-year-old troughs are wearing through the bottom, despite patching, allowing leakage into the hollow interior of the double wall construction. Residence #3 needs the old wood siding replaced. Residence #3 also needs a garage built to bring that house up to standard with the other two residences.

FISH STOCKED

Fingerlings of various species and strains were stocked in six regions of Idaho (Appendix 1). These put-grow-and-take fish numbered 3,440,600 fish weighing 38,800 lbs.

Catchable rainbow trout (8 inches +) were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 115,280 and weighed 76,028 pounds. Catchable brown trout, numbering 5,750 fish and weighing 2,875 lbs, were planted into Horsethief Reservoir.

The hatchery also reared 11,375 cutthroat and 756 rainbow fry for planting into ten high mountain lakes in the Upper Snake Region. Motorcycles, 4-wheelers, stock, and foot travel was used to plant these fish.

The fish transport trucks assigned to Mackay Hatchery traveled on 139 fish stocking trips during the year, logging 25,000 miles. Transport tankers assigned to Fish Transportation hauled nine loads of fish for the hatchery during the year.

Ririe Reservoir received 15,100 of the "Mackay Magnums," ranging in size from 14 to 16 inches long. These fish had their right-ventral fin clipped to distinguish them from Hagerman Fish Hatchery catchables in a creel-return study. Robert's Gravel Pond, located in Upper Snake Region, also received 1,020 of these fish.

FISH FEED

Fish feed used during the year totalled 93,100 pounds at a cost of \$36,424. Feed conversion averaged 1.06 pounds of feed for every pound of fish produced. Feed cost per pound of fish produced was \$0.416. Feed cost per inch of fish produced was \$0.0037.

BioDiet, BioDry 1000, Nelson's Sterling Silver Cup dry and Soft-Moist trout and salmon diets, and Rangen's feed were used, depending upon the specifications of the feed contract.

PUBLIC RELATIONS

Approximately 800 people toured the hatchery during the year. The hatchery's remote location does not seem to attract large crowds of people. Most visitors come to fish in the diversion pond below the hatchery. Scheduled tours were given to five groups. The hatchery crew and the local conservation officer participate in Idaho's "Adopt a Highway" litter control program. Six miles of Highway 93 along Mackay Reservoir are cleaned biannually. Assistance was also provided for the Hunter Education Program at Mackay School.

FISH FIN CONDITION

Using the "Ashton Method" for measuring fin condition of production fish raised at Mackay Hatchery, measurements were taken several times during the planting season.

Fins measured 70% of wild fish fins for Hayspur rainbow trout catchables. The brown trout catchables measured 68%. Fingerling fish fins measured 76% of wild fins for early kokanee, 77% for late kokanee, 93% of wild fins for brown trout, 82% for cutthroat/rainbow hybrids, and 74% of wild fins for Henrys Lake cutthroat trout. The westslope cutthroat trout reared for Payette Lake net pens measured 65% of wild fins.

FISH MARKING

Ten percent (96,900) of the Henrys Lake cutthroat trout were adipose fin-clipped prior to stocking. Twelve percent (100,500) of the cutthroat/rainbow hybrids planted into Island Park Reservoir had their adipose fin clipped off.

ACKNOWLEDGEMENTS

During 1996, the Mackay Hatchery crew included, at different times, Jason Rheinhardt, Rick Bohling, and Mike Paddock; Biological- Aides. Without their excellent assistance, much of the work mentioned above would not have been done. Their care and concern enable 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. Manpower expended totaled 36 permanent man-months and 13.5 temporary man-months.

Appendix 1. Fish production at Mackay Fish Hatchery, January 1 to December 31, 1995.

Species/ Strain	Lot number	Source	Received as	Number/lbs received or carried over	Yield (number/lb)	Destination/ comments
Hayspur rainbow trout	4-U-Id-R9	Hayspur	eyed eggs	109,000/ 28,250	102,100/ 46,000	1996 catchables
Hayspur rainbow trout	5-U-Id-R9	Hayspur	eyed eggs	131,600/ 360	128,800/ 25,600	1997 catchables 1996 fingerlings
Arlee rainbow trout	6-En-RA	Ennis NFH, Montana	eyed eggs	185,000/ eyed eggs	150,000/ alevins	1998 catchables
westslope cutthroat trout	5-U-Id-C2	McCall	fry	22,100/ 121	18,765/ 1,350	1996 Payette Lake net pen
westslope cutthroat trout	6-U-Id-C2	McCall	fry	26,300/ 39	24,950/ 268	1997 Payette Lake
Henrys Lake westslope cutthroat trout	6-U-Id-C3	Henrys Lake	eyed eggs	1,400,000/ eyed eggs	1,044,500/ 6,300	Henrys Lake, Salmon Region, high mountain lake plants
Plymouth Rock brown trout	4-Sr-BN	Saratoga NFH, Wyoming	eyed eggs	5,900/ 1,200	5,750/ 2,900	1996 Horsethief Reservoir catchables
Plymouth Rock brown trout	5-Sr-BN	Saratoga NFH, Wyoming	eyed eggs	5,500/ alevins	5,283/ 1,000	1997 Horsethief Reservoir catchables
Plymouth Rock brown trout	5-Sr-BN	Saratoga NFH, Wyoming	eyed eggs	340,000/ eyed eggs	300,100/ 5,300	1996 fingerlings Magic Valley and Upper Snake regions
Plymouth Rock brown trout	6-Sr-BN	Saratoga NFH, Wyoming	eyed eggs	190,000/ eyed eggs	160,000/ alevins	1997 fingerlings
Crawford brown trout	6-Pb-BN	Paint Bank SFH, Virginia	eyed eggs	125,000/ eyed eggs	115,000/ alevins	1997 fingerlings
Deadwood kokanee	5-U-Id-KE	Deadwood Reservoir	green eggs	1,718,000/ green eggs	1,013,000/ 17,000	1996 fingerlings
Deadwood kokanee	6-U-Id-KE	Deadwood Reservoir	green eggs	70,000/ green eggs	35,000/ alevins	1997 Deadwood Reservoir
Blue Mesa kokanee	5-U-Co-KO	Roaring Judy, Colorado	eyed eggs	349,000/ eyed eggs	252,000/ 3,000	1996 Salmon Falls Reservoir
Blue Mesa kokanee	6-U-Id-KO	Roaring Judy, Colorado	eyed eggs	1,338,000/ eyed eggs	Not all hatched yet.	1997 fingerlings

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

McCALL FISH HATCHERY

1996

Steven T. Kammeyer, Assistant Hatchery Manager

INTRODUCTION

McCall Fish Hatchery 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 U.S. Fish and Wildlife Service Lower Snake River Compensation Plan. Facility 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 (IDFG) license sales revenue.

Payette Lake provides all of McCall Hatchery's 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-ft diameter constriction in the 3-ft diameter mainline limits maximum flow capacity to 20 cubic feet per second (cfs).

Incubation capacity consists of 26 eight-tray Heath style incubator stacks. Additional incubators can be plumbed into four 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 ft long and 4 ft 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 trout, rainbow trout *O. mykiss*, rainbow x cutthroat hybrids, domestic Kamloops rainbow trout, and rear golden trout *O. aguabonita* and Arctic grayling *Thymallus arcticus* fry for stocking into high mountain lakes in the Panhandle, Clearwater, and Southwest regions and 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 net pen rearing were 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 mid-May.

The Fish Lake trap operated from March 28 through May 28, 1996. A total of 490 westslope cutthroat trout were trapped, which is a slight rebound from that experienced in 1995. Of these, 215 were males (43.9%) and 275 were females (56.1%). Average total lengths for males and females were 364.9 mm and 354.7 mm, respectively (Appendix 1).

Westslope cutthroat trout stocked back into Fish Lake for future broodstock have been fin-clipped for identification since the 1986 release. Of the 490 returning adults in 1996, 245 fish with fin clips (50.0%) returned to the trap. The percentage of marked fish returning to the trap has generated a significant trend indicating a loss of natural recruitment to the population (Appendix 2). Initial corrective actions taken to recover the depressed spawning population size have included:

- In 1996, 15 spawning pairs, representing a cross section of the run, were released approximately 1/4 mile upstream from the weir to help reestablish a natural spawning population base.
- Catchable size cutthroat trout taken from the Payette Lake net pens have been released back into Fish Lake in 1994, 1995, and again in 1996 in an attempt to quickly produce spawners while changes to the fry release protocols have a chance to become established.

- With the availability of overwintering hatchery space, fall fry broodstock releases have been delayed until spring after high water. This has resulted in the release of significantly larger fish at a time which is more conducive to survival. This process was first completed with brood year 1995 fish.
- Replacement broodstock stocking numbers have been increased with approximately 10,000 scheduled to be released in 1997.

Spawntaking operations took place from April 18 to May 28, 1996. A total of 256 females were spawned, in 12 lots, to produce a green egg take of 220,940 eggs (Appendix 3). Average fecundity was 863 eggs per female. The average eye-up for these eggs was 89.5% resulting in 197,760 eyed eggs. Of these, approximately 194,900 were initially ponded and available for hatchery programs. Changes made to the spawning/incubation procedures in 1996 included improved shade cover during spawning, second chance respawning of females, only disinfecting eggs once they are brought back to the hatchery (167 ppm argentyne following 30 minute tempering with hatchery water), and daily treatments with formalin (1,667 ppm for 15 minutes).

Replacement broodstock from brood year 1995 were released back into Fish Lake on June 10, 1996. These fish numbered 5,300 and averaged 57.8 fish per pound (fpp) at approximately 94.0 mm total length. The fin identification mark for these fish was a right ventral clip. An additional 700 catchable brood year 1995 westslope cutthroat trout taken from the Payette Lake net pens were stocked into Fish Lake on September 19, 1996. These fish averaged approximately 248.2 mm total length and eroded fins were used for their identifying mark. Approximately 10,750 brood year 1996 westslope cutthroat trout, randomly taken from all lots, are being allowed to overwinter at McCall Fish Hatchery and will be stocked out in the spring of 1997.

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 McCall Fish Hatchery 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 1996 included westslope cutthroat trout, domestic Kamloops rainbow trout, Henrys Lake rainbow x cutthroat hybrids, Arctic grayling, and golden trout (Appendix 5). Means of stocking

included backpacking, aerial plants, and truck plants. All of the high mountain lake plants were distributed within the six-month resident funding period.

A total of 215 lakes (132.7% of original requests) were stocked with 202,810 fry (124.5% of requests) in 1996 (Appendix 6). Of these, 198 were stocked at a total cost of \$5,127.50 in flight time, or \$25.90 per lake stocked in this manner. Volunteers stocked 17 lakes resulting in a savings to the Department of approximately \$440.30 in comparable flight time costs. Feed conversions for all species reared averaged 0.88 (Appendix 7).

Excess numbers of all fish species requested for stocking were available in 1996. This was particularly true for cutthroat and golden trout. Golden trout have not been available since the 1990 stocking season resulting in several missed rotations. In compensation, all lakes requesting golden trout, regardless to rotation, were stocked. Individual regional Fish Managers were given the opportunity to modify this list prior to the initiation of stocking golden trout to ensure maximum utilization of this limited resource. Similarly, cutthroat trout requests have not been fully met the last two years. The Salmon Region was given first priority for the use of these fish, however they declined. In other regions, those lakes which received less than 50% of their request in 1994-1995 and were not scheduled to receive fish in 1996 were restocked to help minimize potential problems caused by previous shortages. No changes were made to the current request rotation schedule. The Clearwater Region elected not to utilize stocking make-ups for 1994 shortages.

Following completion of high mountain lake stocking flights, remaining excess fry were stocked in McCall area waters coordinated through the McCall Subregional Fish Manager. A total of 26,850 westslope cutthroat trout fry were scatter-planted into eight creeks and Goose Lake. Four of these creeks are tributaries to Payette Lake. Domestic Kamloops and rainbow x cutthroat hybrids numbering 10,400 and 10,000, respectively, were stocked into Horsethief Reservoir.

Catchable Redistribution

During the period May 15 to September 4, 1996, a total of 74,210 catchable size domestic Kamloops were stocked into 37 water bodies in the McCall vicinity (Appendix 8). An additional 830 catchable domestic Kamloops were transferred out of McCall Fish Hatchery for Free Fishing Day clinics located at Rapid River Hatchery and Council. A total of 3,490 miles were driven at an approximate cost of \$3,450 to complete 85 stocking trips.

Payette Lake Net Pens

This was the sixth year for net pen production of westslope cutthroat trout in Payette Lake. The net pen project was designed to be sponsored and operated by the community with technical assistance provided by McCall Hatchery personnel. Currently only the McCall Chapter of Trout Unlimited is providing any tangible support for the project in the form of funds used to purchase feed and matching McCall Hatchery in the purchase of replacement belt feeders. Once again, two nets, approximately 28 feet deep, were used with no significant fish mortalities experienced. Total production from the net pens in 1996 was approximately 18,000 westslope cutthroat trout or 6,148 pounds released (approximately 4,798 pounds of gained weight). To accomplish this a total of 4,800 pounds of feed was fed out with an experienced conversion of 1.00.

On June 6, hatchery personnel, McCall Subregion fishery management personnel, and one person from the Trout Unlimited membership loaded approximately 18,730 westslope cutthroat trout into the net pens. These fish originated from Fish Lake and were set out at an average size of 13.9 fpp with some variation in individual fish sizes noted. Increased emphasis on fish size at release was an ongoing concern for the 1996 season. Due to changes in what was considered an acceptable size for a released fish (now at 228.8 mm total length), no mid-summer releases were conducted. Computation of rearing densities supported that sufficient space was available to rear these fish throughout the summer without early releases. Daily feeding chores were performed by hatchery personnel as no community feeder could be secured.

Fish in the net pens were released on September 19, 1996 by hatchery personnel and one person from the Trout Unlimited membership. Approximately 17,300 fish were released into Payette Lake at an average size of 2.93 fpp (247.2 mm total length). Fish size followed a normal distribution based on total length measurements of 48 randomly-sampled fish from the two nets. Applying this data to the entire population indicated 75% of the fish released had met or exceeded what is now considered the minimum acceptable size at release. An additional 700 westslope cutthroat trout were taken from the nets and transported to Fish Lake for replacement broodstock at this time. Eroded fins will be used as the identifying mark for these fish.

Total costs incurred as part of the net pen project in 1996 were estimated at \$3,944. Of this, Trout Unlimited contributed \$919 which was spent on one belt feeder and 2,300 pounds of feed. The cost estimate for McCall Fish Hatchery was \$3,025 which included personnel costs for set up, removal, clean up, daily feeding,

repair parts for the pen structure and feeders, purchase of one replacement belt feeder, and 2,500 pounds of feed.

McCall Fish Hatchery transferred 25,000 westslope cutthroat trout (656.8 fpp) to Mackay Fish Hatchery on August 21, 1996 to overwinter. These fry represented a random cross-section of the spawntake at Fish Lake in 1996. These fish will be scatter-planted into Payette Lake in the spring of 1997. Should the net pen project be continued in 1997, it is thought more consistent results will be obtained through initially loading the nets with catchable size rainbow trout and then providing monthly releases at the net pen dock.

Hatchery/ Program Improvements

The main program improvements included replacement of our 2-ton fish stocking truck with a new GMC 2-ton stocking truck and recondition of its 1,000-gallon fish stocking tank and the reconditioning of our smaller 200-gallon fish stocking tank. Minor improvements included construction of a new shade cover for spawning at Fish Lake and the replacement of the bird covers on the Payette Lake net pens.

