



## **RESIDENT FISH HATCHERIES 2010 ANNUAL REPORT**

Resident fish hatcheries reared and stocked about 17.6 million fish weighing just over a million pounds. More than 2,000 stocking trips were made to plant fish in over 500 waters in the state. There were a total of 18 species and strains raised by the resident hatcheries during 2010.

Resident hatchery program costs were about \$2.5 million for an average cost of \$2.43 per pound or \$141 per 1000 fish.

Rainbow trout of catchable size (8 to 12 inches) accounted for 2.2 million (829,235 pounds) of the total 17.6 million fish (1,068,000 pounds) raised in 2010. Virtually all of the catchable sized rainbow trout raised and stocked by the Department hatcheries were triploid to minimize the hybridization of the hatchery fish with native fish in the wild.

The resident hatcheries cooperated with the states of Wyoming, Montana, Washington, Oregon, and British Columbia as well as the U.S. Fish and Wildlife Service to obtain various species of fish and eggs to meet management efforts in Idaho. Kokanee eggs were obtained from Washington. Lake trout, brown trout, brook trout, and Bear River cutthroat were obtained from Wyoming. Westslope cutthroat were obtained from Washington, Montana, and private sources. Lahontan cutthroat and coho salmon were obtained from Washington. Sterile brook trout were obtained from the Fresh Water Fisheries Society of British Columbia. The U.S. Fish and Wildlife Service provided Snake River cutthroat eggs.

Three captive broodstocks were maintained and spawned at the resident hatcheries, producing over 8 million eggs for various resident programs. These stocks include Westslope cutthroat trout held at the Cabinet Gorge Hatchery; Kamloop rainbow trout, and Hayspur rainbow trout maintained at Hayspur Hatchery.

The resident hatcheries operated adult fish traps on the South Fork Boise River and Granite Creek to obtain kokanee salmon eggs. Yellowstone cutthroat trout eggs were taken at the trap at Henrys Lake.

The Engineering Bureau coordinated construction at the American Falls, Cabinet Gorge, Grace, Hagerman, and Nampa hatcheries this fiscal year. The hatchery staff and regional staff accomplished a lot of work on the Sandpoint Waterlife Center. This center is being developed with volunteer labor and materials and will become an important part of the Sandpoint community.

The hatcheries hosted upwards of 50,000 visitors and a host of Free Fishing Day events and other outreach efforts. This effort is an excellent way to deliver a range of information to interested publics.

The Ashton hatchery held brook trout that are treated to produce all "YY" chromosome offspring eventually. The offspring from these fish will be stocked into the wild to see if they will help control feral brook trout populations by spawning with the normal fish to produce only male offspring in the wild; these will eventually die off, resulting in population control specific to these fish in areas where they have become unwanted or the numbers need to be controlled to meet management goals.

Other research efforts held in 2010 include the preparation for a massive release of tagged catchable sized rainbow trout that have been reared at different densities. This groundbreaking research is going to be done on a scale that has never been attempted in the past. The Hagerman, Nampa, and American Falls hatcheries are rearing their put and take sized fish for the 2011 stocking season at varying densities. The purpose of this effort is to determine if rearing these production fish at different densities will have an effect on the return to the creel rates on a statewide perspective. Thousands of fish will be tagged during the 2011 fish stocking season to determine these rearing effects.

Other summary information from 2010 includes the remodel of the kitchens at the Grace, Hayspur, and Henrys Lake hatcheries. The settling pond at the Grace Hatchery was dredged and a new visitor restroom was installed at the Hagerman Hatchery. The details are included in the individual hatchery sections of this report.

**Idaho Department of Fish and Game  
Resident Hatcheries Fish Production  
01/01/09 - 12/31/09**

<b>Production Hatchery</b>	<b>Put-and-Take Number</b>	<b>Pounds</b>	<b>Put-Grow-and-Take Number</b>	<b>Pounds</b>	<b>Average Fish per pound</b>	<b>Feed Pounds</b>	<b>Feed Costs</b>	<b>Average Length</b>	<b>Total cost</b>	<b>Cost 1,000 fish</b>	<b>Cost/ Pound</b>
American Falls	273,634	88,614	224,521	7,469	5.2	93,825	\$45,227	7.6	\$229,308	\$610.00	\$2.29
Ashton	198,856	44,481	179,940	4,011	7.8	41,314	\$22,648	6.5	\$191,746	\$506.20	\$5.31
Cabinet Gorge	23,955	5,872	6,248,623	30,542	173.0	31,864	\$30,520	2.4	\$303,048	\$48.17	\$9.88
Grace	160,105	46,829	1,047,795	10,012	21.3	59,358	\$33,524	3.7	\$225,200	\$130.70	\$3.73
Hagerman	364,922	297,102	1,330,533	90,030	4.4	585,220	\$287,669	7.9	\$729,030	\$429.99	\$1.88
Mackay	117,706	43,958	2,905,983	28,191	41.9	76,550	\$40,848	4.1	\$283,583	\$93.79	\$3.93
McCall <sup>1</sup>	0	0	130,550	72	1,813.0	32	\$56	1.1	\$10,678	\$81.80	\$148.79
Nampa	674,184	255,568	939,502	17,768	5.9	267,084	\$137,892	6.9	\$402,700	\$249.50	\$1.51
Sandpoint <sup>4</sup>			34,000	38.6	880.0	32	\$0	1.4	-	-	-
Sawtooth	0	0	51,750	28	1,900.0	-	-	1.0	\$4,343	-	-
<b>TOTAL</b>	<b>1,813,362</b>	<b>782,424</b>	<b>13,093,197</b>	<b>188,162</b>	<b>15.4</b>	<b>1,155,279</b>	<b>\$598,384</b>	<b>5.25</b>	<b>\$2,379,636</b>	<b>\$159.64</b>	<b>\$2.45</b>

<sup>1</sup> Flight costs only

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

**Redistribution of catchables**

<b>Hatchery</b>	<b>Put-and-Take Number</b>	<b>Pounds</b>	<b>Put-Grow-and-Take Number</b>	<b>Pounds</b>	<b>Average Fish per pound</b>	<b>Feed Pounds</b>	<b>Feed Costs</b>	<b>Average Length</b>	<b>Total cost</b>	<b>Cost 1,000 fish</b>	<b>Cost/ Pound</b>
Clearwater	93,486	30,483	0	0	2.9	3,000	\$3,810	10	\$23,396	\$250.26	\$0.77
McCall <sup>2</sup>	109,370	33,262	0	0	3.2	0	0	9.5	\$14,378	\$131.45	\$0.43
Mullan	33,561	10,488	0	0	3.2	0	0	9.5	\$35,960	\$1,070.00	\$3.75
Sandpoint <sup>4</sup>	107,519	33,083	0	0	3.2	0	0	9.5	\$49,740	\$460.00	\$1.50
Sawtooth	48,374	14,312	0	0	3.3	350	\$158.55	9	-	-	-
Hayspur <sup>3</sup>	51,980	14,121	0	0	3.6	-	-	9	\$10,356	\$199.21	\$0.73

<sup>2</sup> Distribution mileage costs only.

<sup>3</sup> Distribution costs were not broken out of the overall hatchery budget.

<sup>4</sup> Sandpoint redistribution and high lake stocking costs not separated.

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## AMERICAN FALLS FISH HATCHERY

**Jeffrey D. Seggerman, Fish Hatchery Manager I**  
**Tim Klucken, Assistant Fish Hatchery Manager**

### INTRODUCTION

American Falls Fish Hatchery (AFFH) is a resident fish hatchery located on 101 acres of land on the north bank of the Snake River, one-half mile below the American Falls Reservoir Dam, and two miles by road from the town of American Falls, Idaho. It is owned and operated by the Idaho Department of Fish and Game.

The primary mission of the AFFH is to rear and stock 220,000 catchable sized (10-inch) rainbow trout *Oncorhynchus mykiss*. The AFFH produces 1,500 16-inch catchable rainbow trout and 30,000 brown trout *Salmo trutta* for Idaho waters. The AFFH raises rainbow trout x Yellowstone cutthroat trout *O. clarkii* hybrids for Salmon Falls Creek Reservoir and Bonneville cutthroat trout *O. clarkii utah* for Bear Lake as requested.

Two permanent employees and eleven months of temporary employee time staffed the AFFH during 2010. Volunteers were utilized for special projects as needed and when available.

The physical layout of the AFFH consists of ten single-pass 210-ft x 8-ft x 2.7-ft concrete raceways. The top section on the even numbered raceways contains a dividing wall, allowing for ten single pass 45.5-ft x 3.5-ft x 3.0-ft sections that can be utilized for early rearing. There is a hatchery building containing fourteen 17.5-ft x 4-ft x 2.5-ft concrete rearing vats.

Water for the AFFH comes from Rueger Springs, which is located on AFFH property. The buried spring is monitored by the Idaho Department of Water Resources as part of the Snake River Aquifer using a Signet 2552 Metal Magmeter® flow meter. The springs had an average flow of 21.7 cubic feet per second (cfs) and a water temperature of 56°F during 2010.

### EGG USAGE

The AFFH received 324,000 all female triploid rainbow trout eyed eggs from the Troutlodge facility in Washington at a cost of \$9,925. There were no Hayspur strain triploid eggs received for the year. The AFFH received 46,182 Soda Lake brown trout eggs from the Wyoming Game and Fish Department's Daniels Hatchery, 100,806 rainbow trout x Yellowstone cutthroat trout hybrid eggs from the Idaho Department of Fish and Game's Henrys Lake Hatchery, and 60,000 Bear Lake cutthroat eggs from Utah Division of Wildlife Resource's Fountain Green Hatchery in 2010.

### HATCHERY PRODUCTION

The AFFH stocked 218,909 catchable rainbow trout (85,349 pounds) averaging 10-inches statewide. The AFFH stocked 1,614 magnum rainbow trout (2,313 pounds) averaging 16-inches in select fisheries. The AFFH transferred 55,359 rainbow trout (19,515 pounds) to other hatcheries for redistribution. The AFFH stocked 31,912 brown trout (4,195 pounds) statewide and 87,020 rainbow trout x Yellowstone cutthroat trout hybrids (4,750 pounds) into

Salmon Falls Creek Reservoir. Total fish stocked and transferred were 394,814 fish weighing 116,122 pounds (Appendix 1). Net production for the year (pounds stocked + pounds on hand 12/31/2010 - pounds on hand 1/1/2010) was 126,374 pounds.

The AFFH assisted Nampa Research in a density rearing trial on rainbow trout destined for 2011 spring catchables. There is a high density rearing group in two raceways where the density index (DI) will not exceed 0.30 during the rearing cycle; there is a medium density rearing group in two raceways where the DI will not exceed 0.23; there is a low density rearing group in two raceways where the DI will not exceed 0.15. A portion of these fish will be tagged as part of the "Tag You're It" program and the return to creel will be evaluated for the three rearing groups.

Funding for the AFFH comes from license monies, an American Falls endowment fund, and from proceeds of mitigation fish stocked into the Gem State Hydropower Project at Idaho Falls. Production cost in 2010 was \$275,087. From this total, \$114,547 came from personnel costs and the remaining \$160,540 came from operations.

Overall, it cost \$2.18 per net pound of fish produced. This equates to a cost of \$0.87 to raise and stock each 10-inch catchable rainbow trout and \$3.57 to raise and stock each magnum 16-inch rainbow trout. The cost for producing the brown trout was \$9,145, and the cost of producing the hybrid cutthroat trout was \$10,355.

The two transport trucks assigned to AFFH made 92 separate stocking trips during the year. Fish from AFFH were planted by truck into 21 different bodies of water. Hatchery personnel traveled 15,535 miles for an average of 169 miles per trip. Fleet rental rates and mileage costs for the 1-ton and 2-ton stocking trucks totaled \$12,987. The fish transport tankers stationed at Nampa Fish Hatchery and Hagerman Fish Hatchery made ten trips out of AFFH and drove 2,185 miles at a cost of \$5,661.

## **FISH FEED**

A total of 121,874 pounds of fish feed was used at a cost of \$64,467 (Appendix 2). This is a 30% increase from last year and a 56% increase from three years ago. Feed costs for the year were \$0.51 per net pound of fish produced.

Feed conversion for the year averaged 0.96 pounds of feed per net pound of fish produced. The low conversion is partially due to the Will-O-The-Wisp® bug feeders suspended over the large raceways during the summer months. The mayfly and caddis fly hatches in the adjacent Snake River produced thousands of insects that passed through these bug feeders daily.

## **HATCHERY IMPROVEMENTS**

No capital projects were completed in 2010. Hatchery improvements for the grounds and facilities came from operations. New baseboards were installed in residence #2, a new water heater was installed in residence #3, and plumbing repairs were done on residence #1. Following the safety inspector's recommendations, electrical work was completed in the lower three-stall garage and two crumbling brick chimneys were removed from the lower shop roof. A new switch with a ground fault control was installed on the water tower. For a second year in a

row, a tree trimming service removed dangerous limbs from several Siberian Elm Trees whose branches posed hazards to people and property. A load of slag was delivered and used to fill in potholes on the hatchery roads and driveways. A new fiberglass commercial grade door was installed on the feed room. A local company rebuilt four 75 horsepower pumps and installed four six-inch gear driven valves in the hatchery pump room. Two of these pumps are in continuous operation and the other two serve as emergency backups. Finally, new aluminum frames for the vats and raceways and aluminum C-channel dam boards were fabricated to replace the existing wooden boards and frames. The above noted hatchery improvements totaled \$23,343.

## **HATCHERY NEEDS**

A new residence should be built at the hatchery. Future maintenance costs of residence #1 will exceed the value of the house. A new concrete keyway and rectangular weir at the settling pond should be poured to replace the existing concrete keyway that is crumbling. Aluminum dam boards should replace the existing wooden boards with a system to prevent the public from tampering with them. The existing two ponds below the settling pond should be slowly drawn down to a natural river corridor. Steel siding should be installed on the exterior of the hatchery building to protect against weather and flickers.

## **PUBLIC RELATIONS**

The AFFH received an estimated 5,000 drop-in visitors during this period. Most visitors enjoyed feeding the fish in the show pond. Additionally, organized scheduled tours were given to schools, scouts, and families, which consisted of 464 children and 24 adults and senior citizens. This was down from the previous year due to cancelled tours from school budget cuts. Staff gave presentations and trout dissections to 308 students from four area schools as part of trout in the classroom programs. Staff also gave a presentation to 20 adults at the Blackfoot Rotary Club about southeast Idaho fisheries. In September, the staff put on an auction trip benefitting the grizzly bear exhibit at the zoo by allowing a family to fish the settling pond and assist in stocking the fish they caught into public waters. The nature trail kiosk and voluntary sign in sheet indicated 256 visitor trips were placed, consisting of 59 youths and 197 adults. The main activity listed for walking the nature trail was bird watching.

This year the staff assisted the regional fisheries biologists with conducting a creel census on the Snake River below American Falls Reservoir. The staff mostly covered a few hours each weekend from June to October while the regional staff covered the weekdays. During the creel, anglers were asked their opinion on a proposed regulation change to the fishery that allowed catch and release fishing on the river during the winter season. The creel census helped the commission in its decision to adopt the proposed change starting in 2011.

Tim Klucken, the Assistant Fish Hatchery Manager, was trained as a level one enforcement officer. Tim logged in 157 hours this year doing enforcement activities and public contacts.

## **VOLUNTEER PROGRAM**

Multiple volunteers were used throughout the year to assist in scatter planting catchable fish, hand loading fish onto transport trucks, assisting in the auction trip, and fin clipping

cutthroat trout. A total of 37 volunteers logged a total of 457 hours in order for AFFH to complete operations. Three of these volunteers were job shadow students from local high schools that gained experience in aquaculture. Two volunteers were adults that finished their community service hours; two other adults finished a job training program paid through Deseret Industries. The volunteer hours have been documented on aquatic education tracking forms and sent to headquarters.

## **ACKNOWLEDGMENTS**

During this year employees at AFFH were Jeff Seggerman, Hatchery Manager I; Tim Klucken, Assistant Fish Hatchery Manager; Andrew Varhley, Biological Aide; Jeff Morgan, Biological Aide; Kyle Spencer, aquatic training candidate, and Sarah Swett, aquatic training candidate. We would like to give special thanks to Gary Ady, Dick Bittick, and Ken Taylor for driving the fish tankers and helping complete our fish plants.

## **APPENDICES**

Appendix 1. Swimming Inventory with fish transferred or stocked by month, American Falls Fish Hatchery, 2010.

Month	Species	Fish on hand	Pounds on hand	Fish stocked	Pounds stocked
Dec. 2009	Rainbow	239,224	12,479		
	Brown trout	33,326	17		
Jan. 2010	Rainbow	320,016	21,018		
	Brown trout	32,505	41		
Feb. 2010	Rainbow	315,327	28,833	1,147	441
	Brown trout	32,428	100		
	Rainbow	276,776	38,804	7,952	3,220
Mar. 2010	Brown trout	32,264	200		
	Rainbow X Cutthroat	100,806	40		
	Rainbow	227,282	39,517	29,255	11,218
Apr. 2010	Brown trout	32,196	442		
	Rainbow X Cutthroat	91,585	46		
May 2010	Rainbow	156,061	25,919	71,195	26,394
	Brown trout	32,083	796		
	Rainbow X Cutthroat	87,793	213		
Jun. 2010	Rainbow	219,771	26,309	13,446	5,386
	Brown trout	32,035	1,472		
	Rainbow X Cutthroat	87,582	793		
	Rainbow	243,456	23,393	27,653	10,532
Jul. 2010	Brown trout	32,009	2,286		
	Rainbow X Cutthroat	87,454	1,822		
	Bear Lake Cutthroat	53,910	30		
	Rainbow	292,457	28,165	9,200	3,746
Aug. 2010	Brown trout	31,992	3,403		
	Rainbow X Cutthroat	87,068	3,273		
	Bear Lake Cutthroat	52,472	73		
	Rainbow	285,974	38,872	7,255	2,715
Sep. 2010	Brown trout	26,662	3,588	5,270	718
	Rainbow X Cutthroat			87,020	4,750
	Bear Lake Cutthroat	52,287	168		
	Rainbow	207,759	10,138	105,937	42,374
Oct. 2010	Brown trout	8,730	1,125	17,912	2,352
	Bear Lake Cutthroat	52,200	372		
	Rainbow	203,598	13,398	2,842	1,151
Nov. 2010	Brown trout	45,000	18	8,730	1,125
	Bear Lake Cutthroat	49,939	534		
	Rainbow	324,587	21,660		
Dec. 2010	Brown trout	43,603	24		
	Bear Lake Cutthroat	49,888	1,064		
Total rainbow				275,882	107,177
Total brown				31,912	4,195
Total cutthroat x rainbow hybrids				87,020	4,750
Total				394,814	116,122

Appendix 2. Fish feed fed during the 2010 production year, American Falls Fish Hatchery.

<b>Source</b>	<b>Size/Type</b>	<b>Pounds</b>	<b>Cost</b>
Rangen	0 starter	175	\$134.35
Rangen	0 soft moist	22	\$33.54
Rangen	1 starter	365	\$303.52
Rangen	1/32 soft moist	44	\$64.24
Rangen	2 starter	1,125	\$902.25
Rangen	3/64 soft moist	132	\$190.08
Rangen	3 grower	4,597	\$2,638.62
Rangen	1/16 soft moist	352	\$517.44
Rangen	3 Aquaflor	300	\$477.00
Rangen	3/32	6,150	\$3,328.83
Rangen	3/32 soft moist	278	\$405.91
Rangen	3/32 Aquaflor	200	\$306.00
Rangen	1/8	34,240	\$18,520.89
Rangen	1/8 Aquaflor	960	\$1,034.00
Rangen	1/8 TM	250	\$184.98
Silver Cup	1/8 mm Aquaflor	250	\$362.30
Silver Cup	3.5 mm	72,234	\$34,972.25
Rangen	3/16	100	\$48.80
Silver Cup	7.5 mm	100	\$42.40
<b>Totals</b>		<b>121,874</b>	<b>\$64,467.40</b>

## ASHTON FISH HATCHERY

Doug Engemann, Fish Hatchery Manager I  
Paul Martin, Fish Culturist

### INTRODUCTION

Ashton Fish Hatchery (AFH) is located in Fremont County, Idaho, approximately two miles southwest of the community of Ashton. Ashton Fish Hatchery is owned and operated by the Idaho Department of Fish and Game (IDFG), and is funded by IDFG license dollars and Rocky Mountain Power Company mitigation funds.

Ashton Fish Hatchery's water source is Black Springs, which is a constant 50°F temperature and has a maximum flow of 5.5 cfs. Ashton Hatchery currently serves as a "specialty station," currently rearing three species/strains of trout, char, and grayling, including rainbow trout *Oncorhynchus mykiss*, Arctic grayling *Thymallus arcticus*, and brook trout *Salvelinus fontinalis*. Species raised at AFH in past production years include cutthroat trout *O. clarkii*, brown trout *Salmo trutta*, golden trout *Oncorhynchus aquabonita*, and rainbow x cutthroat hybrids.

The majority of fish produced at AFH are fry and fingerling (1 inch to 6 inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable size fish (8-12 inches) are also reared at AFH and distributed locally in waters managed on a put-and-take basis.

### FISH PRODUCTION

#### General Overview

A total of 365,846 fish were produced at AFH this year, consisting of 213,685 fry and fingerlings and 152,161 catchable sized fish, including holdovers. Ashton Hatchery personnel stocked a total of 90,564 catchables into area waters during 2010. These fish averaged 2.9 fpp (9.4 inches) for a total of 30,240 pounds stocked. Production costs (excluding capital outlay) were \$150,154.74 with \$23,957.47 spent on fish feed and the remaining \$126,197.27 spent on general hatchery operations and personnel costs. Fish transportation cost for 2010 was \$6,101.89. The average cost per pound of fish produced during 2010 was \$4.70. A summary of fish numbers, pounds produced, and production costs per species and life stage is provided in Appendix 1.

All fry in indoor nursery vats were fed by hand on an hourly basis. Fingerlings reared in indoor nursery vats were fed by hand at an average frequency of 4-5 feedings per day. Catchables and holdovers reared in outdoor raceways were fed by hand at an average frequency of two times per day. Predator exclusion covers were provided when the fish were transferred from vats to outdoor raceways. During 2010, feed conversion for catchables was 1.34, and conversion for holdovers was .9. A breakdown of feed cost by size and origin is provided in Appendix 4.

The average survival for all fish stocked from egg to distribution was 59 percent. Arctic grayling survival was 27 percent. Consequently, if Arctic grayling survival is excluded from the

calculations, the average survival for all fish stocked from egg to distribution was 69 percent. Appendix 2 provides a summary of comparative growth rates, feed conversion, and survival percentages for AFH in 2010.

All of the fish reared at AFH during 2010 were received as eyed eggs with the exception of Arctic grayling, which were received as green eggs. The origin of all incoming eggs and fish stocked during 2010 can be found in Appendix 3.

### **Rainbow Trout**

Ashton Fish Hatchery produced and stocked 90,564 Hayspur strain catchable rainbow trout averaging 9.4 inches in length (30,240 pounds) for distribution into area lakes and streams. No rainbow fingerlings were stocked in 2010.

Historically, Hayspur strain rainbow trout stock has been used for catchable rainbow triploid trout production at AFH. However, due to IHN concerns at Hayspur Hatchery, the IDFG fisheries bureau decided to use Trout Lodge strain rainbow trout for 2011 catchable production at AFH.

Ashton Hatchery received two shipments of Troutlodge strain eyed triploid rainbow trout eggs. The first lot was received on March 4, 2010 and numbered 55,000 eyed eggs. AFH received a smaller group of 10,000 eyed eggs on May 6, 2010. No fingerlings were stocked from either lot, resulting in an estimated total of 61,598 (9,228 pounds) 7-inch holdovers produced for stocking activities in 2011.

### **Arctic Grayling**

Ashton Hatchery received 50,000 green arctic grayling eggs from Meadow Lake, Wyoming on May 26, 2010. Ashton personnel transported the eggs from Jackson, Wyoming to AFH. Typical low survival from green egg to fry (27% percent) resulted in 13,570 fry, averaging 9,000 fish per pound (about 1 inch).

While the green egg to fry survival percentage is low this year, it is significantly improved from the last several years. Ashton hatchery personnel will continue investigation of improved culture techniques to improve grayling survival. Observations during the 2010 rearing cycle are discussed below.

The survival from green egg to stocking increased from 9.84 percent last year to 27 percent this year. This is a significant improvement. The AFH Manager theorizes that traditional high chronic losses following feed training may have been reduced by the combination of frozen and freeze-dried Cyclop-Eeze delivered simultaneously. This grayling feeding regime has been used by Wyoming Game and Fish personnel successfully. It was initiated at AFH late during the 2009 grayling production cycle with positive results. This year, it was followed from feed training to liberation.

Due to nutritional concerns resulting from using Cyclop-Eeze as the sole ration, hatchery personnel tried BioVita starter mash fed concurrently with Cyclop-Eeze. While some of the BioVita was utilized, most of the feed sank too quickly to the bottom of the small grayling rearing units and was not utilized by the majority of the fish. This also made cleaning considerably more difficult. In the past, other feeds have been used to augment the Cyclop-Eeze feed as well, but no benefit could be proven.

Alaska has cultured and used live Artemia with very good results, and hatchery personnel may want to investigate this food source in the future pending Bureau approval.

A total of 3,600 grayling fry were directly stocked into Horseshoe Lake by AFH personnel. Region 4 fisheries personnel stocked 1,500 fry into Independence Lake #2 directly. Of the remaining 8,470 grayling fry produced, 2,370 were transferred to the Mackay Hatchery, and 6,100 were transferred to the McCall hatcheries, respectively, for secondary rearing and subsequent mountain lake stocking activities.

### **Brook Trout**

On November 3, 2009, AFH received 150,000 eyed brook trout eggs from Kootenay Hatchery (British Columbia, Canada). The 2010 brook trout request for Henrys Lake was 100,000 fingerlings. As has been the case the last several years, the eggs showed considerable soft shell disease symptoms and required frequent picking. During September 14, 2010-December 16, 2010 a total of 92,775 fingerlings averaging 5.7 inches in length were stocked into Henrys Lake by AFH and IDFG fish transport personnel.

On November 9, 2010, AFH received 150,000 eyed brook trout eggs from Kootenay Hatchery. All resulting fingerlings are destined for Henrys Lake. As has been the case in recent years, the eggs demonstrate considerable soft-shell symptoms, necessitating frequent picking. An estimated total of 107,340 sack fry remained on hand at the end of December 2010.

### **HATCHERY IMPROVEMENTS**

- New wooden predator exclusion covers with constructed to replace older failing units.
- Safety signs (restricted access) were constructed and installed over raceway walkways.
- The office electrical system was upgraded with additional new receptacles. Extension cords and multiple multi-plug adapters are no longer used.
- A new YSI oxygen meter was purchased.
- New lap-jointed dam boards were purchased, cut, and installed. Accurate flow measurements through outdoor raceways are now possible.
- Downed trees and brush were removed from the hatchery water intake area (Black Springs) in preparation for renovation activities scheduled to commence during the summer of 2011.
- Tree trimming continued on the grounds adjacent to the main hatchery driveway. Hazardous suspended limbs were removed and all brush hauled away.

### **FISH STOCKED AND TRANSFERRED**

Rainbow trout stocking practices for 2010 mirrored those of 2009. No rainbow trout fingerlings were stocked into area waters due to poor returns to creel demonstrated previously.

Due to poor fishing conditions, the September request of 1,000 catchables was dropped from Jefferson County (Rigby) Lake this year. A minor inventory shortfall in September resulted in a shortage of 2,300 fish from projections. Ashton Reservoir received 32,168 catchables, a reduction of 2,232 from the request.

With the exceptions mentioned above, the numbers of fish produced and stocking into area waters met or exceeded stocking requests for 2010. No production fish transfers occurred during 2010.

### **ASHTON FISH SPAWNING**

Personnel from AFH traveled to Henrys Lake Hatchery to sort and spawn cutthroat trout and rainbow x cutthroat hybrids. AFH personnel traveled to the Wyoming's Story Fish Hatchery to collect and pressure shock brook trout eggs.

### **FISH FEED**

A total of 40,992 pounds of fish feed were fed (Appendix 4) to produce 31,983 lbs of fish weight gain (Appendix 1), for an average conversion of 1.28 for the 2010 production year.

### **PUBLIC RELATIONS**

Tours were given to several groups of elementary and secondary grade students, as well as adult enrollees in the Idaho Master Naturalist Program. As was the case in previous years, several of the Idaho Master Naturalist candidates subsequently volunteered their services at the hatchery for special projects.

Paul Martin and Doug Engemann gave a cutthroat trout presentation at Henrys Fork Elementary School. Paul and Doug assisted regional personnel with Trout in the Classroom (TIC activities). Paul Martin assisted with regional Hunter Education classes and testing.

Doug Engemann, Paul Martin, and regional volunteers staffed free fishing day on June 12, 2010. Children were allowed to fish the hatchery settling basin on that day, and hatchery staff and volunteers taught the children the basics of trout angling, casting, playing, as well as proper cleaning and care of the catch. A total of 145 children registered for and participated in the event.

Permission was granted for a terminally ill patient to fish the settling basin. It was to be his last fishing trip with his son. Phil caught a very large brook trout, along with several other large fish. Phil passed away one week later. It was our privilege to assist Phil and family during this special day.

## SPECIAL PROJECTS

### Brook Trout Daughterless Female Study

AFH is continuing baseline data collection and study efforts with an Estradiol feminization study that began December 2008. Through a combination of estrogen treatments and genetic screening, it is believed that a population of daughterless females (producing only YY progeny) can be produced. This could be a valuable tool for future use in controlling populations of non-native species.

AFH personnel received eyed eggs from four separate 1:1 brook trout pairings conducted at Story Hatchery in October 2008. The resulting progeny from each of the four families were split into two groups, resulting in eight lots of fish that were initially reared separately. Half the fish from each family group received feed dressed with Estradiol (estrogen); the other half received the standard diet.

The fish were later thinned to three vats to reduce loading, allow planning time for secondary rearing options and study direction, and address potential EEDV virus concerns. Control fish were reared separately from treatment fish until they could be PIT tagged.

To reduce rearing densities and supply needed flow as the fish grow, all study fish were PIT tagged to differentiate control from treatment groups during the month of May 2010, and then transferred to outdoor raceway #4. Volunteers from the Upper Snake Region assisted with the transfer. Fish from the treated and non-treated groups were all combined into this raceway. Shade covers were installed to eliminate the possibility of fish jumping into the adjacent raceway. The fish were then placed on a brood stock diet. Hatchery personnel followed the best sanitation practices possible to minimize potential transfer of EEDV to the fish in the adjacent raceway.

IDFG Geneticist Matt Campbell has identified sex markers that confirm the actual sex chromosome genotype of these fish. The Estradiol study team and the hatchery crew processed these fish for spawning identification for the first time of the season. XX genotype control fish, XX genotype Estradiol treated fish, and fish that could not be positively identified were euthanized, leaving known genotype treatment fish and control males as necessary for spawning.

In preparation for spawning, feed was reduced to a maintenance ration. After several ripeness checks (with some accompanying concern about lack of ripe fish), fish were spawned for the first time on November 10. A second spawning event was completed on November 17. It is noteworthy that nearly all fish fed the Estradiol treated feed were feminized. A total of three females from each of the original family groups were spawned during both spawning events for 12 females spawned per lot. Due to the lack of suitable rearing space required for the second phase of the study, the resulting eyed eggs from the two best eye-up rates per family group were transferred to the Springfield Hatchery in December 2010.

The 16 groups of fish needed for the study will be reared separately until they reach a size suitable for PIT tagging. After PIT tagging they will be transferred back to Ashton for secondary rearing. Hatchery personnel are following the best sanitation practices possible to minimize potential transfer of EEDV from adult fish held in Raceway 4 into the production fish in the adjacent raceway.

## **ACKNOWLEDGEMENTS**

The Ashton Fish Hatchery staff sincerely thanks Tom Frew, Paul Kline, Ed Schriever, Damon Keen, Jeff Heindel, Joe and Jerry Chapman, Jonathan Norwood, Phil Coonts, Doug Burton, Doug Munson, Mick Hoover, and Pat Moore for their help, advice, and support this year.

## **APPENDICES**

Appendix 1. Fish production and cost, Ashton Fish Hatchery, 2010

Species	Size	Number Fish	Pounds Planted or transf.	Weight Gained In 2010	Cost/lb	Cost/fish	Total Cost
<b>Fry and Fingerlings Produced and Stocked</b>							
Brook Trout Triploids	5.7	92,774	6,580	6,560	\$6.52	\$.46	\$42,794.10
Grayling	1.0	13,570	1.94	1.16	\$920.91	\$.13	\$1,786.55
<b>Totals/Ave</b>		<b>105,344</b>	<b>6,582</b>	<b>6,561</b>			
<b>Catchables Produced and Stocked</b>							
Hayspur triploid Rainbow	9.4	90,564	30,240	16,642	\$4.05	\$.746	\$67,434.79
<b>Totals/Ave</b>	<b>9.4</b>	<b>90,564</b>	<b>30,240</b>	<b>16,642</b>	<b>\$4.05</b>	<b>\$.746</b>	<b>\$67,434.79</b>
<b>Sub-catchables Produced For 2011 Stocking-Holdovers</b>							
Trout Lodge triploid Rainbow	7.0	61,598 (On Hand)	8,800 (On Hand)	8,780	\$4.34	\$.619	\$38,139.30
<b>Totals/Ave</b>	<b>7.0</b>	<b>61,598</b>	<b>8,800</b>	<b>8,780</b>	<b>\$4.34</b>	<b>\$.619</b>	<b>\$38,139.30</b>
<b>GRAND TOTAL</b>		<b>257,506</b>	<b>45,622</b>	<b>31,983</b>	<b>\$4.70</b>	<b>.583</b>	<b>\$150,154.74</b>

Appendix 2. Comparative growth rates, feed conversion, and percent survival for all species reared at Ashton Fish Hatchery, 2010.

Species	Average Monthly Length Increase	Average Conversion	Percent Survival
Brook Trout Triploid	.57	1.10	62*
Rainbow Catchables (Hayspur)	.48	1.34	99.6+
Rainbow Holdovers (Trout Lodge)	.66	.9	94.7+
Grayling	.25	4.56	27*

- \* From egg to stocking
- + 2010 survival percentage

Appendix 3. Origin of eggs and fish stocked, Ashton Fish Hatchery, 2010

Species	Source	Eggs	Destination	Stocked	Size (inches)
Brook Trout Triploid	Kootenay, BC	150,000	Henrys Lake	92,775	5.7
Brook Trout Triploid	Kootenay, BC	150,000	Henrys Lake	107,340 (fry on hand)	1.0
Hayspur triploid Rainbow	Hayspur Hatchery	131,556 <sup>a</sup>	Upper Snake Region	90,563	9.4
Trout Lodge Triploid Rainbow	Trout Lodge, Inc.	65,000 <sup>b</sup>	Upper Snake Region	61,598++	7.0
Arctic Grayling	Meadow Lake, WY	50,000	Statewide	13,570	1.0
Total stocked or transferred				365,846	

<sup>a</sup> Received in 2008-for stocking catchable 2010.

<sup>b</sup> Received in 2010-stocking catchable 2011.

++ Holdovers remaining on station for stocking in 2011.

Appendix 4. Feed use, Ashton Fish Hatchery, 2010

Size/Type	Source	Pounds	Cost/lb*	Total Cost*
Swim up	Rangen's	44.5	1.34	\$59.63
#1 Starter	Rangen's	100	\$ .774	\$77.40
#2 Starter	Rangen's	384	\$ .774	\$295.68
#3 Grower	Rangen's	1,491	\$ .566	\$843.91
Str Soft-Moist	Rangen's	44	\$1.45	\$63.80
1/32" Soft-Moist	Rangen's	44	\$1.83	\$80.52
1/16" 450 Pellet	Rangen's	1,100	\$ .706	\$776.60
3/32" 450 Pellet	Rangen's	4,000	\$ .638	\$2,552.50
3/32" 450 (AQF) Pellet	Rangen's	584	\$1.30	\$759.20
1/8" 450 Pellet	Rangen's	32,716	\$ .535	\$17,517.50
Bio-Vita Mash`	Bio-Oregon	2	\$2.03	\$4.06
Micro Vita .6 mm Pellet	Bio-Oregon	7	\$0.00**	\$0.00
Micro-Vita .9 mm Pellet	Bio-Oregon	30	\$0.00**	\$0.00
Bio-Vita 1.2 mm Pellet	Bio-Oregon	40.5	\$0.00**	\$0.00
Bio-Vita 1.5 mm Pellet	Bio-Oregon	44	\$0.00**	\$0.00
Bio-Vita 2.0 mm Pellet	Bio-Oregon	88	\$1.380	\$121.44
Bio-Vita 2.5 mm Pellet	Bio-Oregon	264	\$1.380	\$364.32
Silver Cup #1 Starter (OT	Nelson	2.8	\$1.63	\$4.56
Cyclop-Eeze Dry	Argent	2	\$111.37	\$222.74
Cyclop-Eeze Frozen	Argent	3.3	\$63.50	\$209.55
Total		40,992		\$23,957.47

\* Including shipping.

\*\* Donated by manufacturer.

## **CABINET GORGE FISH HATCHERY**

**John Rankin, Fish Hatchery Manager II**  
**Steve Kammeyer, Assistant Fish Hatchery Manager**

### **INTRODUCTION**

Cabinet Gorge Fish Hatchery (CGFH) is located on the south bank of the Clark Fork River in Bonner County, Idaho approximately eight miles southeast of the community of Clark Fork. The hatchery was constructed in 1985 and was cofunded by Avista (formerly Washington Water Power), Bonneville Power Administration (BPA), and Idaho Department of Fish and Game (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 releases are timed to coincide with cycles of zooplankton blooms. Maximum hatchery capacity is 20 million eggs, with fish production of 16 million two-inch fry. The hatchery is also the state's broodstock facility for westslope cutthroat trout. The captive brood is spawned each spring with eggs being distributed statewide for mountain lake and fingerling requests.

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

### **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 CGFH water supply consists of approximately 5.4 cubic feet per second (CFS) from a spring, which ranges in temperature from 44°F to 52°F, and approximately 20-cfs from a well field which ranges in temperature from 36°F to 64°F. 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 (pump #7 and #8) was utilized for the entire kokanee incubation and early rearing period. Incubation and early-rearing water temperatures were maintained around 50 degrees Fahrenheit (range 45.0°F to 52.0°F). Production water ranged from 38.5°F to 46.0°F.

The hatchery utilizes six pumps to move water to a common head box. The lower spring and upper well field water serves the 31,040 cubic feet of rearing space in the hatchery building, 1,536 cubic feet of space in the cutthroat brood ponds, and 1,800 cubic feet of space in the adult holding ponds.

### **Rearing Facilities**

Rearing facilities at the hatchery include 128 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with a maximum capacity of 150,000 kokanee eggs each. In addition, a total of 30 upwelling incubators, which are 6 inches in diameter and 18 inches high, are available. The smaller incubators have a maximum capacity of 30,000 kokanee eggs each. The 64 concrete raceways have rearing space of 31,040 cubic feet. The hatchery building encloses approximately one-third of each raceway. The

adult kokanee holding area consists of two holding ponds (10 ft. by 30 ft. each) at the head of the fish ladder. Additional adult holding is available in three holding ponds (10 ft. by 33 ft. each).

In 2008, an additional four concrete raceways and 10 half stacks of vertical-flow incubators (in a separate enclosure) were added to the hatchery rearing facilities to operate a westslope cutthroat broodstock program. The broodstock holding area consists of four concrete brood ponds, two (5 ft. by 18.5 ft.) and two (7 ft. by 18.5 ft.). These four ponds have actual rearing space of 1,536 cubic feet.

## **FISH PRODUCTION**

Cabinet Gorge Hatchery produced a total of 9,159,998 fish in 2010 weighing 48,470 pounds. A total of 34,743 pounds of feed produced 37,145 pounds of weight gain for an overall (all species reared) feed conversion of 0.94:1.0. Total production cost (including Nampa's transportation costs) was \$286,319, resulting in an overall cost per pound of fish of \$5.91, cost per inch of fish of \$0.0120, and \$31.26 per thousand fish (Appendix 2).

### **Kokanee**

#### **General Rearing**

Fertilized eggs were brought to the CGFH and disinfected in 100-PPM iodine for 10 minutes. After enumeration, the green eggs were placed into upwelling incubators and rolled until eye-up. At eye-up, the eggs were shocked and sorted with the Jensorter JHC-114 model sorter. The counter mechanism was not operational. Fry were allowed to voluntarily swim out of the incubators into the raceways at 1,300 to 1,350 temperature units. All kokanee fry destined for Lake Pend Oreille were thermally mass marked via temperature manipulation in the raceways. Feed training began at 1,550 temperature units.

