



RESIDENT FISH HATCHERIES

2011 ANNUAL REPORT

Resident fish hatcheries reared and stocked about 19.9 million fish weighing just over one 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 23 species and strains raised and stocked by the resident hatcheries during 2011.

Resident hatchery production program costs were about \$2.8 million.

Rainbow trout of catchable size (8 to 12 inches) accounted for 2.4 million (891,500 pounds) of the total 19.9 million fish (1,100,289 pounds) raised in 2011. Virtually all of the catchable sized rainbow trout raised and stocked by IDFG 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, grayling, golden trout, and Bear River cutthroat were obtained from Wyoming. Lahontan cutthroat and coho salmon were obtained from Washington. The U.S. Fish and Wildlife Service provided Snake River cutthroat eggs. IDFG provided westslope cutthroat trout to the state of Washington to begin rebuilding their feral broodstock in Kings Lake. They eradicated this lake in order to remove the existing population that had become introgressed with rainbow trout.

Two 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 and Hayspur rainbow trout maintained at Hayspur Hatchery.

The resident hatcheries operated adult fish traps on Deadwood River, the Clark Fork 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 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 2011 include the 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 raised 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 were tagged during the 2011 fish stocking season to determine these rearing effects.

The overall resident fish production requests were significantly reduced in order to operate within the existing budget spending authority. Due to increasing fish feed costs, electrical service costs, and other costs over the past few years coupled with a flat MCO budget, the total production from the resident hatcheries was reduced. Overall approximately 400,000 put-and-take sized fish and over a million fingerlings were cut from the production requests.

**Idaho Department of Fish and Game
Resident Hatcheries Fish Production
01/01/11—12/31/11**

Production Hatchery	Put-and-Take Number	Pounds	Put-Grow-and-Take Number	Pounds	Average Fish per Pound	Feed Pounds	Feed Costs	Average Length	Total Cost	Cost 1,000 Fish	Cost/Pound
American Falls	296,285	119,708	104,119	10,515	3.07	102,921	\$57,471	8.98	\$213,304	\$532.72	\$1.64
Ashton	106,694	19,901	151,568	8,008	9.25	33,151	\$21,594	6.1	\$153,320	\$593.66	\$5.49
Cabinet Gorge	0	0	11,917,705	58,772	202.8	41,859	\$49,938	2.54	\$331,289	\$27.80	\$5.64
Grace	122,486	45,148	1,043,839	31,054	13.04	78,953	\$54,133	6.03	\$283,391	\$242.98	\$3.72
Hagerman	401,979	343,373	2,232,032	94,455	6.79	555,624	\$334,786	7.17	\$839,602	\$218.39	\$1.92
Mackay	116,768	46,583	2,436,494	25,816	40.47	88,650	\$57,955	4.1	\$310,955	\$121.79	\$4.30
McCall ¹	0	0	187,845	205	916	112	\$222	1.0	\$14,372	\$76.51	\$70.10
Nampa	623,641	224,806	79,047	23,091	2.83	262,688	\$161,142	7.62	\$482,445	\$687.24	\$1.95

Sandpoint (did not produce any fish this year)

TOTAL

¹ Flight costs only

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

Total of 19,820,502 fish and 1,051,435 pounds produced in 2011.

Redistribution of catchables

Hatchery	Put-and-Take Number	Pounds	Put-Grow-and-Take Number	Pounds	Average Fish per Pound	Feed Pounds	Feed Costs	Average Length	Total Cost	Cost 1,000 Fish	Cost/Pound
Clearwater ³	112,170	45,075	0	0	2.48	6,000	\$9,000	10	\$29,064	\$259.11	\$0.65
McCall ³	109,595	36,532	0	0	3.0		3,432	\$3,003	8.99	\$15,234	\$139.00
Mullan	35,132	10,980	0	0	3.0		0	0	8.99	\$33,799	\$960.00
Sandpoint	120,548	37,181	0	0	3.0		0	0	8.99	\$48,105	\$400.00
Sawtooth	40,595	14,762	0	0	2.75		300	\$164.70	9.67	\$10,136	\$249.69
Hayspur ⁴	46,075	15,358	0	0	3.0						

³ Distribution mileage and feed costs only

⁴ Distribution costs were not broken out of the overall hatchery budget.

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AMERICAN FALLS FISH HATCHERY

Kevin Yelton, Fish Hatchery Manager I
Brandon Filloon, 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 45,000 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 11 months of temporary employee time staffed the AFFH during 2011. 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 contain 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 2011.

EGG USAGE

The AFFH received 269,000 all-female triploid rainbow trout eyed eggs from the Troutlodge facility in Washington at a cost of \$8,137.25. There were no Hayspur strain triploid eggs received for the year. The AFFH received 59,024 brown trout eggs from the Wyoming Game and Fish Department's Story Fish Hatchery, 35,484 rainbow trout x Yellowstone cutthroat trout hybrid eggs from the Idaho Department of Fish and Game's Henrys Lake Hatchery.

HATCHERY PRODUCTION/STOCKING

AFFH staff stocked 240,007 catchable rainbow trout (97,440 pounds) averaging 10 inches statewide. The hatchery stocked 1,278 magnum rainbow trout (2,444 pounds) averaging 16 inches in select fisheries. The AFFH stocked 40,806 brown trout (4,840 pounds) statewide and 16,448 rainbow trout x Yellowstone cutthroat trout hybrids (525 pounds) into Salmon Falls Creek Reservoir. Nampa Hatchery fish transport transferred 55,000 rainbow trout (19,824 pounds) to Clearwater and McCall hatcheries for redistribution. Hagerman Fish Hatchery fish transport stocked 46,865 Bear Lake cutthroat (5,150 pounds) to Bear Lake. The hatchery staff

stocked 102 broodstock rainbow trout (375 pounds) to McTucker ponds that were donated by Clear Springs commercial hatchery. The AFFH also stocked 2,303 catfish (750 pounds) to McTucker ponds that were purchased from Fish Breeders of Idaho in Buhl, Idaho. Total fish stocked and transferred were 241,387 fish weighing 111,524 pounds (Appendix 1).

The AFFH assisted Idaho Fish and Game's Nampa Fisheries Research in a density rearing trial on rainbow trout destined for 2012 spring catchables. There is a high-density rearing group in one raceway where the density index (DI) will not exceed 0.30 during the rearing cycle; there is a medium density rearing group in one raceway where the DI will not exceed 0.23; there is a low density rearing group in one raceway 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 2011 was \$213,304.66. From this total, \$107,726 came from personnel costs and the remaining \$105,579 came from operations.

Overall, it cost \$1.93 per net pound of fish produced. This equates to a cost of \$0.80 to raise and stock each 10-inch catchable rainbow trout and \$3.69 to raise and stock each magnum 16-inch rainbow trout. The cost for producing the brown trout was \$0.66 per net pound of fish produced or \$0.06 per fish. The cost of producing the hybrid cutthroat trout was \$1.20 per net pound of fish produced or \$0.38 per fish.

The two transport trucks assigned to AFFH made 156 separate stocking trips during the year. Fish from AFFH were planted by truck into 29 different bodies of water. Hatchery personnel traveled 17,518 miles for an average of 112.3 miles per trip. Fleet rental rates and mileage costs for the 1-ton and 2-ton stocking trucks totaled \$13,645.85. The fish transport tankers stationed at Nampa Fish Hatchery and Hagerman Fish Hatchery made 11 trips out of AFFH and drove 1,857 miles at a cost of \$4,120.

FISH FEED

A total of 102,921 pounds of fish feed was used at a cost of \$57,471 (Appendix 2). This is an 11% decrease from last year. Feed costs for the year were \$0.52 per net pound of fish produced or \$0.24 per net fish produced.

Feed conversion for the year averaged 0.93 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

Hatchery improvements were handled by hatchery staff and private contractors. Two capital outlay projects were financed by mitigation monies from the interest earned from the American Falls Reservoir endowment fund. They are as follows:

- New shop heater was installed by Sierra Heating and Cooling of American Falls.
- Monroe Fence installed chain link fence around residence 2.