Public Relations

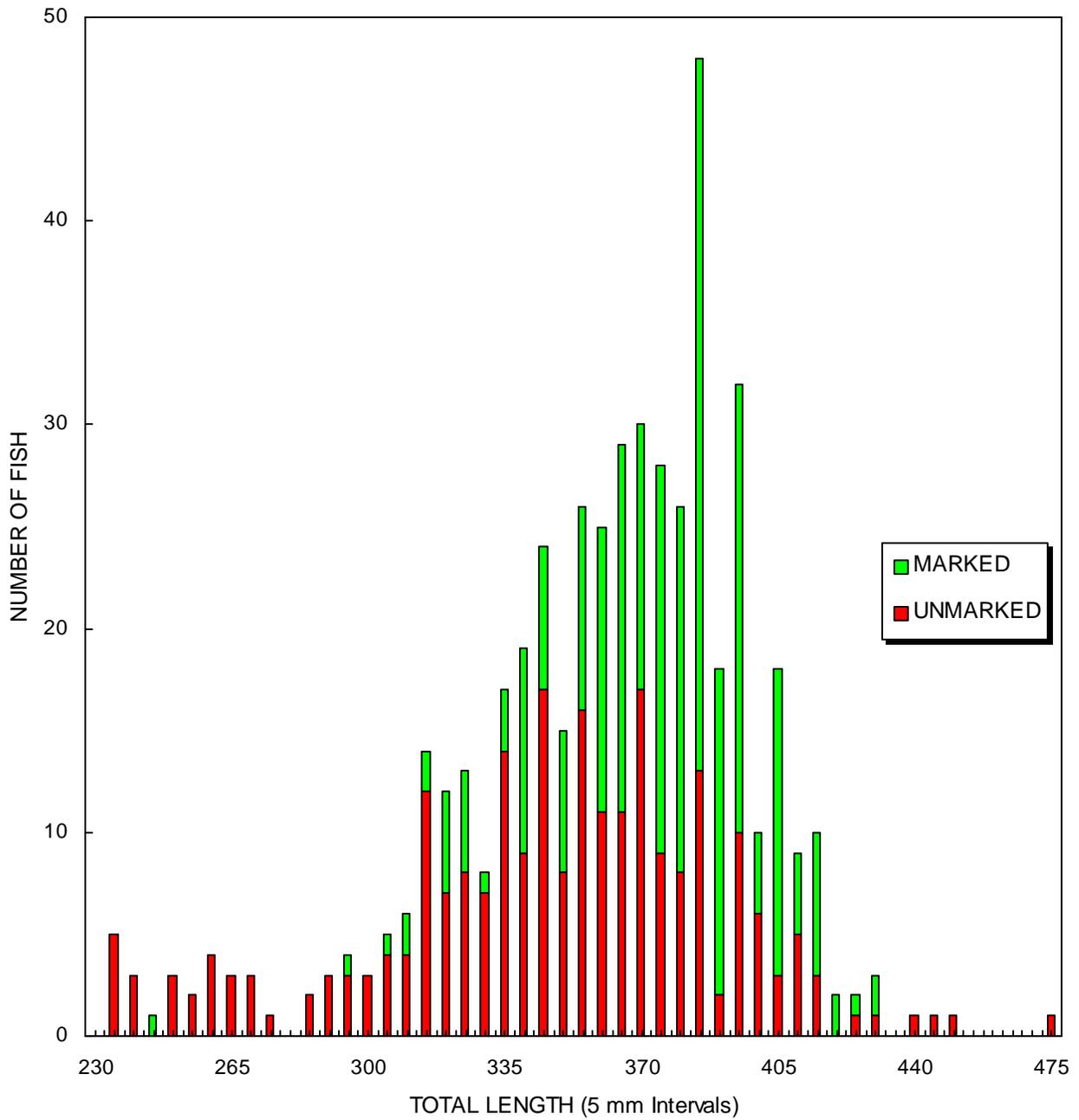
One outdoor school fish stocking presentation was made for approximately 75 sixth graders on Cascade Reservoir. Two in-class presentations were made for Sally Smelsner's 2nd grade class at McCall Elementary School. Fry are provided to Sally in the fall for her to rear in an aquarium throughout the school year and then are released into the North Fork of the Payette River in the spring. Resident funded personnel participated in Free Fishing Day activities at Rowland Pond again this year with scheduled fish stocking timed to enhance participating kids fishing experience. Five meetings were attended with those parties concerned with the direction of the Payette Lake net pens. Firm resolution for this ongoing community project has yet to be established.

ACKNOWLEDGMENTS

Accomplishments made through the resident program in 1996 could not have been done without the support of the entire staff at McCall Fish Hatchery. I wish to thank Gene McPherson, Fish Hatchery 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. Howard Brown, IDFG Fisheries Mechanic, was instrumental in the acquisition of our new 2-ton fish stocking truck and reconditioning of our stocking tanks. Individuals assisting on resident endeavors at McCall Hatchery in 1996 included Joel Patterson (Fish Culturist) and seasonal temporaries Brian Holbrook, Bob Wilson, Mitch Daniel, Stu Chamberlain, Jake Shea, Brennan Koch, Randy Martinez, Ben Rush.

CUTTHROAT TROUT LENGTH FREQUENCY

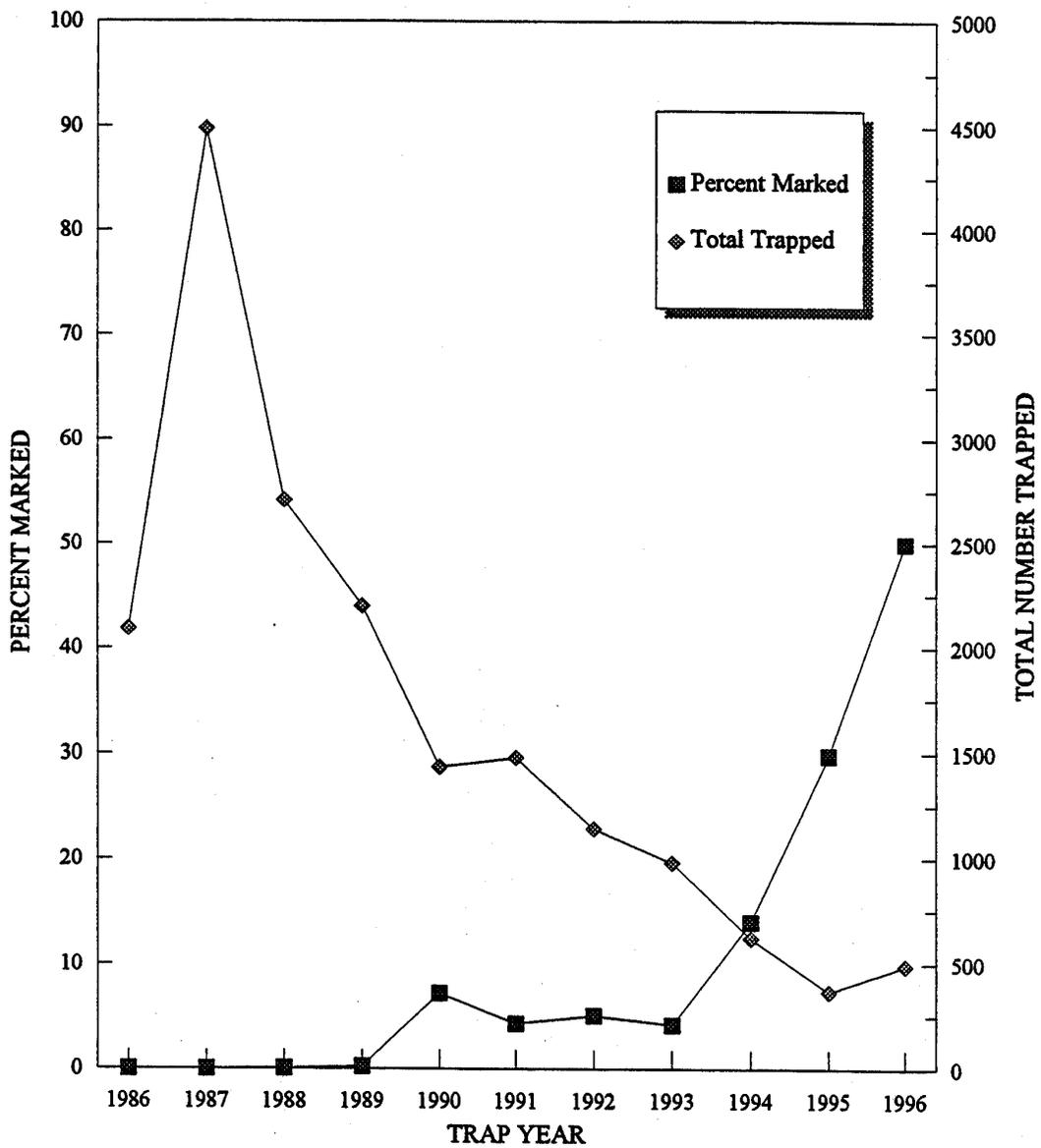
FISH LAKE - 1996



Appendix 1. Cutthroat trout length frequency, MFH, 1996.

HISTORIC TRAPPING DATA

FISH LAKE 1986 TO 1996



Marked fry first introduced in 1986.

Appendix 2. Fish Lake historic trapping data, 1986-96

Appendix 3. Results of westslope cutthroat trout spawn take, Fish Lake, McCall Hatchery, 1996.

Females spawned	Green eggs taken	Percent eye-up	Eyed eggs available	Average fecundity
256	220,940	89.5	197,760	863

Appendix 4. Westslope cutthroat trout broodstock replacement and returns at Fish Lake, 1986-1996.

Year released	Number released	Mark type released	Total adults trapped	Total marks trapped	LV	AD	RV	RP/LP	Eroded fins	Eroded fins/AD
1986	5,490	LV	2,091	0	0	0	0	0	0	0
1987	4,000	AD	4,486	0	0	0	0	0	0	0
1988	3,310	RP	2,708	1	0	0	0	1	0	0
1989	4,000	RV	2,197	4	0	0	0	4	0	0
1990	4,000	LV	1,437	103	91	9	2	1	0	0
1991	4,200	AD	1,480	63	21	33	2	7	0	0
1992	4,200	RV	1,145	58	20	13	15	10	0	0
1993	4,145	AD	980	41	20	0	20	1	0	0
1994 fry	3,262	LV	622	87	69	7	9	1	0	0
net pens	1,042	Eroded fins								
1995 net pens	2,015	AD/EF	366	109	6	40	59	1	3	0
1996 fingerling	5,300	RV	490	245	2	22	192	0	27	2
net pens	700	Eroded fins								
(1997) BY96	Approx 10,000	AD								

Appendix 5. Species stocked out, by region, as part of the high mountain lake program, 1996.

	Westslope cutthroat	Domestic Kamloops	Arctic grayling	Golden trout	Rbt x Ct hybrid	Total stocked	Total lakes stocked
Panhandle	13,750	10,000	8,240	3,250		35,240	12
Clearwater	16,000	1,000				17,000	26
Southwest (3B)	45,700	2,250	8,000	7,600		63,550	82
Southwest (3M)	46,700	30,600	910	5,310	3,500	87,020	95
TOTALS	122,150	43,850	17,150	16,160	3,500	202,810	215

Note: Table does not include excess fry redistribution in Southwest Region that are not part of the high mountain lake program.

Appendix 6. High mountain lake stocking requests by region, 1996.

Region	Initial Request (all species)	Stocked/ transferred (all species)	Percent of request met
Panhandle	34,000	35,240	103.6
Clearwater	17,000	17,000	100.0
Southwest (3B)	40,250	63,550	157.9
Southwest (3M)	71,600	87,020	121.5
Totals	162,850	202,810	124.5

Appendix 7. Feed usage and conversion data, McCall Fish Hatchery, 1996.

Species	Number stocked	Feed used	Weight gained	Conversion	Cost/pound	Cost/fish
Fish Lake Replacement Broodstock						
Westslope cutthroat (BY95)	5,300	129.7 lb	90.1 lb	1.44	\$ 1.398	\$ 0.024
Westslope cutthroat (BY96)	(10,750) to be stocked in 1997	71.0	54.9	1.29	\$ 1.256	\$ 0.006
Note: Does not include broodstock replacement from Payette Lake net pens.						
High Mountain Lake Stocking						
Westslope cutthroat (BY96)	174,000	117.2	125.4	0.93	\$ 0.907	\$ 0.0007
Domestic Kamloop	54,250	40.3	66.3	0.61	\$ 0.590	\$ 0.0007
Rbt x Ct hybrids	13,500	29.5	28.6	1.03	\$ 1.000	\$ 0.0021
Arctic Grayling	17,150	19.1	12.8	1.49	\$ 1.449	\$ 0.0011
Golden Trout	16,160	1.4	3.3	0.42	\$ 0.412	\$ 0.0001
Note: Data includes excess fry redistribution and westslope cutthroat trout transferred to Mackay Hatchery.						
Payette Lake Net Pens						
Westslope cutthroat (BY95)	18,000	4,800	4,798	1.00	\$ 3.937	\$ 0.105
Note: Data reflects total net pen production.						

Appendix 8. Total production and distribution at McCall Hatchery, 1996.

Species	Eggs/ fish received	Fish stocked out	Pounds produced	Cost per lb produced	Cost per fish stock/produced
HIGH MOUNTAIN LAKE PROGRAM					
Westslope cutthroat	220,940 green	122,150	44.86		
Domestic Kamloop	57,600 eyed	43,850	13.37		
Rbt x Ct hybrid	15,690 eyed	3,500	2.47		
Grayling	18,115 fry	17,150	12.95		
Golden Trout	17,150 fry	16,160	1.40		
subtotal	n/a	202,810	75.05	\$ 68.321	\$ 0.025
Note: Cost based on flight time expense of \$5127.50.					
NET PENS/ PAYETTE LAKE PROGRAM					
Westslope cutthroat (1997)	n/a	25,000 (to Mackay)	30.96	\$ 1.456	\$ 0.002
Westslope cutthroat (1996)	18,730	18,000	4,798	\$ 1.081	\$ 0.168
subtotal	18,730	43,000	4,828.96	n/a	n/a
Note: Cost based on hatchery contribution of \$3,025 towards total estimated cost of \$3,944.					
CATCHABLE REDISTRIBUTION PROGRAM					
Domestic Kamloops	78,750	74,210	[36,160]	\$ 0.913	\$ 0.044
subtotal	78,750	74,210	[36,160]	\$ 0.913	\$ 0.044
Note: Cost based on McCall Fish Hatchery transport expenses of \$3,300 (does not include 830 catchables transferred).					
FISH LAKE BROODSTOCK REPLACEMENT					
Westslope cutthroat (BY95)	n/a	5,300	90.09	\$ 1.398	\$ 0.024
subtotal	n/a	5,300	90.09	\$ 1.398	\$ 0.024
Note: Cost based on feed expenses of \$140.					
EXCESS FRY REDISTRIBUTION					
Westslope cutthroat	n/a	26,850	51.98	\$ 3.848	\$ 0.007

Species	Eggs/ fish received	Fish stocked out	Pounds produced	Cost per lb produced	Cost per fish stock/produced
Domestic Kamloops	n/a	10,400	37.16	\$ 0.989	\$ 0.003
Rbt x Ct hybrid	n/a	10,000	28.57	\$ 0.989	\$ 0.003
Subtotal	n/a	47,250	117.71	\$ 2.251	\$ 0.006
Note: Cost based on McCall Fish Hatchery transport expenses of \$265.					
TOTAL	n/a	372,570	5,111.81	\$ 6.182	\$ 0.085
Note: Cost based on McCall Fish Hatchery resident budget expenditures of \$31,600.					

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
MULLAN FISH HATCHERY
1996**

Mary Van Broeke, Laborer

INTRODUCTION

The Mullan Hatchery is a resident species redistribution station located four miles east of Mullan, Idaho. The hatchery buildings and grounds are owned by the Shoshone County Sportsmen's Association. Maintenance of the physical plant is funded by Shoshone County. The Idaho Department of Fish and Game 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 Coeur d'Alene River and the Little North Fork 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 dirt ponds (30 ft x 100 ft), 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. The close proximity to a Shoshone County park encourages the highest visitor attendance rate of any hatchery in the Panhandle Region.

HATCHERY IMPROVEMENTS

There were no major hatchery improvements during 1995. The facility continues to operate with minimal funding for operations only. The dam and associated collection site on the South Fork Coeur d'Alene River water source was covered and totally blocked by a mud slide in the winter of 1996. Mud, logs, and live trees sloughed off of the banks filling in a great portion of the pond. Repairs were completed with equipment and manpower donated from the Idaho Department of Transportation and the Shoshone County Sportsmen's Association in time for Free Fishing day 1996.

The fish transport tank was repainted and new life support equipment installed. A pressure sensitive oxygen alarm and new micro pore gas diffusers were installed, and the recirculation pump was rebuilt.

FISH STOCKED OR TRANSFERRED

Approximately 47,000 rainbow trout >9 inches long were released in waters of the Coeur d'Alene, St. Joe, and St. Maries river drainages from May to August to support a put-and-take fishery. All trout released from the Mullan Hatchery 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 8- to 10-hour trips, 4 to 5 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 Mullan Hatchery 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 4,200 people touring the grounds in 1996.

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 drainage.