Initial early rearing loading rates averaged 240,000 swim-up fry per raceway. Kokanee growth rates were equivalent to 29 monthly temperature units per inch of growth (MTUs). Fish health was excellent throughout rearing and no Bacterial Gill Disease was encountered in 2010.

Kokanee were feed trained at approximately 50 to 52°F using Bio-Oregon BioVita #0 and Rangen Trout and Salmon starter diets for 28 days. At that time, water temperatures were lowered to emulate natural production in LPO. The late kokanee fry remained on Rangen Trout and Salmon starter #1 for the duration of rearing. This was the same rearing protocol that was initiated in 2002 with very favorable results.

A total of 7,075,119 late kokanee fry (Lake Pend Oreille stock) were produced at an average length of 2.25 inches and an average weight of 294.5 fish per pound. These fish gained 22,843 pounds from 20,621 pounds of feed, resulting in a conversion rate of 0.90:1.0. Fish production cost was \$6.56 per pound, \$0.0099 per inch, and \$22.27 per thousand (Appendix 2).

Survival of Lake Pend Oreille kokanee green eggs to eyed eggs was estimated at 90.1%. Survival from green egg to release was 85.6%.

A total of 647,931 early kokanee fry were produced at an average length of 2.7 inches and an average weight of 169.6 fish per pound. These fish gained 3,682 pounds from 4,011

pounds of feed, resulting in a conversion rate of 1.09:1.0. Fish production cost was \$7.83 per pound, \$0.0171 per inch and \$46.18 per thousand (Appendix 2).

Survival of early kokanee green eggs to eyed eggs was estimated at 82%. Survival from green egg to release was estimated at 78.1%.

A total of 441,700 eyed kokanee eggs were received from Montana. These were October spawning fish (KO's) from Lake Mary Ronan. A total of 306,090 KO's were produced at an average of 2.49 inches or 214.8 fish per pound. These fish gained 1,361 pounds from 1,209 pounds of feed, resulting in a conversion of 0.89:1.0. Fish production cost was \$6.40 per pound, \$0.0119 per inch and \$29.81 per thousand (Appendix 2).

In September 2010, Cabinet Gorge Hatchery received 2.3 million green fertilized eggs from the kokanee trap located on Deadwood Reservoir. A total of 1.185 million eyed eggs were transferred to Mackay Hatchery. Overall eye-up was 85.4%.

On December 31, 2010, the hatchery had 714,122 early spawning kokanee swim-up fry on hand. Also in September, a small group of sterile early kokanee eggs were received. These fish will be reared at CGFH until they reach 2 inches, at which time they will be sampled for % triploid.

## **Fish Marking**

To evaluate the success of a kokanee (*Oncorhynchus nerka kennerlyi*) stocking program in Lake Pend Oreille, an otolith thermal mass-marking (Volk et al. 1990) program was utilized at Cabinet Gorge Hatchery. All kokanee fry destined for Lake Pend Oreille received a thermally induced otolith pattern at the swim-up stage of development. Differential temperature was about 9°F. These fish will be distinguishable from their wild counterparts, as well as other hatchery year classes, by examining otolith growth rings for these distinctive bands, which are unique each year.

Analysis of prerelease fish specimens (Grimm et. al. 2009) verified the presence of a recognizable otolith mark on all thermally treated fry.

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

All of the adults that returned to the Sullivan Springs kokanee trap in the fall of 2009 were t-marked. With results from the Washington Department of Fish and Wildlife otolith lab in Olympia, Washington, Idaho fisheries biologists were able to determine the age of the fish and whether it was of hatchery or wild origin. Based on 58 fish sampled from the 2009 kokanee spawning run, 12.1% were hatchery four-year-olds (2003 brood year), 60.3% were hatchery three-year-olds (2004 brood year), and 27.6% were three- or four-year-olds of wild origin. To date, no results have been received from the 2010 spawning adults.

## **Fish Liberation**

On June 22, 23, and 24, 2010, 7,075,119 late kokanee fry were released into Sullivan Springs. These fish were 2.25 inches in length and averaged 294 fish per pound. There were no early kokanee fry released into Sullivan Springs in 2010.

During the month of May 2010, a total of 647,931 early spawning (S. Fk. Boise stock) kokanee were released into five lowland lakes in Regions 1 and 3. The fish averaged 170 fish per pound and had attained a length of 2.7 inches at release.

On June 14, 2010, a total of 306,090 October spawning kokanee (Lake Mary Ronan stock) were released into the raceway spawning channel at the Clark Fork Hatchery. These fish were 215 fish per pound and 2.5 inches.

Numbers at release were based upon Jensorter counter/sorter inventory numbers at eye-up minus mortality. All fish were off feed one day 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. All raceways of fish were displaced onto the transport trucks for all of the releases to double check inventory numbers.

All kokanee fry release groups destined for Sullivan Springs were transported in two IDFG tankers (3,000-gallon capacity) and the two 2-ton stocking trucks from Cabinet Gorge and Sandpoint hatcheries. Loading densities of small fish in all of the tankers was kept below 0.60 pounds per gallon. All of the fish were planted below the bridge on the access road to the old IDFG patrol cabin. All of the other kokanee fry releases were accomplished utilizing the two IDFG tankers and the stocking trucks from Sandpoint, Mullan, and Cabinet Gorge hatcheries.

## **Rainbow**

### **General Rearing**

A total of 17,754 catchable size sterile rainbow trout (Troutlodge) were produced weighing 5,049 pounds. These fish gained 839 pounds from 1,000 pounds of feed, resulting in a conversion rate of 1.19:1.0. Fish production cost was \$.91 per pound, \$0.0290 per inch, and \$258.66 per thousand (Appendix 2).

### **Fish Liberation**

During the months of March and April 2010, 17,754 catchable size rainbow were released into lowland lakes in Region 1. These fish were used for early season stocking from Sandpoint Hatchery. They averaged 3.5 fish per pound and had attained an overall length of 8.92 inches at release.

## **Westslope Cutthroat**

### **General Rearing**

On May 12, 2010, the Cabinet Gorge Hatchery received approximately 10,000 green fertilized westslope cutthroat eggs for future broodstock from King's Lake in Washington. The eggs were disinfected in 100 ppm iodine for 10 minutes and then placed into isolation incubators for 28 days pending genetic and disease sampling results. Eight individual pairings

were culled due to the presence of rainbow trout alleles. Fry were ponded at 500 to 600 temperature units. Initial early rearing took place in a 10-foot fiberglass trough. Feed training began at 800 to 900 temperature units. Growth rates were equivalent to 33 monthly temperature units per inch of growth (MTUs). The fish were feed trained using Bio-Oregon starter feeds.

These fish gained 79.8 pounds from 57.3 pounds of feed, resulting in a conversion rate of 0.72:1.0. Fish production cost was \$8.57 per pound, \$0.0449 per inch, and \$173.83 per thousand (Appendix 2.) On December 31, 2010, the hatchery had on hand 4,010 BY2010 westslope cutthroat (King's Lake strain) weighing 81 pounds (Appendix 2).

The BY2009 (Westslope Trout Co.) westslope cutthroat trout production fingerlings gained 1,659 pounds from 1,693 pounds of feed, resulting in a conversion rate of 1.02:1.0. Fish production cost was \$7.94 per pound, \$0.0445 per inch and \$178.28 per thousand (Appendix 2).

The BY2009 westslope cutthroat (King's Lake strain) trout broodstock gained 1,329 pounds from 1,159 pound of feed, resulting in a conversion rate of 0.87:1.0. Fish production cost was \$7.86 per pound, \$0.1183 per inch, and \$775.64 per thousand. On December 31, 2010, the hatchery had on hand 8,144 fish weighing 1,116 pounds. A total of 7,973 fish weighing 475 pounds were stocked out as excess into area lakes (Appendix 2).

The BY2008 westslope cutthroat (King's Lake strain) trout broodstock gained 1,680 pounds from 1,745 pounds of feed, resulting in a conversion rate of 1.04: 1.0. Fish production cost was \$4.26 per pound, \$0.2361 per inch, and \$2,969 per thousand. On December 31, 2009, the hatchery had on hand 2,465 BY2008 westslope cutthroat (King's Lake strain) weighing 2,162 pounds. In addition, 3,083 of these fish weighing 1,702 pounds were deemed to be excess to future hatchery egg collection needs and were stocked into area waters (Appendix 2). On June 4, a total of 106 females were spawned producing approximately 37,000 green eggs. Before discarding these eggs as extras, eye-up was estimated at 50%.

The BY2007 westslope cutthroat (King's Lake strain) trout broodstock gained 991 pounds from 1,743 pounds of feed, resulting in a conversion rate of 1.76:1.0. Fish production cost was \$5.53 per pound, \$0.3373 per inch, and \$4,453 per thousand. On December 31, 2009, the hatchery had on hand 1,765 BY2007 westslope cutthroat (King's Lake strain) weighing 1,535 pounds. In addition, 2,125 of these fish weighing 1,598 pounds were deemed to be excess to future hatchery egg collection needs and were stocked into area waters (Appendix 2). Between April 23 and June 4, a total of 1,558 females were spawned producing approximately 686,000 green eggs. These eggs were utilized for Mountain Lake and lowland lake stocking statewide.

A total of 192,583, eyed, westslope cutthroat eggs taken from the first three lots of the BY07 fish were utilized for fingerling production at CGFH. The eggs/alevin remained in the vertical flow (Heath) incubators until they reached the button-up stage of development. Fry were moved into the raceways, and feed training began at 1,000 temperature units. Size at initial feeding was about 4,600 fish per pound and 0.85 inches in length. Growth rates were equivalent to 33 monthly temperature units per inch of growth (MTUs). These fish were feed trained using Bio-Oregon starter feeds.

The BY2010 CGFH westslope cutthroat gained 2,465 pounds from 1,303 pounds of feed, resulting in a conversion rate of 0.53: 1.0. Fish production cost was \$6.33 per pound, \$0.0258 per inch, and \$88.12 per thousand. On December 31, 2010, the hatchery had on hand

a total of 101,339 westslope cutthroat fry weighing 2,264 pounds and averaging 4.0 inches in length (Appendix 2).

### **Fish Liberation**

During the months of May and June 2010, 111,556 Montana westslope cutthroat fingerling trout (BY09) were released into nine lakes in Regions 1 and 2. These fish averaged 44 fish per pound and had attained a length of 4.0 inches at release.

A total of 38,142 CGFH westslope cutthroat trout (BY10) were released into Yellowbelly Lake (Region 7) on September 9, 2010, with co-operation from Sawtooth Hatchery personnel. These fish were 1.9 inches and averaged 423.8 fish per pound. There were 42,234 excess CGFH westslope cutthroat fry stocked into Hayden Lake on September 27, 2010. These fish averaged 241 fish per pound and had attained a length of 2.3 inches at release.

## **Fall Chinook**

### **General Rearing**

On October 27, 2010, 44,523 eyed fall Chinook eggs were received from Big Creek Hatchery in Astoria, Oregon. All incoming eyed eggs were disinfected in 100 ppm iodine for 10 minutes. After enumeration, the eyed eggs were placed into six 6-inch diameter upwelling incubators. Fry were allowed to volitionally swim out into the raceways at 800 to 900 temperature units. Feed training began at 1,600 temperature units. Initial early rearing took place in one hatchery raceway. Growth rates were equivalent to 25 monthly temperature units per inch of growth (MTUs). These fish were feed trained using Bio-Oregon starter feeds.

The fall Chinook gained 8.6 pounds from 9.3 pounds of feed, resulting in a conversion rate of 1.08: 1.0. Fish production cost was \$2.35 per pound, \$0.0017 per inch, and \$2.69 per thousand (Appendix 2). On December 31, 2010, 42,032 fall Chinook salmon fry were on station weighing 48 pounds.

### **Fish Liberation**

A total of 28,556 (BY09) fall Chinook were transferred to Nampa Hatchery on February 4, 2010. These fry averaged 198 fish per pound or 2.56 inches.

## **FISH SPAWNING**

### **Kokanee**

#### **Fish Trapping**

The Clark Fork River fish trap at the CGFH was in operation during September of 2010. A total of 800 adult early spawning kokanee were trapped and transferred to the raceway spawning channel at Clark Fork Hatchery. The trap was not operated for late spawning kokanee.

The Sullivan Springs trap was in operation from October 19, 2010 to December 20, 2010. The Sullivan Springs trap collected 103,049 adult kokanee salmon. Of these, 14,238

adults were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records showed that 40.0% of the run was female (41,173).

### **Spawntaking**

An estimated total of 10,378,160 green fertilized kokanee eggs were collected during the 2010 spawning season. Of the 41,173 total females trapped, 27,252 were spawned at the Sullivan Springs trap. The number of adults returning in 2010 was the highest number of fish trapped since 2006 when the predator reduction program was initiated on Lake Pend Oreille (Appendix 1).

### **Westslope Cutthroat**

### **Spawntaking**

A total of 686,000 green eggs were collected from the BY07 (three-year-old) adults being held at the CGFH as broodstock. These eggs eyed up at 66.6%. A total of 37,000 green eggs were taken from the BY08 (two-year-old) fish. These eggs eyed up at approximately 50%.

## **HATCHERY IMPROVEMENTS**

### **Repairs and Improvements**

- The plumbing for the cutthroat incubation room was finished.
- In July, Pump #8 was installed. The cost for the new motor and to rebuild the pump head and discharge head was split between Avista and IDFG.
- In August, the new motor for pump #3 was installed.
- In September, the inside of residence #1 was painted.
- In September, the carpet was replaced in Residence #1.
- A new dialer for the hatchery alarm system was installed in December.
- Pump #3 was individually wired into the hatchery alarm system in December.
- The concrete base for pump # 6 was replaced.
- Pump # 6 was installed on January 4, 2011. The motor, shaft and pump head were replaced and the discharge head was rebuilt.

## **HATCHERY RECOMMENDATIONS**

An inadequate amount 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 5.4 cfs is available from the

lower springs. Modification of existing water collection and pumping facilities or drilling additional wells at this location is warranted. The lower springs collects approximately 6 cfs of available water but the means to pump it is unavailable. Additional water at this location is also available for collection.

All of the 64 raceways (inside and out) need to be sandblasted and repainted as their condition is deteriorating rapidly. Increased algae growth in porous walls is becoming more of a problem in kokanee fry rearing in late spring.

The catwalk structure and the stream anchors for the upper and lower weir at the Granite Cr. trap are made of wood and need replaced. Metal framework and concrete anchors are needed.

An additional 14 doors need to be purchased to replace the existing rusted out doors on the hatchery building.

Residences #1 and #2 at the old Clark Fork Hatchery are in need of new roofs. They are both 30 plus years old.

The two small culverts under the entry road to Clark Fork Hatchery need to be replaced with a bridge or a large enough culvert to handle the stream volume. The county road flooded again this year because of the small culvert size.

The main backup generator and transfer switch as well as the alarm system for the hatchery is over 20 yrs old and needs replaced.

A cold storage area (pole building) needs to be built to protect the hatchery tractor and vehicles from the weather.

## **PUBLIC RELATIONS**

The surrounding communities recognize the CGFH as one of the major contributors of kokanee to the Lake Pend Oreille fishery. The importance of this forage species to the world class Pend Oreille trophy fishery and the local economy is presently estimated in the millions of 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 focused 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 92 people signed our guest registration book this year. An estimated 335 visitors toured the hatchery during the 2010 season. In addition, 13 hatchery tours were given to local school groups.

The CGFH staff was also involved with the "Trout in the Classroom" program. A total of six local schools received eyed eggs (kokanee) or fish (w. cutthroat) for their classroom tanks. An educational presentation was given to each class at the time of delivery.

The CGFH staff assisted with the local Free Fishing Day event in Clark Fork. There were approximately 60 children and adults who participated.

## **ACKNOWLEDGMENTS**

The CGFH staff would like to thank the Cabinet Gorge Dam and Northern Lights personnel for their continued cooperation with hatchery operations. Thanks also to the Bonner County Sportsmen's Association, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season. The staff would also like to thank CGFH Maintenance Craftsman Todd Braunschweig, Mullan Hatchery Fisheries Technician Mary Van Broeke, and CGFH Biological Aides Erik Christensen, Jackie Mitchell, Rauno Raiha (Bonner County Sheriff's boat operator), and Brett Hubbard for their dedication and hard work in making 2010 a successful year.

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## **APPENDICES**

Appendix 1. Lake Pend Oreille kokanee trapping/spawntaking summary, 2010.

<b>Spawntaking</b>	<b>Total</b>	<b>Females</b>	<b>Females</b>	<b>Green</b>		<b>Percent</b>
Site	Fish	Spawned	Unspawned	Eggs	Fecundity	Females*
Sullivan Sps.	103,049	27,252	13,921	10,378,160	381	40.0%
Cabinet						
Gorge	800	0	n/a	n/a **	n/a	
Total	103,849	27,252	13,921	10,378,160	381	40.0%

\* Includes male/female prespawn mortality & Sullivan Springs fish releases above.

\*\* All 800 early kokanee adults trapped in the Cabinet Gorge FH trap/ ladder were transported to Clark Fork FH then released into LR #4, which was rehabilitated into a spawning channel by LPOIC members in the summer of 2008. The Cabinet Gorge FH ladder was closed on 10/14/2010.

Appendix 2. Production Summary, all species, 2010.

Species	Status	Number	Pounds	Length	Fish/lb	Feed Fed	Feed Cost <sup>a</sup>	Annual Cost <sup>b</sup>	Cost/lb	Cost/ 1,000	Cost/ inch	Conv
2009 Kokanee (late) Lake Pend Oreille	Released	7,075,119	24,024.00	2.2	294.5	20,620.8	\$19,896.79	\$157,537.34	\$6.56	\$22.27	\$0.010	0.90
2009 Kokanee (early) SF Boise R	Released	647,931	3,820.00	2.7	169.6	4,010.8	\$3,778.89	\$29,920.22	\$7.83	\$46.18	\$0.017	1.09
2009 Kokanee (October) Lake Mary Ronan	Released	306,090	1,425.00	2.5	214.8	1,208.8	\$1,152.29	\$9,123.52	\$6.40	\$29.81	\$0.012	0.89
2010 Kokanee (early) Deadwood Res.	On Station	714,122	254.20	1.1	2,809.3	97.0	\$115.95	\$918.06	\$3.61	\$1.29	\$0.001	0.78
2010 sterile Kokanee (early) Deadwood Res.	On Station	5,548	2.20	1.1	2,521.8	1.9	\$2.17	\$17.18	\$7.81	\$3.10	\$0.003	1.68
2009 Fall Chinook Big Creek FH, Ore	Released	28,566	144.00	2.6	198.4	94.5	\$151.88	\$1,202.54	\$8.35	\$42.10	\$0.016	1.13
2010 Fall Chinook Big Creek FH, Ore	On Station	42,032	48.00	1.6	875.7	9.3	\$14.27	\$112.99	\$2.35	\$2.69	\$0.002	1.08
2009 Sterile Rainbow Troutlodge	Released	17,754	5,048.60	8.9	3.5	1,000.0	\$580.00	\$4,592.28	\$0.91	\$258.66	\$0.029	1.19
2009 Westslope Cutthroat Westslope Cutthroat Trout Co.	Released	111,556	2,506.00	4.0	44.5	1,692.5	\$2,511.90	\$19,888.54	\$7.94	\$178.28	\$0.045	1.02
2010 Westslope Cutthroat Cabinet Gorge FH	On Station	101,339	2,263.80	4.0	44.8							
	Released	80,376	265.00	2.1	303.3							
	Total	181,715	2,528.80	3.4	71.9	1,302.8	\$2,022.39	\$16,012.73	\$6.33	\$88.12	\$0.026	0.53
BY07 Westslope Cutthroat King's Lake, WA	On Station	1,765	1,534.80	13.5	1.1							
	Released	2,125	1,598.00	12.9	1.3							
	Total	3,890	3,132.80	13.2	1.2	1,743.5	\$2,187.85	\$17,322.80	\$5.53	\$4,453.16	\$0.337	1.76
BY08 Westslope Cutthroat King's Lake, WA	On Station	2,465	2,162.30	13.6	1.1							
	Released	3,083	1,702.00	11.6	1.8							
	Total	5,548	3,864.30	12.6	1.4	1,745.5	\$2,080.48	\$16,472.67	\$4.26	\$2,969.12	\$0.236	1.04
BY09 Westslope Cutthroat King's Lake, WA	On Station	8,144	1,115.60	7.3	7.3							
	Released	7,973	475.00	5.5	16.8							
	Total	16,117	1,590.60	6.6	10.1	1,158.8	\$1,578.87	\$12,501.06	\$7.86	\$775.64	\$0.118	0.87
BY10 Westslope Cutthroat King's Lake, WA	On Station	4,010	81.30	3.9	49.3	57.3	\$88.04	\$697.08	\$8.57	\$173.83	\$0.045	0.72
Totals produced / Average		9,159,998	48,469.80	2.6	189.0	34,743.2	\$36,161.77	\$286,319.00	\$5.91	\$31.26	\$0.012	0.94

<sup>a</sup> Includes freight, shipping, and handling.

<sup>b</sup> Cabinet Gorge FH Budget (\$277,306) & Nampa Fish Transportation Costs (\$9,013).

## **CLEARWATER FISH HATCHERY**

### **RESIDENT PROGRAM**

**Prepared by:**

**Cassie Sundquist, Assistant Hatchery Manager**

**Jerod Morris, Fish Technician**

**Douglas Munson, Anadromous Fish Pathologist**

### **INTRODUCTION**

The Clearwater Fish Hatchery (CFH) is located in the community of Ahsahka in Clearwater County, Idaho. Ahsahka is a Native American word meaning, "where two great 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 U.S. Army Corps of Engineers, under the United States Fish and Wildlife Service (USFWS) Lower Snake River Compensation Plan, and was completed in 1991. Funding is provided by the USFWS. The hatchery is operated by the Idaho Department of Fish and Game.

The primary purpose for CFH is mitigation for anadromous fish losses caused by hydroelectric dams. Anadromous fish production is currently using all available rearing space; therefore, the facility had no excess rearing space for catchable rainbow trout *Oncorhynchus mykiss* production.

Two 1.8 mile long pipelines run upstream to the Dworshak Dam. The pipelines go up the face of the dam to an elevation of 1,357 feet, then through the dam into the reservoir. The 18-inch pipe, secondary supply, is stationary at an elevation of 1,357 feet with a screened inlet to keep out debris. This pipe supplies cool water to the hatchery. The 48-inch flexible plastic pipe, primary supply, is suspended from a floating platform with a winch attached to the platform. A winch raises and lowers the intake of the pipe to the level of desired water temperature. This pipe supplies warm water (50° to 58°F) to the hatchery during the summer and fall and is raised to 15 feet for winter and spring months.

Approximately 200 yards upstream from the hatchery is a distribution structure designed to reduce the 286 psi of the high-pressure supply lines to the gravity flow of 7 psi to the hatchery. The structure consists of a primary and secondary chamber. The primary and secondary pipelines have each been outfitted with a hydroelectric generator and put into operation June 2000. The two generators produce approximately 2,400 KW of electricity.

### **FISH PRODUCTION**

The CFH did not produce catchable rainbow trout in 2010 because spring and summer Chinook and summer steelhead occupied all available rearing space. The CFH was strictly a redistribution center for American Falls Fish Hatchery (AFFH), Grace Fish Hatchery (GFH), Mackay Fish Hatchery (MFH) and Nampa Fish Hatchery (NFH) reared rainbow trout catchables in 2010.

## **FISH STOCKED AND TRANSFERRED**

The CFH redistributed 106,639 Troutlodge triploid rainbow trout catchables: 45,735 that were reared at AFFH, 9,756 reared at GFH, 28,287 reared at MFH, and 13,992 reared at NFH. On two occasions, CFH personnel transferred 4,500 Shasta strain rainbow trout reared at Dworshak National Fish Hatchery and 4,369 Spokane strain rainbow trout reared at Lyons Ferry Fish Hatchery to regional waters. The total average fish per pound was 2.75. The total weight was 40,661 lbs. A total of 89 fish plants were administered to 23 different plant sites throughout the year.

## **FISH FEED**

The CFH redistributed rainbow trout catchables into Region 2 waters during 2010. These fish were stocked in local waters as fast as they arrived; therefore, little supplemental feed was needed to maintain overall health and size of the fish.

A total of 3,000 lbs of Bio-Oregon feed were fed to the rainbows through the summer of 2010 as a maintenance diet (Appendix 2). This food was surplus feed from the CFH Chinook and steelhead programs.

## **PUBLIC RELATIONS**

The CFH and its satellites were open to visitors during the year. Tours at the main hatchery were given to various groups. We had visitors from many states, as well as other countries.

On June 23, 2010, Jeff Jenni planted 450 catchable rainbow trout (3.03 fpp) into Camp Grizzly Pond.

On July 7, 2010, Jeff Jenni planted 250 catchable rainbows (3.3 fpp) and four trophies into Jaypee Mill Pond for sixth graders on a 4-H forestry tour.

On August 6, 2010, Jeff Jenni planted 500 catchable rainbow trout (1.85 fpp) to Orofino Creek near Pierce, Idaho for their annual 1860 Days Celebration.

## **SPECIAL PROJECTS**

A total of 32 trophy sized adult fish, ranging in weight from three lbs. to eight lbs., were recovered from CFH's total flow pond. The planting crew supplemented 10 fish stocking trips to six different sites with these large fish.

## **FISH HEALTH**

In general, the fish health at CFH was good this year. The rainbow trout catchables were transferred from AFFH, GFH, NFH, and MFH to CFH and these fish were, in most cases, immediately stocked out into regional waters. All fish at CFH are monitored daily by personnel to detect any early signs of fish health problems.

### **Diseases Encountered**

Rainbow trout were sampled twice during 2010 at CFH. Both samples were taken due to elevated mortality associated with feeding a dry ration in September 2010 (50 fish per day). All fish sampled (5) were positive for *Staphylococcus spp.* and (1/5) fish were positive for *Pseudomonas spp.* *Staphylococcus spp.* is not considered a pathogen of fish, but subsequent sampling from the fish did detect this bacteria. Within two days of changing to this dry diet, mortalities increased to unacceptable levels and the fish were removed from this feed. Toxicology samples were taken to the University of Idaho Toxicology Laboratory, but nothing was identified that could be considered toxic. Blood samples were drawn and sent to the Clinical Pathology of Oregon State University's College of Veterinary Medicine, but nothing definitive was discovered.

Although no etiologic agent has been identified (other than the *Staphylococcus spp.*), it is suspected that the feed is responsible for the manifestation of disease. Attempts to reproduce the signs of disease and mortality with the suspect feed at the Eagle Fish Health Laboratory have failed. Once CFH fish were removed from this diet, signs of disease disappeared and mortality declined immediately. These fish were fed a different diet and eventually out planted without further problems.

### **NEW ZEALAND MUDSNAIL INFORMATION**

All fish transferred to CFH from hatcheries with New Zealand Mudsnailed (NZMS) were tested for their presence before being transferred to CFH.

## **ACKNOWLEDGEMENTS**

The CFH would like to thank the American Falls Fish Hatchery, Grace Fish Hatchery, Mackay Fish Hatchery, Nampa Fish Hatchery, Dworshak National Fish Hatchery, and Lyons Ferry Fish Hatchery crews for raising the catchable rainbows and also Dick Bittick and Gary Ady for transporting the rainbows to CFH for distribution. Fisheries Technicians and Biological Aides who aided in rainbow trout rearing and distribution included Jerod Morris, Malia Steiner, Jeff Jenni, Steve Duty, Jenny Hole, Chip Roth, Steve Lee, Theresa Elliot, Melissa Hicks, Christina Syzbura, Pam Rowsell, Joseph Blackburn, Jacob Kurth, Kortney Walker and Bob Miller. Our two summer youth participants, Konor Parker and Daniel Kobel, also participated in the raising and distribution of the catchable rainbow trout.

## **APPENDICES**

Appendix 1A. Clearwater Fish Hatchery Resident Rainbow Trout Distribution January 1-December 31, 2010.

Date	Number Released	Pounds	Fish Per Pound	Stock of Fish
3/1/2010-3/31/2010	500	166	3.06	Troutlodge Triploid
4/1/2010-4/43/2010	9,256	3,094	3.02	Troutlodge Triploid
5/1/2010-5/31/2010	33,467	14,365	2.69	Troutlodge Triploid, Shasta*
6/1/2010-6/30/2010	27,870	8,868	3.1	Troutlodge Triploid
7/1/2010-7/31/2010	7,402	2,810	2.37	Troutlodge Triploid
8/1/2010-8/31/2010	2,250	1,215	1.85	Troutlodge Triploid
9/1/2010-9/30/2010	4,450	2,264	2.04	Troutlodge Triploid
10/1/2010-10/31/2010	21,446	7,879	2.75	Troutlodge Triploid, Spokane**
<b>TOTALS</b>	<b>106,641</b>	<b>40,661</b>	<b>2.61</b>	

\* Includes 4,500 Shasta strain rainbow trout at 1.25 fish per pound raised at Dworshak National Fish Hatchery and redistributed by Clearwater Fish Hatchery staff.

\*\* Includes 4,369 Spokane strain rainbow trout at 2.7 fish per pound raised at Lyon's Ferry Hatchery and redistributed to Moose Creek Reservoir by Clearwater Fish Hatchery staff.

Appendix 1B. Clearwater Fish Hatchery Inventory of Resident Rainbow Trout January 1-December 31, 2010.

Inventory	Number of Fish	Weight (lbs)
2010 catchable rainbow trout on hand 1/1/2010	0	0
2010 catchable rainbow trout on hand 12/31/2010	0	0

Appendix 2. Fish Feed Costs and Amount Fed for the CFH Catchable Rainbow Trout Program, Jan 1 - Dec 31, 2010.

Date	Brand	Feed Type	Weight (Lbs)	Cost Per Lb	Total
1/1-12/31	Bio-Oregon	Bio-Grower 2.5	3000*	\$1.27	\$3,810.00
# Of Fish	Weight (Lbs)	Feed Fed	Conversion	Cost Per Lb For Redistribution	Cost/1000 Fish For Redistribution
106,641	40,661	3000 lbs	NA	\$.64**	\$243.20***

Estimated costs include 50% of the FY09 & FY10 budgets and do not include permanent salaries or feed cost @ AFFH, GFH, MFH, and NFH.

Redistribution expenditure by CFH was \$10,913.60.

\* This feed was made available as surplus from BY08 Chinook and was fed out prior to the end of its shelf life at no cost to the rainbow project.

\*\* Cost/lb equals total cost divided by total lbs produced, 1/1/10-12/31/10.

\*\*\* Cost/1000 fish equals total cost (minus feed cost @ AFFH, GFH, MFH, NFH) divided by total number of fish produced times 1000.

1/1/10 to 12/31/10: Redistribution cost @ CFH:	\$10,913.60
Transport cost to deliver fish from AFFH, GFH, MFH, and NFH to CFH:	\$15,021.00
Total cost:	\$25,934.60

## GRACE FISH HATCHERY

**Phillip J. Coonts, Fish Hatchery Manager I**  
**Bryan Grant, Assistant Fish Hatchery Manager**  
**Beau J. Gunter, Fish Culturist**

### ABSTRACT

The 2010 net production for Grace Fish Hatchery was 694,339 fish weighing 74,579 pounds. The average size of a fish included in the net production was 9.31 fish per pound or 6.75 inches in length. The amount of feed used was 71,389 pounds at a cost of \$45,096, including freight and fuel. The total cost for net production was \$320,111. This results in a \$4.29 cost per pound of fish or a \$461.03 cost per 1000 fish. This excludes the fish, feed, and costs associated with the Bear River Bonneville cutthroat trout *Oncorhynchus clarkii utah* program.

### INTRODUCTION

Grace Fish Hatchery (GFH) is located in Caribou County, Idaho, approximately seven miles south of the town of Grace. The GFH was acquired in 1946 and is operated by the Idaho Department of Fish and Game (IDFG). Funding is received from revenue generated by license sales.

The primary mission of the GFH is to produce quality trout for anglers, fish management, and citizens in order to maintain and enhance Idaho's fisheries resources and promote department programs. Species reared at GFH include rainbow trout (RBT) *Oncorhynchus mykiss*; Bonneville cutthroat trout (BCT) *Oncorhynchus clarkii utah*; and lake trout (LKT) *Salvelinus namaycush*.

The GFH is staffed with a Fish Hatchery Manager I, an Assistant Fish Hatchery Manager, a Fish Culturist, and one temporary Biological Aide.

Water for GFH is supplied by gravity flow from West and Middle Whiskey Creek springs. Both springs are located on private property neighboring the hatchery. Average monthly flow for 2010 was 14.39 cubic feet per second (cfs), with a range of 10.7 cfs to 18.7 cfs (Appendix 1). Water temperatures fluctuate between 52°F and 54°F.

Rearing space at GFH consists of 16 single pass indoor vats (3' x 1.5' x 13'), 16 single pass small raceways (4' x 3.5' x 40') and six large raceways (12' x 3.5' x 300'). There are also four single pass medium raceways (4' x 3.5' x 100'), but these should only be used in an emergency situation due to design limitations.

The water supplied to the vats and small raceways is first use. The large raceways receive a mixture of first use water from the springs and second use water from the vat and small raceway effluent. All effluent flows through a full flow settling basin before being discharged into Whiskey Creek, a tributary of the Bear River.

## **PRODUCTION SUMMARY**

This production summary excludes the Bear River Bonneville cutthroat trout (BRBCT) and costs associated with that program.

The GFH began the 2010 calendar year with 515,252 fish (24,003 lbs.) on station. Throughout 2010, GFH stocked or redistributed 935,671 fish (71,635 lbs.). The GFH ended the 2010 calendar year with 273,920 fish (26,947 lbs.) on station. This yields a net production of 694,339 fish (74,579 lbs.) for 2010 (Appendix 2).

Costs associated with the rearing, stocking, and redistributing of the net production were \$320,111. This results in a \$4.29 cost per pound of fish or a \$461.03 cost per 1000 fish (Appendix 2).

## **EGG SOURCES**

The following egg sources were utilized this year: RBT were provided by Troutlodge, Sumner, Washington; Bear Lake Bonneville cutthroat trout (BLBCT) were provided by Utah Department of Wildlife Resources (UDWR), Fountain Green Fish Hatchery, Sanpete County, Utah; LKT were provided by Wyoming Game and Fish Department, Story Fish Hatchery (SFH), Story, Wyoming (Appendix 3).

## **LAKE TROUT**

The IDFG has a cooperative agreement with the UDWR to stock triploid LKT into Bear Lake. Adults are spawned and triploidy is induced at the SFH near Sheridan, Wyoming in October. Eggs are eyed at SFH and shipped to GFH.

## **BEAR RIVER BONNEVILLE CUTTHROAT TROUT**

The IDFG has a cooperative agreement with PacifiCorp to rear BRBCT for supplementation and reestablishment purposes. Six management units (MU) are currently identified in Southeast Idaho reflecting major drainage divides and further separated in the Bear River system by major Bear River Dams (Teuscher and Capurso 2007). Genetic investigations on BCT populations have shown significant genetic differentiation among MUs (Campbell et al. 2007).

From 2007-2009, IDFG fisheries personnel collected approximately 493 subadult BRBCT from the Cottonwood Creek drainage in the Thatcher MU. Wild fish were then PIT tagged and released into a spring fed pond near Grace, Idaho owned by Mr. Kent Clegg.

From May 12 through June 10, staff from GFH spawned 36 female and 72 male BRBCT from the pond. Eggs were incubated and hatched at GFH (Appendix 4).

There were 16,955 fish (278 lbs.) on station at the end of 2010 (Appendix 4). These fish will be stocked into various Bear River tributaries within the Thatcher MU to meet supplementation and reestablishment objectives in spring 2011.

The amount of feed used was 234 pounds at a cost of \$286. The average feed conversion was 0.84 (Appendix 4).

Costs associated exclusively with this program were \$47,782 (Appendix 4).

### **FISH FEED**

This excludes the feed amount and feed costs associated with the BRBCT program.

The amount of feed used in 2010 was 71,389 pounds at a cost of \$45,096 (Appendix 2). The average cost per pound of feed was \$0.632, including freight and fuel charges (Appendix 5).

The average feed conversion for all fish included in the net production was 0.96 pounds of feed to produce one pound of fish (Appendix 2).

### **FISH TRANSPORT**

Both Hagerman Fish Hatchery and Nampa Fish Hatchery transport operators hauled and stocked or redistributed fish for GFH in 2010. Cost for the use of these operators was \$7,851 (Appendix 6).

### **FISH HEALTH SUMMARY**

The brood year (BY) 2010 RBT catchables tested positive for *Flavobacterium psychrophilum*, the causative agent of coldwater disease in salmonids. A veterinary feed directive was given and fish were treated with Aquaflor medicated feed (Appendix 5).

In August 2010, blood samples were obtained from 60 individual BY 2009 LKT to test for triploidy. Samples were sent to Washington State University for analysis and results confirmed that 100% triploid induction rates were achieved among the fish sampled.

An array of tissue samples were taken from all BRBCT female spawners. *Renibacterium salmoninarum*, the causative agent for bacterial kidney disease, was present in 5/36 individuals. All eggs associated with the five females were culled (Appendix 4).

Two individuals from each BRBCT subfamily were sacrificed for tissue samples to obtain a genetic analysis. Data on relatedness were analyzed and Eagle Fish Genetics Lab staff determined that a captive broodstock is not a necessity at this time.

### **FISH MARKING**

August 23-24, 2010, all LKT were given both an adipose clip and a right ventral clip.

October 20, 2010, 400 RBT catchables were Floy-tagged for fisheries management research at C.J. Strike Reservoir.

October 22-23, 2010, all BRBCT were given an adipose clip.

### **INVASIVE SPECIES**

New Zealand mudsnails (NZMS) *Potamopyrgus antipodarum* are present in the settling basin at GFH. Hazard Analysis and Critical Control Point (HACCP) plans are on file at GFH. HACCP plans are used as a guide to prevent the spread of NZMS into habitats where it is not currently established.

Prior to redistributing RBT catchables to McCall Summer Chinook Hatchery, staff at GFH lethally sampled 30 fish to determine if NZMS were present. Digestive systems of each individual were examined for presence of NZMS. No NZMS were observed.

An updated NZMS monitoring plan was created in the winter of 2010. This plan will be implemented starting in calendar year 2011.

### **AQUATIC EDUCATION**

Numerous scheduled tours were given to local area schools. Approximately 300 individuals participated in these scheduled tours, including 215 students and teachers. It is estimated that 400 people took self-guided tours at the hatchery utilizing the interpretive kiosks and picnic area.

The GFH donated RBT eggs and fry to local area schools for Trout in the Classroom programs. Fish dissection workshops were given to 90 students at the Preston Junior High School.

The annual GFH Free Fishing Day clinic was a success once again. Over 200 kids participated in the event this year.

The winning bidder at the Idaho Fish and Wildlife Foundation's annual auction was escorted on a mountain lake fish plant. His two teenage sons accompanied him. The trip was very well executed and greatly appreciated by the family.

### **HATCHERY IMPROVEMENTS**

Numerous improvements were completed throughout the year. The following are highlights of improvements made to GFH in 2010:

- A valve system was installed to allow incubation and vat effluent to bypass the large raceways and be sent directly to the settling basin.
- Larger diameter effluent piping was installed on the small raceways to allow for increased water flow with the addition of the incubation and vat effluent.
- An elastomeric coating (Rhino-line) was applied to 12 vats. The remaining four vats will be coated in 2011.

- More aluminum frame, vertical mesh screens were fabricated for the large raceways.
- The 1-ton fish truck hauling tank was sanded and repainted.
- Cinders were spread over multiple grassy areas to create a “xeriscape” landscape.
- Gravel was hauled and spread on the entry road, parking areas, between the large raceways, and the driveways of Residences #2 and #4.
- The walls of the incubation room were covered with PVC panels.
- All residences received electrical inspections. Numerous improvements were made to bring homes up to code, including installation of tamper-proof receptacles.
- McConnell stand pipes were fabricated for the small raceway waste lines.
- A new hatchery entrance sign was erected.
- The medium raceways received permanent covers. This will prevent algae and plant growth, which would eventually end up on the large raceway head screens.
- A French drain was installed in front of Residence #1 to alleviate the issue of water running into the basement.
- New exterior entry doors were installed at Residences #1 and #2.
- An emergency egress was installed in the basement of Residence #2.
- The basement of Residence #2 was remodeled to create a third bedroom.
- Residence #2 received new kitchen countertops.
- The kitchen in Residence #3 received a remodel, including new cabinets and countertops; new dishwasher, microwave and free standing stove, and new paint.
- A heat-resistant wall and hearth were installed in Residence #3.
- The submersible fish pump was taken to Magic Valley Heli-Arc for repairs.
- Due to failure of the original heat pump, a new central air unit and propane furnace were installed in Residence #4.

### **HATCHERY NEEDS**

- New concrete settling pond with sump basins.
- A central septic system for Residences #1, #2, #3; office; and hatchery building to replace the earthen sewage pond.