A list of hatchery happenings and improvements for the grounds and facilities came from operations. They are as follows:

- Water heaters in residences 2 and 3 were brought up to code.
- A new outside light and bathroom light were installed on residence 2.
- Carpets in all three residences were cleaned.
- Two new toilets were purchased and installed in residence 3.
- Residence #3 was jacked up and re-leveled, and all cracks in the walls and ceiling were repaired.
- The interior of residence 3 was painted.
- A new garage door was installed on residence 2.
- A fire rated door was installed from the house into the garage in residence 2.
- An outside door and the garage door were replaced in residence 2.
- A windstorm knocked down part of an elm tree causing damage to residence 1. Repairs were made and the two large trees were removed between residences 1 and 3.
- Community service volunteers used mulch from these cut trees to cover the nature trail.
- Rock was delivered and added to the show pond to stabilize the sloughing bank.
- The kitchen stove heating element in residence 1 was replaced.
- Replaced bearings on riding lawnmower.
- Road mix was added around the fence to the hatchery bird netting to keep four-legged animals out.
- The speedometer was replaced in the 2-ton.

HATCHERY NEEDS

Steel siding should be installed on the exterior of the hatchery building to protect against weather and nesting birds. It is currently covered with Styrofoam™ and stucco. Since its completion in 1989, the building has been damaged from Northern Flickers (woodpeckers) that make holes in the wall and nest in them. These holes are patched and painted, only to have the birds move over and repeat the process. The porous material also promotes the growth of lichen that cannot be removed unless scraped and painted. Steel siding would cure both of these problems. A cost estimate was calculated in 2010 for the sum of \$11,200.

Residence #2 needs a back door added in the garage. This would replace a large broken and outdated window. It would not only allow access to the back yard, which there is currently none, but also allow an additional escape route out of the house in the case of a fire.

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.

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 578 children, 31 adults, and senior citizens. This was up about 20% from the previous year. Staff gave eggs, fry, presentations, and helped with dissections for 19 different area schools as part of trout in the classroom programs. The nature trail kiosk and voluntary sign-in sheet indicated 149 visitor trips were taken, consisting of 24 youths and 125 adults. The main activity listed for walking the nature trail was bird watching.

VOLUNTEER PROGRAM

Multiple volunteers were used throughout the year to assist in scatter planting catchable fish, hand loading fish onto transport trucks, and maintenance on the nature trail and hatchery grounds. A total of 16 volunteers logged a total of 314 hours in order for AFFH to complete operations. The volunteer hours have been documented on aquatic education tracking forms and sent to headquarters.

ACKNOWLEDGMENTS

We would like to thank our staff, former manager Tim Klucken, and bio-aides Daniel Grant and Carl Glasow. We would also like to give a special thanks to Sherry Moser for her volunteer work and logging over 240 hours in only three months here at the hatchery.

APPENDICES

Appendix 1. Swimming Inventory with fish transferred or stocked by month, American Falls Fish Hatchery, 2011.

Month	Fish on hand	Pounds on hand	Fish stocked	Pounds stocked
Jan. 2011	335,154 ***49,826 42,924*	30,618 ***1,561 *46		
Feb. 2011	332,395 ***49,777 *42,727	37,710 ***2,673 *144	1,898	727 lbs
Mar. 2011	332,397 ***49,710 *42,627	46,330 ***3,610 *347	28,572	3,546 lbs
Apr. 2011	274,622 ***49,639 *42,471	50,299 ***5,455 *598	54,889	10,815 lbs
May 2011	222,345 *42,319 **31,496	59,957 *984 *47	18,639 18,512 transferred ***46,865	7,048 lbs 6,750 lbs transferred ***5,150 lbs
Jun. 2011	351,451 *42,319	40,090 *2,365	17,511 18,864 transferred	6,917 lbs 7,200 lbs transferred
Jul. 2011	**27,782 296,498 *42,322 **27,745	**179 44,892 *2,438 **354	12,704 17,624 transferred ****2,303	4,207 lbs 5,874 lbs transferred ****750 lbs
Aug. 2011	349,337 *42,289 **16,605	43,954 *4,024 **430	7,242	2,661 lbs
Sep. 2011	338,252 *42,240	52,286 *4,000	9,688 **16,448	3,779 lbs **525 lbs
Oct. 2011	210,417	10,617	116,942 40,806*	39,135 lbs 4,840* lbs
Nov. 2011	176,801	13,597	3,772	1,600 lbs
Dec. 2011	248,322 *36,981	165,303 *7.4		
Total rainbow			241,387	100,259 lbs
Total brown *			*40,806	*4,840 lbs
Total hybrids **			**16,448	**525 lbs
Total BLC***			***46,865	***5,150 lbs
Total catfish transferred****			****2,303	****750 lbs
Total			241,387	111,524 lbs

*denotes brown trout; **denotes hybrid; ***denotes BLC; ****denotes transferred catfish

Appendix 2. Fish feed fed during the 2011 production year, American Falls Fish Hatchery.

Source	Size/Type	Pounds	Cost
Rangen	0 starter	93.5	\$89.11
Rangen	1 starter	339.5	\$323.54
Rangen	2 starter	1,113	\$1,060.69
Rangen	3 grower	3,828	\$2,392.50
Rangen	3 Aquaflor	300	\$459.00
Rangen	3/32	6,323	\$3,825.42
Rangen	3/32 Aquaflor	370	\$566.10
Rangen	1/8	90,454	\$48,754.71
Rangen	1/4	100	\$53.80
Totals		102,921	\$57,471.06

ASHTON FISH HATCHERY

Chris Jeszke, 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 four species/strains of trout, char, and grayling, including rainbow trout *Oncorhynchus mykiss*, Arctic grayling *Thymallus arcticus*, brook trout *Salvelinus fontinalis*, and rainbow x cutthroat hybrids. Species raised at AFH in past production years include cutthroat trout *O. clarkii*, brown trout *Salmo trutta*, and golden trout *Oncorhynchus aguabonita*.

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 258,262 fish were produced at AFH this year, consisting of 151,568 fry and fingerlings and 106,694 catchable sized fish, including holdovers. Ashton Hatchery personnel stocked a total of 51,790 catchables into area waters during 2011. These fish averaged 2.54 fpp (10.5 inches) for a total of 19,299 pounds stocked. Production costs (excluding capital outlay) were \$153,320.57 with \$21,594.66 spent on fish feed and the remaining \$131,725.91 spent on general hatchery operations and personnel costs. Fish transportation cost for 2011 was \$5,494. The average cost per pound of fish produced during 2011 was \$5.27. 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 2011, feed conversion for catchables was 1.0, and conversion for holdovers was 0.39. 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 78 percent. Appendix 2 provides a summary of comparative growth rates, feed conversion, and survival percentages for AFH in 2011.

All of the fish reared at AFH during 2011 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 2011 can be found in Appendix 3.

Rainbow Trout

Ashton Fish Hatchery produced and stocked 51,790 Troutlodge strain catchable rainbow trout averaging 10.5 inches in length (19,299 pounds) for distribution into area lakes and streams. No rainbow fingerlings were stocked in 2011.

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 Troutlodge strain rainbow trout for 2011 catchable production at AFH.

Arctic Grayling

Ashton Hatchery received 100,000 green arctic grayling eggs from Meadow Lake, Wyoming on June 8, 2011. Ashton personnel transported the eggs from Jackson, Wyoming to AFH. Survival from green egg to hatched fry (63.5% percent) resulted in 34,466 fry at release, averaging 8,266 fish per pound (about 1.5 inches).

The survival from green egg to stocking increased over previous years. A new feeding regime was tried this year, following the Alaskan example of using live Artemia, then introducing freeze-dried CYCLOP-EEZE®, and finally ending with Bio-Oregon Mash, as the fry grew large enough to consume it. It is believed this contributed to the improved survival.