On June 8, 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 90 children that day with over 270 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.

Total visitor traffic, as well as attendance at Free Fishing Day, was down by over 30% from past years.

SPECIAL PROJECTS

Water Quality Studies

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

Hatchery Trout Evaluation

A hatchery trout evaluation was conducted on both the North Fork Coeur d'Alene and St. Joe rivers during 1996. The study was undertaken to evaluate the difference in return rate between 10- and 12-inch rainbow trout stocked to the put-and-take fishery. The highest return rate, 38%, came from the 12-inch group stocked into the St. Joe River (Appendix 1). The lowest return rate, 22%, came from the 10-inch group stocked into the North Fork Coeur d'Alene River. To maximize return, the fish were released into the most popular areas during the period when fishing pressure was usually the highest. Although return rates were higher in both areas for the 12-inch fish the return for dollar invested was actually much lower. The feed cost alone to rear 12-inch fish is 60% higher than the cost to rear 10-inch trout. That, coupled with added transport cost and competition for limited rearing capacity at the hatchery, hint that rearing 12-inch trout may not be the best use of limited time and dollars.

Appendix 1. Number of rainbow trout stocked for length vs return evaluation in the North Fork Coeur d'Alene and St. Joe rivers, Idaho, 1996.

Date stocked	Mean length at stocking (in)	Number stocked	Number of fish tagged	Number of tags returned	Percent tags returned	Date last tag returned
North Fork Coeur d'Alene River						
6-21-96	10	500	100	22	22	9-11-96
6-24-96	12	500	100	25	25	8-10-96
St. Joe River						
7-12-96	10	500	100	29	29	9-6-96
7-12-96	12	500	100	38	38	10-4-96

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

NAMPA FISH HATCHERY

1996

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

INTRODUCTION

Nampa Fish Hatchery is a resident trout rearing facility located one mile south of Nampa. The hatchery water is supplied by eight artesian wells with a maximum flow of 40 cubic feet per second (cfs) of 59°F water. Built in 1975 and purchased by the Idaho Department of Fish and Game (IDFG) in 1982, fish rearing facilities consist of a hatchery/crews quarters building containing 4 upwelling incubators and 4 early rearing vats, outside rearing tanks including 16 fry raceways, 3 fingerling/broodstock raceways, and 10 production raceways. Up to 16 additional upwelling incubators can be used in the fry raceways to increase egg incubation capacity. A settling pond treats flows from the production units before discharge into Wilson Springs Ponds and Wilson Springs Drain.

FISH PRODUCTION

Nampa Hatchery produced 1,645,071 fish weighing 246,282 pounds during the 1996 fish year. Fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout *Oncorhynchus mykiss* comprised 73% of the fish stocked from Nampa Hatchery. In addition, brown trout *Salmo trutta*, Lahontan cutthroat trout *O. clarki henshawi*, and chinook salmon *O. tshawytscha* were produced at Nampa Hatchery during 1996 (Appendix 1). An additional 1,545 fish weighing 515 pounds were produced at Nampa Hatchery and given to schools for dissection and IDFG personnel for various research and study 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 1,081,474 eggs were received during the 1996 fish year (Appendix 5).

FISH STOCKED/TRANSFERRED

Nampa Hatchery personnel stocked or transferred 1,352,671 fish, weighing 228,595 pounds, during the 1996 fish year. A total of 362 plant sites were stocked by Nampa Hatchery during 1996. The Southwest Region received 399,832 catchable trout weighing 139,061 pounds.

A total of 202,080 Kamloops trout catchables (62,163 pounds) were transferred to other hatcheries throughout the state (Appendix 4). Fingerlings transferred from Nampa Hatchery included 10,080 Colorado River rainbow trout (600

pounds). These fish were transferred to Clark Fork Hatchery where they could be held and released as catchables. No broodstock fish were reared at Nampa Hatchery during the 1996 season.

Fish Transportation

Fish transport operators stationed at Nampa Hatchery stocked waters in all regions throughout the state of Idaho and transferred fish to and from 15 different state/national fish hatcheries. They transferred endangered sockeye salmon *O. nerka* from Big Beef Hatchery (NMFS-operated near Silverdale, Washington) to Redfish Lake near Stanley. A trip was also made to Oklahoma (Holdenville State Hatchery) to pick up channel catfish *Ictalurus punctatus* fingerlings which were stocked in reservoirs throughout Idaho. They made 135 trips throughout Idaho covering 53,000 miles.

Nampa Fish Hatchery's transport operators stocked rainbow trout fingerlings from Lyons Ferry Hatchery (209,958 fish, 6,292 pounds) into Clearwater Region waters. They also stocked chinook salmon and B-run steelhead smolts from Clearwater Hatchery and assisted with the transportation of chinook salmon smolts from McCall Hatchery. Our drivers also assisted transporting and stocking surplus A-run adult steelhead from Oxbow Hatchery; steelhead were released into the Payette (50) and Boise (131) rivers.

Brown Trout

Brown trout eyed eggs were received from Saratoga National Fish Hatchery. A shipment of 95,500 eyed eggs arrived in December of 1995. From this group, a total of 76,195 fingerlings were released in the Panhandle and Southwest regions for an overall survival rate of 79.8% from eyed egg to plant (Appendix 3).

Lahontan Cutthroat Trout

During the 1996 fish year, Nampa Hatchery stocked 250,037 Lahontan cutthroat trout into lakes and reservoirs located in the Southwest and Upper Snake regions. All Lahontan cutthroat eggs were received from Omak 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 and Island Park Reservoir (Appendix 3). Estimated survival from eyed-egg to fingerling was 74.7%.

Fall Chinook Salmon

Nampa Hatchery raised fall chinook salmon for stocking as smolts into Coeur d'Alene Lake. Personnel from Sandpoint Hatchery spawned adult fall chinook returning to the trap at Wolf Lodge Creek, a tributary stream that runs into Coeur d'Alene Lake. The eggs were incubated and reared to the swim-up stage at Sandpoint Hatchery and transferred to Nampa Hatchery in March 1996. Survival from fry to smolt was excellent with this group. Of the 64,880 fry transferred to Nampa Hatchery, 63,665 smolts were stocked for a survival of 98.1%. Receiving fry from Sandpoint has been very successful over the past two years and will continue in the future. Eyed eggs received from Sandpoint have had high mortality at the time of hatching due to the 59°F water at Nampa Hatchery. This scenario of receiving feeding fry in place of eyed eggs should be stressed. Nampa Hatchery stocked 39,700 chinook smolts back into Coeur d'Alene Lake. Additional smolts were stocked into Deadwood Reservoir (7,915 fish), Lucky Peak Reservoir (7,250 fish), Bull Trout Lake (1,000 fish), and Arrowrock Reservoir (7,800 fish). These additional stockings will be continued in future years due to the unavailability of disease-free Atlantic salmon *Salmo salar* eyed eggs.

Colorado River Rainbow Trout

Nampa Hatchery reared rainbow trout from a Colorado River strain for the first time. Eyed eggs were received from Hayspur Hatchery in January to produce a catchable trout by late fall. These fish were to be stocked in larger rivers in the Southwest and Magic Valley regions. These fish grew slowly, reaching a length of six inches by October, and were planted as fingerlings. One group was transferred to Clark Fork Hatchery (10,080 fish weighing 600 pounds) to be reared to catchable size before release.

The Colorado River rainbow trout performed similar to the cutthroat and brown trout at Nampa Hatchery. Of the 217,719 eyed eggs received, 183,816 fingerlings were released or transferred. This gave us an overall survival of 83.57%.

FISH FEED

A total of 262,904 pounds of feed was fed during 1996 at a cost of \$91,893.00 (Appendix 6). Rangen's Inc. made up 91% of the feed purchased by weight, with Bioproducts making up the remaining 9% (Appendix 6). The overall feed conversion was 1.07 pounds of feed fed to produce 1 pound of fish. The increase in

total cost of feed was due to a new feed contract; this also accounted for the increase in Bioproducts feed used.

FIN EVALUATION

Nampa Hatchery personnel evaluated fin conditions on several groups of fish in 1996. Fin evaluations were obtained during fin clipping and fish loading operations to prevent undue stress caused by excessive handling. Hayspur rainbow and Trout Lodge Kamloops catchable fish averaged 70% fin retention. Hayspur rainbow and Trout Lodge Kamloops fingerlings were slightly higher at 75% retention. All specialty fish (fall chinook salmon, brown trout, and Lahontan cutthroat trout) averaged about 85% fin retention, a result of being raised at lower densities, provided with shade structures, and fed a soft-moist diet throughout their rearing cycle. Colorado River rainbow trout averaged about 85% fin retention. They retained their fins better than our production trout possibly due to their wild nature and lower rearing densities.

FISH SPAWNING

Deadwood Reservoir (Early Kokanee)

Nampa Hatchery continues to operate the early kokanee salmon *O. nerka kennerlyi* trapping and spawning project at Deadwood Reservoir. Due to high water levels in Deadwood Reservoir, the weir across the Deadwood River was installed on August 27, 1996; after the water level dropped in the reservoir to a point where the weir could be installed below the mouth of Basin Creek. A volunteer monitored the kokanee run to insure the weir was installed before the migration started. Weirs on Wild Buck and Basin creeks were installed on August 28 and remained in place throughout the spawning season. The weir on Trail Creek was not installed for the third year in a row. Approximately 1,000 early run kokanee were allowed to pass before trapping of fish began. These fish were stopped by the weir on Basin Creek and at the gabion (approximately a 400-yard stretch). These kokanee were allowed to be caught by sportsmen in the area. Sportfishing was also allowed below the weir (100 yards below the weir was closed). With the larger fish returning, the sportfishing at Deadwood Reservoir was very popular with a high number of sportsmen snagging or attempting to snag kokanee. The first kokanee adults were trapped on August 31, 1996, and trapping continued through September 17, 1996. The main weir and trap was removed on September 17, with the velocity barrier and side weirs removed on September 18, 1996. Approximately 500 adult kokanee were released above the

weirs on Wild Buck and Basin creeks throughout the run. The Morrison Knudsen Nature Center received 100 adult kokanee for viewing at the Nature Center's ponds.

All fish were spawned at the trap site. A green egg yield of 70,140 eggs was taken from 93 females for a fecundity rate of 754 eggs/female (Appendix 8). Average total length of kokanee females was 342.9 mm, with males averaging 355.6 mm (Appendix 9). Fecundity and average total length increased significantly again in 1996 (Appendix 9). Percent survival to the eyed egg stage was 70.0%. The kokanee run was extremely low this year, possibly due to management practices in 1992. Reports from sportsmen were also positive, with many fishermen "limiting out" throughout late summer and early fall.

Eggs were shipped to Mackay Fish Hatchery via fixed-wing aircraft. Shipping techniques were identical to those used during previous years. Idaho Department of Fish and Game contracted the flying service with McCall Air Taxi.

HATCHERY IMPROVEMENTS

Several important improvements were implemented at Nampa Hatchery during 1996:

- A new Chevrolet 4x4 1-ton pickup was purchased to be used for fish transportation.
- A new eight-inch fish pump was purchased from Magic Valley Heli-arc.
- The irrigation system in the front hatchery lawn was rebuilt.
- Landscaping around residences #2 and #3 was improved.
- Residence #3 interior walls and ceiling were painted and the carpet and vinyl flooring was replaced.
- The 2-ton fish transport truck was replaced with McCall's 2-ton fish transport truck.
- The tailrace of the C-pond raceways were covered with expanded metal.

Hatchery improvements scheduled for 1997 include:

- Replace the wood headbox covers with metal deck plate.
- Continue landscape improvements.
- Install a concrete pad with drain for a truck disinfection area next to residence #3.
- Modify bird screening over B-pond headbox to improve access.

PUBLIC RELATIONS

As in past years, Nampa Hatchery was a focal point for many visitors, tours, and special groups. In 1996, an estimated 4,800 tourists visited the hatchery, mostly through the late spring and summer months. A total of 52 guided tours were given to area school, church, and boy scout groups. The disabled veterans were allowed to fish the settling pond five times during the summer months, as were the handicapped patients from the Idaho State School, who fished the pond on four trips. The settling pond was also opened to fishing on Free Fishing Day. The Nampa Hatchery and Southwest Region personnel hosted the Free Fishing Day clinic, which saw 300 visitors/fishermen, with an estimated 800 fish caught. The largest fish caught was a 7-pound 8-ounce brown trout and several more over 5 pounds. Free Fishing Day at Nampa Hatchery 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 was a definite improvement over last year.

ACKNOWLEDGEMENTS

Nampa Hatchery staff for 1996 included Rick Alsager, Fish Hatchery Manager II; Dan Baker, Assistant Fish Hatchery Manager; Bob Turik, Fish Culturist (Bob lateraled from Clearwater Hatchery to replace Rob Morris who was promoted to Assistant Fish Hatchery Manager at Grace Hatchery); Gary Ady, Fish Transport Operator; and Dick Bittick, Fish Transport Operator. Bio-aides for 1996 included Jeff Heindel, Chuck Kiester, Mike Brogliatti, and Phil Anderson. Volunteers have also helped on a number of projects throughout the year donating over 400 hours of time.

Appendix 1. Fish requested and produced at Nampa Hatchery during 1996.

Species/Strain	Size	Production goal	Actual production	% of goal achieved
Lahontan cutthroat trout	1-3 inches	70,500	95,637	135.7%
Lahontan cutthroat trout	3-5 inches	150,000	154,400	102.9%
Brown trout	3-5 inches	62,000	76,195	122.9%
Hayspur rainbow trout	3-5 inches	150,000	139,132	92.8%
Kamloops trout	3-5 inches	33,000	66,670	202.0%
Colorado River rainbow trout ^a	4-6 inches	129,000	171,206	132.7%
Fall chinook salmon	5-6 inches	59,000	63,665	107.9%
Kamloops trout	5-7 inches	70,000	91,922	131.3%
Hayspur rainbow trout	8-12 inches	30,000	31,392	104.6%
Kamloops trout	8-12 inches	532,575	570,520	107.1%
Totals		1,286,180	1,460,739	113.6%
^a Requested as catchables but released as fingerlings.				

Appendix 2. Fry production at Nampa Hatchery, 1996.

Species/strain	Source and date	Number received	Yield number	Yield pounds	% survival egg to plant	Destination
Lahontan cutthroat trout	Omak 5/96	120,000	95,637	88.62	79.7%	Southwest Region
Totals		120,000	95,637	88.62	79.7%	

Appendix 3. Fingerling production at Nampa Hatchery, 1996.

Species/ strain	Source and date	Number received	Yield number	Yield pounds	% survival egg to plant	Destination
brown trout	Saratoga 12/95	95,500	76,195	2,687.25	79.79%	Panhandle Region Southwest Region
Colorado River rainbow trout	Hayspur 1/96, 2/96	219,953	183,816	12,775	83.57%	Panhandle Region Southwest Region Magic Valley Region
fall chinook salmon ^a	Sandpoint 3/96	64,880	63,665	2,585	NA	Panhandle Region Southwest Region
Hayspur rainbow trout	Hayspur 12/95	99,788	74,000	5,370	74.16%	Southwest Region Magic Valley Region
Hayspur rainbow trout	Hayspur 2/96	93,387	65,132	1,060	69.74%	Southwest Region Magic Valley Region
Kamloops trout ^b	Hayspur 2/96	26,073	13,650	385	52.35%	Southwest Region
Kamloops trout	Trout Lodge 4/96	127,710	95,784	5,268.2	75.00%	Southwest Region Magic Valley Region Southeast Region
Kamloops trout (Triploid)	Trout Lodge 4/96	65,000	39,158	3,318	60.24%	Southwest Region Magic Valley Region Southeast Region
Lahontan cutthroat trout	Omak 5/96	206,667	154,400	1,930	74.71%	Southwest Region Upper Snake Region
Kamloops trout	Trout Lodge 6/96	12,000	10,000	60	83.30%	Southwest Region
Totals		1,010,958	763,190	34,838.45	74.55% ^c	

^a This group was received as fry from Sandpoint Hatchery.
^b This group includes 15,000 fry which were added to the original group from Hayspur Hatchery.
^c Percent survival does not include groups that were received as fry or fingerlings.

Appendix 4. Catchable production at Nampa Hatchery, 1996.