- New siding and windows on the hatchery building.
- New siding on the garden shed.
- Installation of an exhaust system to eliminate interior condensation in the hatchery building.
- Remodel the bathroom in Residence #2 due to a rotting floor.
- More aluminum frame screens and McConnell stand pipes for the small raceways.
- Isolation incubation shed for the BRBCT program.

## **ACKNOWLEDGMENTS**

We thank Biological Aides Forrest McKinley, Amanda Toly, and Janae Starnes for their very important contributions to the hatchery; Senior Conservation Officer Nathan Stohosky for his assistance throughout the year; Kent Clegg for allowing use of his property and his willingness to assist; Natividad Wilson and her crew for all of the fin clipping; the Southeast Region staff who assisted on Free Fishing Day; the staff at American Falls Fish Hatchery for assistance with hauling the American Falls Reservoir fingerling; Jason Jones, Fish Culturist at Mackay Fish Hatchery, for assistance with lake trout spawning and triploid induction procedures; Doug Burton of the Eagle Fish Health Lab; the staff at Eagle Fish Genetics Lab; the employees at Story Fish Hatchery, Daniel Fish Hatchery, and Fountain Green Fish Hatchery.

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## **APPENDICES**

Appendix 1. Grace Fish Hatchery average monthly and annual flows (cfs), 1994-2010.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>January</b>	11.2	12.5	13.75	15.2	15.7	15.8	15.4	13.3	10.75	11.1	11.4	11.4	14.3	15.49	13.3	13.2	14.2
<b>February</b>	10.5	12.45	12.7	13.5	14.65	14.5	14.3	11.9	10.6	10.22	11.1	10.4	11.8	14.72	12.4	12	13.2
<b>March</b>	12.3	11.15	13.15	12.85	13.4	13.1	13.1	10.1	9.4	9.56	9.97	10.06	11.8	14.3	11.5	11.3	12.1
<b>April</b>	12	10.55	12.85	13.6	12.7	13.2	10.67	9.5	9.4	9.51	9.4	10.4	10.4	11.8	10.9	11.1	11.3
<b>May<sup>a</sup></b>	11.7	10.6	12.3	13.4	13.1	14	8.9	10	9.4	9.52	9.16	10.75	14.9	10.6	10.4	11.1	10.7
<b>June<sup>a</sup></b>	11	10.7	11.1	14.35	13.9	11.6	12.1	9.9	9.5	8.83	10.51	11.8	15.8	13.2	8.6	11.2	12.1
<b>July<sup>a</sup></b>	11.8	10.85	12.8	15.2	12.8	12.7	13.2	11	10.2	10.06	13.2	12.8	16.67	16.2	11.6	11.9	13.2
<b>August<sup>a</sup></b>	12.5	13.75	17.5	18.2	15.6	15.3	14.2	12.15	11.1	12.3	8.43	17.41	20.79	14.3	14.9	15.4	16.3
<b>September<sup>a</sup></b>	13.3	15.9	16.7	19	18.7	17.7	16	12.15	12.8	13.6	13.6	17.67	22.5	14.6	16.8	17.1	18.7
<b>October</b>	14.1	17.1	19.3	19	19.2	17.9	17.1	12	13.6	13.6	13.2	17.67	21.65	16.3	17.6	16.6	18.3
<b>November</b>	14	16.2	17.8	18.2	17.8	17.7	16	12	12.9	13.6	12.9	15.88	20.79	16.3	16.5	16	16.9
<b>December</b>	13.5	15.4	16.5	17.1	17	17	14.9	10.9	11.8	13	12.7	14.72	18.7	13.6	14.9	14.9	15.7
<b>Annual Avg.</b>	<b>12.33</b>	<b>13.10</b>	<b>14.70</b>	<b>15.80</b>	<b>15.38</b>	<b>15.04</b>	<b>13.82</b>	<b>11.24</b>	<b>10.95</b>	<b>11.24</b>	<b>11.30</b>	<b>13.41</b>	<b>16.68</b>	<b>14.28</b>	<b>13.28</b>	<b>13.48</b>	<b>14.39</b>
<b>% Annual Avg.</b>	<b>91%</b>	<b>97%</b>	<b>108%</b>	<b>117%</b>	<b>113%</b>	<b>111%</b>	<b>102%</b>	<b>83%</b>	<b>81%</b>	<b>83%</b>	<b>83%</b>	<b>99%</b>	<b>123%</b>	<b>105%</b>	<b>98%</b>	<b>99%</b>	<b>106%</b>
<b>Annual Avg. (1994 - 2010)</b>	<b>13.55</b>																

<sup>a</sup> May through September irrigation rights can take up to 4.0 cfs.

Appendix 2. Grace Fish Hatchery production and costs summary, 2010.

Species (Size)	Number (Pounds) on 1/1/2010	Number (Pounds) Stocked/ Redist	Number (Pounds) on 12/31/10	Net Production Number (Pounds)	Feed Pounds	Feed Costs	Avg. fpp When Stocked/ Redist	Avg. Length When Stocked/ Redist	Avg. C= When Stocked/ Redist	Avg. Feed Conv. Net Prod	Comments
RBT 3N (catch)	166,252 (23,828)	160,643 <sup>a</sup> (50,009 <sup>b</sup> )	178,570 (25,249)	172,961 (51,430)	51,539	\$29,855	3.21	9.60"	3,520 $\times 10^{-7}$	1.00	Net Prod includes BY09 and BY10
RBT 3N (fing)	301,000 (150)	606,278 (8,251)	0 (0)	305,278 (8,101)	5,875	\$4,688	73.48	3.29"	3,840 $\times 10^{-7}$	0.73	Net Prod includes BY09 and BY10
RBT 2N (fing)	0 (0)	150,900 (12,100)	0 (0)	150,900 (12,100)	11,003	\$7,020	12.47	5.79"	4,130 $\times 10^{-7}$	0.91	
LKT 3N (fing)	48,000 (25)	17,850 (1,275)	48,000 (25)	17,850 (1,275)	1,756	\$2,339	14.00	6.22"	2,970 $\times 10^{-7}$	1.38	Net Prod includes BY09 and BY10
BLBCT (fing)	0 (0)	0 (0)	47,350 (1,673)	47,350 (1,673)	1,216	\$1,194	-	-	-	0.73	Stock in Spring 2011
<b>Summary<sup>c</sup></b>	<b>515,252</b> <b>(24,003)</b>	<b>935,671</b> <b>(71,635)</b>	<b>273,920</b> <b>(26,947)</b>	<b>694,339</b> <b>(74,579)</b>	<b>71,389</b>	<b>\$45,096</b>	<b>9.31</b>	<b>6.75"</b>	<b>-</b>	<b>0.96</b>	

<sup>a</sup> Redistribution summary: Clearwater, 9,900 fish; McCall, 30,008 fish.

<sup>b</sup> Redistribution summary: Clearwater, 3,300 pounds; McCall, 9,475 pounds.

<sup>c</sup> Summary values for average fpp, length (C=3,500  $\times 10^{-7}$ ) and feed conversion use the net production and feed pounds grand totals.

Personnel Cost	Operating Cost	Feed Cost	Egg Cost	Transport Cost	Total Cost Net Prod	Cost/1,000 Fish Net Prod	Cost/ Pound Net Prod
\$171,208	\$74,363	\$45,096	\$21,593	\$7,851	\$320,111	\$461.03	\$4.29

Appendix 3. Eggs received at Grace Fish Hatchery and egg costs, 2010.

Date Received	Number of Eyed Eggs	Source	Species	Lot	Destination	Cost
1/15/2010	62,502	Troutlodge	RBT 3N	10-WA-TT-1	2010 Reg 5 fing	\$1,768
2/25/2010	322,060	Troutlodge	RBT 3N	10-WA-TT-2	2010 AmFalls fing	\$9,362
3/4/2010	184,560	Troutlodge	RBT 2N	10-WA-TD-1	2010 IsPark fing	\$3,696
4/30/2010	180,918	Troutlodge	RBT 3N	10-WA-TT-3	2011 catch	\$5,617
7/1/2010	60,450	Fountain Green	BLBCT	10-UT-TJ-1	2011 Bear Lk fing	N/A
10/29/2010	40,000	Troutlodge	RBT 3N	10-WA-TT-4	2011 catch	\$1,150
12/2/2010	78,125	Story	LKT 3N	10-WY-TN-1	2011 Bear Lk fing	N/A
<b>Total</b>	<b>928,615</b>					<b>\$21,593</b>

Appendix 4. Bear River Bonneville cutthroat trout production summary and costs associated with PCA 38504, 2010.

Number Green Eggs Received	Number Eyed Eggs	Percent Eye-up	Net Production				Total Cost	Cost/ 1000 Fish	Avg. fpp	Avg. Length	Avg. Feed Conv.
			Number (Pounds)	Feed Pounds	Feed Cost	Other Costs					
26,648	23,324 <sup>a</sup>	88.12%	16,955 (278)	234	\$286	\$47,496	\$47,782	\$2,818	61	3.60"	0.84

<sup>a</sup> 5,304 eyed eggs were eventually culled due to presence of *Renibacterium salmoninarum*.

Appendix 5. Feeds used at Grace Fish Hatchery and associated costs, 2010.

<b>Source</b>	<b>Type</b>	<b>Size</b>	<b>Pounds Used</b>	<b>Average Cost Per Pound</b>	<b>Cost</b>
Rangen	TSS	0	468	\$0.740	\$346
Rangen	TSS	1	825	\$0.740	\$611
Rangen	TSS	2	3,378	\$0.740	\$2,500
Rangen	TSS	3	7,233	\$0.740	\$5,352
Rangen	Aquaflor	3	950	\$1.648	\$1,566
Rangen	Grower	4	6,092	\$0.598	\$3,643
Rangen	Low P 450 Ext	3/32"	31,090	\$0.585	\$18,188
Rangen	Low P 450 Ext	1/8"	19,487	\$0.418	\$8,146
Rangen	Soft Moist	1/32"	88	\$1.30	\$114
Rangen	Soft Moist	1/16"	660	\$1.41	\$931
Rangen	Soft Moist	3/32"	1,012	\$1.38	\$1,397
Bio-Oregon	Bio-Vita	#00	42	\$1.63	\$0 <sup>a</sup>
Bio-Oregon	Bio-Vita	#0	25	\$1.63	\$0 <sup>a</sup>
Bio-Oregon	Bio-Vita	#1	12	\$1.62	\$0 <sup>a</sup>
Bio-Oregon	Bio-Vita	#2	27	\$1.62	\$0 <sup>a</sup>
Freight and Fuel					\$2,302
<b>Total</b>			<b>71,389</b>	<b>\$0.632</b>	<b>\$45,096</b>

<sup>a</sup> Feed was paid for with Bear River Bonneville cutthroat trout program money.

Appendix 6. Fish transport operator costs for Grace Fish Hatchery, 2010.

<b>Operator</b>	<b>Miles</b>	<b>Cost/Mile</b>	<b>Cost</b>
Hagerman	1,797	\$2.70	\$4,847
Nampa	941	\$3.19	\$3,004
<b>Total</b>	<b>2,738</b>	<b>\$2.87</b>	<b>\$7,851</b>

## **HAGERMAN FISH HATCHERY**

**Joe Chapman, Hatchery Manager II**  
**David May, Assistant Hatchery Manager I**  
**Travis Parrill, Fish Culturist**  
**Sam VanLiew, Fish Culturist**  
**Ken Taylor, Transport Operator**

### **INTRODUCTION**

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

Funding is provided primarily through Department license money. The HFH used approximately \$816,017 this year: \$27,363 from Hagerman's budget, \$700,226 from Dingell-Johnson (DJ) monies, \$30,198 from other accounts, and \$58,230 from the fish transportation budget, to rear and stock fish in the 2010 production year, not including capital outlay expenditures (Appendix 1).

The HFH is staffed with a Hatchery Manager II, an Assistant Hatchery Manager, two Fish Culturists, and a Fish Transport Operator. Approximately 19 months of temporary labor is available from the DJ budget for use during the year.

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

### **HATCHERY PRODUCTION**

During 2010, the HFH reared and stocked 3,024,708 fish weighing 444,752 lbs. Of these, 1,216,770 were stocked 6-inches or longer and 1,807,938 were stocked smaller than 6-inches (Appendix 1). About 50.2% of the total fish were stocked in Magic Valley Region waters (Appendix 2). The majority of the larger trout were Kamloops rainbows from Troutlodge Inc., with the balance from Hayspur Fish Hatchery. Approximately 123,460 steelhead and 101,775 coho salmon were also stocked, and about 16,924 yellow phase rainbows were stocked locally throughout the stocking season. The 3-inch to 6-inch fish consisted of 1,096,779 rainbow trout and 518,259 Kamloops trout from Hayspur, 44,850 steelhead, and 148,050 coho (Appendix 1).

The 444,752 lbs stocked included 375,927 lbs of put-and-take fish averaging 9.0 inches, and 68,825 lbs of fingerlings that averaged 4.4 inches. The cost of planting the average 6.8 fish

per pound (fpp) (7.0 inches) fish was approximately \$1.33 per lb, or \$194.96 per 1,000 fish (Appendix 1).

In addition to the fish reared and planted, 1,210,481 fish (128,239 lbs) were on hand at the HFH on December 31, 2010. These consisted of 988,624 fish (120,799 lbs), average 8.2 fpp, or 6.6 inches) in the large raceways and 221,857 fingerlings (7,440 lbs, average 29.8 fpp, or 4.2 inches) in the west raceways. The cost of producing these fish was \$1.76 per lb or \$186.97 per 1,000 (Appendix 1).

On hand January 1, 2010 were 1,210,481 fish (128,239 lbs). The HFH also received 938,782 fish (2,001 lbs) from other hatcheries. Consequently, these subtractions yielded a net production for 2010 of 1,802,164 fish (408,866 lbs), mortality excluded (Appendix 1). The cost of producing the net production of 408,866 lbs was \$1.42 per lb, or \$192.68 per 1,000.

A total of 7,925,722 eggs and fry were acquired to yield the fish produced. Approximately 1,263,247 eggs were purchased and the balance was acquired from government sources at no cost (Appendix 4). Of the eggs and fry received, 5,180,113 were received for the fish planted and the balance was used for 2010 production. Some eggs were sent to Magic Valley Fish Hatchery (MVFH) to alleviate overcrowded conditions here. They were then transferred to Hagerman Fish Hatchery (HFH) when they were about 469 fpp (1.7 inches). Because of continued success, eggs were again shipped to MVFH for early rearing and will be transferred here in February 2011.

The overall survival rate of fish stocked was 58.4%, slightly better than last year's 57% (Appendix 3). Again, the improved survival over previous years can be attributed to good survival in the hatchery building. Mortality due to IHNV *Infectious Hematopoietic Necrosis Virus* decreased overall, but still impacted larger fish that had not obtained the disease earlier in life, similar to the previous two years. This virus continues to damage different organs, such as the skin and brain. Losses to *Ichthyophthirius* (ICH) in 2010 did not occur due to an aggressive treatment program when the pathogen was initially detected in December. Losses to Furunculosis decreased because of a vaccination program initiated in 2008 among the Troutlodge fish, which account for about 70% of the rainbow catchables stocked. Interestingly, the only group that was treated with medication for Furunculosis was a group that had not been vaccinated. Again this year, the steelhead were kept on water from Tucker Springs to minimize their exposure to pathogens there, thus improving their survival from 9% in 2007 (on Riley Creek water) to 74% in 2008, 78% in 2010, and 75.5% in 2011.

Fish Transport Operator Ken Taylor logged 26,681 miles delivering fish to state waters, while the rest of the crew logged 13,798 miles. This amounted to a total of 40,479 miles and 278 stocking trips during 2010, and included 24 trips for the private sector and other IDFG hatcheries.

In addition to the annual requests by regional fisheries managers, the HFH crew made 24 trips to haul and stock 820,036 fish weighing 79,620 lbs from other sources (Appendix 7). These included three trips for the American Falls Fish Hatchery (AFFH) to stock 124,455 trout weighing 17,950 lbs; three trips to stock 16,374 channel catfish weighing 3,815 lbs; three trips for Grace Fish Hatchery (GFH) to stock 450,875 rainbow trout weighing 16,325 lbs; two trips for Ashton Fish Hatchery (AFH) to stock 68,100 rainbow trout weighing 4,700 lbs; two trips for the College of Southern Idaho (CSI) to stock 583 sturgeon weighing 1,828 lbs; one trip for Hagerman National Fish Hatchery to stock 15,631 rainbow trout weighing 5,575 lbs; two trips for

Idaho Trout Company to stock 150,440 yellow rainbow trout weighing 23,847 lbs; and eight trips for Clear Springs Foods to stock 1,578 rainbow trout weighing 5,580 lbs.

### **FISH FEED**

The fish produced during 2010 were fed a total of 591,728 lbs of feed from Rangen Inc. and Silvercup (Appendix 5). The net weight gained during 2010 was 408,866 lbs, which resulted in an overall conversion of 1.45 lbs of feed to produce one lb of fish, not including the weight of the mortalities. Cost per pound of feed rose to an average of 0.56 per pound.

### **HATCHERY IMPROVEMENTS**

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

- Dredged the settling pond and removed the material to a local farm.
- Replaced the visitor's bathroom and added an ADA ramp.
- Added a dock and ADA ramp on the Riley Pond.
- Installed a new sprinkler system in the visitor's park and reseeded the area.
- Added gravel to the existing roads around the settling pond.
- Removed trees and brush from the settling pond dike and installed a fabric liner and rock.
- Installed an automatic gate at the entrance to the hatchery from Highway 30.
- Constructed shade cover supports on four of the west raceways.
- Replaced some of the boards at the Riley Creek intake, and repaired the traveling screen.
- Painted the outside of Residence #5 and storage garage.
- Installed a new double garage door on the storage garage.
- Installed a new hydraulic system on the fish feeder.
- Replaced rotten boards in Riley Creek headrace and poured new headrace walls to each raceway.
- Repaired the large and small pipeline flow meters, then calibrated them.
- Installed air relief valves on five of the Tucker Springs raceways inlet pipes to eliminate trapped air in the pipeline.

## **PUBLIC RELATIONS**

The HFH received a large number of visitors and sportsmen throughout the year. An estimated 35,000 visitors toured the facility and used the surrounding public grounds this year. The 37 acres of HFH property are surrounded by 880 acres of the Hagerman Wildlife Management Area (WMA). The WMA provides a large variety of outdoor experiences, including fishing and hunting, wildlife viewing, and family picnic areas.

Hatchery personnel were called upon to give 29 tours to 1,585 school kids during the spring and fall, two tours for area scouts, and three tours to other large groups of adults. One area scout completed his Eagle Scout project this year by building bat boxes for the area property to decrease the mosquito population and hence the prevalence of West Nile disease. Finally, the hatchery hosted a Free Fishing Day clinic here for about 600 participants. The Hagerman Boy Scouts and personnel from Hagerman National Hatchery, Magic Valley Bassmasters, and the Department assisted. Pepsi-Cola, Clear Springs Foods, Costco, Walmart, Falls Brand Meats, the University of Idaho Fish Culture Station, Sportsman's Warehouse, and Simerly's of Wendell contributed to the event.

Again this year, a monthly article was contributed to the Hagerman newspaper, the "Fish Wrap," to keep local anglers informed about fishing hot spots, tips, and miscellaneous fishing and hunting adventures. Hatchery personnel also participated in regional activities, such as fawn-trapping, spawning fish, and working the county fair.

Also this year, the "Trout in the Classroom" program continued for fifth-graders at Hagerman, Castleford, and Bliss elementary schools and Magic Valley Alternative High School. Three sessions were given, which included delivery of eggs, discussion of habitat needs, spawning, fish anatomy, and stewardship. At the end of the school year, the students were given a hatchery tour; learned how to fish at the Hagerman WMA; and learned how to clean, prepare, and taste their catch.

## **ACKNOWLEDGMENTS**

Thanks to the permanent HFH staff of Dave May, Sam VanLiew, and Travis Parrill; to transport operator Ken Taylor; and to temporaries Brandon Berheim and Joe and Lionel Gonzales.

Regional personnel Doug Megargle, Scott Stanton, Richard Holman, Dean Grissom, and Gary Hompland also deserve our gratitude. Thanks also to personnel from Niagara Springs, Hayspur, and Magic Valley hatcheries for their cooperation this year.

## **APPENDICES**

Appendix 1. Costs of fish produced at Hagerman Fish Hatchery 2010. Costs reflect all costs budgeted, except capital outlay, and include \$58,230 of the fish transportation budget.

<b>Species/Strain</b>	<b>Length/ Inches</b>	<b>Number Produced</b>	<b>Weight/ Pounds</b>	<b>Cost to produce and plant</b>	<b>Cost/ 1,000</b>
<b>Fish On Hand January 1, 2010</b>					
Kamloops rainbow trout (TL,TT)	12.1	3,744	2,880		
Rainbow trout, yellow (YT,CL,07)	11.1	16,128	9,487		
Hayspur mix (T9,KT)	8.2	400,942	91,454		
Steelhead (SA)	5.9	117,441	9,104		
Kamloops rainbow trout (TL,TT)	5.8	522,288	44,814		
Kamloops rainbow trout (TL,TT)	3.7	156,309	3,693		
Hayspur mix (KT/T9)	1.8	277,391	692		
<b>Totals</b>	<b>6.3</b>	<b>1,494,243</b>	<b>162,124</b>		
<b>Fish Planted</b>					
Rainbow trout, yellow (YT,CL,06)	13.7	16,924	18,192		
Kamloops rainbow trout (TL,TT)	9.7	476,366	180,753		
Kamloops rainbow trout (KT)	9.6	267,265	100,332		
Hayspur rainbow trout (T9)	6.8	230,980	30,000		
Steelhead (SA)	8.8	123,460	32,100		
Coho	7.2	101,775	14,550		
Subtotals	<b>9.0</b>	<b>1,216,770</b>	<b>375,927</b>		
Hayspur rainbow trout (T9)	4.7	1,096,779	52,400		
Kamloops rainbow trout (KT)	3.6	518,259	11,150		
Steelhead (SA)	3.2	44,850	575		
Coho	4.4	148,050	4,700		
<b>Subtotals Average</b>	<b>4.4</b>	<b>1,807,938</b>	<b>68,825</b>	<b>213,618.58</b>	<b>131.48</b>
<b>Total Planted Average</b>	<b>7.0</b>	<b>3,024,708</b>	<b>444,752</b>	<b>538,219.54</b>	<b>206.45</b>
<b>Fish On Hand December 31,2010</b>					
Kamloops rainbow trout (TL,TT)	10.9	6,441	3,579		
Rainbow trout, yellow (YT,CL,08)	11.1	22,113	13,007		
Hayspur rainbow trout (T9)	7.5	63,937	11,417		
Steelhead (SA)	6.2	108,788	9,745		
Kamloops rainbow trout (TL,TT)	6.3	787,345	83,051		
Kamloops rainbow trout (TL,TT)	<u>4.2</u>	<u>221,857</u>	<u>7,440</u>		
<b>Totals</b>	<b>6.3</b>	<b>1,210,481</b>	<b>128,239</b>		
<b>Total Fish Produced</b>					
Planted in 2010		3,024,708	444,752		
On Hand December 31, 2010		<u>1,210,481</u>	<u>128,239</u>		
<b>Totals</b>		<b>4,235,189</b>	<b>572,991</b>	<b>729,030.00</b>	<b>177.76</b>
From other hatcheries		938,782	2,001		
<b>On Hand January 1, 2010</b>		<u>1,494,243</u>	<u>162,124</u>		
<b>Total Gained</b>		<b>1,802,164</b>	<b>408,866</b>		

Appendix 2. Fish distribution from Hagerman Fish Hatchery, 2010.

<b>Percent of number planted by Region</b>									
	<b>Number</b>	<b>Pounds</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Catchables ≥6 inches</b>									
Rainbow trout, yellow	16,924	18,192	-	-	-	100.0	-	-	-
Kamloops rainbow trout (TT)	476,366	180,753	-	21.5	22.4	33.6	20.1	2.4	-
Hayspur Kamloops rbt (KT)	267,265	100,332	-	16.9	5.4	48.6	18.1	11.1	-
Steelhead (SA)	123,460	32,100	-	-	100.0	-	-	-	-
Hayspur rainbow trout (T9)	230,980	30,000	-	-	12.5	63.6	23.9	-	-
Coho Salmon	101,775	14,550	-	-	100.0	-	-	-	-
<b>Subtotal</b>	<b>1,216,770</b>	<b>375,927</b>	<b>-</b>	<b>12.1</b>	<b>32.2</b>	<b>35.9</b>	<b>16.4</b>	<b>3.4</b>	<b>-</b>
<b>Fingerlings &lt;6 inches</b>									
Hayspur rainbow trout (T9)	1,096,779	52,400	-	-	9.7	67.4	22.9	-	-
Kamloops rainbow trout (KT)	518,259	11,150	-	-	-	57.5	42.5	-	-
Steelhead (SA)	44,850	575	-	-	-	100.0	-	-	-
Coho	148,050	4,700	-	-	100.0	-	-	-	-
<b>Subtotal</b>	<b>1,807,938</b>	<b>68,825</b>	<b>-</b>	<b>-</b>	<b>14.1</b>	<b>59.9</b>	<b>26.1</b>	<b>-</b>	<b>-</b>
<b>Total</b>	<b>3,026,708</b>	<b>444,752</b>	<b>-</b>	<b>4.9</b>	<b>21.4</b>	<b>50.2</b>	<b>22.2</b>	<b>1.3</b>	<b>-</b>

Appendix 3. Fish survival from eyed-egg to stocking, 2010.

<b>Species/Strain</b>	<b>Number Stocked</b>	<b>Eggs and Fry Received</b>	<b>Percent Survival</b>
<b>Catchables:</b>			
Rainbow trout, Yellow	16,924	30,409	55.7
Rainbow trout (T9 & KT)	498,245	838,420	59.4
Kamloops, Troutlodge (TT)	476,366	1,476,329	32.3
Steelhead (SA)	123,460	166,008	74.4
Coho	101,775	130,481	78.0
<b>Subtotal:</b>	<b>1,216,770</b>	<b>2,641,647</b>	<b>46.1</b>
<b>Fingerlings:</b>			
Rainbow trout (T9 & KT)	1,615,038	2,291,884	70.5
Steelhead (SA)	44,850	57,063	85.0
Coho	148,050	189,519	78.1
<b>Subtotal:</b>	<b>1,807,938</b>	<b>2,538,466</b>	<b>71.2</b>
<b>Total</b>	<b>3,024,708</b>	<b>5,180,113</b>	<b>58.4</b>

Appendix 4. Number of eyed-eggs and fry received, species, and source for fish produced in 2010.

Species/Strain	Eggs/Fry received		
	For Fish Planted	For fish on hand December 31, 2010	Source
<b>Received as eggs</b>			
<b>Catchables</b>			
Rainbow/Yellow	30,409	49177	Clear Lakes (ITP)
Rainbow (KT & T9)	801,884	106,829	IDFG Hayspur
Rainbow/sterile Troutlodge (TT)	*1,288,204	1,263,247	Troutlodge, WA
Steelhead	166,008	127,147	IDFG Pahsimeroi, Oxbow
Coho	130,481	0	
<b>Fingerlings</b>			
Rainbow (KT & T9)	1,353,102	1,085,019	IDFG Hayspur
Rainbow (R1)		114,250	Clear Springs Foods
Steelhead (SA)	57,063	0	IDFG Pahsimeroi, Oxbow
Coho	189,519	0	Eagle Crk Nat'l Hatchery
<b>Subtotal eggs</b>	<b>4,016,670</b>	<b>2,745,609</b>	
<b>Received as fry</b>			
Rainbow from Hayspur (T9)	36,536	0	IDFG Hayspur
Rainbow from Magic Valley (KT&T9)	938,782	0	IDFG Hayspur
Rainbow/sterile Troutlodge from MV (TT)	188,125	0	Troutlodge, WA
<b>Subtotal fry</b>	<b>1,163,443</b>		
<b>TOTAL</b>	<b>5,180,113</b>	<b>2,745,609</b>	

\* 96% loss in Lot 1.

Appendix 5. Fish feed used during 2010 at Hagerman Fish Hatchery.

Size	Source	Pounds	Cost/pound	Cost
Str	Rangen	1,000	\$0.985	\$985.00
Str, 1/32" soft moist	Rangen	88	\$1.300	\$114.40
#1	Rangen	3,700	\$0.895	\$3,311.5
#2	Rangen	25,300	\$0.895	\$22,643.50
#2 Aquaflor	Rangen	200	\$1.313	\$262.50
#3	Rangen	53,550	\$0.895	\$47,927.25
#3 TM	Rangen	2,350	\$0.948	\$2,227.80
#3 Aquaflor	Rangen	4,250	\$1.468	\$6,236.88
#4 TM	Rangen	2,200	\$1.000	\$2,200.00
1/16 in, EXT450Float	Rangen	5,000	\$0.661	\$3,305.00
3/32 in, EXT450Float	Rangen	151,860	\$0.595	\$90,356.70
3/32 in, TM	Rangen	1,600	\$0.740	\$1,183.84
5/32 in, EXT450Float	Rangen	333,180	\$0.425	\$141,675.63
#0	Silvercup	250	\$0.880	\$220.00
#1	Silvercup	600	\$0.880	\$528.00
#2	Silvercup	1,200	\$0.880	\$1,056.00
#3	Silvercup	3,900	\$0.570	\$2,223.00
5/32 in, Romet TC	Silvercup	1,500	\$1.160	\$1,740.00
<b>Subtotal</b>		<b>591,728</b>	<b>\$0.560</b>	<b>\$328,197.07</b>
Freight charges				<b>\$2,958.64</b>
Fuel Surcharge				<b>\$201.19</b>
Total cost				<b>\$331,356.90</b>

Appendix 6 Fish stocked by Hagerman Fish Hatchery from other sources, 2010.

Hatchery Stocking	Species	Number	Pounds	SOURCE	DESTINATION
Hagerman	TT,TB	124,455	17,950	American Falls Hatchery (IDFG)	Am. Falls Res., Salmon Falls Creek Res., Blackfoot Res.
Hagerman	TT,TD	450,875	16,325	Grace Fish Hatchery (IDFG)	Hayden Lake, Island Park Res.
Hagerman	R1	150,440	23,847	Idaho Trout Company	Sand Crk WMA ponds, Settler's P, McDevitt P, Lucky Peak Res., Filer P, Dierkes Lake, Oster 1-4, Riley P, McTucker P, Salmon Falls Crk. Res.
Hagerman	TD	68,100	4,700	Ashton Fish Hatchery (IDFG)	Henry's Lake
Hagerman	TP	583	1,828	College of Southern Idaho	Snake R: Idaho Falls, Am. Falls, and Kanaka Rapids
Hagerman	R1	1,578	5,580	Clear Springs Foods	Filer P, Empire P, Emerald Lake, Crystal Lake, Dierkes Lake, Riley Crk, Oster #1, Carmela Vineyard P
Hagerman	KT	15,631	5,575	Hagerman Nat'l Hatchery	Arrowrock Res.
Hagerman	CC	16,374	3,815	Fish Processors, Buhl, ID	Dog Creek Res., Alexander Res., Dierkes Lake
<b>TOTAL:</b>		<b>820,036</b>	<b>79,620</b>		

## **HAYSPUR FISH HATCHERY**

**Bradford W. Dredge, Fish Hatchery Manager II**  
**Brian L. Thompson, Fish Hatchery Assistant Manager**  
**Richard E. Park, Fish Culturist**

### **INTRODUCTION**

Hayspur Fish Hatchery (HSFH) is a license-funded resident salmonid broodstock facility. The mission of the HSFH is production of eyed eggs that are made sterile or triploid by the pressure shocking technique. The TRC Hydraulics Aqua Pressure Vessel is utilized to achieve this mission or goal. Two captive rainbow trout *Oncorhynchus mykiss* broodstocks were maintained on station. These are the Hayspur strain rainbow trout and the Kamloops strain rainbow trout. The Kamloops strain rainbow trout was eliminated from the program in May of 2010. The HSFH personnel maintain an on-site public campground, family fishing water (Gavers Lagoon), and a trophy stream fishery.

The HSFH is located in Blaine County, approximately 30 miles south of Sun Valley on Loving Creek. The HSFH property is an odd shaped 105.12-acre parcel. Fish culture facilities include an incubation building with 23 vertical 8-tray Heath type incubator stacks for trout eggs, a hatchery building with 20 early rearing vats, 15 covered 24-foot circular ponds, 4 small raceways, and 6 large production raceways. Other buildings include a fish spawning equipment storage building, two generator buildings, three residences for permanent employees, an office building, shop, a three bay garage, a barn, and dormitory for temporary employees.

Water sources include the covered spring that supplies 5.5 cubic feet per second (CFS) at 52°F (11.6°C), and three pumped artesian wells producing 2.5 CFS at 48°F to 52°F (8.9°C to 11.6°C). The spring and well water are both considered specific pathogen free (SPF) water supplies.

Three permanent employees (Fish Hatchery Manager II, Fish Hatchery Assistant Manager, and Fish Culturist) and 20.95 months of temporary time are assigned to the HSFH.

### **RAINBOW AND KAMLOOPS EYED EGG PRODUCTION**

The 2010 rainbow trout spawning season was a seven-month project, beginning in October and ending in May, with an egg take of 5,778,396 green eggs from 2,525 females during the year (Appendix 1). Photoperiod manipulation, or light control, has expanded "normal" spawn timing to more closely match egg production with eyed egg requests. Two 2-year-old round ponds, two 3-year-old round ponds, and one 4-year-old round pond of Hayspur rainbows and Kamloops rainbows were manipulated. Hayspur rainbow trout eyed egg production totaled 4,037,196 with 2,162 females spawned and overall eye-up was 76.40%. Kamloop rainbow trout eyed egg production totaled 255,193 with 135 females spawned and overall eye-up was 78.30%. The Hayspurs and the Kamloops combined for a seasonal eye-up of 76.5%, down from 80.07% in 2009, and up from 70.76% in 2008. All eggs produced, except for broodstock replacement eggs, were pressure shocked for triploidy. Hagerman State Fish Hatchery, Hagerman National Fish Hatchery, Magic Valley Steelhead Hatchery, and Nampa Fish Hatchery were shipped eggs as per their requests. Value to the Department at the current contract price of \$30.25/1,000 for sterile triploid rainbow trout eggs equates to \$129,844.76 (Appendix 2).

In 2010, all rainbow trout eggs produced for shipping were pressure shocked and made sterile. This was the tenth year of full production using the heat or pressure shock method. The pressure shocking method replaced the heat shocking method during the spring of 2005. Washington State University performed induction rate sampling on randomly selected groups. A total of 198 individuals were sampled (April 22, 2010). Sample results indicated that 198 out of 198 were verified as being triploid (Hagerman 198/198). The overall induction rate was 100.00%, up from 99.74% the previous year.

### **FISH LIBERATIONS**

Fish requested for the Big Wood and Little Wood drainages were reared at Nampa Hatchery (47,625). Semi-tank and trailer loads were hauled as needed to complete HSFH 2010 plant requests. A total of 18 stocking trips into the Big Wood and Little Wood drainages were stocked with 30,075 catchable sized rainbow trout. A total of 11,602 surplus fingerling rainbow trout (32.01 f/lb or 363 pounds) were transported and released into Lava Lake. In all, 59,227 fish or 15,711 pounds of fish were distributed during the season (Appendix 3).

### **TRANSPORT COSTS**

The two transport trucks assigned to HSFH made 21 separate stocking trips during the year. Fish from HSFH were planted by truck into 14 different bodies of water. Hayspur personnel traveled 7,257 miles for an average of 345.57 miles per trip. The fleet rental charge was \$421.96/month and 77 cents/mile for the 2-ton truck. Fleet rental for the 1-ton truck was \$222.75/month and 40 cents/mile. HSFH fish transport cost totaled \$8,155.78 for 2010.

### **FISH FEED**

Rangen's provided the 1/4-in brood feed. This food was ordered with 150 grams per ton of canthaxathin red additive to enhance egg color and other possible health benefits. Rangen's was the source of early rearing feeds. Rangen's was the primary food source utilized for catchables and for replacement broodstock retained on station (Appendix 4).

### **HATCHERY IMPROVEMENTS AND NEEDS**

- Alpine Tree Service removed seven large willow and elm trees.
- New lumber was purchased and 10 of the original picnic tables were refinished.
- Two new dishwashers were purchased and installed in Residence #2 and Residence #3.
- Four new aluminum covers were constructed and installed over the small raceways.
- All of the residences and the dormitory had the carpets cleaned.
- All of the hatchery fire extinguishers were serviced.

- The domestic water pump was repaired.
- The Kubota tractor was transported to Burk's Tractor in Twin Falls for service and repairs.
- The Kawasaki mule was transported to Action Sports in Twin Falls for repairs and servicing.
- The insulation beneath Residences #1 and #3 was replaced. Residence #1 had the washer and dryer plumbing and electrical moved to an inside wall to prevent frozen lines during the winter months. In addition, new ground cover was installed in the crawlspace.
- All vegetation was removed from large raceways A through F.
- Russian olive trees were pruned in the campground.
- Wooden predator covers over the small raceways were repaired as needed during the season.
- Genplus, a division of Cummins Intermountain Generator Service, serviced both backup generators and made repairs as needed. In addition, all louver motors were replaced with new ones.
- The windows in the hatchery building were trimmed and painted. The feed room in the hatchery building was also scraped and painted.
- The hatchery vats (20) were scraped on the outside and painted.
- The park restrooms in the campground were pumped and serviced.
- The exterior concrete wall of the hatchery building was repaired and painted.
- Overhead Door Company serviced garage doors and openers and installed a new opener in Residence #2.
- The exterior of Residences #1 and #3 were scraped, caulked, and painted. Cedar trim boards were purchased and Residences #1 and #3 had trim installed around all windows and corners of the residences and garages.
- The heating and cooling system in Residence #3 was inspected and serviced by Terry's Heating and Cooling.
- Buffalo Electric inspected the Generator #2 electrical panels and made repairs as needed.
- Ten additional aluminum raceway covers were constructed and installed.
- Twenty new aluminum fry screens were built and installed in the Hayspur hatchery building. These replaced the old, worn wooden screens. In addition, four new aluminum crowd racks were completed.

Needs of the HSFH are:

- Replace the roof on Residence #3.
- Remove several willows between Residence #1 and Residence #3.
- Repair, patch, or remove concrete slab on west side of the hatchery building.
- Replace windows and doors in Residences #1 and #3.
- Replace siding on Residence #1 and #3.
- Remove and replace concrete driveway at Residence #3.
- Replace and enlarge the Gavers Lagoon outlet pipe and remove/dredge out sediment at upper and lower end of the pond.
- Removal of old three stall garage and replace with new heated and insulated garage for storage and maintenance of hatchery equipment.

### **BROODSTOCK MANAGEMENT**

The Hayspur rainbow trout (R9) replacement population is perpetuated by using year-class crosses. Using one-male with one-female, 192 pairs of fish were crossed. The adult fish used in the replacement program were two-year-old males crossed with three-year-old females.

Isolation incubators were used to separate individual families. In 2010, zero R9 families tested positive for Bacterial Kidney Disease (BKD). This is the third consecutive season with no BKD positives detected in the replacement broodstock population.

HSFH personnel completed one medicated feed applications on March 1 through March 10 to control and/or eliminate BKD from the broodstock populations (Appendix 5). Medicated feed from Rangen's Inc (item # 4831) described as TM MEDICATED 5/32 WITH TM 8000G was utilized. In addition, adults utilized for the broodstock replacement program at HSFH were injected with erythromycin (Gallimycin-100) at a rate of .2 ml/kg for BKD control on the 25th of January (BY07) and again on the 14th of September. In conclusion, all BY08 adults were injected with a Cold Water Disease vaccine from July 6 through July 14, 2010.

### **PUBLIC RELATIONS**

Many people utilized the HSFH campground and the popular fishing pond, Gavers Lagoon, during the spring, summer, and fall period. The HSFH campground benefited from the efforts of volunteer Camp Hosts. Kenneth and Mary Robbins volunteered time to answer questions, give directions, clarify regulations, tidy outhouses, clean up litter, provide fishing tips, and generally enhance the image of the Department and HSFH.

Tours were provided to area schools and local groups. The Blaine County Sheriff's Office (PAL Program), Valley Elementary School, Sun Valley Adaptive Sports Group, Wood River YMCA, 4-H Cub Scouts and Boys Scouts, Mountain Adventures of Sun Valley, Sun Valley Community School, Shoshone High School, Carey Elementary School, Magic Valley High School, and the Woodside Elementary School were exposed to the history of the hatchery, the life cycle of trout, water sources and water treatment, followed up by a question and answer period (Appendix 6).