A total of 2,312 grayling fry were directly stocked into Horseshoe Lake by AFH personnel. Of the remaining 32,154 grayling fry produced, 18,000 were transferred to the Mackay Hatchery, and 14,154 were transferred to the McCall hatcheries, respectively, for secondary rearing and subsequent mountain lake stocking activities.

Brook Trout

On November 9, 2010, AFH received 150,000 eyed brook trout eggs from Kootenay Hatchery (British Columbia, Canada). The 2011 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 of 2011, a total of 100,000 fingerlings averaging 5.5 inches in length were stocked into Henrys Lake by AFH and IDFG fish transport personnel.

HATCHERY IMPROVEMENTS

- Trees and brush were removed from the hatchery water intake area (Black Springs) and along the dike in preparation for renovation activities that took place during the summer of 2011.
- Perforated pipe was buried in the intake area (Black Springs) in increase the water available for rearing.
- Cobble was placed on top of the swampy area above the intake to cap the surface water and minimize the chances of disease entering the water source.
- Wiring in the hatch house was brought up to code after a heater broke and had to be exchanged.
- The common border with a property owner was fenced to keep goats and cattle off hatchery grounds.
- Outdated chemicals were removed from the chemical room and disposed of during the Fremont County hazardous waste collection day.

FISH STOCKED AND TRANSFERRED

Rainbow trout stocking practices for 2011 mirrored those of 2010. No rainbow trout fingerlings were stocked into area waters due to poor returns to creel demonstrated previously. A minor inventory shortfall in September resulted in a shortage of 500 fish. Grace Hatchery provided 500 fish, which were stocked in Rexburg City Pond. Ashton Reservoir was not stocked due to work being done on the dam.

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 Wyoming's Story Fish Hatchery to collect and pressure shock brook trout eggs.

FISH FEED

A total of 33,151 pounds of fish feed were fed (Appendix 4) to produce 27,909 lbs of fish weight gain (Appendix 1), for an average conversion of 1.19 for the 2011 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.

Chris Jeszke, Paul Martin, and regional volunteers staffed Free Fishing Day on June 11, 2011. 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 255 children registered for and participated in the event.

Several groups of foster children were allowed to fish the hatchery settling basin pond. It was the first time many of the children had been fishing, and several of the children caught their first fish.

Paul Martin assisted regional personnel in grading hunter safety tests and during horseback patrol at the Egin-Hamer opener.

SPECIAL PROJECTS

Brook Trout Daughterless Female Study

AFH is continuing baseline data collection and study efforts with an estradiol feminization study that began in 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 nonnative 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 nontreated groups were all combined into this raceway. Predator covers were installed to eliminate the possibility of fish jumping into the adjacent raceway. The fish were then placed on a broodstock 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, 2010. A second spawning event was completed on November 17 2010. It is noteworthy that nearly all fish fed the estradiol treated feed were feminized. 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 were reared separately until they reached a size suitable for PIT tagging. After PIT tagging, the fish were transferred back to Ashton for secondary rearing in August of 2011. 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, Jessica Buelow, Joe Chapman, Rick Alsager, James Brower, Doug Burton, Mick Hoover, Pat Moore, Brian Grant, and Beau Gunter for their help, advice, and support this year.

APPENDICES

Appendix 1. Fish production and cost, Ashton Fish Hatchery, 2011.

Species	Size	Number of Fish	Pounds Planted or Transf.	Weight Gained In 2011	Cost / lb	Cost / fish	Total Cost
Fry and Fingerlings Produced and Stocked							
Brook Trout Triploids	5.5	107,200	7,619	7,599	\$5.49	\$.39	\$41,749.19
Grayling	1.5	34,466	4	2	\$870.27	\$.05	\$1,740.53
Rainbow x Cutthroat	4.6	9,493	0	368	\$5.50	.21	\$2,023.83
Estradiol Brook Trout	6.2	409	0	39	\$5.50	.53	\$214.64
Totals/Ave		151,568	7,623	8,008			\$45,728.19
Catchables Produced and Stocked							
Troutlodge triploid Rainbow	10.5	51,790	19,299	14,416	\$5.38	\$1.50	\$77,495.56
Totals/Ave	10.5	51,790	19,299	14,416	\$5.38	\$1.50	\$77,495.56
Subcatchables Produced For 2012 Stocking-Holdovers							
Hayspur triploid Rainbow	6.35	54,904	0	5,485	\$5.49	\$.55	\$30,096.82
Totals/Ave	6.35	54,904	0	5,485	\$5.49	\$.55	\$30,096.82
GRAND TOTAL		258,262	26,922	27,909			\$153,320.57

Appendix 2. Comparative growth rates, feed conversion, and percent survival for all species reared at Ashton Fish Hatchery, 2011.

Species	Average Monthly Length Increase	Average Conversion	Percent Survival
Brook Trout Triploid	.57	1.10	71.5*
Rainbow Catchables (Troutlodge)	.51	1.1	84+
Rainbow Holdovers (Hayspur)	.39	0.72	73+
Grayling	.50	2.86	70.6*
Rainbow x Cutthroat	.67	1.41	69.3
Estradiol Brook Trout	.5	1.9	96.9+

*From eyed egg to stocking
+2011 survival percentage

Appendix 3. Origin of eggs and fish stocked, Ashton Fish Hatchery, 2011.

Species	Source	Eggs	Destination	Stocked	Size (inches)
Brook Trout Triploid	Kootenay, BC	150,000	Henrys Lake	100,000	5.5
Brook Trout Triploid	Kootenay, BC	150,000	Deer Creek Res.	7,200	5.92
Troutlodge Triploid Rainbow	Troutlodge, Inc.	65,000	Upper Snake Region	51,790	10.5
Arctic Grayling	Meadow Lake, WY	100,000	Statewide	34,466	1.5
Total stocked or transferred				193,456	

^a Received in 2010-stocking catchable 2011

Appendix 4. Feed use, Ashton Fish Hatchery, 2011.

Size/Type	Source	Pounds	Cost/lb	Total Cost
#0 Starter	Rangen	51	\$1.66	\$84.66
#1 Starter	Rangen	196	\$1.00	\$196.00
#2 Starter	Rangen	368	\$1.00	\$368.00
#3 Grower	Rangen	936	\$1.00	\$936.00
Str Soft-Moist	Rangen	20	\$1.66	\$33.20
1/16" 450 Pellet	Rangen	621	\$0.77	\$478.17
3/32" 450 Pellet	Rangen	779	\$0.66	\$514.14
1/8" 450 Pellet	Rangen	30,112	\$0.62	\$18,669.44
Bio-Vita Mash	Bio-Oregon	9	\$2.37	\$21.33
Estradiol 3/32" 450 Pellet	Rangen	30	\$0.62	\$18.60
Estradiol 1/8" Pellet	Rangen	26	\$0.62	\$16.12
CYCLOP-EEZE® Artemia eggs	Argent	2	\$85.00	\$170.00
CYCLOP-EEZE® Freeze Dried	Argent	1	\$89.00	\$89.00
Total		33,151		\$21,594.66

CABINET GORGE FISH HATCHERY

John Rankin, Fish Hatchery Manager II
Samuel Van Liew, 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 co-funded 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, 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 11,917,705 fish in 2011 weighing 58,772 pounds. A total of 41,859 pounds of feed produced 45,375 pounds of weight gain for an overall (all species reared) feed conversion of 0.92:1.0. Total production cost (including Nampa's transportation costs) was \$331,289.54, resulting in an overall cost per pound of fish of \$5.64, cost per inch of fish of \$0.0109, and \$27.80 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 Jentsorter 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 (t-marked) 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 2011.

Kokanee were feed trained at approximately 50°F 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 same rearing protocol was initiated in 2002 with very favorable results.