Species/ strain	Source and date	Number received	Yield Number	Yield Pounds	% survival egg to plant	Destination
Hayspur rainbow trout	Hayspur 3/95	^a NA	31,392	13,210	NA	Southwest Region
Kamloops trout	Troutlodge 6/95-8/95	456,630	368,440	125,851	80.7%	Southwest Region
Kamloops trout	Troutlodge 6/95-8/95	250,000	202,080	62,163	80.8%	Transfer to Ashton Transfer to Sawtooth Transfer to Hayspur Transfer to Clearwater Transfer to McCall
Totals			601,912	201,224		
^a Production fish carried over from 1995.						

Appendix 5. Eyed-eggs received at Nampa Hatchery, January 1 to December 31, 1996.

Species/ strain	Date received	Source	Number	Destination	Expected yield	Cost/1,000 fish
Colorado River rainbow trout	1/9/96	Hayspur	98,980	Southwest Region	60,000	N/C
Colorado River rainbow trout	1/17/96	Hayspur	46,500	Southwest Region	30,000	N/C
Colorado River rainbow trout	2/6/96	Hayspur	72,239	Magic Valley Region	39,000	N/C
rainbow trout	2/12/96	Hayspur	97,870	Southwest Region	50,000	N/C
Kamloops trout ^a	2/12/96	Hayspur	26,073	Southwest Region	15,000	N/C
fall chinook ^b	3/7/96	Sandpoint	64,880	Panhandle Region Southwest Region	59,000	N/C
Kamloops trout	4/18/96	Trout Lodge	127,710	Southwest Region Magic valley Region Southeast Region	100,000	\$13.75
Kamloops trout (3n - triploids)	4/18/96	Trout Lodge	65,000	Southwest Region Magic valley Region Southeast Region	50,000	N/C
Lahontan cutthroat trout	5/3/96	Omak	326,667	Southwest Region Upper Snake Region	220,500	N/C
Kamloops trout	6/12/96	Trout Lodge	326,120	Southwest Region Clearwater Region Salmon Region	150,000	\$13.75
rainbow trout	6/20/96	Mt. Lassen	23,908	Statewide	15,000	\$18.50
rainbow trout (3n - triplids)	6/20/96	Mt. Lassen	22,222	Statewide	15,000	\$40.50
Kamloops trout	6/27/96	Trout Lodge	232,532	Southwest Region Hayspur Hatchery Sawtooth Hatchery	250,000	\$13.75
Kamloops trout	9/16/96	Trout Lodge	235,050	Southwest Region Hayspur Hatchery	250,000	\$13.75
brown trout	11/20/96	Saratoga	157,075	Panhandle Region Southwest Region	62,000	N/C
rainbow trout	12/9/96	Hayspur	158,648	Magic Valley Region	80,000	N/C
^a 15,000 fry from Hayspur Hatchery were added to this group. ^b The fall chinook from Sandpoint Hatchery were received as fry.						

Appendix 6. Nampa Hatchery feed costs, 1996.

Supplier/Source	Size/Type	# boxes/bags	Pounds	Price/lb	Feed charge
Biodiet					
soft-moist	starter #1	12 boxes	529.1100	1.1900	\$629.64
soft-moist	starter #2	19 boxes	837.7575	1.1676	\$978.20
soft-moist	starter #3	18 boxes	793.6650	1.1592	\$920.00
soft-moist	1.0 mm	18 boxes	793.6650	1.0604	\$841.60
soft-moist	1.3 mm	29 boxes	1,278.6825	0.9610	\$1,228.80
soft-moist	1.5 mm	46 boxes	2,028.2550	0.8691	\$1,762.80
soft-moist	2.0 mm	40 boxes	1,763.7000	0.8437	\$1,488.00
soft-moist	2.5 mm	80 boxes	3,527.4000	0.9055	\$3,194.00
BioDry 1000	1.0 mm	32 sacks	1,600.0000	1.0500	\$1,680.00
BioDry 1000	1.3 mm	46 sacks	2,300.0000	0.7500	\$1,725.00
BioDry 1000	1.5 mm	88 sacks	4,400.0000	0.7500	\$3,300.00
Steelhead 500	2.0 mm	42 sacks	2,100.0000	0.3100	\$651.00
Steelhead 500	2.5 mm	46 sacks	2,300.0000	0.3100	\$713.00
Bioproducts feed charges					\$19,112.04
Total Pounds					24,252.40
Rangen					
dry	#1 granule	11 bags	550	0.4500	\$247.50
dry	#2 granule	20 bags	1,000	0.4500	\$450.00
dry	#3 granule	37 bags	1,850	0.4500	\$832.50
dry	#4 granule	37 bags	1,850	0.2992	\$553.52
dry TM-50	#4 granule	16 bags	800	0.4989	\$399.12
extruded TM-50	course crumble	14 bags	700	0.5671	\$396.97
450 floating	1/16-in pellet	333 bags	16,650	0.4613	\$7,680.79
450 floating	3/32-in pellet	82 bags	4,100	0.3342	\$1,370.40
450 float TM-50	3/32-in pellet	34 bags	1,700	0.4991	\$848.45
low phosphate	3/32-in pellet	bulk	9,660	0.2518	\$2,432.30
450 floating	3/32-in pellet	bulk	17,580	0.3200	\$5,625.60
450 floating	1/8-in pellet	119 bags	5,950	0.3763	\$2,239.08
450 float TM-50	1/8-in pellet	64 bags	3,200	0.5075	\$1,624.00

Appendix 6. Continued.

Supplier/Source	Size/Type	# boxes/bags	Pounds	Price/lb	Feed charge
Rangen					
low phosphate	1/8-in pellet	bulk	66,810	0.2397	\$16,014.35
450 floating	1/8-in pellet	bulk	10,960	0.3200	\$3,507.20
low phosphate	5/32-in pellet	bulk	24,080	0.2397	\$5,771.98
450 floating	5/32-in pellet	bulk	71,210	0.3200	\$22,787.20
Rangen feed charges					\$72,780.96
Total pounds					238,650
Total Pounds: 262,902.4			Total Feed Cost:		\$91,893.00

Appendix 7. Total cost of net fish production at Nampa Hatchery, 1996.

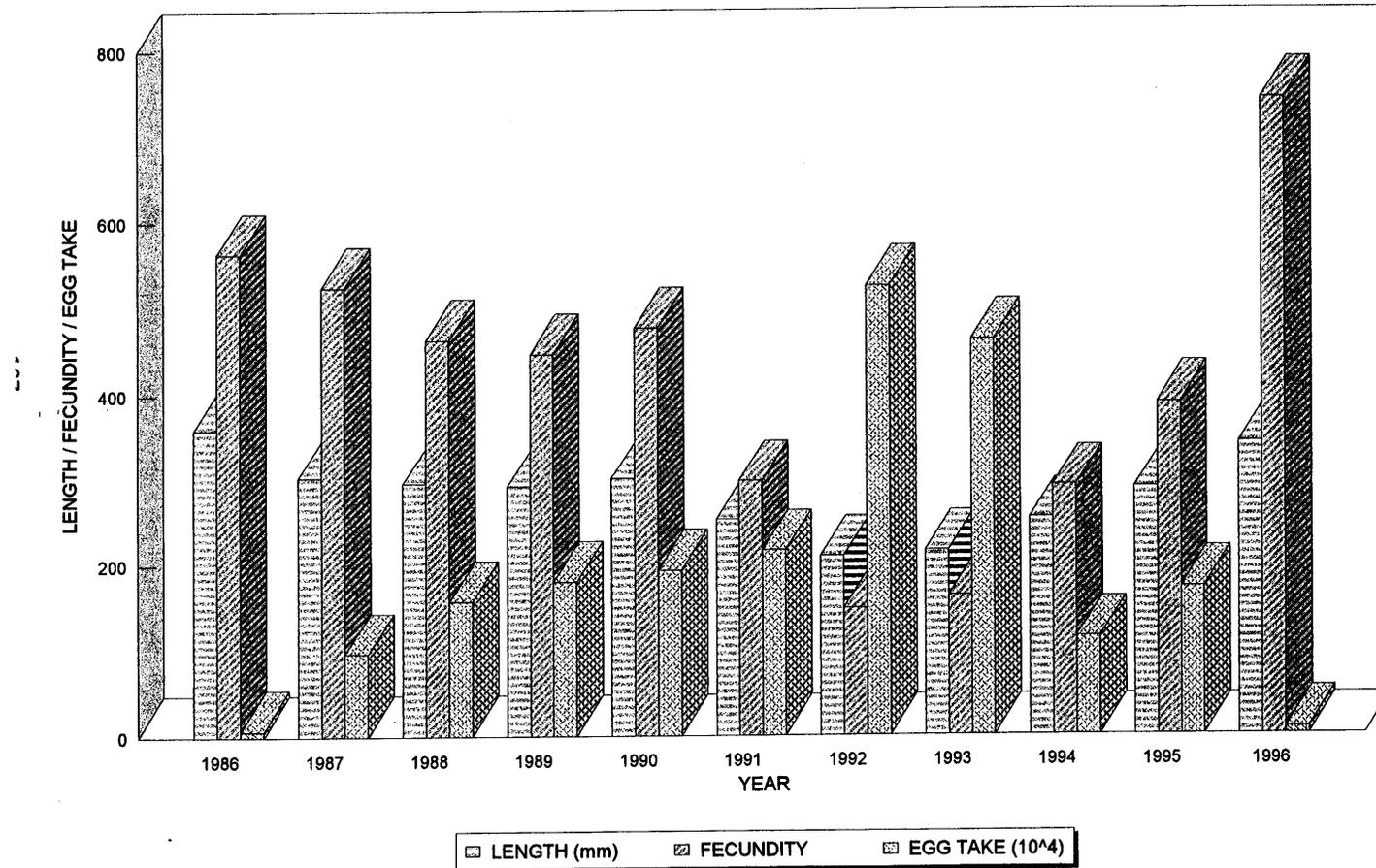
Year	Put-and-take		Put-grow-and-take		Total Number	Total Pounds	Feed		Feed conversion	Total cost	Cost/1,000 fish	Cost/pound	Cost/inch
	Number	Pounds	Number	Pounds			Pounds	Costs					
1993 ^a	475,356	150,559	773,395	32,762	1,328,072	183,321	276,606	\$92,145	1.51	\$265,283	\$212.44	\$1.45	\$0.030
1994	308,023	146,978	793,065	55,014	1,101,088	201,992	220,544	\$72,340	1.09	\$258,010	\$234.32	\$1.28	\$0.029
1995	567,147	193,309	783,722	42,336	1,350,869	235,645	261,589	\$76,793	1.11	\$271,156	\$200.77	\$1.15	\$0.033
1996	694,659	212,011	950,412	34,271	1,645,071	246,282	262,902	\$91,893	1.07	\$274,072	\$166.60	\$1.11	\$0.027

^a Reflects actual production, not net production.

Appendix 8. Kokanee egg take at Deadwood Reservoir, 1996.

Lot number	Spawn date	Females spawned	Green eggs	Eyed eggs	% eye-up
1	09/10/96	93	70,140	49,098	70.0%
Totals		93	70,140	49,098	70.0%

DEADWOOD RESERVOIR KOKANEE
 SPAWNING SUMMARY (1986 - 1996)



IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

SANDPOINT FISH HATCHERY

1996

John R. Thorpe, Fish Hatchery Manager II

INTRODUCTION

The Sandpoint Hatchery is located in Bonner County on the south shoreline of the Pend Oreille River about two miles south of the town of Sandpoint. Although, the hatchery was closed in 1985, it was reopened in 1990 in response to public demand in the Panhandle Region. 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.

The hatchery is license-funded, with \$13,500.00 allocated for operation in FY96. Special hatchery programs (sturgeon culture and cutthroat trout net pen culture) are funded by Bonneville Power Administration (BPA), Washington Water Power (WWP), Trout Unlimited (TU), and the Lake Pend Oreille Idaho Club (LPOIC). These funds are encumbered for specific use items such as water heaters, net pens, and fish feed; therefore, amounts vary annually.

The staffing at the hatchery consisted of the Fish Hatchery Manager II from the Clark Fork Hatchery and approximately 4.0 months of temporary labor. Additional labor was donated from private citizens, sportsmen's groups, and regional personnel.

Water Supply

The hatchery 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 hatchery use; although their discharge is included in the 4 cubic feet per second (cfs) water right. The hatchery flow fluctuates seasonally, with lowest flows in late summer and highest flows in early spring.

The Idaho Department of Fish and Game (IDFG) was deeded the springs in 1928. However, this deed did not include property ownership of the surrounding land. An easement agreement states that IDFG will provide a 2-inch domestic line to the land owners in exchange for a collection reservoir and pipe-line right-of-way from the springs to the hatchery.

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 hatchery use if needed.

Rearing Facilities

The hatchery rearing facilities include 8 Heath incubators (8-tray), 18 cement vats (15 ft x 2.5 ft x 3 ft) inside the hatchery 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 warmwater rearing. The carrying capacity of the hatchery ranges from 880 pounds (2.5 million) of 1-inch fish to 12,800 pounds (25,500) of 10-inch fish.

Off-site hatchery 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.

The hatchery buildings consist of one nursery/shop/office complex, one storage shed, garage/crew quarters, and a residence. A regional shed provides covered storage.

Hatchery Improvements

Hatchery improvements during 1996 included:

1. Repair of all windows in the hatchery/shop and glazing for the first time since the hatchery was reopened in 1990. The repairs greatly reduced heat loss in the hatchery area and improved appearance.
2. A fish transport tank was rebuilt for use at the Sandpoint facility. The tank will provide transport capability without inviting contamination through use of borrowed haul tanks.
3. Outside equipment storage areas were cleaned, graded, and graveled to improve appearance and accessibility to supplies.

Needed hatchery improvements include:

- A new water collection system at spring #3 to collect the water now by-passing the spring box.
- Improved weatherization, as well as an alternative heating system, in the hatchery building. Presently, the 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 flowing water across the floor during spring thaw.

FISH PRODUCTION

The Sandpoint Hatchery produced 913.6 pounds of fish (Appendices 1 and 2) from 5,954 pounds of feed (6.52 conversion) (Appendix 3). On-station production was 583 pounds of fish from 2,541 pounds of feed (4.35 conversion). Net per production was a net loss of 223 pounds of fish from 3,000 pounds of feed. Production costs were estimated at \$70.42 per pound gain and \$97.24 per thousand fish (Appendix 2). Costs to operate the Sandpoint Hatchery included personnel costs for an Assistant Hatchery Manager assigned to the Clark Fork Hatchery.

FISH SPAWNING

Westslope Cutthroat Trout

Westslope cutthroat trout of a Montana strain were obtained from the Washoe Park State Hatchery. Fish from brood year 1992 and brood year 1993 have been held on station for captive broodstock. This stock has been determined to be both genetically pure and disease-free. Neither of these characteristics can be met by the broodstock at either the Clark Fork or McCall hatcheries. Although, this strain typically matures in the fourth year, a portion of the females and many of the males will produce gametes in the third year. The first year of full production commenced in 1996. Eggs were taken from only the four-year-old adults. Unwanted eggs were stripped from the brood year 1993 females as part of the maintenance protocol.

As a disease-free population, these eggs are desirable for any releases above anadromous (particularly threatened) fish populations. The fish were first sorted on May 6 and checked weekly through July 6. Total number of females spawned was 1,687 for 855,447 green eggs (Appendix 4). The first effective spawn day was May 16, over a month earlier than in 1995. Artificial lighting in the hatchery building extended day length starting in January and apparently helped to bring on maturation earlier. The egg size was increased to approximately 400/oz and eye up was up to 60%. In June, 163,130 eyed eggs were shipped to the Sawtooth Hatchery for use in the upper Salmon River drainage.

Chinook Salmon

The chinook trap was installed in Wolf Lodge Creek by Clark Fork Hatchery and regional personnel in early September 1996. The trap was again left unattended for lack of funding. The run was expected to be lower than in past years, and criteria for broodstock selection was modified for 1996 to direct collection from all females trapped.

The Wolf Lodge weir trapped only 34 females before the run ceased. The trap remained in place through October with no fish observed. Females were spawned individually with milt from 2 to 3 males added. Tissue and ovarian fluid samples were taken from all fish spawned and shipped to the Eagle Fish Health Laboratory for disease screening. Eggs from each female were kept separate throughout the spawning and incubation process. Four females were determined to be positive for Bacterial Kidney Disease (BKD). Only the single lot identified as moderate was destroyed. From 34 females, 96,068 green eggs were spawned, resulting in 35,520 eyed eggs (37%) (Appendix 5). All eggs and fry were held at the Sandpoint Hatchery through 1996. Once the fry were up and on feed they would be transferred to the Nampa Hatchery.