## MISCELLANEOUS

On January 12, Doug Burton received 3,000 eyed eggs for research purposes. Lisa Hawdon, who teaches at the Avery School in Coeur d'Alene, was shipped 200 eyed eggs for Trout in Classroom (TIC) on the 12<sup>th</sup>. On January 18, Tom Tighe (Magic Valley Steelhead Hatchery) received 100 TIC eggs and Joe Chapman (Hagerman State Fish Hatchery) received 200 TIC eggs. On February 3, Tom Frew received 4,040 eyed eggs for Trout in Classroom (TIC) programs. One hundred TIC eggs were shipped to McCall Fish Hatchery on December 6. Fifteen hundred TIC eggs were shipped to American Falls Fish Hatchery on December 14. The HSFH shipped or delivered a total of 6,140 eggs for use in the TIC program during the year (Appendix 2).

Dave Grundy and Richard Park attended NZMS training on January 12.

Tom Tighe assisted with spawning operations on the 20<sup>th</sup>. Conservation officer assistance with spawning occurred on January 5, 19, and 26. Rob Morris, Tim Ferguson, and Greg Milner offered their assistance. On February 2 and the 16<sup>th</sup>, the hatchery had help from Lee Garwood and Rob Morris. Rob also helped on March 23 and March 30. Steve Roberts, Lee, and Clint Rogers lent a helping hand on the 13<sup>th</sup>, 20<sup>th</sup>, and 27<sup>th</sup> of April.

Richard Park assisted with spawning operations at Henrys Lake Fish Hatchery on February 22 and the 24<sup>th</sup>.

Brad attended a Silver Creek Watershed Enhancement meeting on March 25 and a second meeting on May 11. Brad also met with Mark Hill, Ecosystem Sciences, on August 18.

Brad completed his annual physical on the 30<sup>th</sup> of March.

Brian and Brad attended a budget training meeting on April 5. Richard Park helped Magic Valley Steelhead Hatchery load smolts on April 5.

Richard helped Sawtooth Fish Hatchery with steelhead trout spawning on the 15<sup>th</sup> of April. In addition, Richard assisted with bitterbrush planting on the 17<sup>th</sup> of April and attended a promotional interview on the 21<sup>st</sup> of April.

Brian helped Bob Becker (Nampa Fish Hatchery) stock Fish Creek Reservoir on April 27 and assisted Rob with sage grouse lek counts on April 30.

Brad attended the Hatchery Managers Meeting in Orofino on the 17<sup>th</sup> and 18<sup>th</sup> of June.

Rich helped Pahsimeroi spawn summer Chinook on September 13.

## **ACKNOWLEDGMENTS**

In 2010, HSFH benefited from the capable assistance of Biological Aides Brandon Torske, David Grundy, Dan Trahan, Jeff McDonald, and Kenyon Roark, and Resident Fish Pathologist Doug Burton. The HSFH would like to thank IDFG employees who helped out during the spawning season: Wade Symons, Jeff Morgan, Tom Tighe, Will Denine, Travis Parrill, Brandon Filloon, Tim Ferguson, Greg Milner, Meghan Roos, Jim Sterling, Clint Rogers, Rich Holman, Doug Meyer, Steve Roberts, Lee Garwood, and Rob Morris.

## **APPENDICES**

Appendix 1. Egg production summary of Hayspur Fish Hatchery, 2010.

<b>Species</b>	<b>Eggs Taken<sup>1</sup></b>	<b>Eggs Shipped<sup>2</sup></b>
T9's	5,452,472	4,037,196
KT's	325,924	255,193
<b>Totals</b>	<b>5,778,396</b>	<b>4,292,389</b>

<sup>1</sup> Total is displaced (gram weight) of both good and bad eggs taken in 2010.

<sup>2</sup> Total is displaced (gram weight) of eyed eggs available for shipping in 2010.

Appendix 2. Eyed egg shipment summary from Hayspur Fish Hatchery, 2010.

<b>Hatchery</b>	<b>Species<sup>1</sup></b>	<b>Total eggs shipped</b>	<b>Estimated value<sup>2</sup></b>
American Falls	T9	0	\$0.00
Hagerman	T9	2,260,317	\$68,374.59
	KT	255,193	\$7,719.59
Grace	T9	0	\$0.00
Magic Valley	T9	1,105,018	\$33,426.79
Sandpoint	T9	0	\$0.00
Nampa	T9	519,403	\$15,711.94
Hagerman NFH	T9	152,458	\$4,611.85
Tuccanon NFH	T9	0	\$0.00
Ashton	T9	0	\$0.00
Shipped		4,292,389	\$129,844.76
Other <sup>3</sup>	Thrown out	444,184	\$13,436.57
	catchables	6,140	\$185.74
	TIC	3,500	\$105.88
<b>Total</b>		<b>4,746,213</b>	<b>\$143,572.95</b>

<sup>1</sup> T9 = sterile R9, KT=sterile Kamloops

<sup>2</sup> At contract value of \$30.25/1,000 sterile rainbow trout eggs.

<sup>3</sup> Eggs used for Trout in The Classroom (TIC), research, and discarded.

Appendix 3. Hayspur Fish Hatchery stocking summary, 2010.

<b>Fish size</b>	<b>Number of fish</b>	<b>Pounds of fish</b>	<b>Fish per pound</b>
3N Catchables	47,625	15,348	3.10
2N Fingerlings	11,602	363	32.01

Appendix 4. Hayspur Fish Hatchery Feed Summary, 2010.

Date	Size	Rangen's Amount /pounds	Cost
6/2/10	1/4 in. Brood pellet	17,220	\$9,869.65
<b>Totals</b>		<b>17,220</b>	<b>\$9,869.65</b>

Size	Rangen's Amount /pounds	Cost
Trout/Salmon Starter #0	50	\$47.65
Trout/Salmon Starter #1	50	\$47.65
Trout/Salmon Starter #2	50	\$47.65
Trout/Salmon Starter #3	100	\$74.00
Trout Grower #4	50	\$29.90
Extruded 450 1/8"	1,500	\$768.00
Extruded 450 3/32"	300	\$172.20
Extruded 450 5/32"	2,500	\$1,335.50
TM Medicated 5/32"	1,650	\$1,409.60
<b>Totals</b>	<b>6,250</b>	<b>\$3,932.15</b>

Appendix 5. Hayspur Hatchery Vaccine and Medicated Feed Treatments 2010.

Date Ordered	Treatment Type	Medicated Feed Ordered			
		Item No.	Feed Size	Qty. (Lbs.)	Cost
01/12/10	Galli-100 <sup>1</sup>				
02/08/10	TM8000	4831	5/32	1,650	\$1,409.60
02/08/10	TM8000	4831	5/32	1,650	\$1,409.60
07/06/10	CWD Vaccine <sup>2</sup>				
09/14/10	Galli-100				
		Fish Treated	% BW	No. Days	Lbs./ Day
01/12/10	Galli-100 <sup>1</sup>				
02/08/10	TM8000	BY07,08 (R9)	1	10	105
02/08/10	TM8000	BY09 (R9)	1	10	60
07/06/10	CWD Vaccine <sup>2</sup>				
09/14/10	Galli-100				
		Vaccine Administered			
		Fish Treated	Dose (ml/kg)	Dates Vaccinated	
01/12/10	Galli-100 <sup>1</sup>	BY07 (R9) <sup>3</sup>	0.2	1/25/10	
02/08/10	TM8000				
02/08/10	TM8000				
07/06/10	CWD Vaccine <sup>2</sup>	BY08 (R9) <sup>4</sup>	0.2	7/6-7/14/10	
09/14/10	Galli-100	BY07 (R9)	0.2	9/14/10	

<sup>1</sup> Galli-100 Lot # 502023 Expires 11/1/03.

<sup>2</sup> CWD vaccine serial # 160330 Expires 1/15/07.

<sup>3</sup> Broodstock replacement pond vaccinated in January and September.

<sup>4</sup> Four- two-year-old ponds vaccinated (4,514 fish total).

Appendix 6. Hayspur Hatchery Tour Group Summary, 2010.

<b>Month</b>	<b>Name of Tour Group</b>	<b>Grade/ Age</b>	<b>Number in Group</b>
February	Magic Valley High School	9th	20
April	Magic Valley High School	9th	11
	Carey Elementary	6th	25
May	Hailey Cub Scouts	7 to 9 years	12
	Shoshone High School	9th/10th	40
	Valley Cub Scouts	9 years	18
	Wood River Middle School	7th/8th	53
	Woodside Elementary	4th	60
	Sun Valley Community School	5th	14
June	Sun Valley Adaptive Sports	7 to 9 years	16
July	Mountain Adventures	10 to 12 years	15
	Woodside Elementary	4th	17
August	Wood River YMCA	9 to 12 years	25
October	Valley Boy Scouts	10 to 13 years	10
	General Public-	27	
Additional tours- 81 people recorded			

## **HENRYS LAKE FACILITY**

### **RESIDENT REPORT**

**Damon Keen, Regional Fisheries Biologist**

#### **ABSTRACT**

The 2010 trapping numbers at Henrys Lake included 4,370 Yellowstone cutthroat trout and 130 hybrid trout. The 2010 spawning operations produced 2,057,871 eyed Yellowstone cutthroat trout eggs and 387,903 eyed hybrid trout eggs. 271,580 eyed Yellowstone cutthroat eggs and 12,097 eyed hybrid eggs were designated as surplus and destroyed. Yellowstone cutthroat Lots 13 & 14 were also destroyed, but prior to eye-up. Subsamples of Yellowstone cutthroat trout and hybrid trout in the Hatchery Creek run were recorded for total length. Mean lengths of 461 mm and 561 mm were calculated, respectively. The percentage of adipose fin clipped Yellowstone cutthroat returning to the ladder was recorded daily throughout the 2010-spawning run. 2.1% of Yellowstone cutthroat trout returning to the ladder in 2010 were adipose fin clipped.

Henrys Lake production hybrids were evaluated for sterility induction success. Induction for 2010 was 100% successful for the triploid condition.

Pathology reports from ovarian fluid sampling for viral or bacterial presence did not detect any positive results.

Riparian fences, fish diversion structures, and fish screens were maintained on the tributaries and other fragile areas surrounding Henrys Lake. Tributary fencing maintained included: Howard Creek, Targhee Creek, Duck Creek, and Timber Creek. Fencing was also maintained on the south and north side of the county boat dock. Additionally, Teton Valley fencing projects were maintained. A new riparian fence was constructed on Duck Creek in 2010.

Late winter dissolved oxygen concentrations were assessed at established sampling sites. Oxygen concentrations were monitored to establish oxygen depletion rates and predict possible hazardous oxygen levels for fish in the lake. Dissolved oxygen data was evaluated and oxygen levels were predicted to remain above the level of concern. Therefore, aeration was not deployed in the winter of 2010.

Fishery habitat improvement projects were identified, evaluated, and funded at several locations in the Upper Snake region including: Henrys Lake area, Henrys Fork River, Teton River, Gray's Lake, and the Big Lost drainage.

Author

Damon Keen

## INTRODUCTION

Henrys Lake Hatchery is a license and federal funded resident station located in the northern Island Park area of Fremont County in east central Idaho. The hatchery was established in 1924 as an egg taking facility to offset the potential loss of spawning habitat due to the construction of a dam at the lake outlet in 1922 (Idaho Fish and Game 1924).

The hatchery continues to function as an egg taking station and ships eyed eggs of Yellowstone cutthroat trout *Oncorhynchus clarkii* and sterile rainbow trout *Oncorhynchus mykiss* x Yellowstone cutthroat trout *Oncorhynchus clarkii* hybrids to statewide hatcheries.

The current hatchery building was completed in 1949 and remodeled in 1989. The building consists of 10 double stacks of Heath tray incubators. Hatchery water is supplied via gravity flow from Hatchery springs at 1.0 cfs for domestic and egg incubation use. Unused water flows into Hatchery creek, through the spawning/trapping facility, and then finally into Henrys Lake via a 150-foot long fish ladder. The spawning/trapping facility was rebuilt in its entirety in 2003.

The hatchery is staffed with one permanent Regional Fisheries Biologist, one 5-month temporary employee, and one 3-month temporary employee.

## METHODS

### Spawning Operation

The Hatchery Creek fish ladder was opened for the spring run on February 20 and remained in operation until April 30. Fish ascending the ladder were identified as Yellowstone cutthroat or hybrid trout and enumerated. Subsamples of approximately 10% of each group were measured (Total Length - mm) on a random basis. Additionally, all of the Yellowstone cutthroat were examined to detect the presence or lack thereof, of adipose fins. Yellowstone cutthroat trout were produced using ripe females spawned into seven fish pools and fertilized with pooled milt from seven males. Hybrid trout were produced with Yellowstone cutthroat trout eggs from the Henrys Lake run and rainbow trout (Fish Lake) milt obtained from the Ennis Federal Hatchery. The hybrid contribution was sterilized by inducing a triploid condition using pressure to shock the eggs post fertilization. Hybrid eggs were placed in the pressure treatment machine 47 minutes 45 seconds post fertilization at 10,000 psi. and held at this level of pressure for 5 minutes. Random samples of the hybrid fry were taken at the Mackay hatchery and sent to the Eagle lab to test induction rates of sterilization. Samples were taken from 60 fish. Hybrid production eggs were shipped to Mackay for hatching, rearing, and subsequent release back into Henrys Lake and other waters. Additional fertile hybrid eggs were shipped to American Falls hatchery for hatching, rearing and subsequent release into Salmon Falls Reservoir. Yellowstone cutthroat eggs were shipped to Mackay for hatching, rearing, and release back into Henrys Lake.

Disease samples were taken from the spring spawning run. Ovarian samples were taken from the egg pools of females to detect bacterial disease presence. All female egg pools were tested. Viral samples were taken randomly from 25 seven female egg pools. A mixed-sex group of 60 adult Yellowstone cutthroat trout during the spring run was sacrificed for disease testing. All samples were sent to the Eagle Laboratory for evaluation.

### **Riparian Fencing and Fish Screening**

Electric fencing has been in place at Henrys Lake and the Teton Valley since the early 1990s. Fencing was stretched and solar panels, batteries, and connections were installed during May 2010 at ten sites on the tributaries of Henrys Lake and at three sites in the Teton Valley. Fencing was checked routinely during the summer and fall months for proper voltage and function. Voltage was checked using a voltmeter at each of the ten sites. Repairs were made as needed. Fences were let down and prepared for winter in November 2010.

Fish diversion screens are located at 11 sites on the tributaries of Henrys Lake. Screens were maintained, cleaned, and checked for proper operation on a routine basis during the summer and fall months of 2010.

### **Creel Surveys**

Annual creel surveys are conducted every three to five years on Henrys Lake. Creel surveys are conducted periodically on Island Park Reservoir. In addition to those full season surveys, partial year surveys and random survey checks are conducted periodically. Creel surveys have been conducted during November on Henrys Lake to collect data relative to the season November season extension initiated in 2006.

A November creel survey was conducted this year at Henrys Lake. No creel survey was conducted on Island Park Reservoir.

### **Water Quality/Dissolved Oxygen Profiles**

Winter (December 2009, January 2010) dissolved oxygen concentrations; snow depth, ice thickness, and water temperatures were taken at established sampling sites. Sites were located using GPS readings from historical sampling sites. Holes were drilled in the ice prior to sampling using a gas powered ice auger. Dissolved oxygen samples were taken using a YSI model 550A oxygen probe. Samples were taken at each site at ice bottom and at subsequent one-meter intervals until the bottom of the lake was incurred. The total mass of dissolved oxygen in the volume of water at each sample site was calculated using methodology developed by Barica and Mathias (1979).

The whole dissolved oxygen mass is calculated from the dissolved oxygen probe's mg/L readings converted to total mass in  $g/m^3$  for each cubic meter sample. This calculation results in a direct conversion of mg/L to  $g/m^3$  (1000 L in a cubic meter). The site samples are then expressed as the sum of each meter data point of oxygen mass within that sample site as measured in surface area ( $m^2$ ). To express this value, each data point from 2 meters until the last data point (above lake bottom) is summed. The mean measurement of ice bottom and 1 meter is added to this sum as the first data point to account for potential environmental influence from the auger hole opening. Summing these data points calculates the total oxygen mass of a given sample site. The last step in calculating the data points for the regression analysis will be to convert the above data points to the natural log.

The purpose of recording dissolved oxygen profiles is to develop a dissolved oxygen depletion model to predict the likelihood of the Henrys Lake environment reaching the critical threshold for fish survival. Historically, the critical threshold at Henrys Lake has been  $10 g/m^2$ . Upon determining the likelihood of reaching the critical dissolved oxygen threshold prior to the

projected recharge date of April 1, a determination can be made of whether or not to deploy aeration.

### **Habitat Improvement Projects**

During 2010, a portion of the Henrys Lake job function was to identify fish habitat projects and prioritize the same. Funding opportunities were sought to complete said projects and projects were initiated. This job function was a major part of the accomplishments from the Henrys facility in 2010. Further details, accomplishments, and specifics are available in the Upper Snake Regional Fisheries report.

## **RESULTS AND DISCUSSION**

### **Spawning Operation**

4,370 Yellowstone cutthroat trout ascended the spawning ladder between February 18 and April 28, with 2,220 males (Figure 1) and 2,150 females (Figure 2) enumerated. Yellowstone cutthroat trout male and female total length averaged 462 mm and 459 mm (Figure 5), respectively. Combined mean Yellowstone cutthroat trout length was 461 mm.

130 hybrid trout ascended the spawning ladder between February 20 and April 30, with 125 males (Figure 3) and 5 females (Figure 4) enumerated. Hybrid trout males averaged 561 mm (Figure 6).

Species/sex ratio at the Henrys Lake trap during 2010 included: YCT females 48%, YCT males 49%, hybrid males 3%, and hybrid females 0% (Figure 7).

Historical species/sex ratio at Henrys Lake for the years 2001-2010 was evaluated (Figure 8). The hybrid fish numbers (both male and female) continues to decrease, with hybrid females now a rarity. The increased success with the sterility program is probably responsible for the decreased trap numbers for hybrid trout. Sterile fish lack the spawning behavior of fertile fish and fewer numbers of those fish could be expected to return to the trap. Creel catch rates for hybrids are still near objective. Likewise, gill net evaluations indicate good numbers of hybrids present in the lake. This indicates that the numbers of hybrids returning to the ladder has little correlation to overall lake population.

Yellowstone cutthroat green eggs totaled 3,488,260 from 1,231 females for a mean fecundity of 2,834 eggs per female (Table 1). Eyed Yellowstone cutthroat eggs totaled 2,057,871 for an overall eye-up rate of 67.0% (Table 1). YCT eye-up varied throughout the spawn season from a low of 58.4% in Lot 12 to a high of 75.5% in Lot 6 (Figure 9). Lots 13 & 14 were destroyed prior to eye-up because the egg quota had been met. These two lots were not considered within the eye-up calculation. All of the eyed Yellowstone cutthroat eggs were shipped to the Mackay facility where they were hatched and reared (Table 3). Subsequently, all Yellowstone cutthroat from the 2010 production were released back into Henrys Lake in the fall of 2010. Twelve spawn days during this year's spring run were devoted to Yellowstone cutthroat spawning.

Hybrid trout green eggs totaled 840,140 from 308 females for a mean fecundity of 2,728 eggs per female (Table 2). Eyed hybrid trout eggs totaled 387,903 for an overall eye-up rate of 46.2% (Table 2). Lot 1 and part of Lot 2 eggs were treated to induce sterility. The other component of Lot 2 eggs were not treated to induce sterility and remained fertile as they were

bound for Salmon Falls Reservoir. Hybrid eye-up was 36.2% in Lot 1 and 46.8% in Lot 2 sterile component and 79.2% Lot 2 fertile component (Figure 10). 275,000 of the hybrid eggs were shipped to Mackay (Table 3) for hatching, rearing, and subsequent release into Henrys Lake and 100,806 fertile hybrid eggs were shipped to American Falls for release into Salmon Falls Reservoir (Table 3). Two spawn days were devoted to production of hybrid eggs during this year's spawn take. Sterilization induction rates for the sterile hybrid production component indicated 100% (60/60) success for the triploid condition.

All but 117 of the entire hatchery run of Yellowstone cutthroat trout were inspected for the presence or lack of an adipose fin. For many years, 10% of the Henrys Lake cutthroat fry have had adipose fins removed to estimate hatchery contribution to the total lake population. Over the last five years, adipose clip ratios have been recorded at the ladder. Results of this year's data (Figure 11) indicate 2.1% (90/4,253) of the YCT returning to the ladder were adipose fin clipped. This data may indicate that an increasing component of the lake population is of natural production origin. Further analysis can be found in the regional report.

Historical run numbers (2001-2010) of both Yellowstone cutthroat and hybrids were evaluated (Figure 12). The 2010 Yellowstone cutthroat run numbers were sufficient to satisfy all egg requests and in fact, a surplus of eggs and male and female YCT was realized. It is important to note that correlation between run numbers and lake population has never been established. The downward trend in the hybrids returning to the ladder continues, and this is probably reflective of improved induction during the sterilization process. Sterile fish do not exhibit spawning behavior to the same extent that fertile fish do. Pressure shocking was instituted in 2004, and the induction rate using pressure shocking has been near 100% since that time. Heat shocking was used prior to 2004, and results were variable. Induction results were as low as 50% in some cases.

Disease sampling was completed on adult spawning fish during the spring run. Results and discussion are included in the resident fisheries pathologist report.

Bacterial disease sampling was taken during spawning from ovarian fluid of all families of eggs. Viral sampling was taken from ovarian fluid of 25 families. All samples, both bacterial and viral were negative, and no eggs were destroyed due to positive results this year. Additional analysis and results are available in the resident fisheries pathology report.

## **RIPARIAN FENCING AND FISH SCREENING**

Electric fencing functioned well during the year. Voltages remained high throughout the season and riparian infringements by cattle were rare.

One new riparian fence was installed along riparian areas of Duck Creek, a tributary to Henrys Lake. The fence was installed along a previously fenced riparian buffer area. The new fence serves as a replacement to the old fence that was in need of replacement. The fencing construction and funding was a result of a collaborative effort between the Forest Service, Fremont County, and IDFG.

The fish screens functioned well during the summer of 2010. The new screens on Targhee and Howard Creek that had been installed during the summer of 2008, and the screen installed during the summer of 2009 on Duck Creek functioned well and will be of benefit both to improved fry survival and facility labor costs.

## Creel Surveys

### **Island Park**

A creel survey was not conducted on Island Park Reservoir during 2010. Periodic angler reports indicated fishing was good overall and angler satisfaction appeared high.

### **Henry's Lake**

A November creel survey was conducted on Henry's Lake during 2010 to determine the potential population impact of ice fishing to the fishery. The creel survey included dates from November 21-November 30. 3,750 hours of angling effort was estimated. 92.1% of the anglers were residents and 7.9% were non-residents. The total catch rate was estimated at 1.48 fish/hour. An estimated 5,562 fish were caught, with 775 of those harvested. Further analysis and results are available in the regional fisheries report.

## Water Quality/Dissolved Oxygen Profiles

Oxygen profiles for January 12, 2010-January 28, 2010 using the methodology identified in the methods section of this document for determining total oxygen mass at a given location. Dissolved oxygen data and profiles were recorded at five sites: Pittsburgh/Targhee, County boat dock, Wild Rose, the Outlet, and the Hatchery. Total dissolved oxygen mass diminished from 36.41 g/m<sup>2</sup> to 35.29 g/m<sup>2</sup> at the Pittsburgh/Targhee site and 24.505 g/m<sup>2</sup> to 20.83 g/m<sup>2</sup> at the hatchery site. Total dissolved oxygen levels increased at three sites, from 21.78 g/m<sup>2</sup> to 24.735 g/m<sup>2</sup> at the County dock, 28.45 g/m<sup>2</sup> to 31.635 g/m<sup>2</sup> at the Wild Rose site, and 17.95 g/m<sup>2</sup> to 18.69 g/m<sup>2</sup> at the Outlet site.(Figure 13). Depletion estimates were determined from these readings. The increases noted were likely the result of an unusual warm period that led to ice melt and subsequent dissolved oxygen recharge at these sites. The unusual ice melt led to dangerous conditions for additional data collection. Therefore, later records were not gathered nor factored in the dissolved oxygen depletion model. Increased dissolved oxygen levels during the winter months are not common, but can occur as exhibited in January 2010.

Historically, the level of concern of oxygen levels has been established at 10 g/m<sup>2</sup>. However, that level of concern is somewhat arbitrary due to the lack of a full understanding of critical dissolved oxygen levels in this environment in relation to the Yellowstone cutthroat species. The projected recharge date is set at April 1. This date is somewhat arbitrary as well. Recharge varies from year to year based on ice thickness and the onset of warmer conditions. Dissolved oxygen recharge can take place anytime that temperature warms enough to begin ice melt. Recharge from springs and creek inflow can take place throughout the winter months. Recharge from ice melt can begin as early as January and as late as early April. Setting the recharge date at April 1 for the purpose of aeration deployment normally provides a safety buffer and can be considered a reliable date for this purpose.

In the winter of 2009-2010, the initial analysis of the dissolved oxygen depletion model predicted dissolved oxygen remaining above the level of concern throughout the winter. Therefore, aeration was not deployed.

Further evaluation of dissolved oxygen depletion and events are included in the regional fisheries report.

## **ACKNOWLEDGMENTS**

Henrys Lake Fish Hatchery continues to operate with assistance from a wide variety of sources. Acknowledgement is at least a minimal thank you for people going out of their way to contribute to the success of the Henrys program. Department personnel from around the state, as well as entire Department programs including Mackay Fish Hatchery, Ashton Fish Hatchery, Hagerman Fish Hatchery, and the Hayspur Fish Hatchery, assisted in spawning, rearing, and/or transportation. Additionally, several hundred hours of volunteer time were devoted to the Henrys program, mostly during the spawning cycle. Of special consideration is Jonathan Norwood, volunteer coordinator from the Idaho Falls office, who organized numerous volunteer trips to Henrys Lake to assist in several projects. Special thanks are given to the other volunteers and employees who venture to the site in the name of resource benefit.

Likewise, a special acknowledgement is given to the Henrys Lake Foundation. For many years, the foundation has given unselfishly in the form of donated time and funds, to maintain this important fishery. Over thirty thousand dollars was pledged this year alone to improve habitat, purchase fishery equipment, and to improve fish passage for natural production benefits. Without the foundations support, many improvements would not happen.

The Henrys Lake facility remains an important avenue for disseminating information to the public. Hundreds of anglers, as well as the general public, stop by the facility to ask questions or to help with the processes of collecting data and spawning fish. It is acknowledged that one of the most important tasks the IDFG faces is relaying the state of the resource to the interested public and to further promote the cooperative atmosphere that is so important in resource management.

## LITERATURE CITED

Idaho Department of Fish and Game. 1924. Fish and Game Warden. 10<sup>th</sup> Biennial Report. 10:113-114.

## **APPENDICES**

Table 1. 2010 Henrys Lake Spring Yellowstone Cutthroat Spring Spawning Summary.

<u>Spawn Date</u>	<u>Lot Number</u>	<u>Females Spawned</u>	<u>Number of Green Eggs</u>	<u>Mean Fecundity</u>	<u>Number Eyed Eggs</u>	<u>Disease Status</u>	<u>Percentage Eye-up</u>
2/28/2010	3	140	373,660	2669	278,226	Neg.	74.5%
3/2/2010	4	140	399,000	2850	290,323	Neg.	72.8%
3/8/2010	5	104	296,400	2850	209,677	Neg.	70.7%
3/11/2010	6	105	299,250	2850	225,806	Neg.	75.5%
3/15/2010	7	105	304,500	2900	205,645	Neg.	67.5%
3/18/2010	8	91	259,350	2850	161,290	Neg.	62.2%
3/25/2010	9	105	299,250	2850	181,452	Neg.	60.6%
3/29/2010	10	105	299,250	2850	181,452	Neg.	60.6%
3/31/2010	11	105	299,250	2850	184,250	Neg.	61.6%
4/5/2010	12	84	239,400	2850	139,750	Neg.	58.4%
4/8/2010	13	77	219,450	2850		Neg.	0.0%
4/9/2010	14	70	199,500	2850		Neg.	0.0%
<b>TOTALS</b>		<b>1231</b>	<b>3,488,260</b>	<b>2834</b>	<b>2,057,871</b>		<b>67.0%</b>

Lots 13 & 14 Destroyed prior to eye and were not used for eye-up calculation.

Table 2. 2010 Henrys Lake Hybrid Spring Spawning Summary.

<u>Spawn Date</u>	<u>Lot Number</u>	<u>Females Spawned</u>	<u>Number of Green Eggs</u>	<u>Mean Fecundity</u>	<u>Number Eyed Eggs</u>	<u>Disease Status</u>	<u>Percentage Eye-up</u>
2/22/2010	1 Sterile	168	483,840	2880	175,000	Neg.	36.2%
2/24/2010	2 Sterile	84	213,780	2545	100,000	Neg.	46.8%
2/24/2010	2 Fertile	56	142,520	2545	112,903	Neg.	79.2%
<b>TOTALS</b>		<b>308</b>	<b>840,140</b>	<b>2728</b>	<b>387,903</b>		<b>46.2%</b>

Table 3. 2010 Henrys Lake Egg Shipment Summary.

<u>DATE</u>	<u>LOT</u>	<u>STOCK</u>	<u>EGG SIZE</u>	<u>ML</u>	<u>EGGS</u>	<u>TU'S</u>	<u>DESTINATION</u>
29-Mar-10	1	HYBRIDS	3.1	10,850	175,000	473	MACKAY
29-Mar-10	2	HYBRIDS	3.1	6,200	100,000	446	MACKAY
30-Mar-10	2*	HYBRIDS	3.1	6,250	100,806		AMERICAN FALLS
5-Apr-10	3	YCT	3.1	17,250	278,226	473	MACKAY
9-Apr-10	4	YCT	3.1	18,000	290,323	473	MACKAY
9-Apr-10	5	YCT	3.1	13,000	209,677	432	MACKAY
16-Apr-10	6**	YCT	3.1	13,000	209,677	473	MACKAY
20-Apr-10	7	YCT	3.1	12,750	205,645	486	MACKAY
20-Apr-10	8	YCT	3.1	10,000	161,290	446	MACKAY
30-Apr-10	9	YCT	3.1	11,250	181,452	486	MACKAY
30-Apr-10	10**	YCT	3.1	6,500	104,839	432	MACKAY
7-May-10	11**	YCT	3.1	4,500	72,581	486	MACKAY
7-May-10	12**	YCT	3.1	4,500	72,581	432	MACKAY
	13***	YCT	3.1		0		
	14***	YCT	3.1		0		
<b>TOTALS</b>				<b>134,050</b>	<b>2,162,097</b>		

\*12,097 Hybrid eggs from Lot 2 fertile destroyed prior to shipment.

\*\*271,580 YCT eggs from Lots 6, 10, 11 & 12 destroyed prior to shipment.

\*\*\*Lots 13 & 14 Destroyed.

Figure 1. Henrys Lake 2010 Male Yellowstone Cutthroat Trout Run Timing (n = 2,220).

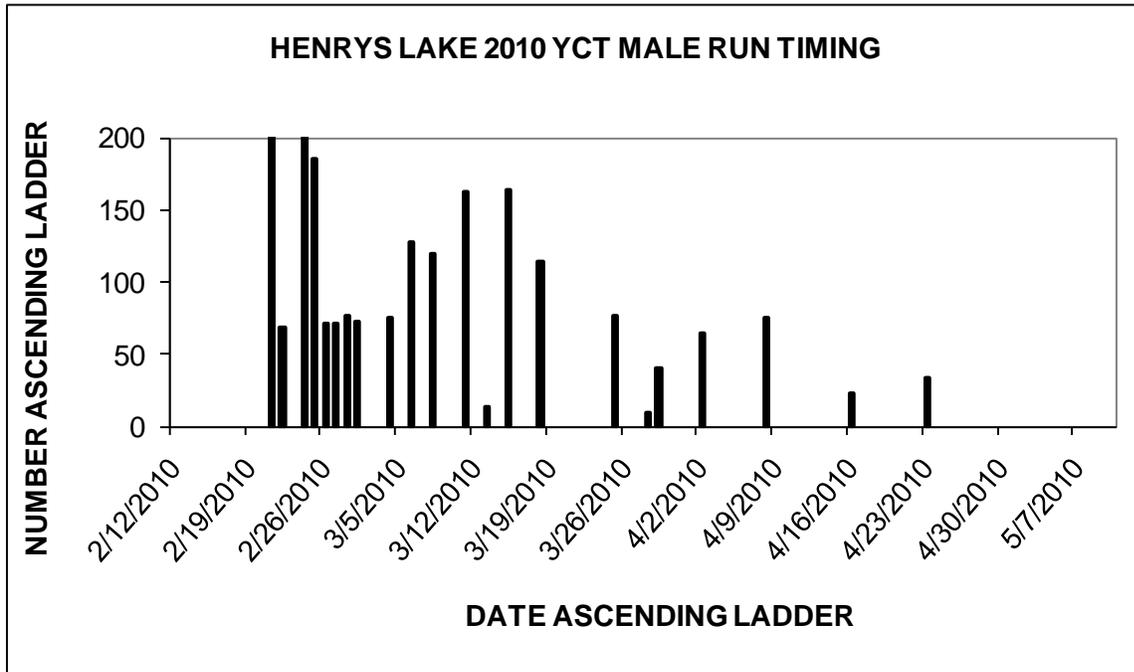


Figure 2. Henrys Lake 2010 Female Yellowstone Cutthroat Trout Run Timing (n = 2,150).

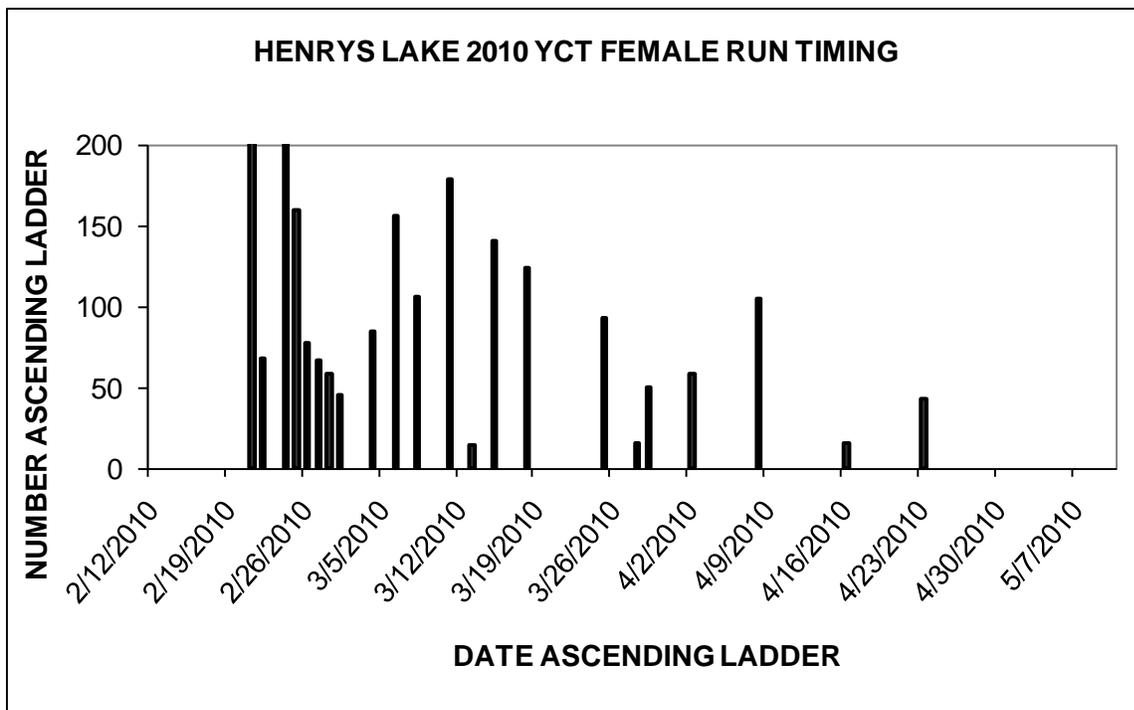


Figure 3. Henrys Lake 2010 Male Hybrid Trout Run Timing (n = 125).

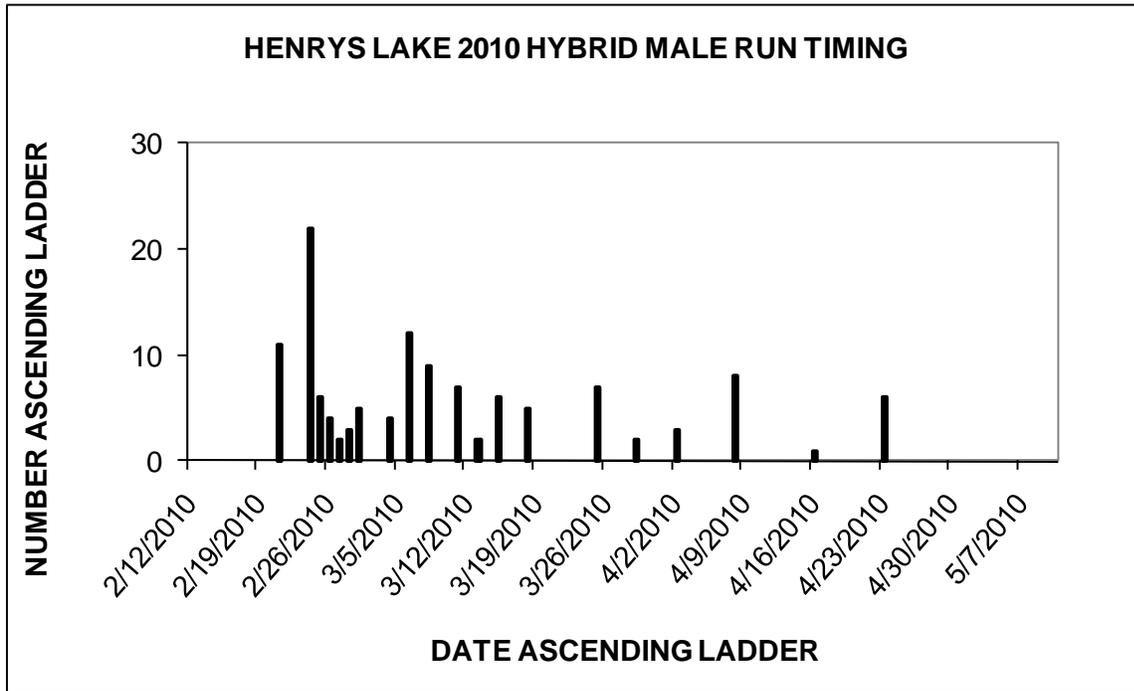


Figure 4. Henrys Lake 2010 Female Hybrid Trout Run Timing (n = 5).

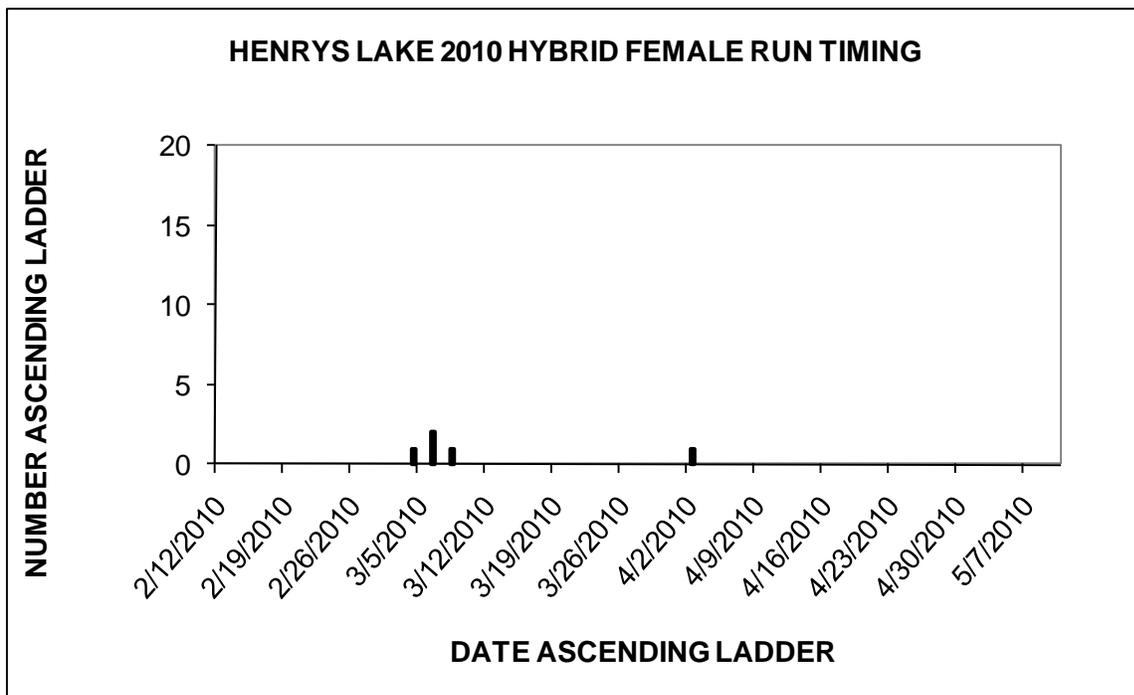


Figure 5. Henrys Lake 2010 Length Frequencies of YCT Spawning Run (n = 300).