On January 1, 2011, there were 10,378,160 late kokanee eggs on hand from the BY2010 spawning season at Granite Cr. trap. Also, in late January and early February a total of 2,874,530 Lake Whatcom stock late spawning kokanee eyed eggs were received.

A total of 10,020,363 late kokanee fry (Lake Pend Oreille and Whatcom stock) were produced at an average length of 2.19 inches and an average weight of 317.7 fish per pound. These fish gained 29,803 pounds from 25,313 pounds of feed, resulting in a conversion rate of 0.85:1.0. Fish production cost was \$5.91 per pound, \$0.0085 per inch, and \$18.59 per thousand

(Appendix 2). Survival of Lake Pend Oreille kokanee green eggs to eyed eggs was estimated at 76.6%.

On December 31, 2011, there were 10,019,244 green late spawning kokanee eggs from the BY2011 spawning season at Granite Cr. trap.

A total of 652,204 early kokanee fry were produced at an average length of 3.22 inches and an average weight of 99.6 fish per pound. These fish gained 6,293 pounds from 6,610 pounds of feed, resulting in a conversion rate of 1.05:1.0. Fish production cost was \$7.09 per pound, \$0.0221 per inch, and \$71.13 per thousand (Appendix 2).

In September 2011, Cabinet Gorge Hatchery received 3,156,869 green fertilized eggs from the Deadwood Reservoir trap, 642,895 were produced from the Clark Fork River trap, and 170,905 were produced from the Granite Creek trap for a total of 3,970,669. Overall eye-up was 69%. A total of 1,127,000 eyed eggs were transferred to Mackay Hatchery. On December 31, 2011, the hatchery had 795,914 early spawning kokanee swim-up fry on hand. Also, in September, Cabinet Gorge Hatchery received 238,196 green 3N early kokanee eggs from the Deadwood trap; eye-up was 85.6%. On October 31, 80,800 (t-marked) eyed eggs were transferred to Mackay Hatchery; the remaining 108,011 were excess to production needs and destroyed.

The 2010 3N early Kokanee study group was sampled for triploidy in March. All but one replicate showed 100% 3N. That replicate had 4% 3N, suggesting that that group was not properly pressure shocked.

Fish Marking

To evaluate the success of the 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, release locations, and release timing, by examining otolith growth rings for these distinctive bands, which are unique for each group.

Four thermal marks were utilized at Cabinet Gorge Hatchery for kokanee destined for Pend Oreille in 2010; an early shoreline release at Telache Landing, a late shoreline release at Telache Landing, a Sullivan Springs Pend Oreille stock release, and a Sullivan Springs Whatcom stock release.

There were also two groups of BY11 early kokanee that were thermal marked. These groups were marked as eyed eggs. The first group were placed in artificial redds in Twin Creek and the other group was the 3N group destined for Warm Lake and were transferred to Mackay Hatchery.

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 2010 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 2010 kokanee spawning run, 8.6% were hatchery four-year-olds (2005 brood year), 65.5% were hatchery three-year-olds (2006 brood year), and 25.9% were three- or four-year-olds of wild origin. To date, no results have been received from the 2011 spawning adults.

Fish Liberation

On June 21 and 22, 2011, 1,366,723 late kokanee fry were released at Telache Landing. These fish were 2.2 inches in length and averaged 307 fish per pound. On June 28, 29, and 30, 2011, 5,356,649 Lake Pend Oreille stock and 1,427,220 Whatcom stock late kokanee fry were released into Sullivan Springs. These fish were 2.13 inches in length and averaged 321 fish per pound. On July 11, 12, and 13, 2011, 1,598,646, late kokanee fry were released at Telache Landing. These fish were 2.2 inches in length and averaged 312 fish per pound. On July 1, 2011, 271,125 late kokanee were released at Clark Fork Hatchery. These fish were 2.15 inches in length and averaged 231 fish per pound. There were no early kokanee fry released into Sullivan Springs in 2011.

On October 28, a total of 294,884 eyed (BY11) early kokanee eggs were placed in artificial redds in Twin Creek.

During the month of May 2011, a total of 652,204 early spawning (Deadwood stock) kokanee were released into nine lowland lakes in Regions 1 and 3M. The fish averaged 100 fish per pound and had attained a length of 3.22 inches at release.

Numbers at release were based upon displacement in the transport trucks; a correction factor of .96 was used due to consistently higher displaced numbers than inventory numbers. 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 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.

Westslope Cutthroat

General Rearing

A total of 16,413 BY2011 replacement broodstock westslope cutthroat (Kings Lake strain) 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 166 pounds from 206 pounds of feed, resulting in a conversion rate of 1.24: 1.0. Fish production cost was \$13.27 per pound, \$0.0905 per inch, and \$399.71 per thousand (Appendix 2). On December 31, 2011, the hatchery had on hand 5,544 BY2011 westslope cutthroat (Kings Lake strain) weighing 167 pounds (Appendix 2). A total of 10,465 fish were deemed excess and transferred to production raceways.

A total of 121,935, (BY11) eyed westslope cutthroat eggs taken from lots 1-5 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 800 to 900 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). The fish were feed trained using Bio-Oregon starter feeds. These fish gained 2,034 pounds from 1,399 pounds of feed, resulting in a conversion rate of 0.69:1.0. Fish production cost was \$9.12 per pound, \$0.0523 per inch, and \$211.66 per thousand. On December 31, 2011, the hatchery had on hand 49,634 westslope cutthroat fingerlings weighing 1,638 pounds and averaging 4.55 inches in length (Appendix 2).

The BY2010 westslope cutthroat Cabinet production fish gained 1,168 pounds from 1,423.3 pound of feed, resulting in a conversion rate of 1.22:1.0. Fish production cost was \$4.36 per pound, \$0.0359 per inch, and \$174.23 per thousand (Appendix 2.)

The BY2010 westslope cutthroat (Kings Lake strain) trout broodstock gained 1,514 pounds from 1,027 pounds of feed, resulting in a conversion rate of 0.68:1.0. Fish production cost was \$6.37 per pound, \$0.2506 per inch and \$2656.42 per thousand. On December 31, 2011, the hatchery had on hand 3,827 fish weighing 1,595 pounds (Appendix 2).

The BY2009 westslope cutthroat (Kings Lake strain) trout broodstock gained 3,346 pounds from 3,118 pound of feed, resulting in a conversion rate of 0.93:1.0. Fish production cost was \$6.31 per pound, \$0.3063 per inch, and \$3,605.57 per thousand. On December 31, 2011, the hatchery had on hand 3,073 fish weighing 4,462 pounds (Appendix 2).

The BY2008 westslope cutthroat (Kings Lake strain) trout broodstock gained 1,221 pounds from 2,236 pounds of feed, resulting in a conversion rate of 1.83:1.0. Fish production cost was \$5.92 per pound, \$0.5292 per inch, and \$8,457.33 per thousand. On December 31, 2011, the hatchery had on hand 2,368 BY2008 fish weighing 3,383 pounds (Appendix 2).

The BY2007 westslope cutthroat (Kings Lake strain) trout broodstock had a conversion rate of 2.66:1.0 before spawning. Fish production cost was \$3.31 per pound, \$0.2329 per inch, and \$3,305.23 per thousand (Appendix 2). To evaluate performance of 5-year-old broodstock, 200 females were ad-clipped and transferred into the BY2008 raceway.

Fish Liberation

During the months of May and June 2011, 82,252 westslope cutthroat fingerling trout (BY10) were released into nine lakes in Regions 1 and 2. These fish averaged 25 fish per pound and had attained a length of 4.85 inches at release.

Due to budget cutbacks, 39,270 westslope cutthroat fry trout (BY11) were released into Hauser Lake on November 9, 2011. These fish averaged 92.4 fish per pound and were 3.14 inches in length.

After spawning, the BY2007 broodstock were deemed to have no future use for hatchery egg collection needs. In July 2011, the remaining 1,175 of these fish weighed 1,175 pounds and were stocked into area waters.