FISH FEED

Normal production feed is purchased from Bioproducts, Inc. in Warrenton, Oregon. Fish are started on BioDiet starters and switched to BioDry 4000 for grow-out. Ration quantity is adjusted weekly and is calculated using Haskell's formula. To accommodate the reduced personnel at the Sandpoint Hatchery, automatic belt feeders are used. Feed cost during 1996 is found in Appendix 3. All of the feed fed to the net pen-reared cutthroat trout was purchased with donated funds, while the sturgeon were fed feed purchased by the Kootenai Tribe.

PUBLIC RELATIONS

About 3,500 people toured the Sandpoint Hatchery in 1996. Effort was made to talk with every tourist visiting the hatchery. Excellent relations were maintained with Bonner County Sportsmen Association, Trout Unlimited, and Lake Pend Oreille Idaho Club. With a more conservative manning of the Sandpoint Hatchery utilizing only the manager of the Clark Fork Hatchery, actual visitor contact has been reduced from the days of a resident manager and underutilized temporary employees. To improve the visitor interface, a visitor information display is being used to provide more information to visitors. This display area would provide information to visitors and additionally insure that the information was consistent and approved by Regional Managers. Hatchery personnel manned a booth with a fish display at the Bonner County Fair. Hatchery personnel also gave multiple presentations to the LPOIC organization.

Organized tours included Sandpoint High School fish and wildlife classes, as well as several elementary schools, and four private preschool groups.

The Sagle Elementary School is still involved in hatching kokanee eggs in a small aquarium and releasing fry into Garfield Bay Creek, Lake Pend Oreille. The Sandpoint Hatchery personnel deliver the eggs and give a short presentation regarding kokanee life history in Lake Pend Oreille. The program is designed for natural resource education.

SPECIAL PROJECTS

Kootenai White Sturgeon

Two age classes, 1992 and 1993, of Kootenai River white sturgeon are being reared at the Sandpoint Hatchery. Sturgeon culture at the Sandpoint Hatchery continued throughout 1996 on a temporary and "as needed" basis. The entire program at Sandpoint was in support of the Kootenai Tribal culture efforts. The Tribe paid for the additional electric power costs related to running water heaters and recirculation pumps.

On January 1, 1996, there were 151 (173 lbs) brood year 1992 and 1 (0.1 lbs) brood year 1993 Kootenai River white sturgeon on-station. There were no mortalities in either the brood year 1992 or brood year 1993 lots during 1995. Production was 12 lbs during 1996. All feed was provided by the Kootenai Hatchery.

Project funding of \$8,000.00 has been identified by the Kootenai Tribe and merits special project status for sturgeon culture at the Sandpoint Hatchery. Two vats modified with heaters and pumps (recirculating) have been allocated to sturgeon culture. Fish production in these two vats is limited by fish waste products (nitrogenous) which degrades the water quality. Water quality limits production when fish weight exceeds 50 pounds per vat; therefore, vats are limited to a specific number of fish for the allowable 50 pounds.

Piper's (1970) density and flow indices have been applied to sturgeon reared at Sandpoint using the same guidelines as those applied to trout. It is recommended that a density index not exceed 0.5 to allow all fish a "resting" position on the raceway bottom.

Water Supply Failure

On December 31, 1996, the water supply pipeline was separated when the support bridge was collapsed by heavy snow loads. When discovered in the afternoon of that day, water had ceased to flow to the vats and the majority of the containers had drained down through standpipe leakage. All of the adult brood year 1992 and brood year 1993 westslope cutthroat trout brood fish had expired. The brood year 1992 sturgeon had been dewatered and appeared dead on initial survey as did the chinook fry.

During the next few hours (up to midnight) personnel from the Clark Fork and Cabinet Gorge hatcheries worked to salvage survivors. There were 133 Kootenai River white sturgeon transferred to the Cabinet Gorge Hatchery along with approximately 25,000 chinook sac fry, 500 brood year 1996 westslope cutthroat trout fry, and approximately 1,000 brood year 1996 domestic Kamloops fry. There were approximately 400 lbs of westslope cutthroat and rainbow trout salvaged from display raceways and stocked to a nearby ice-free stream.

Appendix 1. Fish production at the Sandpoint Hatchery, January 1, 1996 to December 31, 1996.

Species/Strain	Source	Beginning number	Beginning pounds	Ending number	Ending pounds	Number stocked/ transferred	Pounds stocked/ transferred	Destination
westslope cutthroat trout, BY92	Montana	5,033	1,070.7	0	0	0	0	broodstock
westslope cutthroat trout, BY93	Montana	4,030	297.5	0	0	0.00	0.00	broodstock
westslope cutthroat trout, BY94	Clark Fork	80,000	4,878	0.00	0.00	52,930	4,655	Lake Pend Oreille
westslope cutthroat trout, BY95	Clark Fork	0	0	40,085	2,209.9	0.00	0.00	Lake Pend Oreille
westslope cutthroat trout, BY96	Sandpoint Hatchery	0.00	0.00	0.00	0.00	135,500	34.75	broodstock
fall Chinook salmon, BY95	Wolf Lodge Cr	0.00	0.00	0.00	0.00	68,880	80	Nampa
Kamloops rainbow trout BY96	Trout Lodge	0.00	0.00	0.00	0.00	8,707	7.75	Mountain lakes
kokanee BY95	Cabinet Gorge	0.00	0.00	0.00	0.00	181,342	179	Lowland lakes
Kootenai River white sturgeon BY92	Kootenai Hatchery	151.00	173.30	0.00	0.00	133	164	Kootenai River
Kootenai River white sturgeon BY93	Kootenai Hatchery	1.00	0.10	0.00	0.00	0	0	Kootenai River
Total		89,215	6,419.6	40,085	2,209.9	447,492	5,120.5	

Appendix 2. Cost of fish produced at the Sandpoint Fish Hatchery, January 1 to December 31, 1996.

Species/Strain	Numbers produced	Pounds produced	Cost to produce	Cost/1,000	Cost/lb
westslope cutthroat trout >6 inches, BY92-93	6,059	282.0	14,500	2,393.13	51.42
westslope cutthroat trout 2-5 inches, BY94	52,930	(223)	1,000	18.89	****
westslope cutthroat trout, BY95	40,085	330.0	1,000	24.95	3.03
westslope cutthroat trout, BY96	135,500	34.8	10,000	73.80	287.36
Kamloops rainbow trout, BY96	8,707	7.8	1,000	114.85	128.21
kokanee, BY95	181,342	179	3,500	19.30	19.55
fall chinook salmon, BY95	68,880	80	5,000	72.59	62.50
Kootenai River white sturgeon, BY92/ BY93	133	(9)	12,000	90,225.56	****
Totals	493,636	681.6	\$48,000	\$97.24	\$70.42

Appendix 3. Fish feed used in 1996 at the Sandpoint Fish Hatchery.

Size	Source	Pounds	Cost/lb	Total cost
BioDiet starter #1	Bioproducts	235	1.05	246.75
BioDiet starter #2	Bioproducts	50	1.05	52.50
BioDry 4000 3.0 mm	Bioproducts	1,856	.48	890.88
Silver Cup 5/32	Nelson & son	400	.54	217.80
Totals		2,541		\$1,407.93
BioDry 4000 3.0 mm donated by LPOIC	Bioproducts	3,000	.48	1,440.00
Rangen Semi-Moist 6.0 mm provided by Kootenai Tribe	Rangen	413	.66	272.58
Grand Totals		5,954		\$3,120.51

Appendix 4. Spawning summary, Montana strain westslope cutthroat trout, January 1, 1996 to December 31, 1996.

Stock	Females spawned	Number of eggs collected	Average fecundity	Percent eye-up	Eyed eggs
Montana	1,687	855,447	507	60%	513,032

Appendix 5. Spawning summary, Wolf Lodge Creek fall chinook salmon, September 10-30, 1996.

Date	Females spawned	Number of eggs collected	Average fecundity	Percent eye-up	Eyed eggs
Sep 10	12	33,588	2,799	21.5	7,240
Sep 16	5	17,207	3,441	31.1	5,347
Sep 19	7	4,587	2,294	50.0	2,294
Sep 25	6	24,346	2,213	71.4	17,380
Sep 30	6	16,340	4,085	19.9	3,259
Totals	34	96,068	2,826	37.0	35,520

IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

SAWTOOTH FISH HATCHERY

1996

Roger Elmore, Fish Culturist

INTRODUCTION

Sawtooth Fish Hatchery is a U.S. Fish and Wildlife Service Lower Snake River Compensation Plan hatchery and has been in operation since 1985. The primary goal of the hatchery is to trap, spawn, raise, and release spring chinook salmon *Oncorhynchus tshawytscha*. Also, adult steelhead are trapped and spawned. The eyed eggs and fry are sent to other hatcheries for hatching and grow-out. In 1990, a program to stock rainbow trout *O. mykiss* into the surrounding area waters for improved angling opportunities began. In 1996, Sawtooth Hatchery personnel, assisted by Salmon Region fisheries biologists, stocked high mountain lakes with Colorado River rainbow trout, golden trout *O. aguabonita*, cutthroat trout *O. clarki*, and Arctic grayling *Thymallus arcticus*. All high mountain lakes were stocked with fry.

FISH STOCKING

This year, Nampa Fish Hatchery supplied Sawtooth Hatchery with 94,395 Kamloops rainbow trout for stocking purposes. Stocking began on May 23 and continued throughout the summer ending on September 24, 1996. A total of 91,481 fish were stocked. By far the largest number of fish, 40,350, were stocked into the main Salmon River (Appendix 2). 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.

This is the first year of a fishing regulation change regarding fish caught in the Salmon River. The regulation is intended to protect wild trout in the upper Salmon River by imposing a 14-inch minimum size restriction on wild trout. To be able to discern wild trout from the stocked hatchery trout, all of the hatchery trout had their adipose fins clipped. The fin clipping job was performed by hatchery and regional fisheries personnel. A total of 130 man hours was required to clip 56,950 fish. Immediately after clipping, fish were retained at the hatchery for 21 days before stocking. This is the amount of time required to allow for withdrawal of MS-222, used to anesthetise the fish, so the fish would be safe for human consumption.

There were 3,270 fish that were adipose-clipped and stocked into Pettit Lake. The purpose for this is to try and determine how many fish survive over winter and what impacts, primarily predation, they may have on young sockeye salmon. A different type of a mark will be applied to the fish being stocked in 1997, and in future years to be able to differentiate year classes.

As has been the case for the last three years, weekly notices informing the public of the whereabouts of the latest stocking locations have been distributed to

local businesses. Also, a brochure was produced called Fishing Sawtooth Valley. The brochure has pictures of fish available in the area, as well as suggested locations to catch fish. A short narrative describing the plight of anadromous fish is included. The entire back of the brochure has a map indicating where Sawtooth Hatchery stocks fish. Funding for the cost of printing was provided by a grant from Bonneville Power Administration. Only 2,000 brochures were printed and almost all were distributed in 1996. This brochure proved very popular and informative.

Hayspur Hatchery provided Sawtooth Hatchery with both green and eyed Colorado River rainbow trout eggs. The Salmon Region fishery biologists requested that soon after these eggs hatched, they be stocked as swim-up fry near Challis. On April 11, approximately 25,000 fry were stocked into a small, spring-fed stream that flows into the Salmon River. This stream is located on the Karen Whitworth Ranch near the Challis airport.

One other special stocking of rainbow trout occurred at two locations close to Challis. One hundred fish were put in the Salmon River at Bruneau's Bridge and 100 fish at the Bayhorse Bridge area. The experimental purpose was to see how well these fish stayed in this part of the Salmon River to determine long-term angling potential. All of these fish were adipose-clipped and floy-tagged.

As noted in our plans for 1996, Stanley Lake and Alturas Lake were added to our stocking program, while Cape Horn Lake and Josephus Lake plants were dropped. The latter two are now being stocked by Nampa Hatchery.

Local conservation officer Gary Gadwa and Roger Elmore assisted Nampa Hatchery personnel with stocking three small ponds in the Bull Trout Lake area. These ponds are collectively named the Bull Trout Ponds.

On June 8, Sawtooth Hatchery personnel, assisted by conservation officers Paul Valcarce and Gary Gadwa, participated in Free Fishing and Camping Day. The hatchery wildlife pond had been stocked with fish, and 34 kids and 20 adults came to fish. Bill Stutz had prizes for kids and a fish cleaning station set up for those who chose to keep their catch. This day is invaluable for stimulating an interest in fish and fishing. Several of the adults were beginners that had never fished before and expressed their gratitude and joy about their experience.

MOUNTAIN LAKE STOCKING

Sawtooth Hatchery personnel stocked high mountain lakes in the Salmon Region with fixed-wing aircraft or by hiking/horse-packing volunteers. A total of 132 lakes were stocked. Fish stocked included 78,750 cutthroat trout, 8,000 golden

trout, 6,500 Arctic grayling, and 25,500 rainbow trout. Volunteers stocked 15 lakes, donating 140 hours of time. The remainder of this project was funded by resident state money with cooperation from the U.S. Fish and Wildlife Service's Lower Snake River Compensation Plan division. Since this was the first year of a complete program at Sawtooth, there were many details to be worked out. Next year's mountain lake stocking should be easier and less time consuming. Some coordination with the U.S. Forest Service will have to be done because the Sawtooth Wilderness Area is scheduled for stocking in 1997.

PLANS FOR 1997

A meeting will be held between Sawtooth Hatchery, Nampa Hatchery, and Salmon Region personnel to review the stocking program in the Stanley Basin area. Since all fish stocked into flowing water will have to be adipose-clipped again in 1997, Sawtooth and Nampa will explore ways to fine-tune the clipping procedure.

Opportunities for hiking and packing in fry for high mountain lake plants should increase as the Sawtooth Wilderness Area is scheduled for stocking. Volunteers will be needed for these plants. In 1997 two airplanes should be available which will make stocking more efficient for those lakes where hiking is unfeasible.

Plans are to participate in Free Fishing Day again.

ACKNOWLEDGEMENTS

Sawtooth Hatchery would like to thank Rick Alsager and the Nampa Hatchery crew for their cooperation in making 1996 so successful. Special thanks go to Dick Bittick and Gary Ady for transporting fish from Nampa and assisting with direct plants into Alturas and Stanley lakes.

Mike Larkin and Tom Curet of the Salmon Region were responsible for the fantastic Fishing Sawtooth Valley brochure. Also, Tom and his assistants provided valuable help during the adipose clipping job.

Bill Stutz made sure Free Fishing Day ran smoothly and Lara Lee Trandahl kept anglers satisfied by stocking most of the fish.

Steve Kammeyer at McCall Hatchery provided valuable help with coordinating mountain lake stocking flights. Mark Liter of the Salmon Region provided help regarding request numbers for each lake.

Appendix 1. Boundaries for Salmon River sections.

Section 5	Yankee Fork River downstream to Thompson Creek.
Section 6	Valley Creek downstream to Yankee Fork River.
Section 7	Redfish Lake Creek downstream to Valley Creek.
Section 8	Hellroaring Lake Creek bridge downstream to Redfish Lake Creek.

Appendix 2. Planting sites and numbers of catchable rainbow trout stocked in the Salmon Region by Sawtooth Fish Hatchery during May through September, 1996.

Site	Number
Salmon River	40,350
Valley Creek	4,300
Perkins Lake	2,000
Pettit Lake	3,271
Grouse Lake	110
Yankee Fork Ponds	7,000
Little Bayhorse Lake	4,000
Big Bayhorse Lake	2,000
Stanley Lake	14,200
Alturas Lake	13,700
Kelly Creek Pond	550
TOTALS	91,481

IDAHO DEPARTMENT OF FISH AND GAME

RESIDENT HATCHERIES

FISH HEALTH REPORT

1996

Douglas R. Burton, Fishery Pathologist

INTRODUCTION

As the Resident Hatchery Pathologist, my primary duties are to provide fish health inspection and diagnostic services to the Idaho Department of Fish and Game's (IDFG) resident fish hatcheries. I also provide these same services to IDFG fishery managers and biologists around the state, and occasionally to private individuals when the information or relationship is of benefit to the Department. I am the resident hatchery monitor for the Western Regional INAD (Investigational New Animal Drug) program.