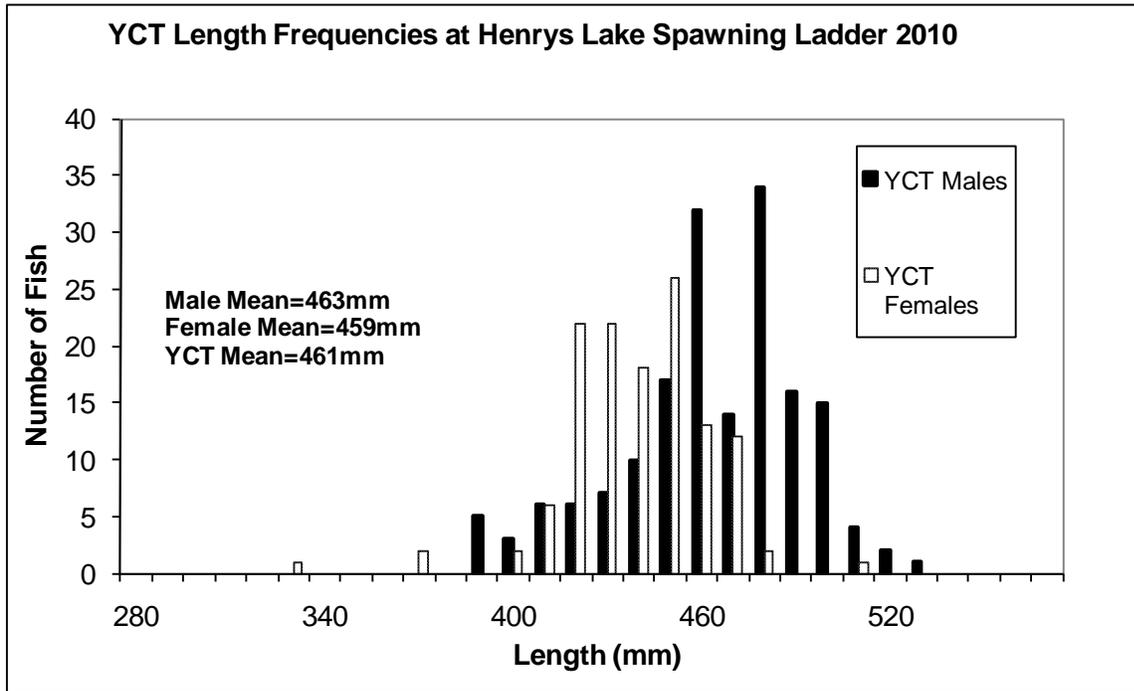


Figure 6. Henrys Lake 2010 Length Frequencies of Hybrid Trout Run (n = 7).

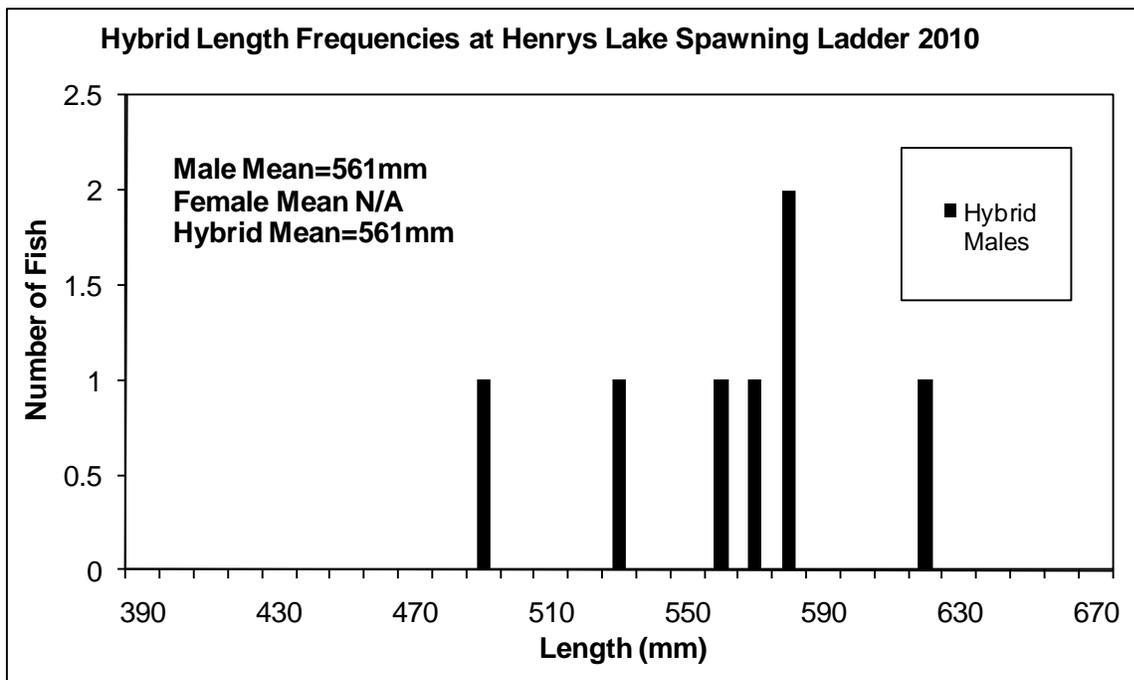


Figure 7. Henrys Lake Trap Species/Sex Ratio Composition 2010 (n = 4,500).

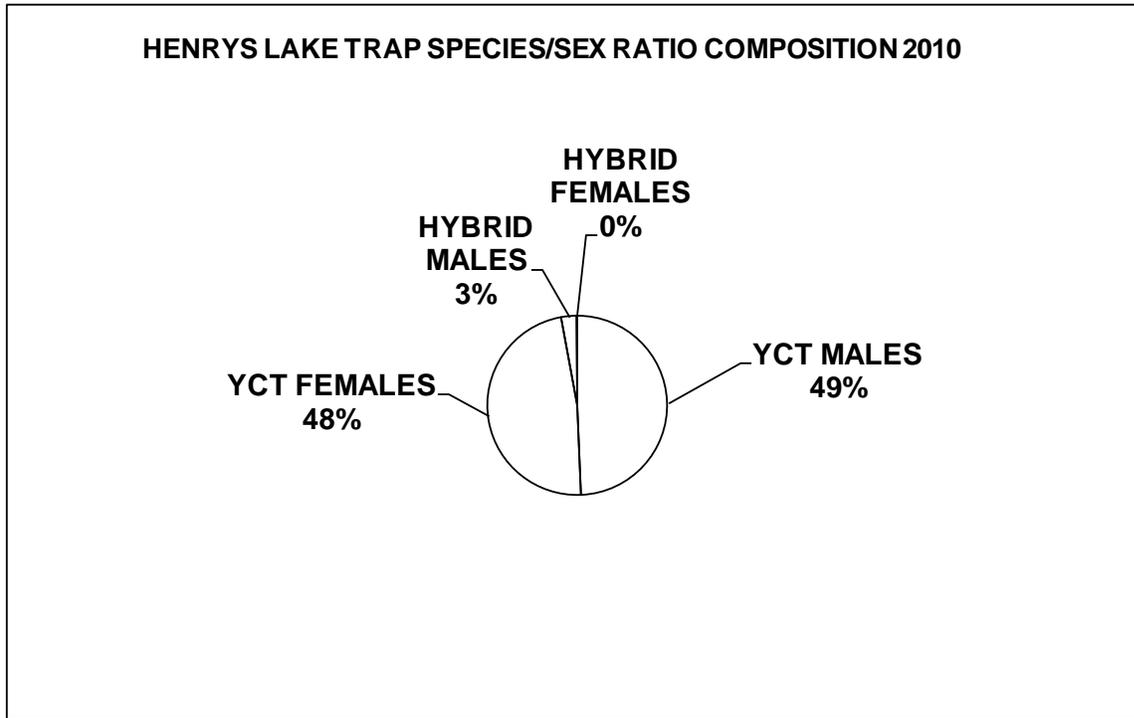


Figure 8. Henrys Lake Trap Historical Species/Sex Ratio Composition 2001-2010.

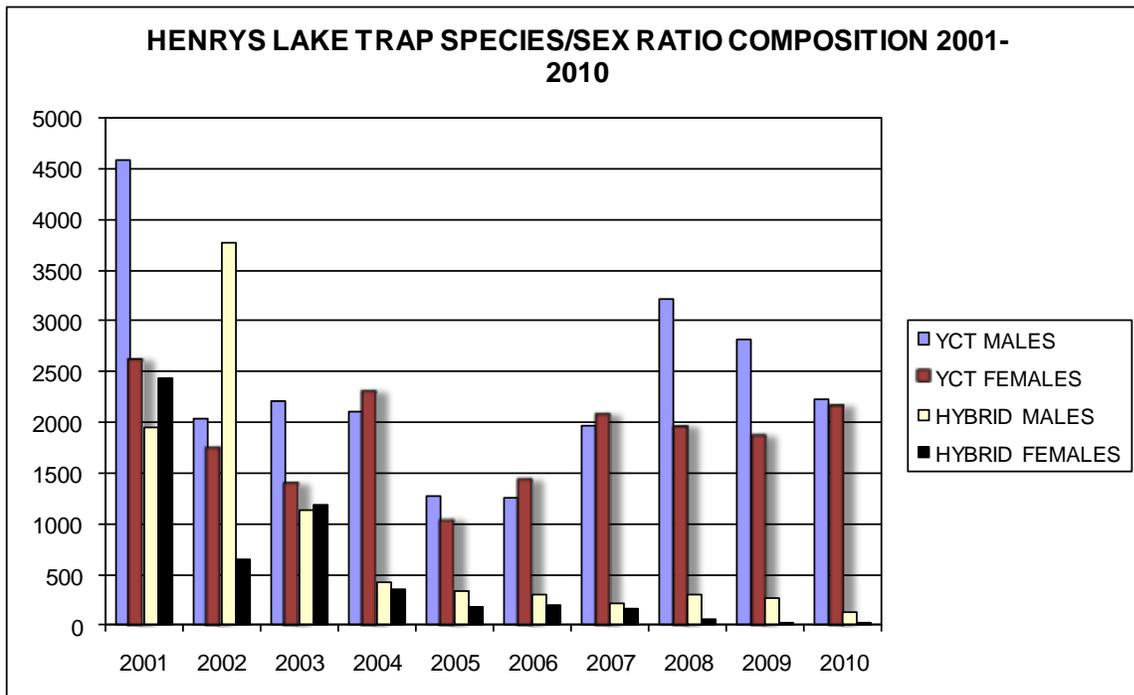


Figure 9. Henrys Lake YCT Eye-Up Percentages by Lot Number.

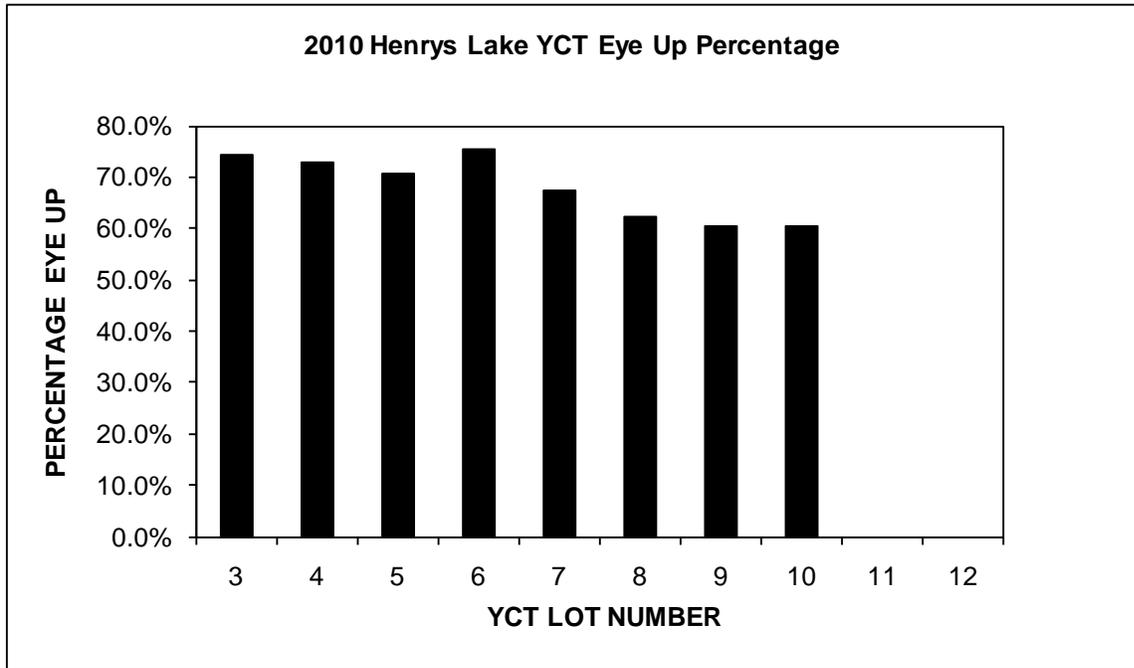


Figure 10. Henrys Lake Hybrid Eye-Up Percentages by Lot Number.

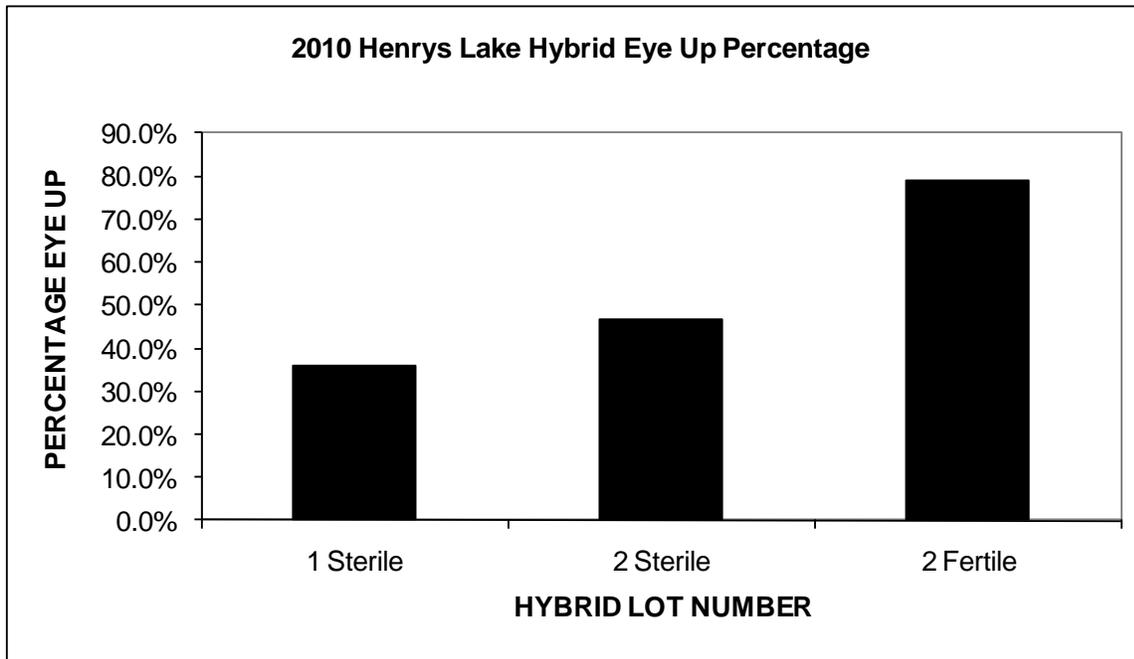


Figure 11. Henrys Lake Adipose Clipped Yellowstone Cutthroat Run Timing (n = 90).

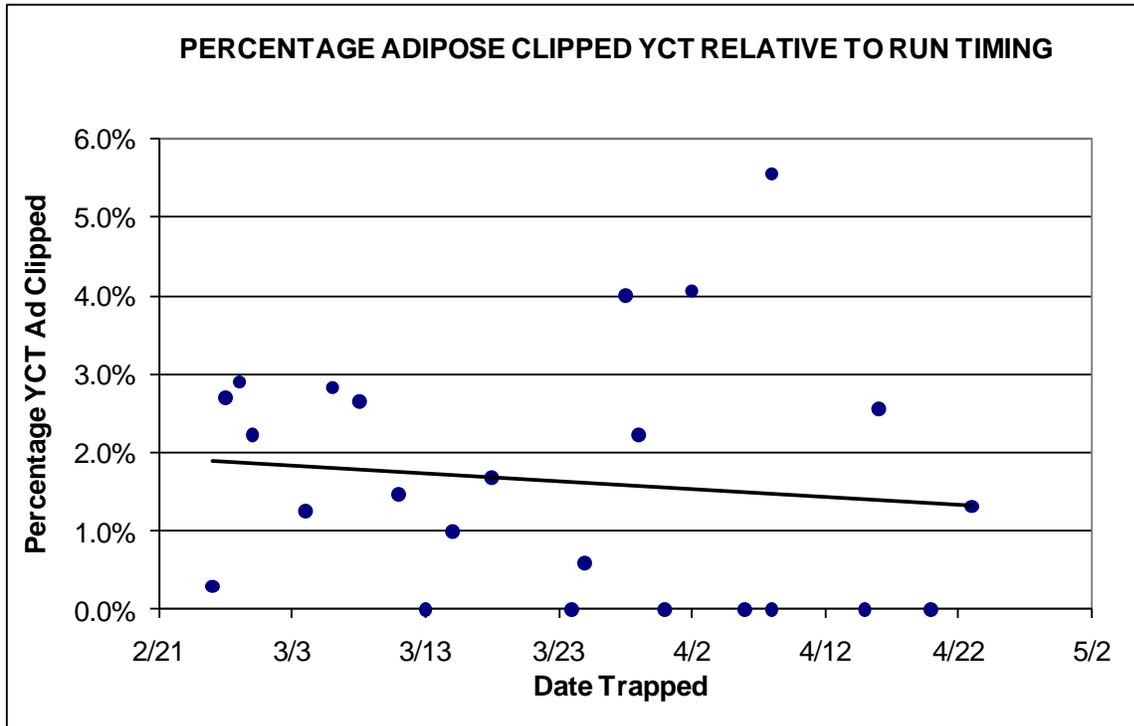


Figure 12. Henrys Lake Cutthroat Run Numbers 2001-2010.

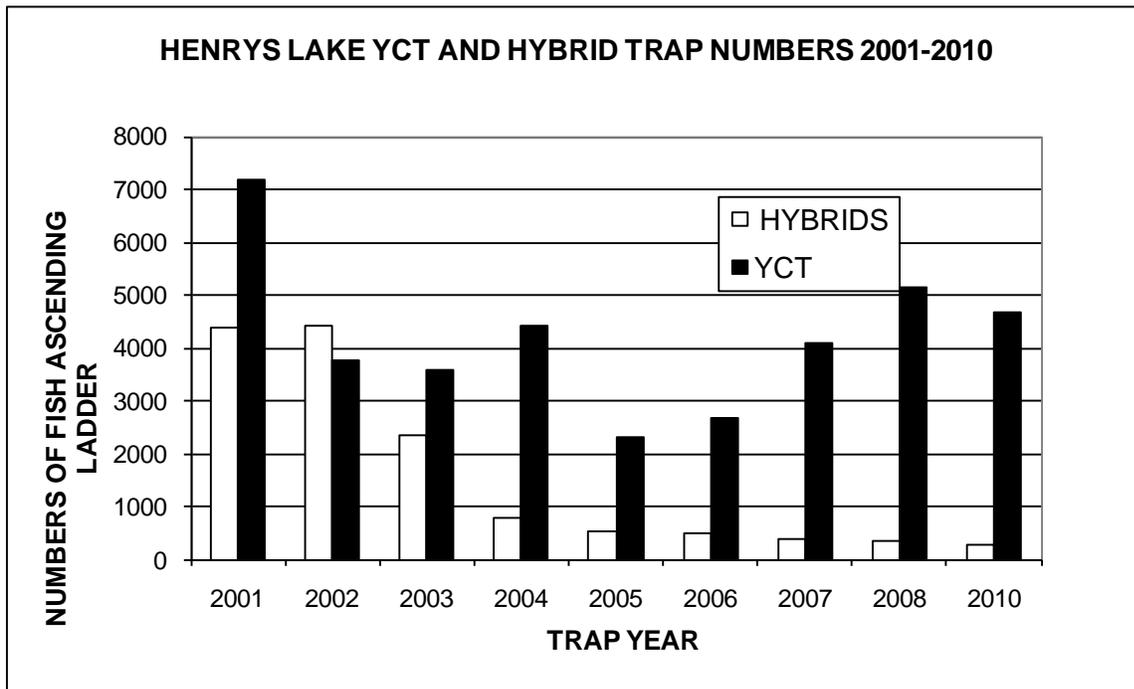
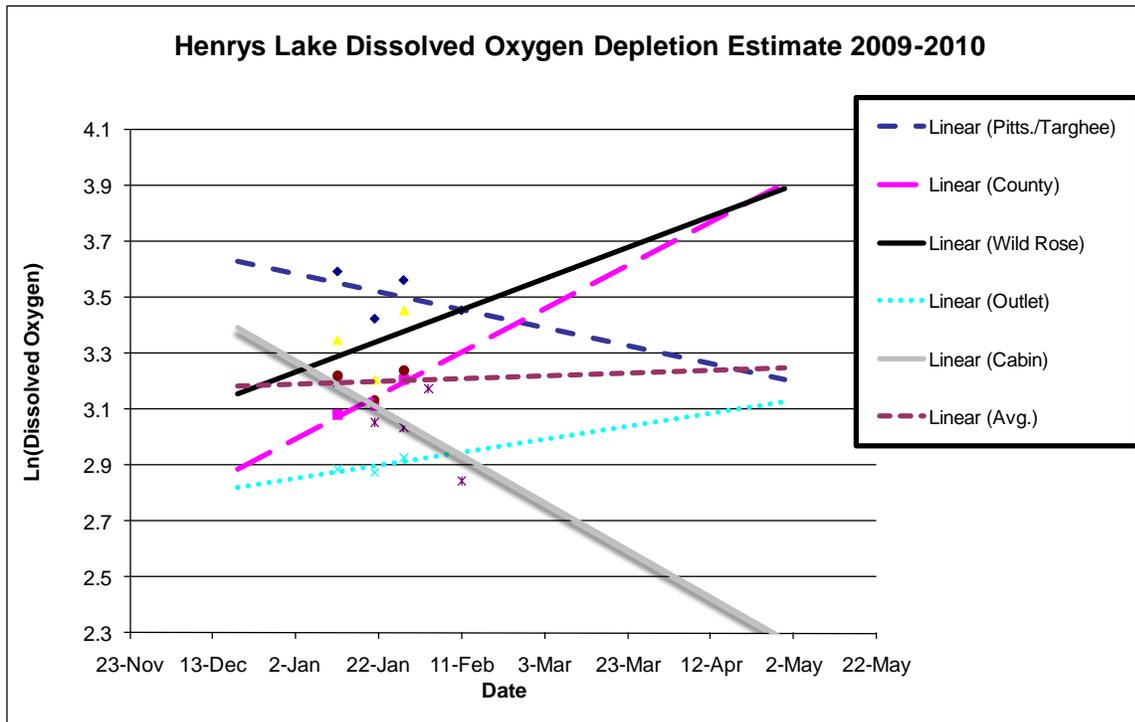


Figure 13. Dissolved Oxygen Depletion Model Henrys Lake 2009-2010.



## MACKAY FISH HATCHERY

**Patrick M. Moore, Fish Hatchery Manager I**  
**Robert M. Hoover, Assistant Fish Hatchery Manager**  
**Jason M. Jones, Fish Culturist**

### INTRODUCTION

The Mackay Fish Hatchery (MFH) is located approximately 15 miles north of Mackay, in Custer County, Idaho. The hatchery produces fish of various species and strains, from 1 to 12 inches in length, for statewide distribution. Funding comes from state license monies for operational and personnel cost.

The hatchery is staffed with three full-time and two year-round, part-time Idaho Department of Fish and Game (IDFG) employees. The MFH 2011 fiscal year (FY) budget is \$272,375. Wages and benefits is \$182,762 for all personnel. The operating budget is \$89,613. Actual expenditures for calendar year 2010 are used for production cost calculations (Appendix 1). This year's fish production included five species and seven strains (Appendix 2).

Rainbow trout (*Oncorhynchus mykiss*)

Troutlodge triploid (Sumner, WA)

Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvierii*)

Henry's Lake (Island Park, ID - Henry's Lake SFH)

Snake River fine spotted (Jackson, WY - Jackson NFH)

Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*)

Westslope Trout Company (Ronan, MT)

Cabinet George fish hatchery (CGFH) (Clark Fork, ID)

Henry's Lake triploid hybrids

Alee rainbow (*Oncorhynchus mykiss*) male x Henry's Lake cutthroat  
(*Oncorhynchus clarkii bouvierii*) female

Kokanee salmon (*Oncorhynchus nerka*)

early spawner (Deadwood Reservoir, ID)

Arctic grayling (*Thymallus arcticus*)

Meadow Lake (Dubois, WY)

## **WATER SUPPLY**

The hatchery's water comes from an artesian spring on the hatchery grounds. The spring flows are collected in six distribution boxes that provide water to the raceways and hatchery building. Following the earthquake in 1983, the spring area was dug out and filled with cobblestone to eliminate any standing water. The available volume of water for hatchery production ranges from 18 cubic feet per second (CFS) during the early months of the year to 23 CFS during the summer months. The temperatures of the springs are 50°F, 52°F, and 54°F. Egg incubation temperature is 52°F.

## **HATCHERY IMPROVEMENTS**

There were no capital projects completed at the MFH in 2010. The hatchery acquired two new pieces of fleet equipment, a four-wheel drive (4WD) Kawasaki mule with snowplow, and a 4WD John Deere tractor with front bucket and rear mower deck. Mackay Fish Hatchery also purchased a compressor, chop saw, and dissolved oxygen meter. Also, two tractors and a two ton truck with 900 gallon tank were surplused and sent to auction. A contractor cleaned out the effluent ditch that supplies the offline setting basin with a backhoe. Hatchery staff continues to maintain the hatchery grounds, buildings, and equipment.

## **FISH STOCKED**

Fingerlings were stocked in Upper Snake, Magic Valley, Southeast, and Southwest regions. These put-grow-and-take fish numbered 2,546,287 and weighed 24,825 pounds (Appendix 2).

Catchable rainbow trout were stocked in the Upper Snake, Magic Valley, and Salmon regions. These put-and-take fish numbered 68,137 and weighed 26,148 pounds (Appendix 2).

Catchable Snake River fine spotted cutthroat trout were stocked in the Upper Snake region. These put-and-take fish numbered 27,217 and weighed 13,461 pounds (Appendix 2).

Henrys Lake cutthroat trout (7,186), Troutlodge triploid rainbow trout (17,244) Westslope cutthroat trout (38,270) and Arctic grayling (1,226) were stocked in 53 mountain lakes in the Magic Valley, Southwest, Upper Snake and Salmon regions. Stocking methods included fixed wing aircraft, ATVs, horse, and backpacking. Fish stocking personnel included IDFG staff (regional and hatchery), United States Forest Service (USFS) staff, and volunteers.

## **FISH TRANSFERS**

Mackay Fish Hatchery transferred 29,959 catchable rainbows weighing 9,550 pounds to Clearwater Fish Hatchery (CFH) May 11, 2010 and May 13, 2010. The transport tankers from Nampa Fish Hatchery (NFH) hauled these fish.

## **TRANSPORT COSTS**

The three fish transport trucks assigned to MFH made 69 separate stocking trips during the year. Fish from MFH were planted by truck into 26 different bodies of water. Hatchery personnel traveled 14,240 miles for an average of 206 miles per trip. The fleet rental charges for FY 2010 were \$421.96/month and \$0.77/mile for each of the two-ton trucks. Fleet rental for the two-ton truck is \$158.93/month and \$0.34/mile. The fleet rental charges for FY 2011 are \$421.96/month and 77 cents/mile for each of the two-ton trucks. Fleet rental for the one-ton truck is \$158.93/month and 34 cents/mile. MFH fish transport cost totaled \$18,824 for 2010.

The fish transport tanker trucks from NFH made 11 trips to 7 different waters and CFH, traveling 4,285 miles for MFH during the year. The cost for the use of the two tankers were \$13,520 bringing the total fish transportation cost to \$32,344.

## **FISH FEED**

A total of 88,950 pounds of feed purchased from Rangen, Inc. was fed during the year. This feed cost \$52,577, including shipping charges and fuel surcharges (Appendix 3). Feed conversions ranged from a low of 0.88 for the 2010 Henrys Lake cutthroat and to a high of 1.76 for the 2008 Snake River fine spotted cutthroat. The average conversion for all lots of fish reared at MFH during the year was 1.19 (Appendix 3).

## **FISH MARKING**

Adipose fins were clipped on 132,040 Henrys Lake cutthroat trout during the third week of August 2010. This represented ten percent of the Henrys Lake cutthroat planted into Henrys Lake. Natividad Wilson and her crew administered these clips.

## **FISH HEALTH SUMMARY**

Due to poor eye-up of green kokanee eggs at MFH in the past, the Deadwood kokanee green eggs were shipped to CGFH. They were incubated to the eyed stage, shocked, picked, and shipped to MFH. Normal mortality was observed between the eyed egg and feeding fry stage. After the fish are on feed, they do quite well.

The Snake River fine spotted cutthroat eggs received from Jackson National Fish Hatchery were of very poor quality. After the eggs hatch and the fry start feeding they survive well.

The Henrys Lake triploid hybrids have a history of Cold Water Disease (CWD) at MFH. A Veterinary Feed Directive was administered in 2010 to reduce mortality caused by CWD. Aquaflor (Florfenicol) was used in May during the early rearing stage to treat the Henrys Lake cutthroat and the Henrys Lake triploid hybrid fry. They responded very well to the treatment and did not exhibit any signs of CWD.

The Westslope cutthroat eggs from CGFH arrived one day late (shipping company error) at 71 degrees Fahrenheit and only ten percent survived.

## **PUBLIC RELATIONS**

Hundreds of people toured the hatchery during the year. Most of these visitors came to fish the diversion pond below the hatchery during the Memorial Day holiday and Free Fishing Day. Signs are posted at the pond suggesting it be for youth fishing only and most people complied. Scheduled tours were given to the following groups: Mackay Elementary School's third, fourth, and sixth grades, USFS Youth Conservation Corps crew, teachers, and high school students from Washington D.C. Mackay Fish Hatchery provided 50 Henrys Lake Cutthroat fingerlings to the Southeast region and 100 Westslope cutthroat to Sawtooth Fish Hatchery personnel for trout in the classroom programs. Many impromptu tours for visitors were conducted throughout the year.

## **ACKNOWLEDGEMENTS**

Mackay Fish Hatchery would like to thank John Lambert and Robert Nash, the bio-aides, for their very important contributions throughout the year. Their work enables the hatchery to produce an excellent quality product for the angler.

## **APPENDICES**

Appendix 1. Mackay Fish Hatchery Production and Costs Summary, 2010.

Pounds of fish stocked, 2010 =	73,984
Pounds of fish on station, 12/31/2009 =	26,900
<b>Total pounds of fish on Site for 2010 =</b>	<b>100,884</b>
Pounds of fish on hand, 12/31/2010 =	27,699
<b>Net pounds of fish produced, 2010=</b>	<b>73,185</b>

**Production Costs**

6 months FY 2010 budget		6 months FY 2011 budget	
personnel =	\$61,903	personnel =	\$83,059
operating =	\$63,632	operating =	\$54,762
<b>total</b>	<b>\$125,535</b>	<b>total</b>	<b>\$137,821</b>
<b>TOTAL 2010 costs =</b>	<b>\$263,356</b>		

Appendix 2. Mackay Hatchery Fish Stocking Summary, 2010.

Species/Strain	Lot	Number Planted	Pounds Planted	Size at Release
Yellowstone cutthroat-Snake River fine spot	08-WY-C4	27,217	13,461	catchable
Yellowstone cutthroat-Snake River fine spot	09-WY-C4	125,915	4,800	fingerling
Yellowstone cutthroat-Snake River fine spot	10-WY-C4	24,263	95	fingerling
Yellowstone cutthroat-Henrys Lake	10-ID-C3	1,425,466	11,535	fingerling
Rainbow x Cutthroat Triploid hybrid	10-ID-TH	137,557	1,430	fingerling
Triploid rainbow -Troutlodge	08-WA-TT	1,442	860	catchable
Triploid rainbow -Troutlodge	09-WA-TT	66,695	25,288	catchable
Triploid rainbow -Troutlodge	10-WA-TT	22,065	33	fingerling
Early spawner kokanee-Deadwood Reservoir	10-ID-KE	771,525	6,909	fingerling
Arctic grayling Meadow Lake, Wyoming	10-WY-GR	1,226	1	fingerling
Westslope Cutthroat Westslope Trout Co. MT	10-MT-C2	6,038	6	fingerling
Westslope Cutthroat Cabinet George Hatchery	10-ID-C2	32,232	16	fingerling

**Total Fish Stocked, 2010**

	Number of Fish	Pounds of Fish
Fingerlings	2,546,287	24,825
Rainbow catchables	68,137	26,148
Cutthroat catchables	27,217	13,461
<b>Total</b>	<b>2,641,641</b>	<b>64,434</b>

Appendix 3. Feed purchased and feed conversions at Mackay Fish Hatchery, 2010.

<b>Rangen Feeds</b>	<b>Avg. cost/pound</b>	<b>Pounds purchased</b>	<b>Cost</b>
TSS # 0	\$0.953	350	\$333.55
TSS # 0 Aquaflor	\$1.453	350	\$508.38
TSS # 1	\$0.871	4,800	\$4,298.70
TSS # 2	\$0.889	6,350	\$5,368.25
#3 Grower	\$0.612	10,300	\$6,201.25
3/32" 450 sinking	\$0.491	7,500	\$3,682.50
5/32" 450 sinking	\$0.490	59,300	\$29,386.30
Shipping/freight			\$2,798.28
<b>Totals</b>		<b>88,950</b>	<b>\$52,577.21</b>

**Feed conversions**

<b>Stock</b>	<b>Conversion</b>
10-C3	0.88
08-C4	1.76
09-C4	0.94
10-C4	1.01
09-KE	1.30
08-TT	1.17
09-TT	1.52
10-TT	1.08
10-TH	1.09
<b>AVERAGE</b>	<b>1.19</b>

Appendix 4. Eggs Received at Mackay Fish Hatchery, 2010.

Date	Species	Lot Number	Strain	Green Eggs	Eyed Eggs
03/29/10	Rainbow	10-WA-TT-1	Troutlodge triploid	N/A	141,667
<b>TOTAL</b>					<b>141,667</b>
03/29/10	C3XRF	10-TH-1	Henrys Lk/triploid RF Cross	N/A	174,999
03/29/10	C3XRF	10-TH-2	Henrys Lk/triploid RF Cross	N/A	99,999
<b>TOTAL</b>					<b>274,998</b>
04/05/10	Cutthroat	10-C3-03	Yellowstone (Henrys Lk.)	N/A	276,613
04/09/10	Cutthroat	10-C3-04	Yellowstone (Henrys Lk.)	N/A	277,941
04/09/10	Cutthroat	10-C3-05	Yellowstone (Henrys Lk.)	N/A	228,906
04/16/10	Cutthroat	10-C3-06	Yellowstone (Henrys Lk.)	N/A	233,332
04/20/10	Cutthroat	10-C3-07	Yellowstone (Henrys Lk.)	N/A	212,903
04/20/10	Cutthroat	10-C3-08	Yellowstone (Henrys Lk.)	N/A	146,774
04/30/10	Cutthroat	10-C3-09	Yellowstone (Henrys Lk.)	N/A	182,264
04/30/10	Cutthroat	10-C3-10	Yellowstone (Henrys Lk.)	N/A	127,589
05/07/10	Cutthroat	10-C3-11	Yellowstone (Henrys Lk.)	N/A	74,196
05/07/10	Cutthroat	10-C3-12	Yellowstone (Henrys Lk.)	N/A	69,357
<b>TOTAL</b>					<b>1,829,875</b>
05/24/10	Cutthroat	10-C4-1	Yellowstone (fine spot)	N/A	247,619
06/01/10	Cutthroat	10-C4-2	Yellowstone (fine spot)	N/A	109,821
<b>TOTAL</b>					<b>357,440</b>
06/10/10	Rainbow	10-WA-TT-2	Troutlodge triploid	N/A	27,233
<b>TOTAL</b>					<b>27,233</b>
6/24/2010	Cutthroat	10-ID-C2-1	Westslope	N/A	*57,751
<b>TOTAL</b>					<b>57,751</b>
7/13/2010	Cutthroat	10-MT-C2-1	Westslope	N/A	39,840
<b>TOTAL</b>					<b>39,840</b>
10/05/10	Kokanee	10-KE-2	Deadwood	N/A	100,676
10/05/10	Kokanee	10-KE-3	Deadwood	N/A	519,595
10/13/10	Kokanee	10-KE-4&5	Deadwood	N/A	567,926
<b>TOTAL</b>					<b>1,188,197</b>
<b>TOTAL EGGS FOR 2010</b>					<b>3,917,001</b>

\*= FedEx delivered these eggs one day late at 71 degrees.

Appendix 5. Mackay Fish Hatchery Cost Summary 2010.

Put and Take Number	125,313
Put and Take Pounds	49,159
Put, Grow & Take Number	2,546,287
Put, Grow and Take Pounds	24,825
Fish/lb Average	36.11
Total Pounds of Feed	88,950
Feed Cost	\$52,577.21
AVG Length in Inches	4.3
Total Cost *	\$263,356
Cost per 1,000 Fish Stocked	\$98.58
Cost per Pound of Fish Stocked	\$3.56

**\* Total Cost includes permanent & temporary employee wages and benefits, and 2010 operating budget expenditures.**

Appendix 6. Fish on hand December 31, 2010.

Stock	Fish Numbers	Pounds	Avg. Length
<b>09-TT</b>	2,345	1,302	11.15
<b>09-C4</b>	31,120	9,725	9.63
<b>10-TT</b>	103,945	14,497	7.04
<b>10-C4</b>	162,926	2,175	3.37
<b>10-KE</b>	~1,050,000	N/A	N/A

## MCCALL SUMMER CHINOOK HATCHERY

### RESIDENT PROGRAM

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

### INTRODUCTION

McCall Summer Chinook Fish Hatchery (MCFH) is located within the city limits of McCall, approximately ¼-mile downstream of Payette Lake, adjacent to the North Fork of the Payette River. This facility underwent a complete renovation by the U.S. Army Corps of Engineers in 1979. The primary objective for MCFH is to produce one million summer Chinook salmon *Oncorhynchus tshawytscha* smolts annually. Anadromous funding is provided through the Lower Snake River Compensation Program (LSRCP). Secondary hatchery objectives pertain to resident programs. Resident fisheries program activities are financially supported through Idaho Department of Fish and Game (IDFG) license sales revenue. Most resident activities occur during the summer months from May to September. Funding for personnel time used on resident program objectives is derived from IDFG license sales revenue and provides for 5 months of assistant fish hatchery manager and 6 months of seasonal biological aide time. Facility overhead and maintenance charges are provided through the anadromous program as funded by LSRCP.

Gravity flow from Payette Lake provides for all of MCFH water needs. Two water intakes are available, which provide limited seasonal water temperature control through mixing. The surface intake is located at Lardo Dam at the outlet of Payette Lake. The subsurface intake extends approximately ¼-mile into Payette Lake at a depth of 50 feet. A 2-foot diameter constriction in the 3-foot diameter mainline limits maximum flow capacity to 20 cubic feet per second (cfs).

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

Major resident program objectives:

- Hatch and rear westslope cutthroat trout *O. Clarkii lewisi*, domestic kamloop rainbow trout *O. Mykiss*, golden trout *O. Aquabonita* and rear arctic grayling *Thymallus arcticus* fry for stocking into mountain lakes in the Panhandle, Clearwater, and Southwest Regions.
- Redistribute up to 101,000 catchable-size rainbow trout.
- Maintain the statewide high mountain lakes stocking request database.
- Provide assistance to the anadromous program as needed and available.

## **FISH PRODUCTION**

### **Mountain Lake Stocking**

Waters located in the Panhandle, Clearwater, Southwest (Boise), and Southwest (McCall) regions were stocked with 136,750 fry out of MCFH in 2010. Species available for redistribution included westslope cutthroat trout, sterile rainbow trout, and arctic grayling (Appendix 1.). A total of 150 lakes that are part of the mountain lake stocking program received 124,540 fry. Two additional locations received 12,210 fry that were available and in excess of program needs. No golden trout were available for stocking in 2010, and grayling were stocked at a reduced rate due to limited availability. All other stocking requests were met.