In September 2011, a total of 4,740 BY2009 fish weighing 1,835 pounds were deemed excess to hatchery needs and stocked out into area waters.

On December 12, 2011, 107 BY2010 broodfish and 220 BY2011 production fish were transferred to the state of Washington Pend Oreille County Public Utilities District to be used as study fish for fish passage on one of their dams.

On June 27 and July 11, a total of 74,505 eyed westslope cutthroat eggs, of which 32,437 were triploid, were shipped to McCall Hatchery for mountain lake stocking. On June 28, a total of 150,510 eyed westslope cutthroat eggs were shipped to Mackay Hatchery for mountain lake stocking. A total of 77,860 eyed westslope cutthroat eggs were shipped to the state of Washington (WDFW) on June 27 and 29 and July 7 to be used as replacement broodstock for Kings Lake as well as production fish for statewide stocking needs.

Fall Chinook

General Rearing

On November 4, 2011, 40,000 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 BY2011 fall Chinook gained 3.1 pounds from 4.0 pounds of feed, resulting in a conversion rate of 1.3:1.0. Fish production cost was \$1.23 per pound, \$0.0008 per inch, and \$1.23 per thousand (Appendix 2). On December 31, 2011, 36,400 fall Chinook salmon fry were on station weighing 36 pounds.

The BY2010 fall Chinook gained 83.5 pounds from 48 pounds of feed, resulting in a conversion rate of 0.57:1.0. Fish production cost was \$4.07 per pound, \$.0059 per inch, and \$13.05 per thousand (Appendix 2).

Fish Liberation

A total of 29,000 (BY10) fall Chinook were transferred to Nampa Hatchery on February 2, 2011. These fry averaged 312 fish per pound or 2.2 inches. A total of 12,000 fish were deemed excess to production needs and destroyed.

FISH SPAWNING

Kokanee

Fish Trapping

The Clark Fork River fish trap at the CGFH was in operation during September of 2011. A total of 6,842 adult early spawning kokanee were trapped. A total of 1,917 fish were transferred to the raceway spawning channel at Clark Fork Hatchery, and 1,704 fish were transferred to the spring portion of Twin Creek. The trap was not operated for late spawning kokanee.

The Sullivan Springs trap was in operation for one day on September 1, 2011 to trap early spawning kokanee adults. A total of 295 females were spawned. The trap was then pulled and the remainder of the run let spawn above the trap.

The Sullivan Springs trap was in operation from October 23, 2011 to December 19, 2011. The Sullivan Springs trap collected 84,414 adult late spawning kokanee salmon. Of these, 8,171 adults were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records showed that 45.2% of the run was female (38,160).

Spawntaking

An estimated total of 10,019,244 green fertilized late kokanee eggs were collected during the 2011 spawning season. Of the 38,160 total females trapped, 28,679 were spawned (Appendix 1).

An estimated total of 170,905 green fertilized early kokanee eggs were collected at the Sullivan Springs trap, and an estimated 642,895 green fertilized early kokanee eggs were collected at the Clark Fork River trap during the 2011 spawning season. Eye-up on the Sullivan Springs eggs was 93.8% while the Cabinet Gorge eggs eyed up at 83.2%.

Westslope Cutthroat

Spawntaking

On May 4, 11, and 18, 2011, a total of 120 BY2007 Kings Lake females were spawned with BY2008 Kings Lake males at a 1:1 ratio to make replacement broodstock. Ovarian fluid samples were taken for disease testing and the eggs placed in isolated incubation. An estimated 30,000 green eggs were taken. No eggs were culled due to disease.

Spawning occurred between April 29 and June 16. A total of 775 females were spawned producing 396,532 green eggs from the BY07 (four-year-old) fish. These eggs eyed up at 46.0%. A total of 861 females were spawned producing 535,350 green eggs from the BY08 (three-year-old) fish. These eggs eyed up at approximately 49.8%. These eggs were utilized for mountain and lowland lake stocking statewide. The BY09 (two-year-old) fish were not spawned in 2011.

HATCHERY IMPROVEMENTS

Repairs and Improvements

- Pump # 6 was installed on January 4, 2011. The motor, shaft, and pump head were replaced and the discharge head was rebuilt.
- Pump # 6 was reset in August to properly align the shaft.
- A new kokanee fish trap was installed at Sullivan Springs.
- The 1-ton fish stocking / snowplow truck was replaced.
- Holes in the incubation header pipe were welded.
- A new isolation valve and new plumbing for incubation lines supplying raceway 25 and 26 was installed.

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.
- 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.

- The gravity water supply lines to the Westslope cutthroat brood ponds were undersized and need to be replaced.

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 183 people signed our guest registration book this year. An estimated 732 visitors toured the hatchery during the 2011 season. In addition, 12 hatchery tours were given to local school groups.

The CGFH staff was also involved with the "Trout in the Classroom" program. Seven 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 that 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 Vanbroeke, and CGFH Biological Aides Todd Christensen, Tyson Pieper, Joseph Swales, Tyrel Thompson, Jim Hopkins (Bonner County Sheriff's boat operator), Kirk Mattila (Bonner County Sheriff's boat operator), and Brett Hubbard for their dedication and hard work in making 2011 a successful year.

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APPENDICES

Appendix 1. Lake Pend Oreille kokanee trapping/spawntaking summary, 2011.

Spawntaking Site	Total Fish**	Females Spawned	Females Unspawned	Green Eggs	Fecundity	Percent Females *
Sullivan Springs (KL)	84,414	28,679	9,481	10,019,244	349	45.2%
Sullivan Springs (KE)	n/a	295	n/a	170,905	579	n/a
Cabinet Gorge (KE)	6,842	1,821	n/a	642,895	353	n/a
Total	91,256	30,795	9,481	10,833,044	352	45.2%

* Includes male/female prespawm mortality and Sullivan Springs fish releases above.

** Males used for spawning at Cabinet Gorge were not recorded; an estimate of 1,400 was included in the total.

A total of 3,621 kokanee were released in either Spring Creek or Twin Creek.

A total of 4,895 females and 3,276 males were released above the Sullivan Springs trap.

Appendix 2. Production summary, all species, 2011.

Species	Status	Number	Pounds	Length	Fish/lb.	Feed Fed	Feed Cost (a)	Annual Cost (b)	Cost/lb. Of Fish	Cost/ 1,000 Fish	Cost/ inch Of Fish	Conversion
2010 Kokanee (late) Lake Pend Oreille	Released	10,020,363	31,545	2.19	317.7	25,312.8	\$28,084.04	\$186,308.02	\$5.91	\$18.59	\$0.0085	0.85
2010 Kokanee (early) Deadwood Res.	Released	652,204	6,547	3.22	99.6	6,610.0	\$6,993.47	\$46,394.31	\$7.09	\$71.13	\$0.0221	1.05
2011 Kokanee (early) Deadwood Res.	On Station	795,914	249	1.01	3,196.4	34.0	\$57.46	\$381.19	\$1.53	\$0.48	\$0.0005	0.33
2010 sterile Kokanee (early) Deadwood Res.	Released/ Destroyed	2,133	2	1.52	948.0	2.4	\$2.28	\$15.13	\$6.72	\$7.09	\$0.0047	1.07
2010 Fall Chinook Big Creek FH, Ore	Released/ Destroyed	41,000	132	2.20	311.8	48.0	\$80.64	\$534.96	\$4.07	\$13.05	\$0.0059	0.57
2011 Fall Chinook Big Creek FH, Ore	On Station	36,400	36	1.49	1,000.0	4.0	\$6.76	\$44.85	\$1.23	\$1.23	\$0.0008	1.30
2010 Westslope Cutthroat Cabinet Gorge FH	Released	82,252	3,290	4.85	25.0	1,423.3	\$2,160.18	\$14,330.52	\$4.36	\$174.23	\$0.0359	1.22
2011 Westslope Cutthroat Cabinet Gorge FH	On Station Released	49,634 39,270	1,638 425	4.55 3.14	30.3 92.4							
		88,904	2,063	4.05	43.1	1,399.2	\$2,836.55	\$18,817.52	\$9.12	\$211.66	\$0.0523	0.69
2007 Westslope Cutthroat King's Lake, WA	Released	1,175	1,175	14.19	1.0	439.4	\$585.42	\$3,883.65	\$3.31	\$3,305.23	\$0.2329	2.66
BY08 Westslope Cutthroat King's Lake, WA	On Station	2,368	3,383	15.98	0.7	2,235.5	\$3,018.86	\$20,026.96	\$5.92	\$8,457.33	\$0.5292	1.83
BY09 Westslope Cutthroat King's Lake, WA	On Station Released	3,073 4,740	2,627 1,835	13.47 10.34	1.2 2.6							
		7,813	4,462	11.77	1.8	3,117.5	\$4,246.39	\$28,170.32	\$6.31	\$3,605.57	\$0.3063	0.93
BY10 Westslope Cutthroat King's Lake, WA	On Station	3,827	1,595	10.60	2.4	1,026.5	\$1,532.44	\$10,166.13	\$6.37	\$2,656.42	\$0.2506	0.68
BY11 Westslope Cutthroat King's Lake, WA	On Station	5,544	167	4.42	33.2	206.0	\$334.04	\$2,216.00	\$13.27	\$399.71	\$0.0905	1.24
Totals/ Average		11,917,705	58,772	2.54	202.8	41,858.5	\$49,938.53	\$331,289.54	\$5.64	\$27.80	\$0.0109	0.92