I examined 114 cases at IDFG resident hatcheries during 1996; 69 routine inspections (including 35 inspections of feral broodstock) and 45 diagnostic cases. This was a decrease from the total number of cases handled in 1995 (139 total cases, 89 inspection, and 50 diagnostic). I also handled 19 wild fish survey inspections and 15 research cases. A summary of the work at each individual hatchery, as well as the results of all sampling done at the hatcheries, are as follows.

AMERICAN FALLS

Flexibacteriosis (coldwater disease) continued to be the only serious disease problem at American Falls Hatchery. Once again, it appeared almost exactly three weeks after the two groups of Hayspur-strain rainbow trout *Oncorhynchus mykiss* fingerlings were transferred from the inside vats to the outside raceways (Appendix A). The standard dosage of oxytetracycline (OTC) (3.75 g/100 lbs of fish/day x 10 days) has not been fully effective at American Falls, but the 1996 INAD protocols allowed experimentation with an increased dosage (10 g/100 lbs/day x 14 days). This increased drug level was applied to both groups with good results. Losses dropped off and stayed low for the remainder of the rearing period. Later groups of Trout Lodge-strain fish did not experience any disease problems. It may be that this strain of fish has greater resistance to the strain of Flexibacter psychrophilus bacteria which seems to be endemic to American Falls Hatchery, although the different timing of the rearing cycle may also be involved. Unfortunately, this characteristic of the Trout Lodge fish does not hold true at other hatcheries in the IDFG system.

The hatchery manager initiated a test with the Hayspur lots received in November, where a portion of the fry were started in an outside raceway, thus entirely avoiding the transfer mentioned above. The remainder were moved outside shortly after swim up, instead of being held inside until they outgrew the vats. Hatchery personnel report that these fish remained healthy into 1997, with no signs of bacterial infection.

ASHTON HATCHERY

The only fishes that required a diagnostic check at Ashton in 1996 were the Henrys Lake brook trout *Salvelinus fontinalis* (Appendix B). A portion of the fry in each vat were observed floating on the surface until disturbed, then they would swim away. This was similar to what has been reported for the past three years, although numbers involved were not as great as in the past. Histology on these fish showed severe separation of the gill epithelium from base pillar cells which suggested either gas bubble disease or a heavy metal toxicity. I returned to Ashton with appropriate sampling gear and determined that the total gas pressure (TGP) in the hatchery water supply was 104%. Further examination discovered gas bubbles in the body cavities of several fry. A water sample was also taken to AlChem Laboratory in Boise and tested for lead, copper, and zinc. Zinc was detected at 0.003 mg/l, but it is not clear in the literature if this is a high enough concentration to effect fish health. My final conclusion was that the high TGP was the most likely culprit, and that some long-term solution to lower the dissolved gas level should be found. Other water chemistry results were: pH 7.50, alkalinity 164 mg/l, ammonia <0.05 mg/l, nitrate 5.14 mg/l, copper <0.01 mg/l, lead <0.002 mg/l.

The brook trout were sampled again in mid-summer due to slightly elevated mortality. They were found to be carrying both Flexibacter psychrophilus and Aeromonas hydrophila. Loading density in the raceway was reduced and mortalities declined without further treatment.

The Colorado River rainbow trout destined for Hayspur Hatchery broodstock were inspected and found to carry Renibacterium salmoninarum (RS) by Enzyme-Linked Immunosorbant Assay (ELISA). The Colorado River rainbow trout that were already at Hayspur were also carriers of RS, so it was decided that transfer of these fish was no additional threat to the program. Ashton's catchable rainbow trout were also inspected and no pathogens were detected.

CABINET GORGE HATCHERY

Health of the kokanee *O. nerka kennerlyi* fry and fingerling was reportedly very good this year. I was unable to schedule a routine visit during the production period (January through June) and never had to do so in response to a diagnostic call. Historically, the only fish health problem in this program is bacterial gill disease. Some new management approaches have been implemented which seem to have alleviated the problem, and the hatchery crew should be commended for this effort!

I did visit in December to do routine inspection of the spawning adults at Sullivan Springs (Appendix C). Numbers of fish returning to the hatchery ladder on the Clark Fork River were so low this year that I did not sample spawners. I requested that the hatchery crew freeze carcasses which will be tested for Renibacterium and whirling disease at a later date. The fish tested from Sullivan Springs were carrying a number of bacteria species (Flexibacter psychrophilus, Pseudomonas fluorescens, Flavobacterium sp., and Xanthomonas sp.) at levels somewhat elevated from years past. Significance of this is not certain, as the sample date was a couple of weeks later than usual and timing may have an effect on bacterial levels in one-time spawners like kokanee. No gross clinical signs of bacterial disease were evident.

CLARK FORK HATCHERY

Cutthroat trout *O. clarki* broodstock were inspected during spawning at Clark Fork Hatchery (Appendix D). Ovarian fluid samples were taken for both virology and fluorescent antibody tests, so no fish were sacrificed. Renibacterium salmoninarum was detected in the brood year 1991 fish, and Infectious Pancreatic Necrosis (IPN) virus was found in the brood year 1992 group.

A diagnostic visit was made to the hatchery in September. A number of brood year 1995 Arctic grayling *Thymallus arcticus* were laying on the bottom or swimming in a disoriented manner. This had been observed in the past with no associated mortality, but these fish were dying at a rate of 1-2% per day. No gross clinical signs were visible other than the abnormal behavior, and no major infectious agents could be isolated. Pasteurella aerogenes, a bacterium which is not reported in the literature as a fish pathogen, was isolated at moderately heavy levels. I was unable to make a conclusive diagnosis in this case, although I suggested a treatment of OTC in feed to treat the Pasteurella with the understanding that this population was never to be stocked out in public waters. Hatchery personnel chose not to apply the treatment and mortalities declined naturally, although the unusual behavior continued.

Fingerling Hayspur Kamloops were also examined and found positive for Flexibacter psychrophilus. There were signs of chronic coldwater disease in the population, but losses were not high enough to justify treatment. Finally, a check of the cutthroat trout fry detected IPN virus, which was not unexpected in those fish.

Samples of the cutthroat trout fingerling were shipped to the laboratory in October and again in December. Flexibacter psychrophilus and Pseudomonas fluorescens were detected in both samples, and the latter set of samples also tested positive for IPN virus. Signs were consistent with coldwater disease, so the raceway from which the October sample was taken was treated with OTC under an INAD protocol. Results of the treatment were quite good. The December samples were

from a different raceway and were received on the 30th, so no results were available before the first of the year. Although Clark Fork Hatchery was dropped from the INAD system in 1997, the presence of the Pseudomonas would have allowed legal treatment with OTC. Hatchery personnel chose not to treat and mortalities eventually declined.

Clark Fork personnel were responsible for spawning and sampling the adult fall chinook trapped at Wolf Lodge Creek. The green eggs were taken immediately to Sandpoint Hatchery, therefore the results of that sampling are reported in the Sandpoint Hatchery section (Appendix M).

CLEARWATER HATCHERY

Doug Munson, the Anadromous Fishery Pathologist, is responsible for most of the inspection work at Clearwater Hatchery, and so performed one diagnostic and two inspection examinations of the resident rainbow trout during the course of his routine visits to the facility. I made one inspection visit to the hatchery without sacrificing any fish. The one diagnostic case involved the Trout Lodge fish in March. Flexibacter psychrophilus was isolated from 4 of 4 fish, however total mortalities were never great enough to justify treatment.

GRACE HATCHERY

Flexibacteriosis and bacterial gill disease are historically the major disease problems at Grace, but only the latter was significant in 1996 (Appendix F). Flexibacter psychrophilus was isolated from two groups of rainbow/Kamloops catchables, but losses were not deemed great enough to warrant treatment. Bacterial Gill Disease was diagnosed three different times, each from lots of fish in the large raceways on mostly reuse water. Chloramine-T, used under INAD 9321 protocols, was successful in reducing mortalities in each instance.

Renibacterium salmoninarum continues to be detected brood year ELISA, at low levels, from various species of fish reared at Grace Hatchery. Rainbow trout and Kamloops trout catchables were found RS positive in 1996.

HAGERMAN HATCHERY

Much of the reduction in case load mentioned in the Introduction was at Hagerman Hatchery. I examined 19 diagnostic cases at Hagerman in 1996 compared

to 36 in 1995 (Appendix G). Significant problems continued with starting fry in the hatchery vats during January through March. Gills from fry on feed for 7 to 10 days showed extreme hyperplasia (proliferation of epithelial cells between the secondary lamellae), protozoan parasites (Ichthyobodo/Costia), and fungus. Treatments with Chloramine-T were unsuccessful in 1995, so this therapy was not considered in 1996. Instead, a number of things were tried to improve the environmental quality, such as cleaning out the dead eggs before pouring out the upwelling incubators, disinfecting vats with benzalkonium chloride instead of straight chlorine in case there was residual, and hand feeding instead of relying on belt feeders for the first couple of weeks. One or more of these seems to have helped, because survival in lots received in the latter portion of the year was significantly better than in those from the early months.

Fish moved to Hagerman's outside raceways are almost immediately challenged a barrage of pathogens. Flexibacteriosis and Infectious Hematopoietic Necrosis (IHN) often work together to remove a significant number of fish from production. It seems that if the bacteria is identified early enough in the episode for effective treatment with OTC (under INAD 9333 protocols), the impact of the viral involvement can also be reduced. Conversely, once the viral episode is well established, use of OTC is much less effective. A total of seven INAD trials using OTC to treat systemic flexibacteriosis (E. psychrophilus), external flexibacteriosis (E. columnaris), or both, were completed at Hagerman in 1996. Concomitant isolations of IHN virus were made in three instances. Fish species or strains treated included Hayspur rainbow trout, Hayspur Kamloops, Trout Lodge Kamloops, Colorado River rainbow trout (from Hayspur), and Henrys Lake rainbow x cutthroat hybrids. Most treatments were reasonably successful.

The completion of the bird netting over all of the large raceways and the reconstruction of the Tucker Springs portion of the large headrace have not yet had a significant effect in reducing losses at Hagerman. Specifically, IHN has continued to be a major problem in the large raceways. The opportunity for pathogen contamination has not been (and probably cannot be) totally eliminated, but it can be hoped that the frequency and intensity of disease episodes will eventually be reduced. The near elimination of bird predation should greatly increase inventory control. A reduction in total production on the facility, and a corresponding reduction in loading densities, could reduce losses to pathogens and possibly produce a higher quality fish.

An attempt was made to quantify the impact of the blood fluke Sanguinicola on production at Hagerman Hatchery (Appendix G, Accessions 96-210A-E). Specifically, a group of Kamloops trout were taken from a lot of fish which had been reared in raceways on the Riley Creek water supply. These fish were kept on that water and were sampled monthly over the summer. Aneurysms on the secondary gill filaments were presumed to indicate presence of the fluke. Numbers of fish with aneurysms were recorded to find the prevalence in the population, and total numbers of aneurysms per fish were counted to indicate levels of infection in individuals. Prevalence increased from May (56.7%) to June (77.4%), then significantly decreased

in July (28.1%) and August (25.8%). No sample was taken in September, but in October the prevalence had increased to about the same as in May (60.0%). Severity of infection in individuals was determined by the average number of aneurysms per gill arch. Negative fish had no aneurysms evident under a dissecting microscope. Fish with an average of ≤ 1.5 aneurysms per gill arch were ranked "low," those with 1.5 to 10 aneurysms per arch were ranked "moderate," and those with >10 were ranked "high." An index of infection was then calculated by giving a value to each ranking (negative=0, low=1, moderate=2, high=3), multiplying those values by the numbers of fish in each ranking, adding those numbers together, then dividing that total by the number of fish sampled. It was determined that the levels of infection in individual fish followed the same pattern as the prevalence in the population. The index of infection went up from May (1.00) to June (1.84), then dropped in July (0.59) and August (0.45). The index then went up again in October (1.13). An interpretation of this information is difficult to make with only one year's observations. Hatchery personnel reported that the "bleeding gill" syndrome, attributed to rupturing aneurysms when the fish are handled, was not as severe in 1996 as in past years. I hope to repeat these observations for several years, recording differences in water conditions, temperatures, etc., in order to learn why this parasite has greater impact in some years than in others.

HAYSPUR HATCHERY

There were no production fish reared at Hayspur this year, thus, there were no significant disease problems. My work at Hayspur involved considerable effort to inspect broodstock and broodstock replacement lots, and to inject the female broodstock with OTC. This meant that I worked more closely with the Hayspur personnel than with those of any other hatchery. I wish to express my appreciation to Bob Esselman, Doug Young, and Paul Dorman for their efforts to assist my work and make it most enjoyable.

The brood year 1994 replacement broodstock of both the Hayspur rainbow and Kamloops were inspected in September. No viruses or Myxobolus spores were detected. It was disappointing, in light of the effort and expense invested in sampling and culling, to find that both populations tested positive for Renibacterium by ELISA (Appendix H, Accessions 96-368 and 96-379). These fish were all held on spring/well water at Hayspur, but in the small raceways which are in very close proximity to the open pond. The fish were subject to predation by otters or mink which easily penetrated the light-weight bird net over the raceways. I believe it would greatly benefit the program to invest in some type of solid predator enclosure around these raceways if replacement broodstock are to be kept at Hayspur.

Intensive sampling and culling of the replacement broodstock pairings continued to be the health priority at Hayspur Hatchery. Ovarian fluids were collected from

every female for virology and membrane filtration fluorescent antibody (MFAT) analysis. In addition, a portion of the females from each population were sacrificed for ELISA, direct fluorescent antibody (DFAT), and some tissue virology tests. Eggs from individual females were held in isolation until the test results were available. Groups of eggs were culled if the parent female tested positive for any virus, or for Renibacterium salmoninarum (RS) by MFAT or DFAT. The culling criteria for ELISA was set at an optical density (OD) ≥ 0.20 for the spawning that was done in January and February of 1996. The culling level was reduced to ≥ 0.11 beginning with the fall spawning season. One hundred percent of the females from all spawning populations were injected with OTC in September and October 1996. The purpose of the injections was to inhibit transmission of Flexibacter psychrophilus, but there may have been some additional benefit in lowering the levels of Renibacterium. Possibilities exist to alter this injection program to utilize other drugs on a Veterinary extralabel permit.

Colorado River Rainbow Trout

The 1996 spawning season (December 1995 through February 1996) was the first replacement broodstock spawning of the Colorado River-strain broodstock at Hayspur Hatchery. These fish had been held for some years at Ashton Hatchery before being transferred to Hayspur. (Another age class was still at Ashton at the beginning of the year). There were two age classes of mature brood fish at Hayspur for the 1996 spawning season. These fish were all held in one round pond (with differential adipose fin clips), so were treated as one population for disease sampling. Two hundred females were tested using ovarian fluids for MFAT and virology. Forty-six females and 15 males were sacrificed for ELISA and DFAT. No viruses were detected in the population and one female tested positive for RS by MFAT. Her eggs were culled. These fish had a history of ELISA positive tests, so the one positive result was no surprise.

Ashton Hatchery transferred another year class of Colorado River rainbow trout to Hayspur in the summer of 1996. Lack of space forced hatchery personnel to put these fish in the same pond as the other two year classes. This was not of great concern, in that there was no indication from my samples that these fish carried anything that was not already present in the population. However, I strongly recommend that this practice not be continued with the progeny of the pairings reported above.

Hayspur Rainbow

The Hayspur-strain broodstock replacement spawning began on October 16 and ended December 18. A total of 200 females (198 domestic and 2 feral) were tested. Sixty domestic females and both ferals were sacrificed for ELISA and DFAT. Ovarian fluids for virology and MFAT were collected from all but one female. (That fish was “dry” so was sacrificed for DFAT, ELISA, and tissue virology). No viruses were detected from any fish. A total of 12 fish, 10 domestic and 2 feral, tested positive for RS (5.05% of domestics and 100% of ferals). Among the positive domestic females, 6 were positive by ELISA only, with a minimum OD of 0.101 and a maximum of 0.213. The other 4 positive females were detected by MFAT. Ten lots of eggs were culled (8 domestic and 2 feral). The number of positive females detected in the domestic population was slightly higher than the previous year (3 positive, 2 by ELISA, and 1 by MFAT). This may be explained by the fact that Renibacterium is very slow growing, and we were sampling the same population a year later. This additional time may have allowed the bacterial titer within some individuals to become great enough for our laboratory techniques to detect. Prevalence in the population is still significantly less than that of the fish which were once reared in the earth pond.