Ten fixed-wing fish stocking flights were flown during the period of August 14 through September 18 resulting in the release of 111,160 fry into 132 lakes. In doing so, approximately 3,387 miles were flown over at a flight cost of \$11,494.50. The average cost, based on redistribution flight time, to stock a mountain lake out of MCFH in 2010 was \$87.08 and ranged from \$72.82 to \$435.00 for individual regions. Volunteers backpacked 12,850 fry into 17 lakes in the McCall Area. It is estimated that their efforts saved the IDFG \$1,247 in comparable flight time costs. Fishery management personnel backpacked 530 arctic grayling into one lake. Hatchery staff transported 250 westslope cutthroat trout fry to the Morrison Knudsen Nature Center to be placed on display for educational purposes and stocked out 11,960 westslope cutthroat trout fry into Payette Lake which were in excess of program needs.

Bio-Oregon's BioVita Starter #0 was the primary feed used throughout the rearing period with good results. This starter feed was supplemented with Bio-Flake feed in an attempt to improve feeding response. Arctic grayling were fed a mixed diet of Argent's "Cyclop-Eeze," provided by Ashton FH, along with the Bio-Oregon products to minimize any potential negative transition effects related to diet when they were transferred to MCFH. In all, 35.97 pounds of feed was used to gain 58.64 pounds of fish growth resulting in an average conversion of 0.61 (Appendix 2.). The total feed cost for feeding resident fry was \$125.97 and averaged \$0.92 per 1,000 fry stocked.

All westslope cutthroat trout stocked in 2010 originated from eyed eggs from the newly developed captive broodstock reared at Cabinet Gorge FH. These eggs/ fry performed well at MCFH.

### **Catchable Rainbow Trout Redistribution**

A total of 112,240 sterile Troutlodge rainbow trout triploids were stocked into 38 water bodies in the McCall vicinity during the period of May 13 to September 1. Various resident hatcheries reared these fish including: Nampa FH (71,375 fish averaging 3.14 fpp), Grace FH (30,010 fish averaging 3.17 fpp), and American Falls FH (10,440 fish averaging 2.90 fpp). Comparing the transferred number of fish into MCFH to the number stocked out of MCFH plus holding mortalities resulted in a net inventory gain of 415 fish or 0.4% and likely derived from errors in loading weights and sample counts throughout the redistribution period at MCFH.

Transportation costs to bring catchable size rainbow trout to MCFH totaled \$7,511 with 2,512 miles driven by Transport Operators stationed out of Nampa FH. Hatchery personnel drove 4,614 miles on 104 stocking trips to complete requests at an estimated transportation cost of \$5,356. To maximize efficiency multiple sites were stocked on 11 occasions eliminating the need to make additional stocking trips. Based on the combined transportation cost of \$12,867

the redistribution cost for catchable rainbow trout stocked out of MCFH in 2010 was \$115.03 for each 1,000 fish stocked, or \$0.36 per pound stocked (Appendix 3.). To maintain the condition of fish, while at MCFH, 616 pounds of BioTrout 4.0 mm feed was used to provide intermittent feeding at a cost of \$448.45.

### **Payette Lake Net Pens**

Two net pens (20' x 20' x 17' each) were utilized to provide for continued rearing of catchable size rainbow trout during the summer months at Brown's Park. All fish rearing activities are directed by the McCall sub-regional fishery management staff.

Sterile rainbow trout, numbering 6,000, were placed into the nets on June 3 at a size of 3.15 fpp (9.4 inch TL). Hatchery and fishery management personnel weighed fish out of the nets for release into Payette Lake on September 14 to help to provide a more accurate estimate of fish release numbers. Sample counts and measured weights determined a total of 4,400 fish were released from the net pens at an average size of 1.34 fpp (12.3 inch TL). While in operation, city employees from McCall intermittently fed these fish 1,964 pounds of 4.0 mm BioTrout feed at a cost of \$1,430 resulting in fish weight gain of 1,383 pounds. The experienced feed conversion for the Payette Lake Net Pens in 2010 was 1.42.

### **Special Projects**

Efforts were coordinated with Dale Allen, McCall Sub-regional Fish Manager, to reorganize the McCall sub-region mountain lake requests in a manner that would better consolidate lakes being stocked on individual rotations. Work was completed in time to incorporate changes to the 2010 mountain lake stocking season and should help improve flight plan efficiency, and reduce costs, by lessening the area being covered each year.

### **Hatchery Improvements/ Needs**

Discharge pipes exiting the hatcheries wash-down vats, located near incubators, were rerouted prior to being used to rear resident fry in 2010. This project entailed running PVC pipe from the wash-down vats to existing effluent discharge channels in the hatchery building, but still allowed connecting the outflows to existing plumbing during those periods when these containers are used for cleaning and disinfecting equipment; discharge via city sewer system.

Changing older style carbon oxygen diffusers to the more efficient point four micro-bubble ceramic plate oxygen diffusers in the resident program 1,000-gallon transport tank has been identified as a program need to be addressed in the future. Replacement of the resident program 2-ton transport truck has been requested due to age and poor highway performance.

### **Public Relations**

Fish stocking opportunities were provided to several groups of volunteers who backpacked 12,850 fry into 17 mountain lakes in the McCall area; saving the Department approximately \$1,247 in comparable flight time costs. Small groups of catchable rainbow trout were periodically provided to Scout Masters at Camp Morrison, in McCall, who used these fish as part of their aquatic education lessons given to Boy Scout groups. In all, 30 fish were provided for this effort. Hatchery personnel participated in the Free Fishing Day event held at Rowland Pond and numerous hatchery tours were given to visitors/ school groups throughout the summer.

## **ACKNOWLEDGEMENTS**

Resident program activities were completed with the support and cooperation of the entire staff at McCall Summer Chinook Hatchery. I wish to thank Gene McPherson, MCFH Hatchery Manager II, for his ongoing advice, support and for making available seasonal employees who were utilized on resident program endeavors. Individuals assisting on resident program activities in 2010 include Joel Patterson, MCFH Fish Culturist, and seasonal bio-aides Tony Folsom, Charlie Haley, Matt Hershel, Paul Lemons, Nick McConnell, Nikki Sauerland, Sean Ward, Brett Watterson, and Matt Watterson.

## **APPENDICES**

Appendix 1. Fry redistribution by Region, MCFH, 2010.

Species	Panhandle	Clearwater	Southwest (3B)	Southwest (3M)	Total Stocked
Westslope Cutthroat Trout (Cabinet Gorge FH – C2)	2,500	26,000	1,750	58,560	88,810
Rainbow Trout Triploid (Trout Lodge – TT)			23,000	20,150	43,150
Arctic Grayling (Meadow Lake, WY – GR)	2,550			2,240	4,790
<b>Total</b>	<b>5,050</b>	<b>26,000</b>	<b>24,750</b>	<b>80,950</b>	<b>136,750</b>
# Lakes Stocked by Plane	4	35	35	58	132
# Lakes Stocked by Other Means			1	19 <sup>a</sup>	20
<b>Total Lakes Stocked</b>	<b>4</b>	<b>35</b>	<b>36</b>	<b>77</b>	<b>152<sup>a</sup></b>
Approximate Flight Costs	\$1,740.00	\$2,784.00	\$2,747.13	\$4,223.37	\$11,494.50
Average Cost to Stock Each Lake by Plane	\$435.00	\$79.54	\$78.49	\$72.82	\$87.08

<sup>a</sup> One lake was stocked by both staff and volunteer, with different species, and is double counted.

Appendix 2. Resident fry feed usage and conversion data, MCFH, 2010.

Species	Number Stocked	Feed Used (lb)	Pounds Gained	Conversion	Cost per Lb Gain	Cost per 1000 fish	Total Feed Cost
Westslope Cutthroat Trout (Cabinet Gorge FH – C2)	88,810	18.65	30.61	0.61	\$1.67	\$0.58	\$51.14
Rainbow Trout Triploid (Trout Lodge – TT)	43,150	14.35	25.39	0.57	\$1.44	\$0.85	\$36.51
Arctic Grayling (Meadow Lake, WY)	4,790	2.97	2.64	1.13	\$14.52	\$8.00	\$38.32
<b>Fry Total</b>	<b>136,750</b>	<b>35.97</b>	<b>58.64</b>	<b>0.61</b>	<b>\$2.15</b>	<b>\$0.92</b>	<b>\$125.97</b>
Rainbow Trout Triploid (Trout Lodge – TT) Payette Lake Net Pens	4,400	1,964	1,383	1.42	\$1.03	\$325.00	\$1,430.00

Appendix 3. Production and distribution costs, MCFH, 2010.

Species	Setout <sup>a</sup> / Received	Stocked/ Transfer	Transportation Cost	Pounds Stocked	Cost per LB Stocked	Cost per 1000 Stocked
<b>Fry Redistribution</b>						
Westslope Cutthroat Trout (Cabinet Gorge FH – C2)	94,300	88,810	\$6,824.15	57.55	\$118.58	\$76.84
Rainbow Trout Triploid (Trout Lodge – TT)	46,930	43,150	\$3,684.95	41.03	\$89.81	\$85.40
Arctic Grayling (Meadow Lake, WY)	6,100	4,790	\$2,147.90 <sup>c</sup>	3.32	\$646.96	\$448.41
<b>Fry Redistribution Total</b>	147,330	136,750	\$12,657.00	101.90	\$124.21	\$92.56
Notes: <sup>a</sup> Setout/ received number is reported as number stocked plus rearing mortality.						
<sup>b</sup> Breakdown based on \$11,494.50 partitioned flight redistribution for C2 & TT. Fry stocked by volunteers/ excess are included at no cost.						
<sup>c</sup> Breakdown for GR includes an additional transport cost of \$1,162.50 for returning grayling fry from Ashton FH to MCFH.						
<b>Catchable Rainbow Trout Redistribution<sup>d</sup></b>						
Trout Lodge Rbt Triploid (Reared at Nampa FH)	112,240	111,860	\$12,867	35,828	\$0.36	\$115.03
Note: <sup>d</sup> Based on transportation costs of \$12,867 (\$5,356 MCFH and \$7,511 Nampa FH).						
<b>Grand Total<sup>e</sup></b>	259,570	248,610	Average Budget \$83,031	35,930	\$2.31	\$333.98

Note: <sup>e</sup> Grand total cost is based on the average resident program budget of \$ 83,031; no capital outlay money is included.

## **MULLAN FISH HATCHERY**

**John Rankin, Fish Hatchery Manager**

**Mary Van Broeke, Fisheries Technician**

### **INTRODUCTION**

The Mullan Fish Hatchery (MUFH) is a resident species redistribution station located four miles east of Mullan, Idaho. The Shoshone County Sportsmen's Association owns the MUFH. Shoshone County provides funds to maintain the physical plant. The Idaho Department of Fish and Game provides funds for personnel costs, production costs, and equipment with fishing and hunting license fee revenue. The manager at Cabinet Gorge Fish Hatchery supervises operations and provides additional labor and equipment if needed. There is one temporary employee on station year-round.

The hatchery receives water from the South Fork of the Coeur d'Alene River and the Little North Fork of the Coeur d'Alene River. Two (10 ft x 60 ft) concrete raceways 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 of the dirt ponds 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 to the Coeur d'Alene and St. Joe River drainages to stock ponds and lakes, 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.

Mullan Hatchery personnel, in 2010, were also involved with the Kokanee spawning operation at Granite Creek, and assisted with Mountain Lake stocking and catfish stocking.

### **HATCHERY IMPROVEMENTS**

Hatchery improvements during 2010 included:

- Replaced all of the sewer lines and drain lines in the hatchery building.
- The main hatchery building was scraped and painted.
- The hatchery intake reservoir on the Little North Fork was dug out by the Shoshone County work crew. This will now be done on an annual basis.
- The Shoshone County Sportsman Club received a grant for \$7,000, which they used to replace all of the windows and doors on the lower level of the hatchery building.
- Damaged 2 x 4's on garage #3 were replaced with 4 x 4's and painted.
- The fish loader was repaired.

## **FISH STOCKED OR TRANSFERRED**

A total of 36,416 (9-inch) rainbow trout, weighing 11,380 pounds (3.2 f/lb), were released into waters of the Coeur d'Alene and St Joe river drainages from May to September to support a put-and-take fishery. All stocking sites received sterile rainbow trout. Troutlodge Triploids (TT) Trout released from the MUFH came from Nampa Hatchery. Hatchery personnel loaded the fish into a 500-gallon pickup truck mounted tank and delivered them to ten different lakes and ponds. The distribution schedule requires three to five hour trips, four to five days each week during the summer season.

Mullan Hatchery's annual expenditures came to \$32,676. This amount included \$8,005 in operating costs, \$20,164 in personnel costs and \$4,507 in transportation costs from NFH. The streamside cost of catchable redistribution from MFH in 2010 was \$.90/fish or \$2.87/pound.

## **PUBLIC RELATIONS**

The MUFH is located adjacent to a popular Shoshone County "day use" park. As a direct result, the hatchery receives a much higher visitor level than would be expected in this remote location. The hatchery serves the highest number of visitors of any hatchery in the Panhandle Region, with over 12,000 people touring the grounds in 2010. The hatchery also hosted the Silver Valley Good Samaritan RV rally. The Shoshone County Sportsman had their annual meeting at the hatchery with over 50 members attending. A total of four school tours were given this year.

## **NAMPA FISH HATCHERY**

**Rick Alsager, Fish Hatchery Manager II**

**Bob Turik, Assistant Fish Hatchery Manager**

**Bob Becker, Fish Culturist**

### **INTRODUCTION**

Nampa Fish Hatchery (NFH) is a resident trout rearing facility located one mile south of Nampa. The NFH water is supplied by eight pump assisted artesian wells. A maximum flow of 35 cubic feet per second (cfs) of 59°F water is available for fish production. Built in 1975 and purchased by the Idaho Department of Fish and Game (Department) in 1982, fish rearing facilities consist of a hatchery building/dorm; containing four early rearing vats and a feed storage room. Outside rearing tanks including 16 fry raceways, three fingerling/broodstock raceways, and 10 production raceways. Sixteen upwelling incubators are available for use in the fry raceways for eyed egg incubation. A settling pond treats flows from the production units before discharge into Wilson Springs Ponds and Wilson Springs Drain.

### **FISH PRODUCTION**

During the 2010 fish year, the NFH net fish production was 1,946,071 at a net weight of 271,162 pounds (Appendix 1). The net cost for rearing fish at the NFH from grow out through stocking was \$378,222 (Appendix 2). Fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout *Oncorhynchus mykiss* comprised 91.07% of the fish stocked or transferred from NFH. In addition, Lahontan cutthroat trout *O. clarkii henshawi*, brown trout *Salmo trutta*, and fall Chinook salmon *O. tshawytscha* were produced at NFH during 2010 (Appendix 3). Another 785 fish weighing 257 pounds were produced at NFH and given to schools for educational purposes and department personnel for various research programs. A total of 1,986,958 eyed-eggs were received during the 2010 fish year (Appendix 4).

From March 2005 to Dec 2008 NFH had numerous Ichthyophthirius (ICH) outbreaks, the largest being in early 2006 leading to 250,000 mortalities. In 2009 and 2010, NFH continued to apply five-day formalin treatments to any fish being transferred to anadromous hatcheries. Fish were inspected by pathologists after treatment and prior to hauling. No ICH was diagnosed.

Due to disease concerns at IDFG's Hayspur Hatchery, NFH did not receive eggs destined for the Stanley basin via Sandpoint Hatchery in 2010. Changes in permitting will allow NFH to rear these fish free of previous size and species restrictions. Current plans are to stock catchable sized Troutlodge rainbow trout in Stanley basin lakes during the summer of 2011.

### **FISH STOCKED/TRANSFERRED**

The NFH personnel stocked or transferred 1,419,399 fish, weighing 272,559 pounds, during the 2010 fish year. These fish do not include warmwater transfers or fish reared in non-

IDFG hatcheries that were stocked into Idaho waters. NFH made 214 stocking trips to 280 planting waters during 2010.

NFH stocked or transferred a total of 650,509 fingerlings (Appendix 5) and 768,890 catchables (Appendix 6), which are listed by species/strain in each table. A total of 327,031 catchables (Appendix 7) were transferred to seven other hatcheries throughout the state.

### **FISH TRANSPORTATION**

Fish transport operators (Gary Ady and Dick Bittick) stationed at NFH stocked waters in all seven regions throughout the state. They transported fish to and from 16 different state and federal fish hatcheries. The transport operators made 168 trips totaling 48,561 miles during 2010. When not transporting fish, the two transport operators assist the NFH staff in fish rearing as well as facility and equipment maintenance. Intensive fish culture duties amount to 25% of their yearly budgeted time.

The NFH transport operators stocked 156,637 rainbow trout fingerlings weighing 1535 pounds from Lyons Ferry Fish Hatchery into Clearwater Region waters. They also stocked spring Chinook salmon and B-run steelhead smolts from Clearwater Fish Hatchery and assisted with the transportation of summer Chinook salmon smolts from McCall Fish Hatchery. NFH stocked Channel Catfish purchased from Fish Breeders of Idaho to lakes in the Panhandle, Clearwater, and Southwest Regions.

In May, Dick and Gary went to Oxbow Fish Hatchery in Western Oregon, operated by ODFW, to transport ESA sockeye salmon fingerlings back to Redfish Lake. In July, NFH assisted the department with personnel time and vehicles in planting two loads of adult Chinook salmon into the Boise River. These surplus fish were provided by the South Fork Salmon trapping facility. In November, the transport operators and NFH personnel assisted in transporting and stocking 1000 surplus A-run adult steelhead from Oxbow Fish Hatchery into the Boise River. These adult anadromous fish create a very popular local fishery.

### **BROWN TROUT**

During 2010, NFH reared and stocked 43,132 brown trout fingerlings, weighing 1,351 pounds, into waters in the Southwest and Magic Valley regions (Appendix 5). Eyed brown trout eggs were provided by Wyoming Game and Fish's Daniel Hatchery. Estimated survival from eyed egg to fingerling was 37.96%.

### **LAHONTAN CUTTHROAT TROUT**

During 2010, NFH stocked 55,883 Lahontan Cutthroat trout fingerlings (1,010 pounds) into four reservoirs located in the Southwest Region's Owyhee Desert. (Appendix 5) The Lahontan Cutthroat eggs were received from Omak Fish Hatchery in Washington. Estimated survival from eyed egg to stocking was 66.55%.

## **FALL CHINOOK**

In 2010, NFH stocked 27,698 fall Chinook fingerlings (3,670 pounds) (Appendix 5). Two trips totaling 20,417 Chinook were stocked in Coeur d'Alene Lake, as well as one trip to Deadwood Reservoir totaling 7,281 fingerlings. Chinook were received as fry from Cabinet Gorge Fish Hatchery. Cabinet Gorge acquired the eggs from Big Creek Hatchery in Astoria, OR. Estimated survival from fry to plant was 96.96%.

## **FISH FEED**

A total of 325,424 pounds of feed was fed during 2010 at a cost of \$181,577.28 (Appendix 8). The average cost per pound of feed was 55.79 cents. Rangen's Inc. made up 99.16% of the feed purchased by weight. 2,735 pounds of feed was received from other hatcheries and fed throughout the year. The overall feed conversion was 1.20 pounds of feed fed to produce one pound of fish.

Rangen's continues to carry the feed contract and is used throughout the rearing cycle. The use of Skretting feed was curtailed because of supply problems. Fall Chinook were fed a Bio-Oregon diet during early rearing.

## **FISH SPAWNING**

### **Early Kokanee**

In 2010, Nampa Hatchery returned to Deadwood Reservoir for the Kokanee spawning operation. The main reason for returning to Deadwood was the lower numbers of adult kokanee returning to the South Fork Boise River and the difficulty reaching our egg take goal in 2009. Other reasons were addressed in our 2009 Annual Report.

The Deadwood River weir was installed on August 17, 2010 and went in with no issues. A new Special Use permit was required by the USFS in order to install the camp, and a 404 Permit from the Corps of Engineers was required to utilize sandbags (fill) in the installation of the weir. These permits were completed in large by Jeff Dillon, Regional Fisheries Manager, and Art Butts, Regional Fisheries Biologist. The only other weir installed this year was on Basin Creek just south of the main weir. This weir was installed to divert a large number of kokanee upriver to the main weir. There was no real effort put forth to prevent fish from running up other tributaries around the reservoir as in earlier years. The Basin Creek weir installation was actually delayed due to an archeological survey of the site by USFS personnel. After inspection, the site was cleared and the weir installed on August 20.

Due to requests from the Enforcement Bureau, we decided to utilize Conservation Officers to assist us with weir operations. Due to budget constraints in the Enforcement Bureau, they requested that anyone able to use Conservation Officers to assist them with their duties to do so. We needed assistance at the weir for operations and for safety concerns. Brian Marek, Ben Cadwallader, and Dave McGonigal all worked three-day shifts in which they assisted with weir operation and spawning as well as conduct enforcement checks throughout the area. This worked well and benefited both the officers and the weir personnel who got to see a little how the enforcement side of things worked.

This year it was decided to try a new procedure handling the eggs. Cabinet Gorge has historically had higher success eyeing up Deadwood Kokanee eggs. This year all eggs were flown directly to Cabinet Gorge where they were incubated until eye-up. Mackay then arranged to pick up their share of the eyed eggs for rearing. The goal for 2010 was reduced to 2.2 million green eggs. Eggs numbers reported from Cabinet Gorge Hatchery were 2,356,132 green eggs. Percent eye-up at Cabinet was an average of 85.38% (Appendix 9).

### **HATCHERY IMPROVEMENTS**

Several important improvements were implemented at NFH during 2010:

- Replaced toilets in Residence #1.
- Replaced stove hood in Residence #2.
- Replaced stove/oven unit in hatchery dormitory.
- Repaired and replaced degassing towers to well #2.
- Had three new half screens built for hatchery density study.
- Installed quarter length keyways in three production "C" raceways.
- Replaced old wire feed and stick welders with new Miller wire feed welder, providing steel and aluminum capabilities.

NFH improvements scheduled for 2011 include:

- Replace 1-ton GMC pickup.
- Replace ¾-ton Ford pickup.
- Remove degassing boxes and wood dam boards in headrace and replace with aluminum screening and dam boards.
- Replace roof on upper shop.
- Remove loft flooring in upper shop and replace.
- Replace carpeting and vinyl in office and dorm.
- Replace old small diesel tank with new larger tank that is pumped and metered.

### **PUBLIC RELATIONS**

As in past years, NFH was a focal point for many visitors, tours, and special groups. In 2010, an estimated 3000 tourists visited the NFH. Most visitations came through the late spring and summer months, although, school and educational tours were scheduled throughout the

spring, summer, and fall. A total of 38 guided tours were given to area school, church, and Boy Scout groups. Several disabled veterans groups were allowed to fish the settling pond four times during the summer months. The settling pond was also opened to fishing on Free Fishing Day. NFH, with the help of regional personnel and reservists hosted the Free Fishing Day clinic, which saw 600 visitors/fishermen, with an estimated 700 fish caught. The largest fish caught was a 5.4 pound rainbow trout and four more over five pounds were caught. Free Fishing Day at NFH was again a big success and will be continued in the future. The "kids only" session from 8:00 a.m. to noon continued to be very popular and successful. The Gem State Fly Fishing Group held a 3-day fly fishing instructional class (no hooks allowed) at the hatchery. Hatchery personnel assisted with the Trout in the Classroom program again this year. Eggs, fry, and fingerlings were provided for living streams and catchables were provided for dissection in 23 different schools.

## **ACKNOWLEDGEMENTS**

The NFH staff for 2010 included Rick Alsager, Fish Hatchery Manager II; Bob Turik, Assistant Fish Hatchery Manager; Bob Becker, Fish Culturist; Gary Ady and Dick Bittick, Fish Transport Operators. Bio-aides for 2010 included Travis Balls, David Jansen, Andrew Endicott, Tim Maier, and Todd Gross. Chuck Kiester trained new NFH staff and assisted with fish marking. Kelci Roberts, a college student, assisted hatchery personnel through a work-study program in 2010. Three groups of correctional inmates from the state prison worked at the hatchery scraping raceways and doing grounds maintenance. Volunteers, community service, and several kids from the juvenile detention center have also helped on a number of projects throughout the year donating over 500 hours of time.

## **APPENDICES**

Appendix 1. Total net fish production at Nampa Fish Hatchery, 2000 through 2010.

Year	Put-and-Take		Put-grow-and-take		Total		Feed		Feed Conversion
	Number	Pounds	Number	Pounds	Number	Pounds	Pounds	Costs	
2000	864,603	250,976	1,100,595	18,197	1,965,198	269,173	281,264	\$81,862	1.04
2001	754,641	241,435	1,197,489	15,513	1,952,130	256,948	282,264	\$75,737	1.10
2002	923,854	346,918	1,155,212	24,334	2,079,066	371,252	356,982	\$100,727	0.96
2003	981,383	285,537	535,119	16,239	1,516,502	301,776	337,630	\$91,742	1.12
2004	811,838	272,531	711,242	11,206	1,523,080	283,737	310,718	\$93,818	1.10
2005	851,974	287,331	889,924	14,212	1,741,896	301,543	287,706	\$96,150	0.95
2006	882,057	269,183	1,316,658	17,060	2,198,715	286,243	294,160	\$95,925	1.03
2007	657,640	172,669	1,012,943	14,511	1,670,583	187,180	217,415	\$94,694	1.16
2008	739,450	227,052	394,636	9,064	1,134,086	236,116	223,537	\$111,223	0.95
2009	674,184	255,568	939,502	17,768	1,614,316	273,336	267,084	\$137,893	0.98
2010	846,535	252,514	1,099,536	18,646	1,946,071	271,160	325,424	\$181,577	1.20

\* Feed cost does not include feed donated from other hatcheries, but is included in feed fed and feed conversion.

Appendix 2. Total cost of net fish production at Nampa Fish Hatchery, 2000 through 2010.

Year	Total cost through grow - out				Mean Length inches	Total cost through stocking			
	Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ Inch		Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ Inch
2000	\$353,747	\$180.02	\$1.31	\$0.032	5.59	\$411,497	\$209.41	\$1.53	\$0.037
2001	\$338,998	\$173.67	\$1.32	\$0.031	5.64	\$390,917	\$200.27	\$1.52	\$0.036
2002	\$379,398	\$182.49	\$1.02	\$0.027	7.75	\$440,031	\$211.66	\$1.23	\$0.032
2003	\$408,764	\$269.63	\$1.35	\$0.037	7.22	\$441,840	\$291.45	\$1.46	\$0.040
2004	\$391,145	\$256.83	\$1.38	\$0.036	7.07	\$409,293	\$268.74	\$1.44	\$0.037
2005	\$428,208	\$245.96	\$1.42	\$0.037	6.72	\$466,381	\$267.88	\$1.55	\$0.040
2006	\$418,182	\$190.26	\$1.47	\$0.037	5.11	\$455,674	\$207.31	\$1.59	\$0.041
2007	\$466,723	\$279.48	\$2.49	\$0.052	5.38	\$501,323	\$300.19	\$2.68	\$0.056
2008	\$396,508	\$349.65	\$1.68	\$0.050	7.78	\$437,862	\$386.12	\$1.85	\$0.055
2009	\$363,010	\$224.87	\$1.42	\$0.033	6.91	\$402,700	\$249.50	\$1.51	\$0.036
2010	\$346,941	\$178.28	\$1.28	\$0.035	7.66	\$388,040	\$199.40	\$1.43	\$0.039

Appendix 3. Fish Requested and produced at Nampa Fish Hatchery, 2010.

Species/Strain	Size	Production	Actual	% of Goal
		Goal	Production	Achieved
Brown Trout (BN)	3-5 Inches	55,000	43,132	78.42%
Lahontan cutthroat trout (C6)	3-5 inches	43,000	55,883	129.96%
Fall Chinook (FC)	5-7 inches	25,000	27,698	110.79%
Troutlodge Triploid Kamloop (TT)	3-5 inches	600,000	523,796	87.29%
Triploid rainbow trout (T1)	8-12 inches	100,000	77,002	77.00%
Triploid rainbow trout (T9)	8-12 inches	18,000	18,569	103.16%
Troutlodge Triploid Kamloop (TT)	8-12 inches	700,000	673,319	96.19%
<b>Totals:</b>		1,541,000	1,419,399	92.11%

Appendix 4. Eyed-eggs received at Nampa Hatchery, January 1 to December 31, 2010.

Date Received	Species/Strain	Source	Number	Pond	Destination	Cost/1000 eggs
1/28/2010	Troutlodge Triploid Kamloop(TT)	Trout Lodge	439,110	A6-11	C Reg, Statewide	\$30.25
4/20/2010	Lahontan cutthroat trout(C6)	Omak, WA	83,971	A15	SW/Reg	N/C
6/17/2010	Troutlodge Triploid Kamloop(TT)	Trout Lodge	667,965	A1-9	Statewide	\$30.25
7/15/2010	Troutlodge Triploid Kamloop(TT)	Trout Lodge	224,986	A10-12, A16	Statewide	\$30.25
11/16/2010	Brown trout(BN)	Daniel, WY	84,490	A15	SW/Reg	N/C
12/20/2010	Triploid rainbow trout(T9)	Hayspur	486,436	A1-7	SW/Reg	N/C
<b>Total:</b>			<b>1,986,958</b>			
	<b>Designation Key</b>					
C Reg	Clearwater Region					
MV/Reg	Magic Valley Region					
P Reg	Panhandle Region					
SE Reg	Southeast Region					
SW/Reg	Southwest Region					
US/Reg	Upper Snake					
Salmon Reg	Salmon Region					

Appendix 5. Fingerlings produced at Nampa Fish Hatchery in 2010.

Species/Strain	Source	Number Received	Number Produced	Pounds Produced	Survival Egg to Plant	Designation
Troutlodge Triploid Kamloop(TT)	Trout Lodge	664,379	523,796	16,135	78.84%	SW Reg
Lahontan Cutthroat (C6)	Omak, WA	83,971	55,883	1,010	66.55%	Southwest Region
Brown Trout (BN)	Daniel Hatchery, WY	113,625	43,132	1,351	37.96%	SW Reg/MV Reg
Fall Chinook (FC)	Big Creek Hatchery Astoria, OR	28,566*	27,698	3,670	96.96%	SW Reg/Panhandle
<b>Totals:</b>		<b>890,541</b>	<b>650,509</b>	<b>22,166</b>	<b>73.05%</b>	

\*number received reflects fry picked up @ Cabinet Gorge Hatchery, not eyed eggs.

Appendix 6. Catchables produced at Nampa Fish Hatchery in 2010.

Species/Strain	Source	Number Received	Number Produced	Pounds Produced	Survival Egg to Plant	Designation
Triploid Rainbow (T9)	Hayspur	33,000	18,569	6,353	56.27%	Salmon Region, Southwest Region
Triploid Rainbow (T1)	Hayspur	96,900	77,002	25,625	79.47%	Statewide
Troutlodge Triploid Kamloop(TT)	Troutlodge	1,062,509	673,319	218,415	63.37%	Statewide
<b>Totals:</b>		<b>1,192,409</b>	<b>768,890</b>	<b>250,393</b>	<b>64.48%</b>	

Appendix 7. Catchable transfers from Nampa Hatchery to other hatcheries throughout the state.

Hatchery	Species	Number	Pounds	Fish/pound
Clearwater Fish Hatchery	TT	13,000	4,000	3.25
McCall Fish Hatchery	TT	71,375	22,700	3.14
Mullan Fish Hatchery	TT	36,320	11,000	3.30
Sawtooth Fish Hatchery	TT	48,870	16,000	3.05
Sandpoint Fish Hatchery	TT	108,203	37,400	2.89
Hayspur Fish Hatchery	TT	43,983	14,350	3.07
Hagerman Fish Hatchery	TT	5,280	1,600	3.30
<b>Totals:</b>		<b>327,031</b>	<b>107,050</b>	<b>3.05</b>

Appendix 8. Nampa Hatchery feed costs in 2010.

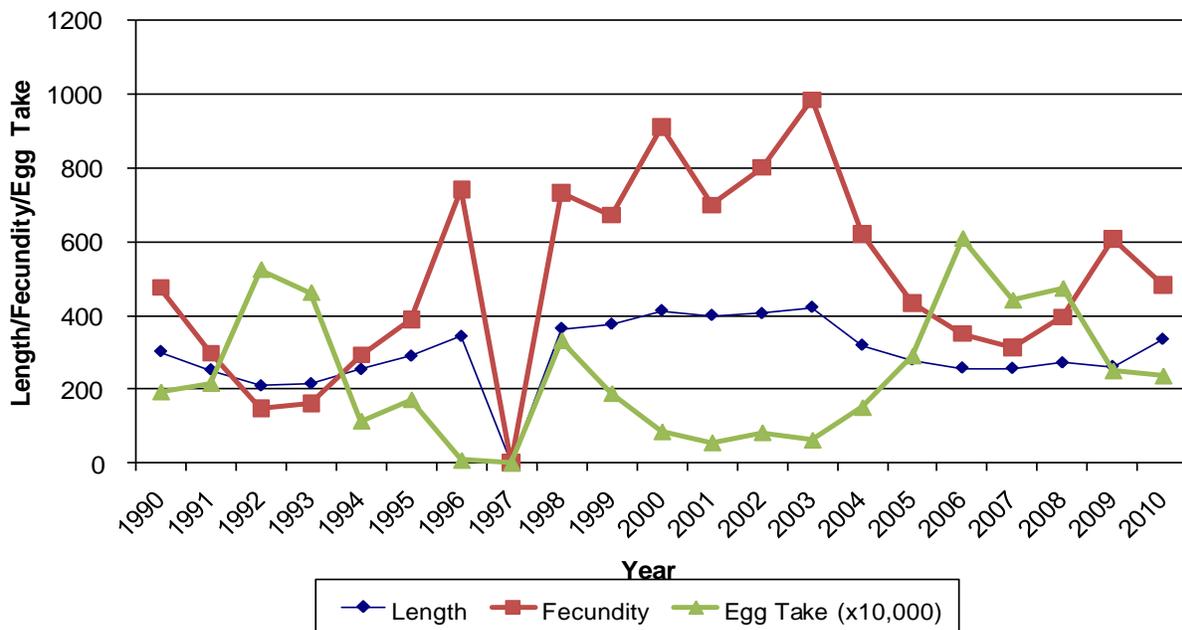
Supplier/Source	Size/Type	Pounds	Price/lb.	Feed Charges
<b>Rangen</b>				
Dry Crumble	Starter #0	250	0.74	\$185.00
Dry Crumble	Starter #1	1,500	0.843	\$1265.00
Dry Crumble	Starter #1	750	0	DONATED
Dry Crumble	Starter #2	4,000	0.858	\$3,432.75
Dry Crumble	Starter #2	20	0	DONATED
Dry Crumble	Grower #3	20,250	0.588	\$11,909.25
Dry Crumble	Grower #3	50	0	DONATED
Soft Moist	Starter #0	19	1.66	\$31.54
Soft-Moist	1/32"	264	1.46	\$385.44
Soft-Moist	3/64"	220	1.37	\$301.84
Soft-Moist	1/16"	396	1.32	\$523.16
Soft-Moist	3/32"	1,540	1.34	\$2,069.76
Soft Moist	1/8"	5,852	1.37	\$8,044.08
450 Floating	1/16" sack	7,350	0.695	\$5,111.80
450 Floating	3/32" sack	10,500	0.573	\$6,013.25
450 Floating	1/8" sack	11,738	0.484	\$5,682.26
450 Floating	5/32" sack	6,800	0.481	\$3,273.45
450 Floating	3/32" bulk	44,260	0.559	\$24,741.70
450 Floating	1/8" bulk	119,400	0.465	\$55,530.48
450 Floating	5/32" bulk	84,700	0.502	\$42,519.40
Dry Crumble med. TM 4K	Starter #1	50	0.840	\$41.98
Dry Crumble med. TM 4K	Starter #2	100	0.840	\$83.96
Dry Crumble med. TM 4K	Grower #3	1,150	0.982	\$1,129.20
Dry Crumble med. TM 4K	3/32 pellet	1,650	0.740	\$1,220.84
Dry Crumble med. TM 8K	3/32 pellet	700	1.01	\$707.00
<b>Bio-Oregon</b>				
Bio-Vita	Starter #0	280	0	DONATED
Bio-Diet	Grower 1.5 mm	15	0	DONATED
Bio-Clark	4.0 mm	1,000	0	DONATED
EWOS	1.2mm	20	0	DONATED
EWOS	2.0mm	600	0	DONATED
<b>Total:</b>		325,424		\$174,203.10
<b>Freight:</b>				\$7,374.18
<b>Grand Total:</b>		325,424		\$181,577.28

Appendix 9. Kokanee egg take at Deadwood Reservoir by Nampa Fish Hatchery in 2010. (Numbers determined by Jensorter Egg Counter.)

<b>Cabinet Gorge</b>					
<b>Spawn Date</b>	<b>Lot Number</b>	<b>Females Spawned</b>	<b>Green Eggs</b>	<b>Eyed Eggs</b>	<b>% Eye-up</b>
8/30/2010	1	878	420,906	371,091	88.1%
9/1/2010	2	1241	625,824	554,484	88.6%
9/3/2010	3	1210	612,615	519,595	84.8%
9/7/2010	4	823	318,078	253,134	79.5%
9/10/2010	5	717	378,709	313,425	82.7%
<b>Totals:</b>		<b>4869</b>	<b>2,356,132</b>	<b>2,011,729</b>	<b>85.38%</b>

Appendix 10. Kokanee spawning length, fecundity and egg take Nampa Fish Hatchery, (1990-2010).

### Deadwood Kokanee Spawning Summary (1990-2010)



## **SANDPOINT HATCHERY**

**John Rankin, Fish Hatchery Manager II**

**Jamie Mitchell, Fish Culturist**

### **INTRODUCTION**

Sandpoint Fish Hatchery (SPFH) is located two miles west of the town of Sandpoint, on the south side of the Pend Oreille River in Bonner County, Idaho. The Idaho Department of Fish and Game (IDFG) constructed SPFH in 1908, with additional funding from the Bonner County Sportsman Club. The hatchery is currently owned and operated by IDFG and is funded with revenue generated from hunting and fishing license sales.

The Sandpoint Fish Hatchery is in operation from mid-March through October and is staffed with a Fish Culturist. The Fish Culturist spends the remainder of their time working at Cabinet Gorge Fish Hatchery (CGFH) assisting with the late Kokanee salmon *Oncorhynchus nerka* (KE/KL) spawning operation and egg incubation. The Manager II position at CGFH oversees operations at SPFH and supplies additional labor when needed. During normal operations, there is a great deal of facilities maintenance at Sandpoint Hatchery that needs to be completed on a regular basis.

Sandpoint Fish Hatchery is primarily used as a redistribution facility for catchable triploid Kamloop Rainbow Trout *Oncorhynchus mykiss* (TT). The catchables are delivered to SPFH via IDFG semi-tanker trucks from various production hatcheries in southern Idaho where they are raised. There are roughly 22 lowland lakes that receive catchables throughout the spring, summer, and fall. Along with catchable redistribution, SPFH also raises up to 50,000 two inch triploid Hayspur Rainbow Trout *Oncorhynchus mykiss* (T9) fingerlings for Nampa Fish Hatchery (NFH). Additionally, on even years, 50,000 Westslope Cutthroat trout *Oncorhynchus clarkii* (C2) fry and 30,000 TT fry are raised for planting 29 mountain lakes in the Idaho Panhandle.

### **WATER SUPPLY**

The hatchery receives water through a pipeline from Murphy Spring which is collected a quarter mile southwest of the hatchery. The spring is enclosed and supplies the facility with 400-500 gallons per minute (gpm) of pristine groundwater. Throughout the year, the spring water temperature may fluctuate between 43-48 degrees Fahrenheit.

### **REARING FACILITIES**

The hatchery rearing facilities include 4 half-stack Heath tray incubators (7 trays/stack), and 18 concrete vats (15x2.5x3ft) located inside the main hatchery building. There are also two outdoor concrete raceways (10x60x4ft) used for holding catchables for redistribution.

## **FISH STOCKING**

Catchable size triploid rainbow trout (~9.0-10.0 inches) were stocked in the Kootenai, Pend Oreille, and Spokane river drainages to support a put and take fishery. All of the lakes and reservoirs stocked are located within the northern portion of the Panhandle Region. All fish supplied for redistribution in 2010 were Troutlodge triploids (TT's) from NFH. A total of 116,135 fish weighing 39,679 lbs (2.97 f/lb) were stocked between the third week of March and the second week of October. Streamside cost to redistribute fish was \$0.32 per fish (Appendix 1). This amount was calculated by breaking down the total days of operation of SPFH. Out of 128 days of operation, each day was then considered a catchable day or a fry day. It was determined that there were 75 catchable days and 53 fry days.

The Mountain Lakes program remains to be one of the most valued fisheries to the sportsmen of Idaho. In 2010, over 65,000 fry were stocked into 25 lakes (Appendix 2). Lakes above 1000 meters in elevation are considered Mountain Lakes. These lakes are stocked with fry predominantly by backpack on alternating years. Several non-agency volunteers and Region 1 staff helped to make this a successful stocking season. All but one of the plants was completed by the end of September.