(a) Includes freight, shipping, and handling.

(b) Cabinet Gorge FH Budget (\$321,796.54) and Nampa Fish Hatchery transportation costs (\$9,793).

CLEARWATER FISH HATCHERY

2011 RAINBOW TROUT

**Melissa Hubbs, Biological Aide
Jennifer Nalder, Fish Culturist
Cassie Sundquist, Hatchery Manager 1**

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 2011 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), Dworshak National Fish Hatchery (DNFH), Grace Fish Hatchery (GFH), Lyon's Ferry Fish Hatchery (LFFH), and Mackay Fish Hatchery (MFH) reared rainbow trout catchables in 2011.

FISH STOCKED AND TRANSFERRED

The CFH redistributed 120,397 Troutlodge triploid rainbow trout catchables: 56,110 that were reared at AFFH, 4,413 reared at DNFH, 34,140 reared at GFH, 3,814 reared at LFFH, and 21,920 reared at MFH. CFH also redistributed 45,225 rainbow trout fingerlings, which were hauled from LFFH, to two different plant sites (Appendix 1A). Of the 120,397 rainbow trout out-planted in 2011, CFH personnel stocked 4,413 Shasta strain rainbow trout that were reared at DNFH to compensate for a shortage in the 2010 stocking request and 3,814 Spokane strain rainbow trout, reared at LFFH, into regional waters.

Fish were stocked and redistributed from the months of March to November (Appendix 1B). The average fish per pound was 2.67. The total weight of fish was 45,075 lbs. A total of 82 fish plants were administered to 26 different plant sites throughout the year.

FISH FEED

The CFH redistributed rainbow trout catchables into Region 2 waters during 2011. 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 6,000 lbs of Bio-Oregon feed were fed to the rainbows through the summer of 2011 as a maintenance diet (Appendix 2). This food was surplus feed from the CFH steelhead program BY10.

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 21, 2011, Jeff Jenni planted 500 catchable rainbow trout (2.43 fpp) and three trophies into Camp Grizzly Pond, near the Boy Scout Camp.

On July 13, 2011, Jeff Jenni planted 750 catchable rainbows (3 fpp) and five trophies into Jaye Mill Pond for sixth graders on a 4-H forestry tour.

On August 5, 2011, Jeff Jenni planted 500 catchable rainbow trout (2.5 fpp) to Orofino Creek near Pierce, Idaho for their annual 1860 Days Celebration.

On June 6, 2011, Jeff Jenni planted 250 catchable rainbow trout (2.96 fpp) and 4 trophies into Wilkins Pond for Free Fishing Day.

On April 8, 2011, Jeff Jenni planted 500 catchable rainbow trout (2.94 fpp) and 1 trophy at the Lewiston Fair Grounds for the Outdoorsmen Show.

SPECIAL PROJECTS

A total of 105 trophy-sized adult fish, ranging in weight from three pounds (lbs.) to eight lbs., were recovered from CFH's total flow pond. The planting crew supplemented 23 fish stocking trips to twelve different sites with these large fish.

Floy Tags were used in 10 of the 82 plants of rainbow trout at six different sites. Floy Tags are a region's way of monitoring fish harvest and survival and to gain a better understanding of angler returns statewide on our catchable-sized rainbow trout stock this year. This tagging system is part of an exploitation study and is a Bureau-level program evaluation of our catchable stocking program done in collaboration with other resident hatchery staff and the regional fisheries managers. Information from this study will better allocate hatchery resources and improve hatchery operations. For CFH particularly, Floy Tags were used to monitor fish harvest at certain plant sites to see if stocking should be continued in those public fishing areas. Regional staff came to CFH the morning of the plant and tagged rainbow trout using a tagging gun to attach Floy Tags. The tags were attached just behind the dorsal fin of the fish with a tag number and phone number on the side. Fishermen who caught fish with these tags were encouraged to call the phone number and report their tagged fish. Some tags also included a reward amount on the tag if the tag number is reported. There are some fish that were tagged with two tags, and this is done to allow researchers to estimate tag loss.

FISH HEALTH

In general, the fish health at CFH was good this year. The rainbow trout catchables were transferred from AFFH, DNFH, GFH, LFFH, 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

No diseases were encountered during the redistribution of any catchable rainbow trout.

NEW ZEALAND MUDSNAIL INFORMATION

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

ACKNOWLEDGEMENTS

The CFH would like to thank the American Falls Fish Hatchery, Dworshak National Fish Hatchery, Grace Fish Hatchery, Lyons Ferry Fish Hatchery, and Mackay 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 and technicians that aided in rainbow trout rearing and distribution included Jerod Morris, John Curtner, Max Bausch, Jeff Jenni, Steve Duty, Jenny Hole, Chip Roth, Melissa Hicks, Melissa Hubbs, Christina James, Pam Rowsell, Jacob Kurth, Kortney Walker, and Bob Miller. Our two summer youth participants, Aaron Elliot and Steven Elsbury, also participated in the raising and distribution of the catchable rainbow trout.

APPENDICES

Appendix 1A. Clearwater Fish Hatchery Resident Rainbow Trout Fingerling Distribution
January 1-December 31, 2011.

Date	Site	Released	Stock	FPP	Pounds	BY	Marks	Rearing Hatchery
5/19/2011	Soldier's Meadows Reservoir	38,250	Spokane Strain	45	850	2010	none	Lyon's Ferry
5/19/2011	Deer Creek Reservoir	6,975	Spokane Strain	45	155	2010	none	Lyon's Ferry
Total		45,225		45	1,005			

Appendix 1B. Clearwater Fish Hatchery Resident Rainbow Trout Distribution January 1-
December 31, 2011.

Date	Number Released	Pounds	Fish Per Pound	Stock of Fish
3/1/2011-3/31/2011	5,413	1,997	2.71	Shasta Strain*
4/1/2011-4/31/2011	12,190	4,161	2.94	Troutlodge Triploid
5/1/2011-5/31/2011	27,820	8,819	3.15	Troutlodge Triploid
6/1/2011-6/31/2011	26,900	9,874	2.66	Troutlodge Triploid
7/1/2011-7/31/2011	14,100	5,142	2.71	Troutlodge Triploid
8/1/2011-8/31/2011	1,300	520	2.50	Troutlodge Triploid
9/1/2011-9/31/2011	9,114	3,561	2.41	Spokane Strain**
10/1/2011-10/31/2011	16,276	7,603	2.14	Troutlodge Triploid
11/1/2011-11/31/2011	7,284	3,398	2.14	Troutlodge Triploid
Total	120,397	45,075	2.59	

*Includes 4,413 Shasta strain rainbow trout at 2.6 fish per pound raised at Dworshak National Fish Hatchery and redistributed by Clearwater Fish Hatchery staff.