Hayspur Kamloops

Kamloops spawning at Hayspur overlaps the end of the calendar year. The results of the 1995-96 season were reported in the 1995 Resident Hatchery Annual Report, therefore, only the results of the 1996-97 season will be included in this report. One hundred twenty-eight Kamloops females were tested between December 10, 1996 and February 19, 1997. No viruses were detected. Nine fish were found to carry RS (7.0%) by either ELISA, MFAT, or both. As a result of these RS-positive tests, 7 lots of eggs were culled. The majority of the positive females tested were from older year classes in Pond #4. A group of 29 males from Pond #4 were also tested by ELISA and 3 (10.3%) were positive with optical densities of 0.113, 0.159, and 0.199.

HENRYS LAKE HATCHERY

Disease inspection samples were taken from spawning cutthroat trout at Henrys Lake Hatchery from March 8 through April 12, 1996 (Appendix I). Ovarian fluids were collected by hatchery personnel and shipped to the Eagle Laboratory where they were tested for viruses (200 females in 40 five-fish pools) and RS (1755 females in 351 pools). A group of 60 fish (both males and females) were sacrificed for ELISA,

virology, and Myxobolus tests. All tests were negative for viruses (both tissues and ovarian fluid). Renibacterium salmoninarum was detected by FAT in 2 ovarian pools, and by ELISA in 12 of 12 pooled kidney samples (all lows). Eggs from the FAT-positive pools were discarded. Bacteriology samples taken from 12 fish showed a low-level mix (bacteremia) of potential pathogens, including species of Pseudomonas, Flavobacter, and Flexibacter (other than psychrophilus). Microsporidian spores were detected by the digestion method in 4 of 12 pooled samples. Histology confirmed the spores were in the cartilage, thus the diagnosis was Myxobolus cerebralis, the causative agent of whirling disease.

Similar samples were taken from spawning brook trout in October and November. Because of a personnel change, Ashton Hatchery personnel were in charge of spawning at Henrys Lake, resulting in a change in sample-taking methods. Pooled gametes were collected at the trap and transported to Ashton, where ovarian fluid samples were decanted before the eggs were fertilized. Those samples were then shipped to the laboratory. A total of 60 pooled ovarian fluid samples (377 fish) were tested (182 fish for viruses and 313 for RS). No pathogens were detected from ovarian samples. In addition, a group of 50 males were sacrificed for ELISA, Myxobolus, bacteriology, and virology tests. All fish tested were negative for viruses. ELISA results indicated RS positives from 8 of 25 two-fish pools, all lows. For the second year in a row, Myxobolus spores were detected by the digestion method from 1 of 10 pooled samples, but histology was unable to confirm the species.

Much of the geographic region around Henrys Lake is positive for Myxobolus cerebralis, and it was probably inevitable that the parasite would eventually be detected from fish in the lake. This parasite has been strongly implicated in the reduction of several riverine wild trout populations, but the potential impact on lake or reservoir populations has not been well documented. A high priority should be put on sampling the feeder streams as well as the Henrys Fork immediately below the lake as soon as possible.

KOOTENAI HATCHERY

Fish health at Kootenai Hatchery was reportedly excellent in 1996. No outbreaks of bacterial gill disease or any other disease in the Kootenai River sturgeon were reported, therefore, no one from the Laboratory visited the facility this year. The remote location of the facility discourages routine inspection visits, and the endangered species listing of the fish precludes me from sampling them even if I wanted to.

MACKAY HATCHERY

Mackay Hatchery was visited once in 1996 (Appendix J). Inspection samples were taken from five of the populations on-station at the time. No pathogens were detected from Hayspur rainbow trout, the westslope cutthroat trout from McCall, the Henrys Lake rainbow x cutthroat hybrids, or from the Deadwood Reservoir early kokanee. The only pathogen detected from production fish was Flexibacter psychrophilus, which was found in 100% of a select group of the Henrys Lake cutthroat trout fingerlings. Specifically, the hatchery manager mentioned that there seemed to be an unusually high percentage of deformed “dwarf” fish in a few, but not all, raceways of these fish. I took a small sample of just these deformed fish and found the bacterium in all of them. Classic clinical signs of coldwater disease were not evident.

None of the production fish at Mackay tested positive for Myxobolus cerebralis, but we know that the parasite has been found in fish from the settling pond. The proximity of M. cerebralis 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 at Fish Lake were sampled by Eagle Laboratory personnel on May 2 (Appendix K). The run was small this year, so only 10 fish were sacrificed for tissue samples (ELISA, kidney imprint FAT, and VIRO). Ovarian fluids from 29 females were collected and used for virology and FAT (pellet) tests. All samples were negative for replicating viruses, and all FAT were negative for Renibacterium salmoninarum, but 8 of 10 kidney samples were positive for RS by ELISA (all lows). The prevalence of RS in this population has remained constant in the last four years of sampling by ELISA (87% in 1993, 90% in 1994 and 1995). No clinical signs of BKD have been observed in any of those years. It is uncertain what, if any, direct impact that RS is having on this population. However, this should certainly raise some concern about where progeny of this population are stocked.

A group of Wyoming grayling, which had just been transferred from Ashton Hatchery to McCall, were examined by Doug Munson. The fish were extremely small (approximately 3,000/lb), making them nearly impossible to sample for most pathogens. Whole fish were processed for virology, but no viruses were detected. The losses decreased naturally, and may have been a natural drop off of first-feeding larvae or a response to the handling and transfer.

NAMPA HATCHERY

Pathologists from the Eagle Fish Health Laboratory visited the hatchery on 11 occasions in 1996 (a decrease from 14 times in 1995). Systemic flexibacteriosis (E. psychrophilus) and motile aeromonad septicemia (primarily A. hydrophila) were the two most common diseases diagnosed in rainbow trout at Nampa (Appendix L). Not all episodes were severe enough to warrant treatment. Oxytetracycline was used, either under INAD or existing label approval, when losses became unacceptable. Results of OTC treatment were generally good, with one exception. In that case, Hayspur-strain rainbow trout were diagnosed with flexibacteriosis. Mortalities declined in three effected raceways following treatment, but increased again in one of the three 4-6 weeks following the treatment. A second treatment of that one raceway seemed to resolve the situation.

An adult male Hells Canyon steelhead was discovered swimming in a production raceway on May 21. It was assumed that the fish was one of a group transported from the Oxbow Hatchery and released for angling opportunity in the Boise River. The fish must have come up the Wilson Drain/Pond system into the settling pond and tailrace of the hatchery. The fish was sampled and tests were negative for viruses M. cerebralis and Ceratomyxa shasta. The fish tested positive for Renibacterium by ELISA at a low level.

Contact has been made with a toxicology expert at Wright State University to help identify the mystery "blue-green" algae which sometimes causes losses at Nampa Hatchery. Unfortunately, from an identification standpoint but not from the fish health view, the syndrome was not seen during 1996. We will follow up on this if, or when, the problem occurs again.

Nampa personnel were responsible for spawning early kokanee at Deadwood Reservoir. However, the eggs were shipped green to Mackay Hatchery, so results of the inspection on these fish are summarized in the Mackay Hatchery section of this report (Appendix J).

SANDPOINT HATCHERY

I visited the hatchery twice in 1996, specifically to sample the Washoe Park cutthroat trout broodstock (Appendix M). This provided three inspections, at least six months apart, as required for this population to be considered a "certified" disease-free broodstock. (The first sample for the brood year 1992 lot was in May 1995). Both the brood year 1992 and brood year 1993 lots were sampled on May 13, 1996. The only potential pathogen detected in the brood year 1992 lot was a ubiquitous Pseudomonas species which is not a certifiable pathogen. None of the fish appeared

in any way effected by the presence of the bacteria. No pathogens were detected from the brood year 1993 lot. The second sample for both lots was in December. This time, two species of Pseudomonas were found in the brood year 1993 group. Again, there were no indications of clinical disease. An ELISA optical density of 0.100 was registered from one 5-fish pool of kidney tissue from the brood year 1992 lot. All the fish from that pool tested negative by direct FAT, which is the accepted test method in the AFS Fish Health Blue Book. Considering that an OD of 0.100 is the arbitrary cutoff between negative and low positive, and that the fish still had considerable food in the intestinal tract despite being off feed for the previous weekend, I would not have been uncomfortable saying that the result was probably a false positive. The point became moot December 31, when heavy snow and rain collapsed the hatchery supply pipe and all of the cutthroat trout broodstock were lost.

ACKNOWLEDGMENTS

I wish to gratefully acknowledge my supervisor, Keith Johnson, and my anadromous counterpart, Doug Munson, for their assistance in the field and for sharing their considerable knowledge with me. The efforts of the Laboratory Technologists Sharon Wavra, Roberta Scott, and Carla Hogge, are greatly appreciated. Their timely and accurate results from the laboratory are essential in diagnosing and treating fish health problems in the field. Deanna Lokker's ability to organize the masses of information and paperwork is a very important contribution to our team. Finally, I wish to acknowledge the Hatchery Managers and personnel with whom I worked. Their cooperation is greatly appreciated, and I sincerely hope I have been able to benefit their programs.

Appendix A. Summary report of Eagle Fish Health Laboratory results for American Falls Hatchery (Class A). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	96-154	-	-			-	-	+						DX: CWD, Pseudomonad septicemia; VIRO 0/8 F. psychrophilus 8/8 Pseudomonas 4/8 INAD protocol #20209
1996	Hayspur	Rainbow trout	96-199	-	-			-	-	+						DX: CWD, Bacteremia; F. psychrophilus 6/10 INAD protocol #20328

Appendix B. Summary report of Eagle Fish Health Laboratory results for Ashton Hatchery (Class B). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1995	Henrys Lake	Brook trout	96-053													DX: Histopath results: Epithelial/capillary separation in gills, congestion in liver. Possible heavy metal toxicity or response to GBD. Subsequent test: TGP=104%
1994	Colorado River	Rainbow trout	96-139	-	-		+	-	-	-		-				IX: RS; VIRO 0/60 ELISA 2/12 pools low, FAT 0/60, WHD 0/60 BACTE-NSG
1995	Henrys Lake	Brook trout	96-221	-	-			-	-	+						DX: CWD, MAS; VIRO 0/8 <u>E. psychrophilus</u> 3/8, <u>A. hydrophila</u> 2/8
1996	Hayspur	Rainbow trout	96-222	-	-			-	-	-		-				IX: NPD; VIRO 0/20, BACTE-NSG

Appendix C. Summary report of Eagle Fish Health Laboratory results for Cabinet Gorge Hatchery (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Sullivan Springs	Kokanee salmon	96-541	-	-		+	-	-	+		-				IX: Mixed Bacteremia, CWD; VIRO 0/60, FAT 0/60, ELISA 2/12 pools low, <u>E. psychrophilus</u> 6/8 <u>P. fluorescens</u> 6/8 <u>Flavobacterium</u> sp. 5/8 <u>Xanthomonas</u> sp. 4/8 WHD 0/60

Appendix D. Summary report of Eagle Fish Health Laboratory results for Clark Fork Hatchery (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Kamloops trout	96-202	-	-			-	-	-						DX: Undetermined etiology; VIRO 0/10 BACTE-NSG
1991 (Brood)	Clark Fork	Cutthroat trout	96-203	-	-		+									IX:BKD; FAT 7/50, VIRO 0/50
1992 (Brood)	Clark Fork	Cutthroat trout	96-204	-	+		-									IX:IPNV; IPN 1/50 IHN 0/50, FAT 0/50
1995	Wyoming	Grayling	96-396	-	-		-	-	-	-	-					DX:Bacteremia; VIRO0/10 ELISA 0/10, PKX 0/8, Enterocytozoon 0/8, EIBS 0/8
1995	Hayspur	Kamloops trout	96-397	-	-		-	-	-	+						DX: CWD; VIRO 0/5 ELISA 0/5, FAT 0/5 <u>F. psychrophylus</u> 4/4
1996	Clark Fork	Cutthroat trout	96-398	-	+											DX: IPN; IPNV 1/2 pools, IHNV 0/10
1996	Clark Fork	Cutthroat trout	96-427					-	-	+						DX; CWD, Pseudomonad Septicemia; <u>F. psychrophylus</u> 7/8 <u>P. fluorescens</u> 4/8 <u>P. cepacia</u> 4/8
1996	Clark Fork	Cutthroat trout	96-548	-	+			-	-	+						DX:CWD, Pseudomonad septicemia, IPNV; IPN 2/2 pools, IHN 0/10, <u>F. psychrophylus</u> 6/12 <u>P. fluorescens</u> 6/12

Appendix E. Summary report of Eagle Fish Health Laboratory results for Clearwater Hatchery Resident Trout Program (ClassC). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1995	Trout Lodge	Rainbow trout	96-070*	-	-			-	-	+						DX: CWD; VIRO 0/5, <u>F. psychrophilus</u> 4/4
1995	Hayspur	Rainbow trout	96-224*	-	-			-	-	-						IX: NPD; VIRO 0/10, FAT 0/10, BACTE 0/8
1996	Hayspur	Rainbow trout	96-487*	-	-			-	-	-						IX: NPD; VIRO 0/4 BACTE 0/8

*Sampled and reported by A. D. Munson.

Appendix F. Summary report of Eagle Fish Health Laboratory results for Grace Hatchery (Class B). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1995	Hayspur	Kamloops trout	96-051	-	-		+	-	-	+		-				DX: CWD, RS; VIRO 0/5 <u>E. psychrophilus</u> 1/4 ELISA 1/1 pools low
1995	Hayspur	Rainbow trout	96-052	-	-		+	-	-	+						DX: CWD, MAS, RS; ELISA 1/1 pool low <u>E. psychrophilus</u> 1/2 <u>Aeromonas</u> sp. 1/2
1995	Mt. Lassen	Rainbow trout	96-193					-	-	-						DX:BGD, Multiple parasitism; <u>Gyrodactylus</u> 2/4 <u>Hexamita</u> 1/4
1995	Mt. Lassen	Rainbow trout	96-242					-	-	-						DX: BGD 1/1
1996	Hayspur	Rainbow trout	96-258					-	-	-						DX: BGD 1/2

Appendix G. Summary report of Eagle Fish Health Laboratory results for Hagerman Hatchery (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	96-021	-	-											IX: Single parasitism-Costia; VIRO 0/10
1996	Arlee	Rainbow trout	96-022					-	-	-						IX: MAS Aeromonas 1/4
1996	Hayspur	Rainbow trout	96-067	-	-			-	-	-						DX: NPJ; VIRO 0/10, BACTE-NSG
1995	Hayspur	Rainbow trout	96-068	+	-			-	-	+						DX: IHN, CWD; IHNV 1/1 (pooled), <u>F. psychrophilus</u> 4/4
1995	Hayspur	Rainbow trout	96-077	+	-			-	-	+						DX: IHN, CWD; IHNV 2/2 (pooled), <u>F. psychrophilus</u> 2/8
1996	Colorado River	Rainbow trout	96-094													DX: Single parasitism-Costia (very heavy)
1996	Hayspur	Rainbow trout	96-095	-	-			-	-	-						DX: Costiasis, Bacteremia; VIRO 0/15
1995	Hayspur	Rainbow trout	96-096	-	-			-	-	+						DX: Columnaris, CWD, MAS; VIRO 0/10 <u>F. columnaris</u> 4/8, <u>F. psychrophilus</u> 1/8 <u>Aeromonas</u> sp. 4/8
1995	Henry's Lake	Rainbow x cutthroat hybrids	96-097	-	-			-	-	-						DX: Columnaris, MAS; VIRO 0/10, <u>F. columnaris</u> 4/8, <u>A. hydrophila</u> 3/8 INAD protocol #20161
1995	Hayspur	Kamloops trout	96-122	+	-			-	-	+						DX: IHNV, Columnaris, CWD, BGD; IHNV 2/2 pools, <u>F. columnaris</u> 1/7, <u>F. psychrophilus</u> 5/7 INAD protocol #20201