## **PRODUCTION**

On June 20, 99,000 eyed westslope cutthroat (C2) eggs from CGFH were delivered to SPFH (Appendix 3). This is the first year that SDFH has received eggs produced at CGFH from the new Kings Lake C2 broodstock. The eggs were incubated and hatched in one Heath stack for 28 days and ponded into two fiberglass troughs from which they were stocked. The C2 were on station for a total of 99 days.

On June 24, 40,000 eyed sterile rainbow trout eggs (TT) were received from Troutlodge (Appendix 3). The rainbow eggs were incubated in one Heath stack for 27 days and ponded into a concrete vat from which they were stocked. The rainbow were on station for a total of 95 days.

## **HATCHERY IMPROVEMENTS**

No major improvements were completed this year at SPFH. However, major construction has been completed on the Water Life Discovery Center (WLDC), which will increase public educational opportunities in the future. The Center now consists of a pond with viewing windows, handicap accessible interpretive trail system, public boat dock on the Pend Oreille River, and an educational building. Most of the landscaping has been completed including the pond inflow and outflow streams.

## **HATCHERY NEEDS**

- Repair hatchery building interior ceiling panels.
- New windows for the hatchery building.
- Catwalk over headbox and tailbox of outside raceways.

- Upgrading interior electric service of work shop in main hatchery building.
- Delivery structure for loading water on to fish trucks.
- Replace water supply line under hatchery building.
- Update information Kiosk
- Rip out old dam structure on spring #2 (landowner request)

### **PUBLIC RELATIONS**

The hatchery receives a fair amount of visitors because of its close proximity to Sandpoint and US Highway 95. SPFH is a one-person fish distribution station. There is not a great deal of public interaction due to lack of time actually spent at the hatchery. When available, the hatchery personnel conduct educational tours, provide information to the public, and attend community events on the Department's behalf. Hatchery staff frequently interacts with the public during fish plants and uses those opportunities for education. SPFH staff also participates in free fishing day (FFD) activities. Four waters were specifically stocked for Region 1 FFD clinics; Priest Lake Golf Course Pond, Rathdrum Creek, Round Lake, and the Clark Fork Lodge Pond.

## **ACKNOWLEDGMENTS**

The SPFH staff would like to thank the staff at CGFH: John Rankin (Fish Hatchery Manager 2) and Todd Braunschweig (Maintenance Technician) for their assistance when additional manpower was needed. Thanks to Gary Ady and Dick Bittick for transporting catchable rainbows from NFH throughout the stocking season. Also, we would like to thank Mark Taylor from Region 1 for all the work and dedication he has put into the WLDC. Additionally we would like to thank all the regional staff who helped out with mountain lakes: Jim Fredericks, Jim Derig, John Wakkinen, Wayne Wakkinen, Garrett and Hunter, Mary Vanbroeke, Derek Antonelli, Colleen Trese and her WMA staff, Brian Johnson, and Greg Johnson. We would also like to thank the Idaho Fish and Wildlife Foundation for allowing us to auction two trips this year. And finally we are much obliged to our volunteers: John and Doreen Beck, Tim and Jenny Dougherty, Stefani and Evan Mitchell, Warren Ponder, and Leyla Christopher, who definitely got the “whole experience”.

Appendix 1. TT Catchable Redistribution Cost:

Employee Costs		\$11,400
Nampa Transportation cost		\$15,021
Operating		\$10,740
Total		<b>\$37,161</b>
(75 Days of catchable stocking)		
Cost	Number of Catchables	Streamside Cost Per Fish
\$37,161	116,135	<b>\$.32</b>

Appendix 2. C2/TT Fry Stocking Cost:

Employee Costs	\$8,056
Operating	\$7,590
Total	<b>\$15,646</b>

Cost	Number of Fry	Streamside Cost Per Fish	Average Cost per Lake
\$15,646	65,730	<b>\$.24</b>	<b>\$626</b>

Appendix 3. C2/TT Production Summary.

C2

# Eyed Eggs Received	99,000
# Fry Released	63,046
Overall % Survival	63.7%
Conversion	.21
End Weight	26.3 lbs
End F/lb	1,553

TT

# Eyed Eggs Received	40,000
# Fry Released	37,688
Overall % Survival	94.2%
Conversion	.13
End Weight	14.0 lbs
End F/lb	1,912

Appendix 4. Feed costs:

	Bio Oregon* #0
Amount Fed	7.4 lbs
Total Cost	\$0

\*Surplus feed from CGFH KE/KL salmon and C2 trout production

## **SAWTOOTH RESIDENT REPORT**

### **Resident Program**

**Danielle Dorsch, Fish Culturist**  
**Laura Rose, Biological Aide**  
**Lori Burchard, Biological Aide**

### **INTRODUCTION**

The Sawtooth Fish Hatchery began operations in 1985 and is owned and managed by the Idaho Department of Fish and Game. Funding for the hatchery however, comes from the U.S. Department of the Interior's U.S. Fish and Wildlife Service and is authorized under the Lower Snake River Compensation Plan. The primary goal of Sawtooth Fish Hatchery is to trap, spawn, rear, and release spring Chinook salmon, *Oncorhynchus tshawytscha*. Other fish species also trapped at this facility are sockeye salmon, *Oncorhynchus nerka*, and steelhead, *Oncorhynchus mykiss*. In 1990, a program was implemented to stock rainbow trout, *Oncorhynchus mykiss*, into the surrounding area waters for the purpose of improving angling opportunities. In 2010, Sawtooth Fish hatchery no longer participated in most aspects of the program to stock the high mountain lakes with Westslope cutthroat trout fry *Oncorhynchus clarkii lewisi*. That program is now staffed by the Mackay Hatchery. However, the Sawtooth Fish Hatchery continues to stock Yellow Belly Lake with Westslope Cutthroat fry from the Cabinet Gorge Fish Hatchery.

### **FISH STOCKING**

Sawtooth Fish Hatchery met its stocking request in 2010 for the rainbow trout stocking program. Between May 25 and September 22, a total of 48,689 hatchery rainbows were stocked in 60 stocking trips (Appendix 1).

Nampa Fish Hatchery supplied Sawtooth Fish Hatchery with Troutlodge triploid rainbows for stocking. Fish transport mileage was 941 miles at a cost of \$3,004. A total of 50,189 fish were delivered from May 25 to July 12. Based on 10 sample counts the fish averaged 3.06 fish per pound and 9.06 inches in length (230 mm). Sawtooth Fish hatchery employees drove approximately 2,841 miles to stock fish in the Salmon River, local lakes, ponds and streams. Nampa Fish Hatchery stocked Stanley, Pettit, Perkins, and Alturas lakes in 2010. This summer, SFH stocked 1,500 fewer fish into the Salmon River at the end of the season due to the record returns of sockeye salmon. This move was to prevent anglers from harvesting or interfering with the migration of the sockeye in the river sections nearest Redfish Lake Creek. The last 500 fish stocking of Valley Creek also was withheld for the same reason as the trout would out-migrate into the Salmon River. Sawtooth Kid's Pond saw lots of fishing this year and was stocked with an additional 1,190 rainbows throughout the summer. Blue Mountain Pond in Challis also received an additional 300 fish and was much appreciated by local fishermen and children.

This year 1,500 of the Troutlodge rainbows will winter over in order to do early summer stocking on Sawtooth Kid's Pond and Kelly Creek Pond. The fish are being fed a maintenance diet of Rangen's 3/16 extruded floating pellets as long as water temperatures permit. An

additional 3,059 excess Troutlodge rainbow were stocked into Stanley Lake at the end of the stocking season.

NOAA permit #1188 that expired December 31, 2004, outlines resident rainbow trout releases in anadromous waters in the Salmon River drainage. The permit allows that hatchery-reared rainbow trout be released in rivers, streams, and lakes with ESA-listed fish. Stocked fish should average in size no greater than 250 mm with no individual larger than 300 mm in length. The 250 mm size restriction would include fish planted in the Salmon River, Valley Creek, and the Yankee Fork Dredge Ponds. The permit, which stipulates the upper Salmon River cannot be stocked before June 15 and stocked fish must be adipose fin-clipped, continues to be followed. Only fish with the adipose fin-clipped may be kept, thereby protecting from harvest wild/natural fish. Rainbow trout received and stocked were adipose-fin clipped by Nampa Fish Hatchery personnel and then delivered to Sawtooth Fish Hatchery over 21 days later to allow for withdrawal of MS-222 to comply with label directions.

The rainbows were fed a maintenance diet of Rangen's extruded floating pellets 3/16 inch size. A total of 350 pounds of 3/16 pellets were purchased at a cost of \$157.50.

Weekly notices informing the public of the latest stocking locations are distributed to the local businesses and were posted at Sawtooth Fish Hatchery. Brochures titled Fishing the Sawtooth Valley were distributed to local businesses where they are readily available to summertime visitors. A repeating message, updated weekly, containing stocking information and current news about Sawtooth Fish Hatchery can be heard over the hatchery's radio transmitter. Current stocking information can also be found on Idaho Department of Fish and Game's website.

### **HIGH MOUNTAIN LAKE STOCKING**

Sawtooth Fish Hatchery in conjunction with Cabinet Gorge Fish Hatchery planted 38,160 cutthroat fingerlings at 424 fish to the pound into Yellowbelly Lake. The fish were reared at Cabinet Gorge FH then transferred to Sawtooth Fish Hatchery's 300 gallon tank distribution truck for delivery to the lake (See Cabinet Gorge FH Resident Report).

### **FREE FISHING DAY**

Free Fishing Day was held throughout the state of Idaho on Saturday, June 12, 2010. Sawtooth Fish Hatchery participated by providing assistance to anglers from 10:00 to 14:00 at our Kids Fishing Pond. Sawtooth Fish Hatchery's Tour Guide, Lori Burchard, organized this Free Fishing Day event and it was successfully carried out with the assistance of Biological Aides Annemarie Golz, Jeff McDonald, Peter Starr, Brian Ashton, Tori Goodson, and Conservation Officer Merritt Horsmon. Over 100 people attended Free Fishing Day, 62 of which were children under the age of 16 years old. Participating children traveled from all over Idaho, Utah, Washington, and even as far as Texas.

Refreshments and snacks were provided consisting of juice, bottled water, chips, and cookies. All children were provided with a bag that included fishing regulations, a coloring book, and various other informative pamphlets and goodies. Also provided were fishing poles, reels, tackle, and bait. Every child registered received a number that was placed inside of a hat in which prizes were raffled to each number to ensure that all children received a prize.

Prizes were donated by the following local businesses: McCoy's Tackle & Gift Shop, Redfish Lake General Store, Riverwear, The River Company, Jerry's Country Store, Stanley Baking Company, Papa Brunee's, River1, High Country Inn, Sawtooth Adventure Company, Mountain Village Mercantile, Silver Creek Outfitters, and Smiley Creek Lodge.

### **PLANS FOR 2011**

Sawtooth Fish Hatchery will continue to stock the flowing water sites and small area ponds with adipose clipped rainbows from the Nampa Fish Hatchery. Nampa Fish hatchery will continue to stock the larger Sawtooth Basin lakes. Sawtooth Fish Hatchery will continue to plant Westslope cutthroat fry into Yellow Belly Lake.

## **ACKNOWLEDGEMENTS**

The Sawtooth Fish Hatchery would like to thank Rick Alsager and the Nampa Hatchery crew for their cooperation in making 2010 successful. Special thanks go to the staff at Nampa Fish Hatchery for transporting fish from Nampa and stocking the big lakes in the Stanley Basin. Bio Aide Peter Starr provided excellent guidance and supervision of the stocking operations. Bio Aide Lori Burchard did a great job of delivering the stocking notices in a timely manner and Bio Aide Laura Rose carried out the actual stocking this year. Tom Frew provided valuable coordination for the Resident Fish Programs. We would also like to thank the staff at the Cabinet Gorge Fish Hatchery for their help this season.

## **APPENDICES**

Appendix 1. Planting sites and numbers of catchable rainbow trout stocked in the Salmon Region by Sawtooth Fish Hatchery from June through September 2010.

<b>Site</b>	<b>Number</b>
Sawtooth Kids Pond	2,190
Stanley Lake	3,059
Little Bayhorse Lake	2,000
Grouse Creek Lake	100
Kelly Creek Pond	1,140
Salmon River	29,700
Yankee Fork Dredge Ponds	4,000
Valley Creek	4,500
Blue Mountain Meadow Pond	1,200
Squaw Creek Pond	800
<b>Totals</b>	<b>48,689</b>

Appendix 2. Planting site and number of Westslope cutthroat fry stocked in one high mountain lake by Sawtooth Fish Hatchery on September 9, 2010.

<b>Site</b>	<b>Number</b>
Yellowbelly Lake	38,160

## RESIDENT FISH HEALTH REPORT

### RESIDENT FISH HATCHERIES

Douglas R. Burton, Fishery Pathologist

#### INTRODUCTION

As the Resident Hatchery Pathologist, my base is the Eagle Fish Health Laboratory (EFHL). 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 and to assist hatchery personnel in maintaining good health in cultured resident fish. I also provide these services to IDFG fishery managers and biologists and occasionally to private individuals or companies when the information or relationship is of benefit to the State of Idaho. My Anadromous Hatchery counterpart, A. Douglas Munson, and I work closely together, often assisting each other in our respective programs and coordinating efforts when those programs overlap. Both of us hold American Fisheries Society Fish Health Section certificates as Fish Health Inspectors. We are supported by three Fish Health Technologists in the laboratory: Carla Hogge, Sharon Landin, and Roberta Scott, and by our supervisor, Phillip Mamer, DVM. With the assistance of these EFHL personnel, I examined 128 cases for IDFG resident hatchery programs during 2010 (55 diagnostic cases, 45 routine hatchery inspections, 26 inspections of feral brood fish, and 2 research inspections). I was also responsible for three inspections done on rainbow trout samples submitted by Rangen's Aquaculture (fish purchased by Idaho Power Co. for mitigation release), three wild fish inspections, and two diagnostic cases for local koi producers.

Idaho Dept. of Fish and Game is a member of the Pacific Northwest Fish Health Protection Committee (PNFHPC). This group classifies fish pathogens in three categories: Class A (Exotic Disease Agents), Class B (Regulated Endemic Agents), and Class C (Endemic Pathogens of Significant Concern). The EFHL identified no Class A pathogens in Idaho in 2010. Confirmed detections of Class B pathogens in the resident hatchery system were limited to Hagerman Hatchery. These included infectious hematopoietic necrosis virus (IHNV) and two parasitic agents *Tetracapsuloides bryosalmonae* (PKX) and *Nucleospora salmonis* (NS). The first-ever detection of IHNV at Hayspur Hatchery occurred in July 2009. Fortunately, the affected population was well isolated from the broodstock populations, and was destroyed. Multiple samples from all remaining populations on station have extended well into 2010. There have been no detections of virus at Hayspur since the initial occurrence.

The most significant fish disease in the statewide resident hatchery system continued to be bacterial coldwater disease (CWD), caused by *Flavobacterium psychrophilum*. Clinical CWD was diagnosed 36 times at six resident hatcheries in 2010. Thirty-five of those clinical cases were diagnosed in rainbow trout; the other was in rainbow X cutthroat trout hybrids. Five carrier states were identified: four in rainbow trout and one in adult cutthroat trout from Henrys Lake. Oxytetracycline (OTC) and Aquaflor are the only antibiotics registered to treat CWD in food fish. Results from treating CWD with these drugs in IDFG resident hatcheries were usually successful, with notable exceptions explained in the hatchery sections below. An injected autogenous vaccine for *F. psychrophilum* has been used in the adult rainbow trout at Hayspur Hatchery for several years. Since the vaccine has been applied, there have been no clinical episodes of CWD at Hayspur, and there has been a reduction in post-spawning mortality. A metaphylactic treatment with Aquaflor was successfully applied to first-feeding Yellowstone cutthroat trout fry at Mackay Hatchery, where an extensive history of disease requires an early

antibiotic intervention for control. Current literature reports experimental progress in control of CWD using oral vaccines, probiotics, or resistant trout strains, but none of these are yet available for IDFG programs.

*Renibacterium salmoninarum* (RS), the causative agent of bacterial kidney disease (BKD), is endemic to most of Idaho and is most problematic in anadromous salmon. There were no detections of clinical BKD from any resident fish species in 2010, but carrier states were identified in adult rainbow and cutthroat trout populations.

*Myxobolus cerebralis* (MC), the causative agent of salmonid whirling disease (WHD), is present at varying levels in many river drainages in southern Idaho. No resident hatchery production fish tested positive for the parasite in 2010, and no new positive wild populations or locations were confirmed.

The EFHL issues IDFG fish import/transport/release permits to Department personnel, co-managing agencies, and private individuals. I signed 121 of the 166 permits issued in 2010. This duty involved collecting fish health inspection and certification information from various sources to meet state regulations, communicating with Regional Managers to determine if the fish were appropriate for their waters, and confirming that other required permits were in place. Idaho's laws and regulations give IDFG and Idaho State Department of Agriculture (ISDA) parallel, and sometimes overlapping, regulatory authority for fish importations. My counterpart at ISDA is the Assistant State Veterinarian, Dr. Debra Lawrence. She has been outstanding to work with in this cooperative effort. I also coordinated the paperwork needed to obtain a Federal Title 50 certificate to import sterile brook trout eggs to Ashton Hatchery from British Columbia, Canada.

The following are descriptions of the work done for IDFG resident programs in 2010. Summaries of the test results for each resident hatchery are included in Appendix A through Appendix I, wild resident fish inspection summaries are in Appendix J, and Appendix K contains a list of acronyms used in this report.

## **AMERICAN FALLS HATCHERY**

Seven of seven diagnostic examinations at American Falls determined that CWD was the cause of mortality in rainbow trout and rainbow-cutthroat trout hybrids (Appendix A). One of those cases had a concomitant *Aeromonas hydrophila* septicemia (MAS). The fish were treated with OTC-medicated feed during the earliest episode (February). Response to treatment was not acceptable, even though antibiotic sensitivity tests at EFHL indicated that the bacterial isolate was susceptible to the antibiotic. Medicated feed samples sent to the ISDA Feed and Fertilizer Laboratory in Boise were found to contain the proper level of active OTC and the hatchery feed rate calculations were reviewed and found correct. Thus, the fish were presented with the proper dose. A follow-up examination proved that *F. psychrophilum* was still the only pathogen that could be isolated. The second isolate was slightly less sensitive to OTC but still within an acceptable range. This was an example of those times when the real world does not follow the expectations of the laboratory. I did not choose to recommend a second treatment of OTC, so another treatment using Aquaflor was administered with much better results. The last four episodes of CWD were treated using Aquaflor with positive results.

Standard cell culture testing of samples from two of the diagnostic examinations detected no evidence of replicating viral agents and no signs indicating viral infection were

observed on station in 2010. The last record of any virus at American Falls Hatchery in the EFHL database was infectious pancreatic necrosis virus (IPNV) in 1980.

### **ASHTON HATCHERY**

I inspected the BY09 rainbow trout in March (Appendix B). No *Myxobolus* (MYXOB) spores or replicating viruses (cell culture) were detected. No evidence of epizootic epitheliotropic disease virus (EEDV) was detected in this population by polymerase chain reaction tests (PCR). All PCR results given in this report were done at EFHL unless otherwise noted. For further details on EEDV, see the section below titled EMERGING ISSUE – EPIZOOTIC EPITHELIOTROPIC DISEASE VIRUS.

The BY10 rainbow trout fry experienced elevated mortality in April and were diagnosed with MAS. A standard treatment with OTC-medicated feed combined with a change of feeding practice (programmed feeding instead of sight) successfully controlled the mortality.

The BY09 British Columbia (BC) triploid brook trout tested negative for EEDV in March, but the fish were very small and the tissue samples may not have been sufficient. The BC brook trout and the maturing BY08 Story Hatchery (estradiol-treated) brook trout were sampled and tested negative for EEDV in May. The Story population was also negative for viruses by standard cell culture methods. A final preliberation inspection was done on the BC population in August. No significant bacteria, MYXOB spores, or replicating viruses (cell culture) were detected. The hatchery crew collected feral rainbow and brook trout from the settling pond and sent kidney samples to EFHL for PCR. All test results were negative for EEDV.

I assisted the hatchery personnel and numerous researchers in sorting the estradiol-treated brook trout prior to spawning. It was obvious that the treatment had successfully feminized most of the males that received the hormone. The population was spawned in November, with ovarian fluid and tissue samples delivered to EFHL. All samples were negative for replicating viruses (cell culture) while PCR for EEDV is pending.

Infestations of *Gyrodactylus salmonis* (GYRO), a monogenetic trematode, are an annual issue at Ashton. There has never been an elevated mortality attributed to this parasite, but general fish quality and growth efficiency may have been compromised. There seems to be a persistent reservoir of parasites in the springs above the hatchery. The Hatchery Manager and I decided to initiate a treatment regimen of formalin during the winter months when the problem seems most prevalent. The treatment controlled the signs of GYRO, including flashing, jumping, and skating on the surface. However, because this was only one of a number of changes the hatchery manager initiated to improve fish quality, it is difficult to determine which practice has had the most benefit.

Part of the hatchery's water source is an open spring on private property. This situation leaves the hatchery at risk to the introduction of pathogenic organisms via birds, animals, or human vectors.

### **CABINET GORGE HATCHERY**

This was the fourth consecutive year that Cabinet Gorge Hatchery received green westslope cutthroat trout eggs collected from King's Lake in Washington State. The goal is to

establish a captive brood population from these eggs, so sampling parent fish for both pathogens and genetic introgression is required. This was probably the last year to bring eggs from the lake, as it was also the first year of successful spawning at the hatchery. I traveled to the hatchery on May 11 to sample captive spawning adults, and then went on to King's Lake the next day. Samples I collected at the hatchery included ovarian fluids from 60 BY07 females, and tissues from 29 BY08 males. Laboratory tests detected no replicating viral agents. Direct fluorescent antibody tests (DFAT) for *Renibacterium salmoninarum* (RS) were negative, as were enzyme-linked immunosorbent assay (ELISA) tests for RS antigen (Appendix C). I took tissue samples for pathogen and genetic tests from 60 spawning fish at King's Lake (30 females and 30 males). Individual egg lots from these spawned pairs were incubated separately at the hatchery until all tests were complete. No viruses were detected, while ELISA tests detected low levels of RS antigen from two females. Analysis at the Eagle Fish Genetics Laboratory detected rainbow trout alleles in samples from eight females and one male. No eggs were culled due to pathogen detections, but the eggs from nine pairs were culled due to genetic introgression.

I inspected spawning kokanee salmon adults at Sullivan Springs (Lake Pend Oreille) in December. No replicating viruses or RS antigen (ELISA) were detected. The EFHL database records indicate no viruses have ever been detected from adult kokanee at Sullivan Springs, but there is one record of IPN virus in Sullivan Springs juvenile kokanee reared at Clark Fork Hatchery in 1979 (before Cabinet Gorge Hatchery was built). A light infection of encysted cestodes was evident in the pyloric caeca of almost all of the fish. These organisms are observed every year and do not appear to have any adverse effect upon their hosts.

## GRACE HATCHERY

A February sampling of the BY09 Story lake trout did not detect EEDV by PCR (Appendix D). Samples taken at the same time from the rainbow trout in large raceway A were positive by PCR. This was the only actual fish tissue sample to date in which EFHL has been able to corroborate test findings from UC Davis (See EMERGING ISSUE – EPIZOOTIC EPITHELIO-TROPIC DISEASE VIRUS, below). A preliberation sample taken from the lake trout in August detected no replicating virus by traditional cell culture methods, and 60 blood samples were determined to be 100% triploid. Grace Hatchery has not had a detection of replicating virus recorded in the EFHL database since a positive IPNV test by ELISA in 1983.

Grace Hatchery initiated a new Bonneville cutthroat trout spawning and broodstock development program in 2010. Regional personnel captured fish from the wild and held them to maturity in a private pond northeast of the hatchery. Spawning began in May. Thirty-six spawned and three non-spawned females were sacrificed for pathogen testing. Individual egg lots were kept in isolation at the hatchery until tests were complete. No replicating viruses were detected by cell culture methods and no MYXOB spores were detected. Thirty-two females tested positive for RS antibodies by ELISA, with optical density (OD) values from three spawned and two non-spawned individuals in a moderately high range (between 0.25 and 0.50). Eggs from the ELISA high females were culled from the program. Subsequent PCR tests on the two individuals with highest ELISA values were negative for RS. The laboratory often detects positive ELISA values in wild/feral fish that cannot be confirmed by other methods. Such results can make management decisions more difficult. The vast majority of ELISA data is from Chinook salmon, a highly susceptible species for which control of clinical BKD is an essential management tool. This mass of data gives us a very good feel for the correlation between ELISA values and increasing risk of bacterial transmission. However, extrapolating this information to another species for which we have much less data, like cutthroat trout, is

uncertain at best. It is always best to error on the side of caution when bringing a new population onto a production hatchery like Grace, so the loss of eggs from three individuals was justified.

The BY10 rainbow trout were diagnosed with CWD in the single diagnostic case at Grace Hatchery. A successful Aquaflor-medicated feed treatment was applied, although the response was not as rapid as expected.

## HAGERMAN STATE HATCHERY

A total of 32 diagnostic and two inspection cases were examined from Hagerman State Fish Hatchery in 2010 (Appendix E). Hagerman State easily surpasses all other hatcheries in the IDFG system in the variety of pathogens that kill fish on station, often in concomitant combinations of two or more. Viral IHN and bacterial CWD are the two most significant diseases at Hagerman, followed by MAS, bacterial furunculosis (FUR), and Columnaris disease (COL). Several parasites can also cause losses, including *Ichthyophthirius multifiliis* (ICH), *Tetracapsuloides bryosalmonae* (PKX), and *Nucleospora salmonis* (NS). Heavy loads of *Gyrodactylus* sp. (GYRO) may not directly kill fish, but can stress fish already challenged by other conditions. External parasites like ICH and GYRO can be effectively treated with a number of chemicals, but there are no approved treatments for either NS or PKX.

The EFHL confirmed IHN five times at Hagerman Hatchery between February and June 2010. One raceway of near catchable-size rainbow trout experienced 45% mortality in June, but the hatchery-wide impact of virus in 2010 was lower than usual. The last detection of IPNV at Hagerman was in 1994.

*Flavobacterium psychrophilum* was cultured from Hagerman fish in 23 cases and presumptively diagnosed in one other. Antibiotic therapies continued to have inconsistent success, although in vitro tests at EFHL do not indicate significant antibiotic resistance has developed. There are always many complicating factors at Hagerman that may influence a response to therapy, including concomitant infections with other bacteria or IHN. Both OTC and Aquaflor were used at Hagerman on a case-by-case basis.

Furunculosis, caused by *Aeromonas salmonicida*, was diagnosed twice. Both cases involved concomitant infections of *F. psychrophilum* and IHN in catchable-size fish. A treatment with Romet-medicated feed was applied with reasonable success to the first case (February) because there was time to meet the 42-day withdrawal period before the fish were to be stocked. In the second case, mortalities remained chronic (below 0.1% per day) and it was decided that the best solution would be to stock the fish in waters where the pathogens were already known to be present. The fish in the second case had been vaccinated for *A. salmonicida*, while the fish in the first case had not.

Hatchery personnel detected ICH during routine checks on fish in the Riley Creek raceways in December 2009. One-hour flush treatments of potassium permanganate, applied 2-3 times per week for 6-8 weeks extended into 2010. The treatments were effective, with no elevated mortalities attributed to the parasite. Furthermore, the potassium permanganate may have been beneficial in controlling external COL infections that are chronic at Hagerman. Periodic checks did not detect ICH during December of 2010, but the parasite was found on fish in Riley Creek water on January 4, 2011. There is no good explanation for the apparent seasonal nature of mid-winter ICH infestations at Hagerman Hatchery. The outbreaks seem to

coincide with the large annual influx of migratory waterfowl that stir up the water of Riley Creek. However, it also coincides with reduced water temperature, which should slow down the parasite's live cycle. There are many fish in the creek to serve as reservoir hosts, so it would seem logical that the problem would be in the summer when the water is warmer. My suspicion is that the seasonality is more related to production timing and a low challenge dose in the creek water.

What I believed to be an adverse response to Aquaflor in the summer of 2009 had convinced me that the drug causes a photosensitivity leading to sunburned fish. This could be worse when shallow raceways with clear water receive a lot of direct overhead sunlight, like Hagerman's West raceways. For this reason, I believe that the use of Aquaflor during the summer months is risky. However, the Hatchery Manager wanted to try Aquaflor again to make sure the 2009 episode was not a fluke. So I reluctantly agreed when I diagnosed CWD in a small group of Hayspur rainbow fingerling that were excess to the hatchery's production (Appendix E; Accession 10-200). Figure 1 presents a graph comparing percent daily mortality of the 2009 and 2010 episodes. In each case, mortality from the bacterial infection was declining by the end of the 10-day treatment, when losses suddenly exploded. In 2010, the fish appeared normal on day 10. When hatchery personnel came to work the next morning, dead fish had plugged the screens and the raceways were overflowing. Affected fish showed patchy areas of pale skin and lost mucous on the sides and dorsal. A follow-up examination (Appendix E; Accession 10-224) could detect no systemic bacteria remaining in the fish. I sent tissue samples to Dr. Kevin Snekvik, a board-certified pathologist at the Washington Animal Disease Diagnostic Laboratory, Washington State University (WADDL). His diagnosis was necrotizing dermatitis consistent with sunburn. I attempted to replicate the signs at the EFHL using feed left over from the Hagerman treatment and healthy rainbow trout from the EFHL wet lab. I set fiberglass tanks outdoors to try to get as much direct sunlight as possible. The test fish did not develop signs, probably because there was too much shade refuge in the tanks. These experiences, plus a similar but less dramatic episode at American Falls Hatchery in the summer of 2007, have convinced me that I will never again recommend an Aquaflor treatment during the months of May through August.

Other cases of skin disorders have become more prevalent at Hagerman in the last few years. Instances were recorded in 2010 where skin lesions appeared similar to the sunburn reported above, except that no Aquaflor had been used, weather was either cloudy or not in the peak of summer, and the mortality was more chronic. Motile *Aeromonas* bacteria were sometimes, but not always, associated with the lesions. Such superficial infections often responded well to bath treatments with potassium permanganate. Other cases did not seem to have the bacterial involvement and did not respond to treatment. I speculate that there may be some involvement with changing feed components, such as different protein or fat sources. But since a proximal analysis of the feed would only tell me the quantity of protein and fat and not their quality, I do not know how to test my hypothesis.

Steatitis (inflammation of the fat tissues manifested by sterile skin lesions along the dorsal median) has been sporadically observed in small rainbow trout at Hagerman for years. This condition was confirmed in 2010 when I sent samples from juvenile rainbow to WADDL for histological examination (Appendix E; Accession 10-086). In warm-blooded animals, this condition has been linked to a deficiency in fat-soluble Vitamin E and overabundance of unsaturated fat in the diet. If this is also true for fish, the situation may be due to changes in base ingredients for commercial fish feeds or because of feed storage problems. Either is easy to speculate but difficult to test. The best solution may be to change to a different feed batch or manufacturer when signs are observed. Historically, I have thought that steatitis sometimes

responded to OTC feed treatment. In retrospect, the positive change may have been due to changing the feedlot and not to the antibiotic.

The presence of both NS and PKX at Hagerman State is well documented in the Riley Creek water supply during spring and early summer months. No treatments are available for either parasite. Two samples sets were tested in 2010 by PCR. Yellow-phase rainbow from raceway L-23, section-B tested positive for PKX and negative for NS in mid-March, and Hayspur triploid rainbow from raceway L-23, section-A tested positive for NS the first week of April. While neither parasite may cause direct mortality, both may impair kidney functions, thus having a negative effect on a fish's immune system. A reduced immune response then leaves a fish susceptible to any of the many other pathogens present at Hagerman.

### **HAYSPUR HATCHERY**

The most significant issue at Hayspur Hatchery in 2010 was the response to a 2009 detection of clinical IHN from a group of catchable-size rainbow trout in one of the old "large" raceways at the south (downstream) side of the facility. Hatchery personnel destroyed all fish in the large raceways, shipments of Hayspur eggs were restricted to hatcheries in the Magic Valley where IHN is already considered endemic, and an intense sampling protocol was implemented to assure that all fish populations remaining on station are free of virus. Ovarian fluid sampling from every pond of brood fish at a 2% prevalence level (150 individuals per pond) was completed in January 2010 (Appendix F). No evidence of replicating virus was detected from any population. Lethal tissue sampling at a 5% prevalence level (60 individuals per year class) was done in April. Again, no evidence of virus was detected. Kidney samples taken at that time from the 4-year-old fish were positive for RS antigen by ELISA with three of 30 optical density values above 0.25 (maximum value 0.768). This population was treated multiple times with OTC-medicated feed but was never injected with Erythromycin. A second set of lethal samples (60 individuals per year class) were taken in September and October with the same results. Finally, a repeat set of ovarian fluid samples (60 per pond) are being collected over the course of the 2010-11 spawning season. No evidence of virus has been detected to date. Following the September sampling, the hatchery had met the criteria of no virus detected from three sample sets collected at least six months apart. So shipments of eggs to hatcheries with no history of IHN were resumed.

Hayspur Hatchery produces broodstock replacement eggs by crossing individual males from one age class with individual females from another age class to minimize inbreeding. I sample ovarian fluid from every individual female and sacrifice a random 60 females within the group for pathogen testing. Eggs are incubated in separate groups until the test results are complete, so that the eggs of any female that should test positive for any virus or RS can be culled. In 2010, 192 Age 3+ females from pond #3 were crossed with Age 2+ males from pond #2. No evidence of IHN or any other replicating virus was detected from either ovarian fluids or kidney/spleen tissue samples. No evidence of RS was detected in 198 ovarian fluid cell pellets by fluorescent antibody tests (OCP-FAT) or from 60 kidney smears by direct FAT. Additionally, ELISA tests on 60 kidney tissue samples were all negative for RS antigen. All fish in the RS-tested population had been injected with Gallimycin (the injectable form of Erythromycin) prior to the spawning season.

Rainbow trout at Hayspur have a long history of carrying RS, but the only recorded case of clinical BKD on the hatchery was in 2006. Various antibiotic therapies in addition to culling of replacement eggs have been used in attempts to reduce detected levels of the bacterium. The

results reported above strongly indicate that oral treatments of OTC in the feed are not effective in reducing the detection of RS by ELISA, but that injections of Gallimycin are effective. Therefore, I recommend discontinuing use of OTC medicated feeds in the Hayspur brood fish populations unless there is an overt outbreak of susceptible bacterial infection, such as CWD or MAS. This was the third year that 3-year-old fish injected with Gallimycin were 100% negative by ELISA. This drug is not registered for use on food fish and so treated fish have always been destroyed. Discussions with Dr. Phil Mamer have indicated that he might write a Veterinary Extra-label prescription that would allow use of these fish for the fishery in Gaver Lagoon if we identify an adequate withdrawal time. I intend to pursue this avenue in 2011 with the intent of injecting all fish on station with Gallimycin. A benefit beyond treating RS is that nearly all isolates of *F. psychrophilum* tested at EFHL are susceptible to Erythromycin. This could be an effective therapy for this bacterium in the brood fish at Hayspur without the risk of developing resistance to either OTC or Aquaflo.

### **HENRYS LAKE HATCHERY**

Hatchery personnel collected kidney samples from adult cutthroat in late December 2009 to be tested for EEDV (Appendix G). Results were not available for the 2009 report. The results from PCR tests run at University of California Davis were one of 24 positive for viral DNA. Another 36 samples were run at EFHL and were all negative. See the EMERGING ISSUE – EPIZOOTIC EPITHELIOTROPIC DISEASE VIRUS section below for a discussion of the implications from this finding.

Yellowstone cutthroat trout spawning occurred at Henrys Lake Hatchery from February through April 2010. Hatchery personnel collected and pooled ovarian fluids from all spawned females and shipped 220 samples to EFHL. Virology tests were done on 25 random samples (175 individuals in 7-fish pools) and OCP-FAT for RS was done on all 220 samples (1540 individuals). There was no evidence of replicating viruses or RS in any ovarian fluid samples, including four 7-fish pools that were blind-passed to check for viral hemorrhagic septicemia virus (VHSV). An IPNV detection in 1989 is the only record of replicating virus at Henrys Lake in the EFHL database. No eggs were culled due to the presence of pathogens in 2010.

I visited the hatchery on March 1 and took lethal samples from a group of 60 fish (mixed males and females) for kidney DFAT, ELISA, tissue virology, bacteriology (BACTE), and MYXOB tests. Virology tests and PTD for MYXOB spores were negative. No RS was detected by DFAT, but three of twelve 5-fish pooled kidney samples were positive by ELISA at low levels. These results were consistent with the findings in previous years. Bacteriology samples isolated *F. psychrophilum* from six of sixteen individuals. This 25% prevalence was consistent with 2009 and 2008 (25% and 20%, respectively) but much lower than 2007 (44%) or 2006 (88%). It seems that bacterial prevalence in these fish is associated with the over-winter conditions in the lake. Specifically, the better the winter condition, the less stress occurs to the fish and the healthier they are at spawning time. No signs of clinical CWD signs have ever been evident in the adult cutthroat trout at Henrys Lake.

### **MACKAY HATCHERY**

I visited Mackay Hatchery and inspected the Henrys Lake rainbow X cutthroat hybrid fingerlings in August. No replicating viruses were detected and 60 blood samples sent to the

Thorgaard Laboratory were 100% triploid (Appendix H). The EFHL database contains only one historic detection of IPNV at Mackay Hatchery in 1977.

First-feeding Henrys Lake cutthroat and rainbow X cutthroat hybrid fry have historically experienced significant losses due to CWD. Onset of signs was always within the first two weeks of feeding, and by the time the bacterium could be isolated and identified, heavy losses would have already occurred. This was the fourth consecutive year that hatchery personnel applied a metaphylactic treatment of Aquaflor to all lots at about 5 days after first feeding. Hatchery history and the persistent culture of *F. psychrophilum* from brood fish at Henrys Lake have been the justifications for this treatment. Mortality rates remained very low through the entire rearing program, and overall survival of the Henrys Lake cutthroat from eyed egg to fall stocking was 79%. The hybrids had a much lower survival rate due to poor egg quality and mortality prior to hatch, possibly due to pressure treatment to induce triploidy. There may also be a correlation between the pathogen load in Henrys Lake cutthroat eggs and the winter conditions under the ice at the lake (see HENRYS LAKE HATCHERY, above). Without untreated controls, it is impossible to state that CWD losses would or would not have occurred. The last year when a major mortality event occurred at Mackay was 2006, which was the last year of reported poor overwinter/high stress conditions at Henrys Lake. Detected prevalence of *F. psychrophilum* in the 2006 Henrys Lake brood fish was 88%. The first metaphylactic Aquaflor treatment was in 2007.

I was personally pleased that Mackay Hatchery received early-spawning kokanee eggs from fish out of Deadwood Reservoir instead of Anderson Ranch Reservoir. Considering the fish stocking histories of both reservoirs, I consider Deadwood to be a much lower risk for pathogens such as IHNV and NS. This is also better because Mackay's green eggs were sent for the first time from the Deadwood trap site to Cabinet Gorge Hatchery for early incubation. Eyed eggs were then transferred from Cabinet Gorge to Mackay. The rationale was that Cabinet Gorge historically has better incubation survival of kokanee eggs than Mackay, possible due to different water chemistry (lower alkalinity) and lower temperature. No data is available to date, but both hatchery managers report that the trial seems to have been a success. I sampled the spawning adults at Deadwood this year on September 10. No replicating viruses, RS, or MYXOB spores were detected in the samples.

#### **MCCALL HATCHERY RESIDENT PROGRAM**

The McCall Hatchery resident fish program consists of redistributing catchable-size rainbow trout transferred from other hatcheries, and hatching rainbow and cutthroat trout eggs to stock as very small fry into mountain lakes. The hatchery staff reported no fish health issues in their resident fish program. The EFHL staff examined no resident fish from McCall Hatchery during 2010.

#### **MULLAN HATCHERY**

The Mullan Hatchery fish program consists of redistributing catchable-size rainbow trout transferred from other hatcheries. The hatchery staff reported no fish health issues in 2010. I did not sample any fish from Mullan Hatchery during 2010.

## NAMPA HATCHERY

I examined fourteen cases at Nampa Hatchery in 2010 (Appendix J). Ten cases involved clinical CWD and/or MAS in rainbow trout. Motile *Aeromonas* infections, many of which are resistant to OTC, were nearly as common at Nampa as *F. psychrophilum*. Thus, I am growing reluctant to recommend antibiotic treatment until I have confirmed which bacteria are involved. A high proportion of the *Aeromonas* infections also seem to be superficial rather than systemic. The signs are mottled areas on the skin where the normal mucous layer is absent and pigmentation is lost. I sometimes see motile bacteria in a skin scrap on the high-dry setting of a microscope but am often unable to culture bacteria from the kidney or spleen tissues of the same individuals, so I have begun using the diagnosis of "Motile *Aeromonas* Infection" (MAI) to distinguish this disease manifestation from an internal septicemia (MAS). A potassium permanganate bath treatment has had some success treating external infections. This syndrome is very similar to that reported at Hagerman State Hatchery.