** Includes 4,369 Spokane strain rainbow trout at 3.05 fish per pound raised at Lyon's Ferry Hatchery and redistributed to Moose Creek Reservoir by Clearwater Fish Hatchery staff.

Appendix 1C. Clearwater Fish Hatchery Inventory of Resident Rainbow Trout January 1-
December 31, 2011.

Inventory	Number of Fish	Weight (lbs)
2011 catchable rainbow trout on hand 1/1/2011	0	0
2011 catchable rainbow trout on hand 12/31/2011	0	0

Appendix 2. Fish Feed Costs and Amount Fed for the CFH Catchable Rainbow Trout Program, Jan 1 - Dec 31, 2011 (LFH and DNFH are not held or fed at CFH).

Date	Brand	Feed Type	Weight (Lbs)	Cost Per Lb	Total
4/1-11/20	Bio-Oregon	Bio-Grower 2.5	6,000*	\$1.50	\$9,000.00
# Of Fish	Weight (Lbs)	Feed Fed	Conversion	Cost Per Lb For Redistribution	Cost/1000 Fish For Redistribution
112,170	45,075	6,000 lbs	NA	\$.65**	\$259.11***

Estimated costs include 50% of the FY10 & FY11 budgets and do not include permanent salaries or feed cost @ AFFH, DNFH, GFH, LFFH, and MFH.

Redistribution expenditure by CFH was \$10,913.60.

*This feed was made available as surplus from BY10 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, DNFH, GFH, LFFH, MFH) divided by total number of fish produced times 1000.

1/1/11 to 12/31/11	Redistribution cost @ CFH	\$9,479.15
	Transport cost to deliver fish from AFFH, DNFH, GFH, LFFH, MFH to CFH	<u>\$19,585.00</u>
	Total cost	\$29,064.15

GRACE FISH HATCHERY

Eric Pankau, Fish Culturist
Beau J. Gunter, Assistant Fish Hatchery Manager
Bryan Grant, Fish Hatchery Manager I

ABSTRACT

The 2011 net production for Grace Fish Hatchery was 1,166,325 fish weighing 76,202 pounds. The average size of a stocked fish was 13.04 fish per pound or 6.03 inches in length. The amount of feed used was 78,953 pounds at a cost of \$54,133, including freight and fuel charges. The total cost for net production was \$283,391. This results in a \$3.72 cost per pound of fish or a \$242.98 cost per 1000 fish. Please see the 2011 Bear River Bonneville Cutthroat Trout Production Report for additional production information.

INTRODUCTION

Grace Fish Hatchery (GFH) is located in Caribou County, Idaho, approximately eight 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 IDFG license sales. Additional funding is provided by PacifiCorp for operations related to the Bear River Bonneville cutthroat trout (BRBCT) broodstock development program.

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 1, an Assistant Fish Hatchery manager, a Fish Culturist, and two temporary Biological Aides. Funding for one of the Biological Aide positions is provided by PacifiCorp.

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 2011 was 16.4 cubic feet per second (cfs), with a range of 12.0 cfs to 22.1 cfs (Appendix 1). Water temperature is 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 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, if necessary, 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

The GFH began the 2011 calendar year with 247,920 fish (26,932 lbs.) on station. Throughout 2011, GFH stocked or redistributed 1,145,666 fish (87,887 lbs.). The GFH ended the 2011 calendar year with 268,579 fish (15,247 lbs.) on station. This yields a net production of 1,166,325 fish (76,202 lbs) for 2011 (Appendix 2).

Costs associated with the rearing, stocking and redistributing of the net production were \$283,391. This results in a \$3.72 cost per pound of fish or a \$242.98 cost per 1000 fish (Appendix 2).

Please see the 2011 BRBCT Production Report for additional GFH production information.

EGG SOURCES

The following egg sources were utilized this year: RBT were provided by Troutlodge, Sumner, Washington and Hayspur Fish Hatchery, Bellevue, Idaho; Bear Lake BCT (BLBCT) were provided by the Utah Department of Wildlife Resources, Mantua Fish Hatchery, Mantua, Utah; LKT were provided by Wyoming Game and Fish Department, Story Fish Hatchery, Story, Wyoming (Appendix 3).

Please see the 2011 BRBCT Production Report for additional egg source information.

FISH FEED

The amount of feed used in 2011 was 78,953 pounds at a cost of \$54,133, including freight and fuel charges. The average cost per pound of feed was \$0.6856, including freight and fuel charges (Appendix 4).

The average feed conversion for the net production value was 1.01 pounds of feed to produce one pound of fish (Appendix 2).

Please see the 2011 BRBCT Production Report for additional fish feed information.

FISH TRANSPORT

Both Hagerman Fish Hatchery and Nampa Fish Hatchery transport operators stocked or redistributed fish for GFH in 2011. Cost for the use of these operators was \$7,645 (Appendix 5).

FISH HEALTH SUMMARY

In August, blood samples were obtained from 60 brood year (BY) 2010 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.

Please see the 2011 BRBCT Production Report for additional fish health information.

FISH MARKING

All BY 2010 and BY 2011 BLBCT were adipose clipped.

All BY 2010 LKT were adipose and left ventral clipped.

The fall plant of 6-inch triploid RBT (39,600 fish) into Hayden Lake were adipose clipped.

Please see the 2011 BRBCT Production Report for additional fish marking information.

INVASIVE SPECIES

New Zealand Mudsnails (NZMS) *Potamopyrgus antipodarum* are present in the settling basin at GFH. Hazard Analysis and Critical Control Point (HACCP) plans and a NZMS monitoring protocol are on file at GFH. The HACCP plans and NZMS monitoring protocol are used as guide to prevent the spread of NZMS into habitats where they have not been detected or are not already established.

Fish at GFH were sampled for the presence of NZMS on the following dates:

- March 10 and May 8—catchable triploid RBT were sampled prior to redistribution to the Clearwater Fish Hatchery.
- June 5—catchable triploid RBT were sampled prior to redistribution to the McCall Summer Chinook Hatchery.
- April 18—triploid RBT fingerling were sampled prior to being stocked into Cocolalla Lake and Hayden Lake.
- September 25—triploid RBT fingerling were sampled prior to being stocked into Hayden Lake.
- April 26—BLBCT were sampled prior to being stocked into Fish Haven Creek near Bear Lake.
- October 25—BLBCT were sampled prior to being stocked into St. Charles Creek near Bear Lake.
- November 5—triploid LKT were sampled prior to being stocked into Bear Lake.

AQUATIC EDUCATION

Numerous tours were given to local area schools and hatchery visitors. Approximately 400 individuals participated in these tours, including 280 students and teachers.

It is estimated that approximately 400 people took self-guided tours at the hatchery utilizing the interpretive kiosks and picnic area.

Fish dissection workshops were given to 180 students at the Preston Junior High School.

The annual GFH Free Fishing Day clinic was a success once again. Over 300 kids participated in the event.

HATCHERY IMPROVEMENTS

Numerous improvements were completed throughout the year. The following are highlights of improvements made at GFH in 2011:

- Eight more aluminum screens and McConnell standpipes were fabricated to fit the small raceways.
- A new motor and seals were installed on the fish pump.
- New siding and vented soffits were installed on the vat building and garden shed with assistance from funding provided for operations related to the BRBCT broodstock development program.
- New windows were installed on the vat building with assistance from funding provided for operations related to the BRBCT broodstock development program.
- The interior of the shop was painted.
- A drain box was built near the back door of the vat building for disposal of chemicals.
- A ladder, landing platform and safety cage were installed on the feed silo.
- A sign for directing hatchery visitors was erected.
- The concrete, awnings, and trim portions of the vat building and residence #1 were painted.
- Stabilizing braces on the truck water tower were replaced.
- The residence #2 bathroom was remodeled.
- The water heater was replaced in residence #2.
- The interior of residence #2 was painted.
- The stairwell in residence #2 was carpeted.
- Floors in both entryways of residence #2 were tiled.
- The unsafe concrete sidewalk at residence #3 was torn out and replaced with cinders and stepping-stones.