Appendix G. Hagerman Hatchery--Continued.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	96-179	-	-			-	-	-						DX:NPD; VIRO 0/5 BACTE-NSG
1995	Hayspur	Kamloops trout	96-180	+	-			-	-	-						DX: IHN, Columnaris; IHNV 1/1 (5-fish pool), IPN 0/5 <u>F. columnaris</u> 2/4 INAD protocol #20277
1995	Hayspur	Rainbow trout	96-181	+	-											DX: IHN; IHNV 1/1(5-fish pool),IPN 0/5
1996	Hayspur	Rainbow trout	96-208					-	-	-						DX: MAS, Columnaris; <u>F. columnaris</u> 4/4, <u>A. hydrophila</u> 3/4, <u>A. caviae</u> 2/4
1996	Hayspur	Rainbow trout	96-209	-	-			-	-	-						DX: Columnaris; VIRO 0/8 <u>F. columnaris</u> 2/8 INAD protocol #20331
1995 17/30	Trout Lodge	Kamloops trout	96-210A													RX: Single parasitism <u>Sanguinicola</u> aneurysms
1995	Trout Lodge	Kamloops trout	96-210B													RX: Single parasitism <u>Sanguinicola</u> aneurysms 24/31
1995	Trout Lodge	Kamloops trout	96-210C													RX: Single parasitism <u>Sanguinicola</u> aneurysms 9/32
1995	Trout Lodge	Kamloops trout	96-210D													RX: Single parasitism <u>Sanguinicola</u> aneurysms 8/31
1995	Trout Lodge	Kamloops trout	96-210E													RX: Single parasitism <u>Sanguinicola</u> aneurysms 18/30

Appendix G. Hagerman Hatchery--Continued.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	96-223	+	-			-	-	-						DX: IHN; IHNV 2/2 pools
1996	Hayspur	Rainbow trout	96-228	+	-			-	-	+						DX: IHN, CWD; IHNV .1/2 pools, <i>E. psychrophilus</i> 7/8 INAD protocol #20487
1996	Colorado River	Rainbow trout	96-229	-	-			-	-	+						DX: CWD; VIRO 0/10 <i>F. psychrophilus</i> 7/8 INAD protocol #20515
1996	Trout	Kamloops trout	96-234					-	-	+						DX: CWD; <i>F. psychrophilus</i> 4/4 INAD protocol #20533
1996	Sawtooth	Steelhead A trout	96-235					-	-	-						DX: MAS; VIRO 0/5 <i>A. hydrophila</i> 2/4
1996	Trout Lodge	Kamloops trout	96-412	-	-			-	-	-						DX: MAS; VIRO 0/15 <i>A. hydrophila</i> 3/8 <i>A. sobria</i> 4/8
1996	Trout Lodge	Kamloops trout	96-421	-	-			-	-	-						DX: External Aeromonad Infection; VIRO 0/5, <i>A. sobria</i> 2/4
1996	Trout	Kamloops trout	96-422					-	-	-						IX: NPD; BACTE 0/4

Appendix H. Summary report of Eagle Fish Health Laboratory results for Hayspur Hatchery (Class A & C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Hayspur	Kamloops trout	96-003	-	-		+									IX: RS; VIRO 0/14, DFAT 0/20, MFAT 0/14, ELISA 3/20 (1 low, 2 mod.)
Brood	Colorado River	Rainbow trout	96-007	-	-		-									IX: NPD; VIRO 0/50, MFAT 0/50 DFAT 0/30, ELISA 0/31
Brood	Colorado River	Rainbow trout	96-013	-	-		-									IX: NPD; VIRO 0/50, MFAT 0/50
Brood	Colorado River	Rainbow trout	96-020	-	-		-									IX: NPD; VIRO 0/60
Brood	Colorado River	Rainbow trout	96-035	-	-		+									IX: RS; VIRO 0/20 MFAT 1/20
1994	Hayspur	Rainbow trout	96-368	-	-		+									IX: RS; VIRO 0/60 DFAT 0/60, WHD 0/60 ELISA 11/60 (10 low, 1 mod)
1994	Hayspur	Kamloops trout	96-379	-	-		+									IX: RS; VIRO 0/60 ELISA 6/60, all low DFAT 0/60
Brood	Hayspur	Rainbow trout	96-426	-	-		-									IX: NPD; VIRO 0/20, DFAT 0/10, MFAT 0/20, ELISA 0/10
Brood	Hayspur	Rainbow trout	96-452	-	-		+									IX: RS; VIRO 0/30 DFAT 0/10, MFAT 0/30 ELISA 3/10
Brood	Hayspur (feral)	Rainbow trout	96-468	-	-		+									IX: RS; VIRO 0/1 DFAT 0/1, MFAT 0/1, ELISA 1/1 moderate
Brood	Hayspur	Rainbow trout	96-469	-	-		+									IX: RS; VIRO 0/49 DFAT 0/10, MFAT 2/48 ELISA 1/10 low

Appendix H. Hayspur Hatchery--Continued.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Hayspur (feral)	Rainbow trout	96-497	-	-		+									IX: RS; VIRO 0/1 DFAT 0/1, MFAT 0/1 ELISA 1/1 low
Brood	Hayspur	Rainbow trout	96-498	-	-		+									IX: RS; VIRO 0/49 DFAT 0/10, MFAT 1/48 ELISA 0/10
Brood	Hayspur	Rainbow trout	96-506	-	-		+									IX: RS; VIRO 0/30 DFAT 0/10, MFAT 1/30 ELISA 2/10 (both low)
Brood	Hayspur (feral)	Rainbow trout	96-507				+									IX: RS; DFAT 0/2, ELISA 2/2 (both low), WHD 0/2
Brood	Hayspur	Kamloops trout	96-519	-	-		+									IX: RS; VIRO 0/30 DFAT 0/16, MFAT 2/30 ELISA 3/16 (all low)
Brood	Hayspur	Rainbow trout	96-536	-	-		-									IX: NPD; VIRO 0/20 DFAT 0/10, MFAT 0/20 ELISA 0/10
Brood	Hayspur	Kamloops trout	96-542	-	-		-									IX:NPD; VIRO 0/25 DFAT 0/11, MFAT 0/25 ELISA 0/11
Brood	Colorado River	Rainbow trout	96-549	-	-		+									IX:RS; VIRO 0/50 DFAT 0/22* , MFAT 0/50 ELISA 1/22* very low (*includes 2 males)

Appendix I. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Cutthroat trout	96-074				-									IX NPD; FAT 0/20
Brood	Henrys Lake	Cutthroat trout	96-075				-									IX: NPD; FAT 0/90
Brood	Henrys Lake	Cutthroat trout	96-082				-									IX: NPD; FAT 0/80
Brood	Henrys Lake	Cutthroat trout	96-083				-									IX: NPD; FAT 0/110
Brood	Henrys Lake	Cutthroat trout	96-084				+									IX: RS; FAT 1/32 pools
Brood	Henrys Lake	Cutthroat trout	96-090				-									IX: NPD; FAT 0/150
Brood	Henrys Lake	Cutthroat trout	96-091				-									IX: NPD; FAT 0/90
Brood	Henrys Lake	Cutthroat trout	96-092				-									IX: NPD; FAT 0/40
Brood	Henrys Lake	Cutthroat trout	96-107				-									IX: NPD; FAT 0/135
Brood	Henrys Lake	Cutthroat trout	96-108				-									IX:NPD; FAT 0/150
Brood	Henrys Lake	Cutthroat trout	96-109				-									IX: NPD; FAT 0/150
Brood	Henrys Lake	Cutthroat trout	96-123	-	-		-									IX: NPD; VIRO 0/80 FAT 0/80
Brood	Henrys Lake	Cutthroat trout	96-124	-	-		+									IX:RS; VIRO 0/110 FAT 1/22 (pools)
Brood	Henrys Lake	Cutthroat trout	96-140	-	-											IX: NPD; VIRO 0/10

Appendix I. Henrys Lake Hatchery--Continued.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Cutthroat trout	96-141				-									IX: NPD; FAT 0/80
Brood	Henrys Lake	Cutthroat trout	96-142	-	-		+	-	-	-		+				IX: RS, WHD; VIRO 0/60 FAT 0/60, BACTE 0/12 ELISA 12/12 (pools) all low <u>M. cerebralis</u> 4/12 pools Histology confirmed
Brood	Henrys Lake	Cutthroat trout	96-157				-									IX: NPD; FAT 0/170
Brood	Henrys Lake	Cutthroat trout	96-158				-									IX: NPD; FAT 0/60
Brood	Henrys Lake	Brook trout	96-435	-	-											IX: NPD; VIRO 0/20
Brood	Henrys Lake	Brook trout	96-438	-	-											IX: NPD; VIRO 0/19
Brood	Henrys Lake	Brook trout	96-440	-	-											IX: NPD; VIRO 0/25
Brood	Henrys Lake	Brook trout	96-455	-	-		-									IX: NPD; VIRO 0/61, FAT 0/61
Brood	Henrys Lake	Brook trout	96-458	-	-		-									IX: NPD; VIRO 0/57, FAT 0/57
Brood	Henrys Lake	Brook trout	96-467	-	-		+	+	-	+		-				IX: RS, FUR, CWD; VIRO 0/50, FAT 0/115, ELISA 8/25 (all low), <u>E. psychrophilus</u> 2/4, <u>A. salmonicida</u> 2/4, <u>Myxobolus</u> sp. 1/10(pools)
Brood	Henrys Lake	Brook trout	96-481				-									IX:NPD; FAT 0/80
Brood	Henrys Lake	Brook trout	96-482				-									IX:NPD; FAT 0/50

Appendix J. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery (Class A). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	96-320	-	-		-	-	-	-		-				IX:NPD; VIRO 0/25 ELISA 0/25, WHD 0/25 BACTE-NG
1996	Fish Lake (McCall)	Cutthroat trout	96-321	-	-			-	-	-						IX:Bacteremia; VIRO 0/20 <u>Pseudomonas</u> 1/4
1996	Henrys Lake	Cutthroat trout	96-322	-	-			-	-	+						IX: CWD; VIRO 0/10 <u>E. psychrophilus</u> 3/4
1996	Henrys Lake	Rainbow x cutthroat hybrids	96-323	-	-			-	-	-						IX: NPD; VIRO 0/20 BACTE-NSG
1995	Deadwood Reservoir	Kokanee salmon	96-324	-	-		-					-				IX: NPD; VIRO 0/20 ELISA 0/20, FAT 0/20 WHD 0/20
Brood	Deadwood Reservoir	Kokanee salmon	96-358	-	-		+					-				IX: RS; VIRO 0/60 FAT 0/60, WHD 0/60 ELISA 5/12 5-fish pools (all low)

Appendix K. Summary report of Eagle Fish Health Laboratory results for McCall Hatchery Resident Program (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Westslope (Fish Lake)	Cutthroat trout	96-187	-	-		+					-	-			IX: RS; VIRO 0/39 ELISA 8/10 (all low), DFAT 0/39, Epithelial papillomas present on several fish
1996	Wyoming	Grayling	96-265*	-	-											IX: NPD, VIRO 0/7

*Sampled by A. Douglas Munson.

Appendix L. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery (Class C). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1995	Hayspur	Rainbow trout	96-009	-	-			-	-	+						DX: CWD, MAS; VIRO 0/5, <u>E. psychrophilus</u> 4/7, <u>Aeromonas</u> sp. 3/7 . INAD protocol #20056
1995	Hayspur	Rainbow trout	96-066	-	-			-	-	+						DX: CWD; VIRO 0/6, <u>E. psychrophilus</u> 2/8 INAD protocol #20142
1995	Saratoga	Brown trout	96-088	-	-			-	-	-						DX: NPD; VIRO 0/10
1995	Hayspur	Rainbow trout	96-128	-	-			-	-	-						DX: MAS; VIRO 0/8 <u>Aeromonas</u> sp. 2/8
1996	Hayspur	Rainbow trout	96-159					-	-	+						DX: CWD; <u>E. psychrophilus</u> 6/8 INAD protocol #20242
Adult	Hells Canyon	Steelhead trout	96-212	-	-		+	-	-	-		-	-			IX: RS; ELISA 1/1 low VIRO 0/1, FAT 0/1 CSH 0/1, WHD 0/1
1996	Colorado River	Rainbow trout	96-226	-	-			-	-	+						DX: CWD; VIRO 0/10 <u>E. psychrophilus</u> 7/8 INAD protocol #20514
1996	Colorado River	Rainbow trout	96-231					-	-	+						DX: CWD; <u>E. psychrophilus</u> 7/8 INAD protocol #20514 Followup to 96-226
1996	Trout Lodge	Kamloops trout	96-332	-	-			-	-	+						DX: MAS, CWD; VIRO 0/10 <u>A. hydrophila</u> 2/4 <u>E. psychrophilus</u> 1/4
1996	Trout Lodge	Kamloops trout	96-333	-	-			-	-	+						DX: MAS, CWD; VIRO 0/10 <u>A. sobria</u> 1/4 <u>E. psychrophilus</u> 1/4

Appendix L. Nampa Hatchery--Continued.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Trout Lodge	Kamloops trout	96-352					-	-	-						DX:NPD; BACTE-NSG
1996	Trout Lodge	Kamloops trout	96-364	-	-			-	-	-						DX: MAS, Single parasitism; VIRO 0/10 <u>A. hydrophila</u> 5/8 <u>Hexamita</u> 3/5

Appendix M. Summary report of Eagle Fish Health Laboratory results for Sandpoint Hatchery (ClassCB). January 1 - December 31, 1996.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1993	Washoe Park Westslope	Cutthroat trout	96-200	-	-		-	-	-	-		-				IX: NPD; VIRO 0/60, ELISA 0/60, FAT 0/60, WHD 0/60, (Sample date 5/13)
1992	Washoe Park Westslope	Cutthroat trout	96-201	-	-		-	-	-	-		-				IX: Pseudomonad bacteremia; VIRO 0/60 ELISA 0/60, FAT 0/60 WHD 0/60, Pseudomonas 1/12 (Sample date 5/13)
Brood	Wolf Lodge Creek	Fall chinook	96-359	-	-		+					-				IX: RS; VIRO 0/12 ELISA 1/12 low, FAT 0/12 WHD 0/5
Brood	Wolf Lodge Creek	Fall chinook	96-373	-	-		-					-				IX: NPD; VIRO 0/5, ELISA 0/5, WHD 0/5
Brood	Wolf Lodge Creek	Fall chinook	96-395	-	-		+					-				IX: RS; VIRO 0/2, ELISA 1/2 low, WHD 0/2
Brood	Wolf Lodge Creek	Fall chinook	96-408	-	-		+					-				IX: RS; VIRO 0/15 ELISA 2/15 (1 low, 1 mod), WHD 0/15
1992	Washoe Park Westslope	Cutthroat trout	96-539	-	-		+	-	-	-		-				IX: RS; VIRO 0/60 ELISA 1/12(od = 0.100), FAT 0/60, WHD 0 /30, BACTE-NSG (Sample date 12/17)
1993	Washoe Park Westslope	Cutthroat trout	96-540	-	-		+	-	-	-		-				IX: NPD; VIRO 0/60, ELISA 0/60, FAT 0/60, WHD 0/30, BACTE-NSG (Sample date 12/17)

Submitted by:

Bill Doerr, Fish Hatchery Manager I
David Billman, Assistant Hatchery Manager
Todd Garlie, Fish Culturist
Mel Sadecki, Fish Hatchery Manager I
Steve Wingert, Assistant Hatchery Manager
Bradford W. Dredge, Fish Hatchery Manager I
Bruce Thompson, Assistant Hatchery Manager
John Thorpe, Fish Hatchery Manager II
Daniel Beers, Assistant Hatchery Manager
Brian Malaise, Assistant Hatchery Manager
Dwight Aplanalp, Fish Culturist
Scott Patterson, Assistant Hatchery Manager
Robert Hill, Fish Hatchery Manager I
Robert Morris, Assistant Hatchery Manager
Paul Martin, Fish Culturist
Joe Chapman, Fish Hatchery Manager II
Bob Esselman, Fish Hatchery Manager II
Doug Young, Assistant Hatchery Manager
Paul Dorman, Fish Culturist
John Siple, Assistant Hatchery Manager
Susan Ireland, Fish Biologist, Kootenai Tribe of Idaho
Phil Coonts, Fish Hatchery Manager I

Robert Hoover, Assistant Hatchery Manager
Mel Hughes, Fish Culturist
Steven Kammeyer, Assistant Hatchery Manager
Mary Van Broeke, Laborer
Rick Alsager, Fish Hatchery Manager II
Dan Baker, Assistant Hatchery Manager
Bob Turik, Fish Culturist
Roger Elmore, Fish Culturist
Douglas R. Burton, Fishery Pathologist

Compiled by:

Sherri Moedl
Word Processing Specialist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Chief
Bureau of Fisheries

Thomas S. Frew
Fish Hatcheries Supervisor