In one case, I diagnosed bacterial gill disease (BGD) in juvenile brown trout. I recommended a treatment with potassium permanganate and a change in feeding practice. The treatment regimen was successful. Another case was diagnosed as *Ichthyobodo* (COS), and treated with potassium permanganate as well.

Standard cell culture testing of samples from three of the diagnostic examinations detected no evidence of replicating viral agents and no signs indicating viral infection were observed on station in 2010. The last record of any virus at Nampa Hatchery in the EFHL database was IHNV in 1986.

Three inspection cases screened groups of fish for ICH before those fish were transferred to other hatcheries for redistribution. The established hatchery protocol is for raceways containing fish destined for transfer to be treated with formalin for five consecutive days. Gills from 60 fish per raceway are then examined under a light microscope. If inspection finds no ICH trophonts, those groups of fish can then be transferred within 10 days. Phil Mamer and Doug Munson assisted me with these examinations. We detected no ICH at Nampa in 2010.

Two significant design flaws at Nampa Hatchery have direct impacts on fish health. First, the large raceway floors are all far below the level of the outflow to the settling pond. Thus, the raceways never dry up nor can they be isolated from the settling pond. This situation allows direct contact with feral fish and whatever pathogens they may introduce, as well as providing an easy avenue for invasive species like New Zealand mudsnails. The second flaw is the lack of sufficient water for the nursery "A" raceways. The existing pipeline is too small to deliver the water needed when all 16 raceways are in use. Inadequate water flow may be a contributing factor in the increase of motile *Aeromonas* infections.

## SANDPOINT HATCHERY

The Sandpoint Hatchery fish program consists of redistributing catchable-size rainbow trout transferred from other hatcheries, and hatching rainbow and cutthroat trout eggs to stock as very small fry into mountain lakes. The hatchery staff reported no fish health issues in their resident fish program. No fish were sampled from Sandpoint Hatchery during 2010.

## **SAWTOOTH HATCHERY RESIDENT PROGRAM**

The resident fish program at Sawtooth Hatchery consists of redistributing catchable rainbow trout transferred from Nampa Hatchery and hatching cutthroat trout eggs in order to stock very small fry into high mountain lakes. A discussion occurred in the spring of 2010 regarding the risks of river water exposing the cutthroat fry to MC. Although this risk is very small and was acceptable in the past, a decision to transfer the mountain lake program to Mackay Hatchery was made to deal with recent concerns. This also consolidated the effort at one location. The Sawtooth hatchery staff reported no fish health issues in their redistribution fish program. The EFHL staff examined no resident fish from Sawtooth Hatchery during 2010.

## **WILD FISH TESTING**

Fish biologists from IDFG and Idaho Department of Environmental Quality submitted wild fish samples to EFHL for a variety of reasons (Appendix M). Kajsa Stromberg (DEQ) submitted cutthroat trout from the North Fork of the Coeur d'Alene River for MC testing. This small sample (3 individuals) was negative. Her concern was based on signs of deformity that could have been from the parasite or due to environmental contamination. The results were inconclusive for her purposes due to the small sample size.

Anglers reported catching rainbow trout with red skin sores from Sage Hen Reservoir. Southwest Region biologists captured three individuals and delivered them to EFHL for diagnostic examination. I observed varying levels of petechial hemorrhaging in the caudal peduncles. Two fish had external copepod parasites (*Salmincola* sp.) with some secondary fungal infection around the attachment sites; one had evident hemorrhage in the hindgut associated with an enteric parasite (*Hexamita salmonis*). No systemic bacteria grew in culture from kidney or spleen, but two fish were ELISA positive (low) for RS antigen. No replicating viruses were detected. My opinion is that the fish were showing signs of chronic stress due to late-summer water conditions and that the signs would diminish as water temperatures cooled.

Finally, I examined adult kokanee collected from Warm Lake by Paul Jansen of the McCall Subregion. He believes that this population may contain vestigial anadromous sockeye genetics and has plans to start a hatchery enhancement program in the future. We had no current fish pathogen data from this lake, thus the need for an inspection. No replicating viruses were detected from 33 fish sampled, and all were negative for RS antigen by ELISA. *Myxobolus* spores consistent in size and shape for *M. neurotropus* (MN) were detected by PTD. This was no surprise, as this species was confirmed from Warm Lake kokanee in 2003.

## **EMERGING ISSUE – EPIZOOTIC EPITHELIOTROPIC DISEASE VIRUS**

A new PCR test has been under development at the University of California, Davis to detect segments of genetic material (DNA) from salmonid herpes virus 3 (epizootic epitheliotropic disease virus or EEDV). Scientific literature reports that this virus causes mortality only in lake trout or lake trout hybrids, that other salmonid species show no clinical signs after experimental challenge. The virus is not detectable by traditional tissue culture. Prior to PCR, the only method to confirm EEDV was through electron microscopy of clinically sick fish. The PNFHPC lists all fish herpes viruses as class B pathogens, thus the concern over this virus.

While searching for a negative control population for the test, the UC Davis laboratory tested samples of the lake trout brood fish at Wyoming Game and Fish Story Hatchery in 2009. The results were positive for EEDV DNA segments, although no clinical signs have ever been observed at Story Hatchery or at any other location in Wyoming. Idaho's Grace Hatchery had a juvenile population of lake trout that originated as eggs from Story Hatchery in 2008. I sent samples from the Grace Hatchery lake trout and from rainbow trout in the large raceways that received reuse water from the lake trout raceways to UC Davis. Both groups were positive by their PCR, although neither group exhibited any signs of disease. As expected, the same lake trout were negative for replicating viruses by traditional cell culture methods. Further PCR testing at UC Davis has detected EEDV DNA in all other fish populations at Story Hatchery, in lake trout sampled by Utah Division of Wildlife from Bear Lake (personal communications from Dee Dee Hawk, WGF and Chris Wilson, UDW), from wild Lake Pend Oreille lake trout, and from one wild/feral cutthroat trout captured at Henrys Lake. The Story Hatchery lake trout population originated from Jenny Lake (Grant Teton National Park) approximately 40 years ago with periodic infusions since. The wild Jenny Lake population probably originated from Lake Michigan as early as 1890. The records are poor, but they indicate introduction of lake trout in Lake Pend Oreille may have occurred as early as 1925 from unknown origins.

Another location of concern has been Ashton Hatchery, where a captive population of brook trout that originated as eggs from Story Hatchery has been on station since 2008. Samples of these fish, as well as samples from production lots of rainbow trout, brook trout from British Columbia, and feral rainbow trout and brook trout from the hatchery's settling pond have all tested negative at EFHL. More tests from spawning female brook trout (Story) are pending. Because Ashton Hatchery routinely stocks fish in the vicinity of Henrys Lake and because there was concern over contamination from the Story fish, we took an opportunity to sample adult cutthroat from Henrys Lake in December 2009. Tests run at UC Davis had one positive out of 24 samples, while 36 samples run at EFHL were all negative. This finding would indicate that the virus is already present in the lake and it would not be a new introduction in the event that fish from Ashton Hatchery were carriers. More samples will be taken from Henrys Lake fish in 2011 to confirm this single positive result.

Other laboratories, including EFHL, the University of Wyoming Forensic Laboratory, and the USFWS Lamar Fish Health Center, have acquired the EEDV primers and incorporated this PCR into their testing repertoire. However, none of these laboratories can repeat the UC Davis level of sensitivity. Specifically, when testing known-concentration samples, UC Davis reports detections of as few as 10 DNA copies per sample while none of the other facilities can detect less than 100 copies per sample. Tests on rainbow trout at Grace Hatchery have been the only case where EFHL has been able to confirm the UC Davis findings from actual fish samples. This suggests that the quantitative presence of viral DNA in the most fish samples is extremely low.

Unfortunately, PCR detects only a relatively small segment of nucleic acid assumed unique to the target organism. This is useful confirmatory information when there is already evidence of an organism and/or clinical disease has already been diagnosed. But PCR is a very questionable primary diagnostic tool when there is no corroborating evidence of disease because it does not provide evidence of viability or virulence of the assumed target organism. Positive results from rainbow trout in reuse water below positive lake trout at Grace suggests that the virus replicated and passed from one host to another, but this is not conclusive without controls. The lack of clinical signs or corroborating tests puts considerable doubt on whether these PCR results indicate presence of a true pathogen or of an attenuated, non-virulent

organism. Therefore, to date there has been no justification to change any long-term management plans for IDFG hatcheries due to EEDV. Some monitoring will continue at specific sites of concern, but there are currently no plans for statewide surveys.

## **OTHER ACTIVITIES**

Stocking sterile triploid domestic fish from IDFG hatcheries to avoid introgression with wild populations has become an important part of statewide fishery management. Triploidy is induced at IDFG hatcheries by treating freshly fertilized eggs with very high hydraulic pressure to cause the embryonic cells to retain an extra set of maternal chromosomes (the polar body). Effectiveness of the treatment depends on applying the pressure before the polar body deteriorates in the initial cell divisions. This technique is not perfect, so IDFG has established a goal of at least 95% triploidy in those production lots intended to be sterile. The triploid fish genome contains half again more DNA than the diploid, thus triploid red blood cell nuclei are statistically larger than diploids. The size of red blood cell nuclei can be accurately measured using an expensive flow cytometer machine. My part was to take individual blood samples from presumed triploid fish populations and send them to the Thorgaard Laboratory at Washington State University for analysis. All triploidy testing results for 2010 indicated 100% induction rates. Fish species tested included Hayspur-stock rainbow trout lots at Hagerman Hatchery (198 individuals), juvenile hybrid trout (Ennis rainbow male X Henrys Lake cutthroat female) at Mackay Hatchery (60 individuals), and lake trout juveniles at Grace Hatchery that originated as eggs from Story Hatchery, Wyoming (60 individuals).

I examined two diagnostic cases of ornamental koi carp for local Boise owners. The first was a private owner who suspected that intruders had injured her fish or poisoned her ponds. I necropsied two of her fish on July 16 and isolated some unusual bacteria but no replicating viruses. I did not observe suspicious lesions on the gills, so did not send any samples to other laboratories. The second case presented on August 20. Boise Parks and Recreation maintained show ponds of koi at the historic Boise Train Depot. An acute die-off of their fish was occurring. Upon examination, I did observe focal lesions on the gills that made me suspect koi herpes virus (KHV). Samples sent to the University of Arkansas confirmed my sight-diagnosis by PCR. The Depot ponds were depopulated, drained, and disinfected. I learned that there had been a koi show at the Depot in July and that water from the tanks was drained onto the grass rather than down the sewer drains. I strongly suspect this was the source of the virus. I do not know if there was any connection between this show and the first case.

## **ACKNOWLEDGMENTS**

I wish to thank my anadromous counterpart, A. Douglas (Doug) Munson, for his assistance in the field, for sharing his considerable knowledge with me, and for being a congenial colleague and valued friend. I greatly appreciate the efforts of Fish Health Technologists Sharon Landin, Carla Hogge, and Roberta Scott. Their timely and accurate laboratory results are essential in managing the resident hatchery system's fish health challenges. Doug Marsters, Utility Craftsman, was great at keeping Eagle Fish Health Laboratory's physical plant operating and in keeping our vehicles safely on the road. Administrative Assistant Lani Clifford has kept us all organized and operating smoothly. I also thank my supervisor, Dr. Phil Mamer, for his directions and unique perspectives on fish health issues. Finally and most importantly, I wish to recognize the Hatchery Managers, Assistant Managers, and Fish Culturists with whom I work. I would be unable to do my job without their cooperation. I sincerely hope my efforts have benefited their programs.

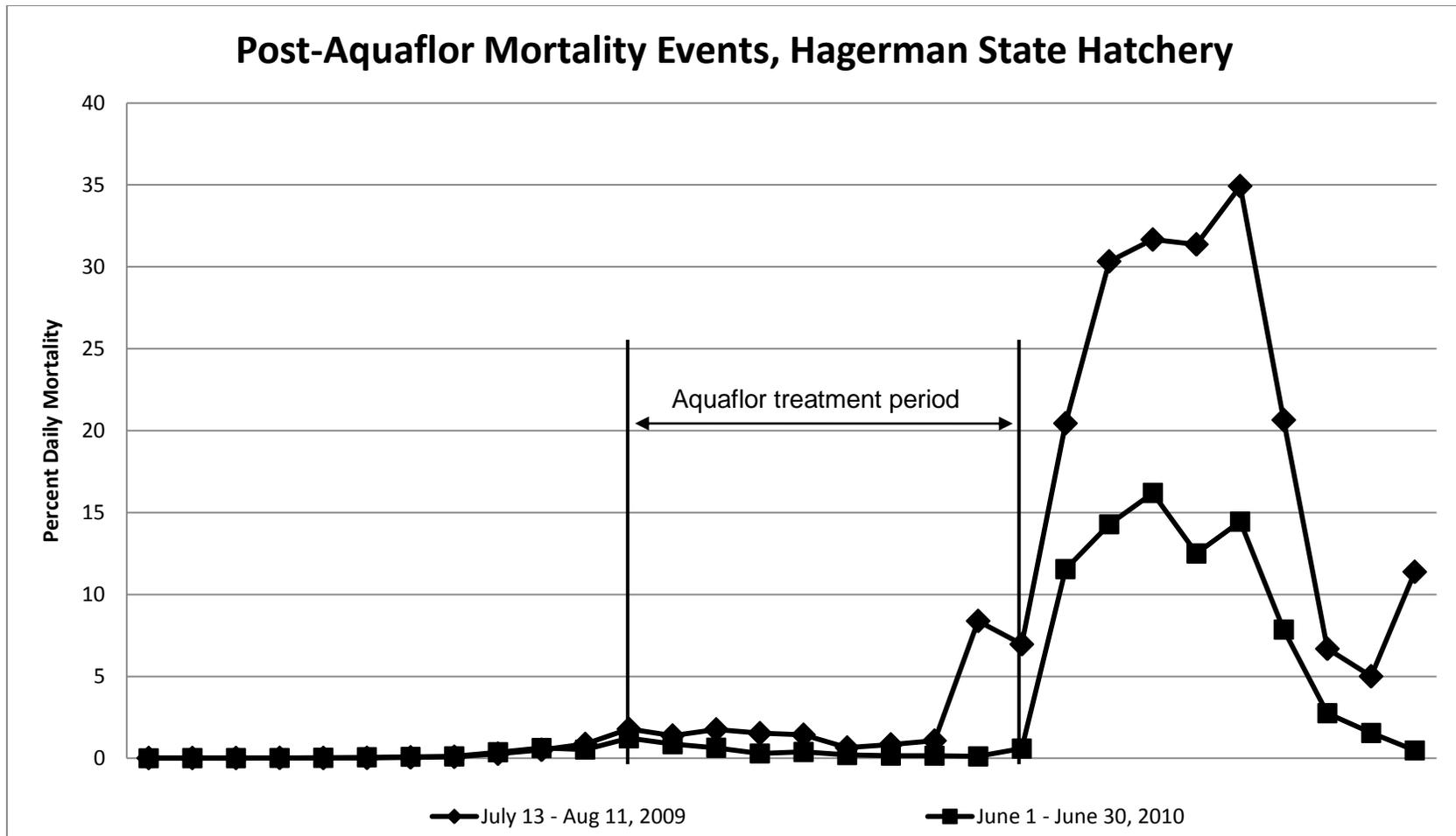


Figure 1. Percent daily mortality for two groups of rainbow trout at Hagerman State Hatchery, calculated as that number of fish to die on a given day divided by the number remaining after the previous day's losses. Both groups were diagnosed with bacterial coldwater disease and treated with Aquaflor-medicated feed for 10 days at the VFD-approved dose of 10 mg florfenicol per kg of fish.

Appendix A. Summary of Eagle Fish Health Laboratory results for American Falls Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2009	Troutlodge	Rainbow trout, triploid	10-031	02/22/10					-	-	+	-			DX: CWD; <i>Flavobacterium psychrophilum</i> 8/8
2009	Troutlodge	Rainbow trout, triploid	10-043	03/03/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5
2009	Troutlodge	Rainbow trout, triploid	10-049	03/08/10					-	-	+	+			DX: CWD, MAS; <i>F. psychrophilum</i> 6/8, <i>Aeromonas hydrophila</i> 5/8
2010	Troutlodge	Rainbow trout, triploid	10-143	05/04/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 8/8
2010	Troutlodge	Rainbow trout, triploid	10-151	05/10/10					-	-	+	-			DX: CWD, PSEU; <i>F. psychrophilum</i> 7/7, <i>Pseudomonas sp.</i> 7/7
2010	Henry's Lake	Rainbow X Cutthroat Hybrids	10-280	08/12/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 3/4
2010	Troutlodge	Rainbow trout triploid	10-451	11/09/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 6/6

Appendix B. Summary of Eagle Fish Health Laboratory results for Ashton Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2009	Hayspur	Rainbow trout, triploid	10-042	03/02/10	-	-							-		IX: NPD; VIRO 0/60, PTD-MYXOB 0/60, PCR (EFHL)-EEDV 0/30
2009	British Columbia	Brook trout	10-060	03/02/10											IX: NPD; PCR (EFHL)-EEDV 0/25
Feral Adult	Ashton Settling Pond	Rainbow trout	10-061	03/07/10											IX: NPD; PCR (EFHL)-EEDV 0/6
Feral Adult	Ashton Settling Pond	Brook trout	10-062	03/09/10											IX: NPD; PCR (EFHL)-EEDV 0/12
2010	Troutlodge	Rainbow trout, triploid	10-100	04/12/10					-	-	-	+			DX: MAS; <i>Aeromonas sobria</i> 4/4
2008	Story, WY	Brook trout	10-152A	05/11/10	-	-									IX: NPD; VIRO 0/30, PCR (EFHL)-EEDV 0/15
2009	British Columbia	Brook trout	10-152B	05/11/10											IX: NPD; PCR (EFHL)-EEDV 0/10
2009	British Columbia	Brook trout	10-308	08/23/10	-	-			-	-	-	-	-		IX: NPD; VIRO 0/59, BACTE 0/10, PTD-MYXOB 0/59
2010	Troutlodge	Rainbow trout, triploid	10-390	10/07/10					-	-	+	-			DX: CWD; <i>Flavobacterium psychrophilum</i> 2/2
2008	Story, WY	Brook trout	10-452	11/10/10	-	-	-								IX: NPD; VIRO 0/12, VHSV 0/2, PCR pending
2008	Story, WY	Brook trout	10-467	11/17/10	-	-	-								IX: NPD; VIRO 0/12, PCR pending

Appendix C. Summary of Eagle Fish Health Laboratory results for Cabinet Gorge Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007 Brood	King's Lake	Westslope Cutthroat trout	10-154	05/11/10	-	-		-							IX: NPD; VIRO 0/60, OCP-FAT 0/60
2008 Brood	King's Lake	Westslope Cutthroat trout	10-155	05/11/10	-	-		-							IX: NPD; VIRO 0/29, DFAT 0/29, ELISA 0/29
Brood (Feral)	King's Lake	Westslope Cutthroat trout	10-156	05/12/10	.	.	.	+							IX: RS; VIRO 0/60, VHSV 0/6, ELISA 2/30 (low)
Brood	Sullivan Springs	Kokanee salmon	10-484	12/09/10	-	-		-							IX: NPD; VIRO 0/60, ELISA 0/60

Appendix D. Summary of Eagle Fish Health Laboratory results for Grace Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2009	Story, WY	Lake Trout	10-017	02/02/10											IX: NPD; PCR (EFHL)-EEDV 0/8
2009	Troutlodge	Rainbow trout, triploid	10-018	02/02/10											IX: EEDV; PCR (EFHL)-EEDV 2/20
Brood	Bear River	Bonneville Cutthroat	10-157	05/12/10	-	-	-	+							IX: BKD; VIRO 0/6, VHSV 0/2, ELISA 4/6 (3 LOW, 1 HIGH)
Brood	Bear River	Bonneville Cutthroat	10-158	05/18/10	-	-	-	+					-		IX: BKD; VIRO 0/6, VHSV 0/2, ELISA 5/6 (2 LOW, 3 HIGH), PTD-MYXOB 0/6, PCR-RS 0/2
Brood	Bear River	Bonneville Cutthroat	10-171	05/21/10	-	-	-	+							IX: RS; VIRO 0/4, VHSV 0/1, ELISA 3/4 (3 LOW)
Brood	Bear River	Bonneville Cutthroat	10-173	05/24/10	-	-	-	+							IX: RS; VIRO 0/7, VHSV 0/3, ELISA 6/7 (6 LOW)
Brood	Bear River	Bonneville Cutthroat	10-178	05/28/10	-	-	-	+							IX: RS; VIRO 0/5, VHSV 0/1, ELISA 2/5 (2 LOW)
Brood	Bear River	Bonneville Cutthroat	10-196	06/04/10	-	-	-	+							IX: BKD; VIRO 0/9, VHSV 0/2, ELISA 9/9 (8 LOW, 1 HIGH)
Brood	Bear River	Bonneville Cutthroat	10-211	06/10/10	-	-		+							IX: RS; VIRO 0/2, ELISA 2/2 (2 LOW)
Brood	Bear River	Bonneville Cutthroat	10-227	06/01/10									-		IX: NPD; PTD-MYXOB 0/33
2009	Story, WY	Lake Trout	10-309	08/24/10	-	-									IX: NPD; VIRO 0/60, Triploid induction rate 60/60 (100%)
2008	Troutlodge	Rainbow trout, triploid	10-356	09/03/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>Flavobacterium psychrophilum</i> 8/8

Appendix E. Summary of Eagle Fish Health Laboratory results for Hagerman State Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2009	Hayspur	Rainbow trout, Triploid	10-013	02/01/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>Flavobacterium psychrophilum</i> 4/5
2009	Troutlodge	Rainbow trout, Triploid	10-014	02/01/10	+	-			-	-	-	-			DX: IHN, GYRO; IHNV 1/1x5, IPNV 0/5, BACTE 0/5, <i>Gyrodactylus</i> sp. 2/3
2008	Hayspur	Rainbow trout, triploid	10-015	02/01/10				-	-	-	-	-			DX: GYRO, PSEU; DFAT 0/1, <i>Pseudomonas chororaphis</i> 1/1, <i>Gyrodactylus</i> sp. 1/1
2009	Hayspur	Rainbow trout, triploid	10-024	02/11/10	-	-			-	-	+	-			DX: CWD; VIRO 0/10, <i>F. psychrophilum</i> 10/10
2009	Troutlodge	Rainbow trout, triploid	10-025	02/11/10	-	-			-	-	+	-			DX: CWD, GYRO; VIRO 0/5, <i>F. psychrophilum</i> 4/5, <i>Gyrodactylus</i> sp. 2/2
2010	Hayspur	Rainbow trout, triploid	10-028	02/18/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5
2009	Hayspur	Rainbow trout, triploid	10-029	02/18/10	+	-			+	-	+	+			DX: IHN, FUR, CWD, MAS; IHNV 1/1x5, IPNV 0/5, <i>Aeromonas salmonicida</i> 2/5, <i>F. psychrophilum</i> 3/5, <i>Aeromonas hydrophila</i> 1/5
2009	Hayspur	Rainbow trout, triploid	10-044	03/03/10	-	-			-	-	+	-			DX: CWD, <i>F. psychrophilum</i> 4/4
2009	Hayspur	Rainbow trout, triploid	10-045	03/03/10	-	-					+				DX: NPD; VIRO 0/5, CWD-PRESUMPTIVE
2009	Hayspur	Rainbow trout, Triploid	10-056	03/16/10	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1x5, IPNV 0/5, <i>F. psychrophilum</i> 4/5
2009	Hayspur	Rainbow trout, triploid	10-057	03/16/10					-	-	-	-			DX: MAI, EXTERNAL FLAVO; <i>A. hydrophila</i> 4/4, <i>Flavobacterium</i> sp. 1/4

## Appendix E. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2008	Hagerman Yellows	Rainbow trout	10-058	03/16/10	-	-			-	-	+	-			DX: CWD, PKX; VIRO 0/4, <i>F. psychrophilum</i> 2/4 <i>Tetracapsuloides bryosalmonae</i> (PCR) 2/4, PCR-NS 0/4
2008	Hayspur	Rainbow trout, triploid	10-085	04/06/10											IX: NS: <i>Nucleospora salmonis</i> (PCR) 1/1
2009	Hagerman Yellows	Rainbow trout	10-086	04/06/10	-	-			-	-	+	-			DX: CWD, STEATITIS; VIRO 0/5, <i>F. psychrophilum</i> 4/5, HISTO-Necrotizing steatitis
2009	Hayspur	Rainbow trout, triploid	10-087	04/06/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5
2009	Hayspur	Rainbow trout, triploid	10-088	04/06/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5
2009	Hayspur	Rainbow trout, triploid	10-111	04/19/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 1/1x5
2009	Troutlodge	Rainbow trout, triploid	10-137	04/29/10	-	-			-	-	-	-			DX: NDP; VIRO 0/8, BACTE 0/5
2009	Troutlodge	Rainbow trout, triploid	10-138	04/29/10	+	-			+	-	+	-			DX: IHN, FUR, CWD; IHNV 1/1 (x5), IPNV 0/5, <i>A. salmonicida</i> 1/5, <i>F. psychrophilum</i> 2/5
2009	Sawtooth	A-Steelhead trout	10-139	04/29/10	-	-									DX: COL; VIRO 0/5, <i>F. columnare</i> (visual) 1/5
2010	Hayspur	Rainbow trout, triploid	10-200	06/10/10	-	-			-	-	+	+			DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 2/5, <i>A. hydrophila</i> 2/5
2010	Hayspur	Rainbow trout, triploid	10-201	06/10/10	-	-			-	-	-	-			DX: BGD; VIRO 0/5, <i>A. hydrophila</i> 4/4 (gills),
2009	Troutlodge	Rainbow trout, triploid	10-202	06/10/10	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1x5, IPNV 0/5, <i>F. psychrophilum</i> 1/5
2010	Hayspur	Rainbow trout, triploid	10-224	06/22/10	-	-			-	-	-	-			DX: NDP; VIRO 0/5, BACTE 0/4, HISTO-Necrotizing dermatitis consistent with sunburn.

Appendix E. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Hayspur	Rainbow trout, triploid	10-225	06/22/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 4/4
2010	Hayspur	Rainbow trout, triploid	10-281	08/12/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/5
2010	Troutlodge	Rainbow trout, triploid	10-288	08/17/10	-	-			-	-	+	-			DX: CWD, PSEU; VIRO 0/5, <i>F. psychrophilum</i> 2/5, <i>Pseudomonas</i> sp. 1/5
2009	Troutlodge	Rainbow trout, triploid	10-289	08/17/10	-	-			-	-	-	+			DX: COL, MAS; VIRO 0/5, <i>F. columnare</i> 5/5, <i>A. hydrophila</i> 4/5
2010	Troutlodge	Rainbow trout, triploid	10-424	10/25/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/5
2010	Troutlodge	Rainbow trout, triploid	10-425	10/25/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/5
2010	Troutlodge	Rainbow trout, triploid	10-426	10/25/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/5
2010	Hayspur	Rainbow trout, triploid	10-478	12/02/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 5/5
2010	Troutlodge	Rainbow trout, triploid	10-479	12/02/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 5/10

Appendix F. Summary of Eagle Fish Health Laboratory results for Hayspur Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007	Hayspur	Rainbow trout, diploid	10-008	01/11/10	-	-									IX: NPD; VIRO 0/15
2007	Hayspur	Rainbow trout, diploid	10-009	01/11/10	-	-									IX: NPD; VIRO 0/10
2008	Hayspur	Rainbow trout, diploid	10-094	04/08/10	-	-									IX: NPD; VIRO 0/60
2009	Hayspur	Kamloops RBT, diploid	10-095	04/08/10	-	-		-	-	-	-	-			IX: NPD; VIRO 0/60, DFAT 0/1, BACTE 0/1
2010	Hayspur	Rainbow trout, triploid	10-128	04/27/10	-	-	-								IX: NPD; VIRO 0/60, VHSV 0/10
2006	Hayspur	Rainbow trout, triploid	10-129	04/27/10	-	-	-	+							IX: BKD; VIRO 0/60, VHSV 0/10, ELISA 9/30 (6 LOW, 3 HIGH)
2006	Hayspur	Rainbow trout, triploid	10-374	09/27/10	-	-	-	+							IX: BKD; VIRO 0/60, VHSV 0/10, ELISA 6/12x5 (4 LOW, 2 HIGH)
2007	Hayspur	Rainbow trout, diploid	10-375	09/27/10	-	-	-	-							IX: NPD; VIRO 0/60, VHSV 0/20, ELISA 0/60
2008	Hayspur	Rainbow trout, diploid	10-376	09/27/10	-	-	-	-							IX: NPD; VIRO 0/60, VHSV 0/20, ELISA 0/60
2009	Hayspur	Rainbow trout, diploid	10-406	10/20/10	-	-	-								IX: NPD; VIRO 0/60, VHSV 0/20
2008	Hayspur	Rainbow trout, diploid	10-446	11/08/10	-	-	-								IX: NPD; VIRO 0/60, VHSV 0/6
2007	Hayspur	Rainbow trout, diploid	10-447	11/08/10	-	-	-								IX: NPD; VIRO 0/60, VHSV 0/6
2008	Hayspur	Kamloops RBT, diploid	10-448	11/08/10	-	-	-								IX: NPD; VIRO 0/60, VHSV 0/6
2007	Hayspur	Rainbow trout, diploid	10-449	11/09/10	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/5, DFAT 0/15, OCP-FAT 0/48, ELISA 0/15

Appendix F. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007	Hayspur	Rainbow trout, diploid	10-461	11/16/10	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/7, DFAT 0/15, OCP-FAT 0/48, ELISA 0/15
2008	Hayspur	Kamloops RBT, diploid	10-468	11/17/10	-	-									IX: NPD; VIRO 0/18
2008	Hayspur	Rainbow trout, diploid	10-469	11/17/10	-	-									IX: NPD; VIRO 0/18
2007	Hayspur	Rainbow trout, diploid	10-473	11/23/10	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/7, DFAT 0/15, OCP-FAT 0/48, ELISA 0/15
2008	Hayspur	Rainbow trout, diploid	10-474A	11/22/10	-	-	-								IX: NPD; VIRO 0/18, VHSV 0/6
2008	Hayspur	Rainbow trout, diploid	10-474B	11/22/10	-	-									IX: NPD; VIRO 0/18
2007	Hayspur	Rainbow trout, diploid	10-476	11/30/10	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/5, OCP-FAT 0/48, DFAT 0/15, ELISA 0/15
2008	Hayspur	Rainbow trout, diploid	10-477	11/30/10	-	-	-	-							IX: NPD; VIRO 0/24, VHSV 0/6
2008	Hayspur	Rainbow trout, diploid	10-488A	12/21/10	-	-									IX: NPD; VIRO 0/24
2007	Hayspur	Rainbow trout, diploid	10-488B	12/21/10	-	-									IX: NPD; VIRO 0/88
2006	Hayspur	Rainbow trout, diploid	10-488C	12/21/10	-	-									IX: NPD; VIRO 0/24
2007	Hayspur	Rainbow trout, diploid	10-488D	12/21/10	-	-									IX: NPD; VIRO 0/12
2007	Hayspur	Rainbow trout, diploid	10-490	12/27/10	-	-									IX: NPD; VIRO 0/12

Appendix F. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007	Hayspur	Rainbow trout, diploids	10-491	12/28/10	-	-									IX: NPD; VIRO 0/18
2006	Hayspur	Rainbow trout, diploids	10-492	12/28/10	-	-	-								IX: NPD; VIRO 0/30, VHSV 0/24

Appendix G. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
Adult	Henrys Lake	Yellowstone Cutthroat trout	10-006	12/22/09											IX: EEDV; PCR (UCD)-EEDV 1/24, PCR (EFHL)-EEDV 0/36
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-034	02/22/10	-	-		-							IX: NPD; VIRO 0/21, OCP-FAT 0/168
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-039	03/01/10	-	-	-	+	-	-	+	+	-		IX: RS, CWD, MAS; VIRO 0/60, VHSV 0/10, DFAT 0/60, ELISA 3/12x5 (5 LOW), <i>F. psychrophilum</i> 6/16, <i>A. sobria</i> 6/16, PTD-MYXOB 0/20
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-040	02/24/10	-	-	-	-							IX: NPD; VIRO 0/21, VHSV 0/7, OCP-FAT 0/140
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-041	03/01/10	-	-		-							IX: NPD; VIRO 0/21, OCP-FAT 0/140
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-047	03/05/10	-	-	-	-							IX: NPD; VIRO 0/14, VHSV 0/14, OCP-FAT 0/140
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-048	03/08/10	-	-		-							IX: NPD; VIRO 0/14, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-054	03/11/10	-	-		-							IX: NPD; VIRO 0/21, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-055	03/15/10	-	-		-							IX: NPD; VIRO 0/14, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-067	03/18/10	-	-	-	-							IX: NPD; VIRO 0/7, VHSV 0/7 OCP-FAT 0/91
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-072	03/25/10	-	-		-							IX: NPD; VIRO 0/7, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-073	03/29/10	-	-		-							IX: NPD; VIRO 0/14, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-082	03/31/10				-							IX: NPD; OCP-FAT 0/84

Appendix G. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-083	03/31/10	-	-		-							IX: NPD; VIRO 0/7, OCP-FAT 0/105
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-101	04/08/10	-	-		-							IX: NPD; VIRO 0/7, OCP-FAT 0/77
Brood	Henrys Lake	Yellowstone Cutthroat trout	10-102	04/12/10	-	-		-							IX: NPD; VIRO 0/7, OCP-FAT 0/70

Appendix H. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery, January 1 - December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Henrys Lake	Rainbow X Cutthroat Hybrids	10-276	08/09/10	-	-									IX: NPD; VIRO 0/60, Triploid induction rate 60/60 (100%)
Brood	Deadwood Reservoir	Kokanee salmon	10-345	09/10/10	-	-		-							IX: NPD; VIRO 0/60, DFAT 0/60, ELISA 0/60, PTD-MYXOB 0/20

Appendix I. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery, January 1 - December 31, 2010.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2009	Troutlodge	Rainbow trout, triploid	10-011	01/28/10					-	-	+	-			DX: CWD; <i>Flavobacterium psychrophilum</i> 5/5
2009	Troutlodge	Rainbow trout, triploid	10-032	02/23/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 3/3
2009	Troutlodge	Rainbow trout, triploid	10-037	02/26/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 3/3
2009	Troutlodge	Rainbow trout, triploid	10-068	03/23/10	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/13
2009	Daniel, WY	Brown trout	10-090	04/07/10					-	-	-	-			DX: BGD; BACTE (internal) 0/5, Bacterial Gill Disease 3/3
2010	Troutlodge	Rainbow trout, triploid	10-091	04/07/10					-	-	-	+			DX: MAS; <i>Aeromonas sobria</i> 2/2
2009	Troutlodge	Rainbow trout, triploid	10-112	04/20/10	-	-			-	-	-	+			DX: MAS; <i>A. sobria</i> 1/4
2010	Troutlodge	Rainbow trout, triploid	10-142	05/03/10					-	-	+	+			DX: CWD, MAS; <i>F. psychrophilum</i> 4/5, <i>A. hydrophila</i> 5/5
2009	Troutlodge	Rainbow trout, triploid	10-189	06/04/10										-	IX: NPD; ICH 0/60
2009	Troutlodge	Rainbow trout, triploid	10-237A	06/11/10											IX: NPD; ICH 0/60
2009	Troutlodge	Rainbow trout, triploid	10-237B	07/07/10											IX: NPD; ICH 0/60
2010	Troutlodge	Rainbow trout, triploid	10-383	09/30/10											DX: COS; <i>Ichthyobodo necator</i> 1/1
2010	Troutlodge	Rainbow trout, triploid	10-392	10/12/10	-	-			-	-	-	-			DX: NPD; VIRO 0/5, BACTE 0/5
2010	Troutlodge	Rainbow trout, triploid	10-457	11/15/10					-	-	-	-			DX: MAI; BACTE (internal) 0/4, <i>A. caviae</i> (external) 4/4

Appendix I. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, triploid	10-458	11/15/10					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 4/5
2010	Troutlodge	Rainbow trout, triploid	10-459	11/15/10					-	-	+	+			DX: CWD, MAS; <i>F. psychrophilum</i> 3/5, <i>Aeromonas sp.</i> 3/5
2010	Troutlodge	Rainbow trout, triploid	10-483	12/08/10	-	-			-	-	-	+			DX: MAS; VIRO 0/10, <i>A. hydrophila</i> 5/10

Appendix J. Summary report of Eagle Fish Health Laboratory results for resident wild fish inspections, January 1 - December 31, 2010.

Sample Location	Species	Accession	Date	Sample											Diagnoses	
				IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	MN			
<b>PANHANDLE REGION</b>																
<b>N Fork, Coeur d'Alene River</b>																
Beaver Creek	Westslope Cutthroat trout	10-388	09/24/10											-	-	IX: NPD; PTD-MYXOB 0/3
<b>SOUTHWEST REGION</b>																
<b>Payette River</b>																
Sage Hen Reservoir	Rainbow trout	10-415	10/21/10	-	-		+	-	-	-	-	-	-	-	-	DX: ENTERITIS, MULTIPLE PARASITISMS, MYCOSIS, RS; VIRO 0/3, DFAT 0/3, ELISA 2/3 (2 LOW), PTD-MYXOB 0/3, <i>Aeromonas sobria</i> 1/1 (from hind gut), <i>Hexamita salmonis</i> 1/3, <i>Salmincola californiensis</i> 2/3
<b>South Fork Salmon River</b>																
Warm Lake	Kokanee salmon	10-428	10/25/10	-	-		-								+	IX: MN; VIRO 0/33, ELISA 0/33, PTD-NEURO 4/7x5

Appendix K. List of acronyms used in the Resident Hatcheries Fish Health Report-2010.

BACTE	Bacteriology test results
BKD	Bacterial kidney disease, caused by <i>Renibacterium salmoninarum</i>
COL	Columnaris disease, caused by <i>Flavobacterium columnare</i>
CWD	Bacterial coldwater disease, caused by <i>Flavobacterium psychrophilum</i>
DFAT	Direct fluorescent antibody test
DNA	Deoxyribonucleic acid
DX	Diagnostic examination
EEDV	Epidemic Epitheliotropic Disease Virus or Salmonid Herpes Virus 3.
EFHL	Eagle Fish Health Laboratory
ELISA	Enzyme-linked immunosorbent assay
ERM	Enteric redmouth disease, caused by <i>Yersinai ruckeri</i>
FUR	Furunculosis, caused by <i>Aeromonas salmonicida</i> .
GYRO	<i>Gyrodactylus sp.</i> , a monogenetic trematode parasite
IDFG	Idaho Department of Fish and Game
IHN(V)	Infectious hematopoietic necrosis (virus)
ICH	<i>Ichthyophthirius multifiliis</i> ; a protozoan parasite of skin and gills
ISDA	Idaho State Department of Agriculture
IPN(V)	Infectious pancreatic necrosis (virus)
IX	Inspection examination
MAS	Motile aeromonad septicemia, caused by many <i>Aeromonas</i> -like species
MAI	Motile aeromonad infection; external infection that has not gone systemic
MC	<i>Myxobolus cerebralis</i> ; causative agent of whirling disease of salmonids
MN	<i>Myxobolus neurotropis</i> ; new species of <i>Myxobolus</i> found in nerve tissues
MYXOB	<i>Myxobolus</i> ; acronym used when a species is not identified
NPD	No Pathogens Detected
NS	<i>Nucleospora salmonis</i> , an intranuclear, microsporidian parasite
OCP-FAT	Ovarian cell pellet fluorescent antibody test
OTC	Oxytetracycline antibiotic
PCR	Polymerase chain reaction test; used to detect specific DNA fragments of a targeted organism
PKX	<i>Tetracapsuloides bryosalmonae</i> : causative agent of proliferative kidney disease
PNFHPC	Pacific Northwest Fish Health Protection Committee
PSEU	Septicemia due to a variety of <i>Pseudomonas</i> species of bacteria
PTD	Pepsin/trypsin digest method for detecting microsporidian spores

RS *Renibacterium salmoninarum*; causative agent of BKD; acronym used in diagnosis to indicate presence of bacteria without signs of clinical disease

VHS(V) Viral hemorrhagic septicemia (virus); disease/agent not yet detected in Idaho

VIRO Virology test results

WADDL Washington Animal Disease Diagnostic Laboratory, Washington State University

WHD Whirling disease of salmonids, caused by *Myxobolus cerebralis*

**Approved by:**

IDAHO DEPARTMENT OF FISH AND GAME

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Thomas S. Frew  
Resident Hatcheries Supervisor

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Edward B. Schriever, Chief  
Bureau of Fisheries