HATCHERY NEEDS

- New settling basin.

- A central septic system for Residences #1, #2, #3, office and hatchery building to replace the earthen sewage pond.
- Installation of an exhaust system to eliminate interior condensation in the hatchery building.
- Explosion proof exhaust fan with timer system for the chemical storage room.
- New concrete and French drain system for the Residence #2 driveway.
- New carpet in Residences #1 and #2.
- New paint on the vat exteriors.
- Decks at Residences # 2, #3, and #4 need sanded and stained.
- Gravel at the “boneyard” area.

ACKNOWLEDGMENTS

We thank Biological Aides Chad Smith and Janae Starnes for their very important contributions to the hatchery; IDFG reservists Wendell Dunn and Jay Pierson for assistance with the Free Fishing Day event; Senior Conservation Officers Nathan Stohosky, Korey Owens, Brandon Chamberlin, Tyler Peterson, and Tom Burkhart for their assistance with routine duties; Natividad Wilson and her crew for administering the fin clips; the fish transport operators from Hagerman, Nampa, and Eagle for assistance with hauling; Jason Jones, fish culturist at Mackay Fish Hatchery and Chris Jeszke, manager at Ashton Fish Hatchery, for assistance with lake trout spawning and triploid induction procedures; Phil Mamer, Doug Burton, and all of the Eagle Fish Health Lab staff; Matt Campbell and the crew at Eagle Fish Genetics Lab; and Story Fish Hatchery; Mantua Fish Hatchery; PacifiCorp for funding operations related to the BRBCT broodstock development program.

APPENDICES

Appendix 1. Grace Fish Hatchery average monthly and annual flows (cfs), 1994-2011.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
January	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	14.5	
February	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	13.4	
March	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	12.3	
April	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	12	
May^a	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	12	
June^a	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	13	
July^a	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	16.5	
August^a	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	20.4	
September^a	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	22.1	
October	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	21.9	
November	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	19.7	
December	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	18.7	
Annual Avg.	12.33	13.10	14.70	15.80	15.38	15.04	13.82	11.24	10.95	11.24	11.30	13.41	16.68	14.28	13.28	13.48	14.39	16.38	
% Annual Avg.	90%	96%	107%	115%	112%	110%	101%	82%	80%	82%	82%	98%	122%	104%	97%	98%	105%	119%	
Annual Avg. (1994 - 2011)	13.71																		

^a May through September irrigation rights can take up to 5.64 cfs.

Appendix 2. Grace Fish Hatchery production and costs summary, 2011.

Species (Size)	Number (Pounds) on 1/1/2011	Number (Pounds) Stocked/ Redist ^a	Number (Pounds) on 12/31/11	Net Production Number (Pounds)	Feed Pounds	Feed Costs ^b	Avg. fpp When Stocked/ Redist	Avg. Length When Stocked/ Redist	Avg. C= When Stocked/ Redist	Avg. Feed Conv. Net Prod	Comments
RBT 3N (catchable)	178,570 (25,249)	164,477 (55,205)	136,579 (15,192)	122,486 (45,148)	49,471	\$30,724	2.98	9.86"	3,500 x 10 ⁻⁷	1.10	Net Prod includes BY10 and BY11, 13K stocked as fing
RBT 3N (fingerling)	0 (0)	699,215 (12,582)	110,000 (45)	809,215 (12,627)	9,925	\$7,115	55.57	3.62"	3,800 x 10 ⁻⁷	0.79	
RBT 2N (fingerling)	0 (0)	168,750 (13,500)	0 (0)	168,750 (13,500)	12,562	\$7,997	12.50	6.00"	3,700 x 10 ⁻⁷	0.93	
LKT 3N (fingerling)	22,000 (10)	14,400 (960)	22,000 (10)	14,400 (960)	1,180	\$1,655	14.58	6.05"	3,100 x 10 ⁻⁷	1.23	Net Prod includes BY10 and BY11
BLBCT (fingerling)	47,350 (1,673)	98,824 (5,640)	0 (0)	51,474 (3,967)	4,065	\$2,645	17.52	5.82"	2,900 x 10 ⁻⁷	1.03	Net Prod includes BY10 and BY11
Summary^c	247,920 (26,932)	1,145,666 (87,887)	268,579 (15,247)	1,166,325 (76,202)	77,203	\$50,136	13.04	6.03"	3,500 x 10⁻⁷	1.01	

^a Catchable redistribution summary: Clearwater = 34,220 fish (11,650 pounds); McCall = 6,000 fish (2,000 pounds).

^b Feed costs do not include freight and fuel charges. See appendix 4.

^c Please see the 2011 Bear River Bonneville cutthroat trout production report for additional Grace Fish Hatchery production information.

Personnel Cost	Operating Cost ^d	Transport Cost	Total Cost Net Prod	Cost/1,000 Fish Net Prod	Cost/ Pound Net Prod
\$165,505	\$110,241	\$7,645	\$283,391	\$242.98	\$3.72

^d Includes PCA 31810 (Grace Fish Hatchery operating budget) and PCA 31843 (feed, eggs, freight and fuel charges budget).

Appendix 3. Eggs received at Grace Fish Hatchery and egg costs, 2011.

Date Received	Number of Eyed Eggs	Source	Species	Lot	Destination	Cost
1/6/2011	429,975	Troutlodge	3N RBT	11-WA-TT-1	R1 & R5 spring/fall 2011	\$9,982.50
2/3/2011	347,760	Troutlodge	3N RBT	11-WA-TT-2	Am. Falls spring 2011	\$9,831.25
3/3/2011	181,500	Troutlodge	2N RBT	11-WA-TD-1	Island Park fall 2011	\$3,810.63
5/5/2011	190,315	Troutlodge	3N RBT	11-WA-TT-3	Catchables 2012	\$5,747.50
6/20/2011	70,315	UDWR-Mantua	BLBCT	11-UT-BLBCT-1	Bear Lake fall 2011	\$0.00
11/17/2011	49,650	Troutlodge	3N RBT	11-WA-TT-4	R5 spring 2012	\$1,300.75
12/7/2011	156,570	WGFD-Story	LKT	11-WY-LKT-1	Bear Lake fall 2012	\$160.74
12/12/2011	78,720	Hayspur	3N RBT	11-ID-T9-1	R1 spring 2012	\$0.00
Total	1,504,805					\$30,833

Appendix 4. Feeds used at Grace Fish Hatchery and associated costs, 2011.

Source	Type	Size	Pounds Used	Cost	Average Cost Per Pound
Rangen	TSS	0	654	\$622.97	\$0.9526
Rangen	TSS	1	836	\$796.95	\$0.9533
Rangen	TSS	2	3,623	\$3,452.72	\$0.9530
Rangen	TSS	3	1,127	\$1,074.15	\$0.9531
Rangen	Grower	3	6777	\$4,235.47	\$0.6250
Rangen	Grower	4	4,986	\$3,115.94	\$0.6249
Rangen	Low P 450 Ext	3/32"	59,894	\$36,624.57	\$0.6115
Rangen	Soft Moist	1/32"	44	\$67.76	\$1.5400
Rangen	Soft Moist	3/64"	264	\$401.28	\$1.5200
Rangen	Soft Moist	1/16"	132	\$196.68	\$1.4900
Rangen	Soft Moist	3/32"	616	\$899.36	\$1.4600
Freight and Fuel				\$2,644.33	
Total^a			78,953	\$54,132.18	\$0.6856

^aThis includes feed used by Bear River Bonneville cutthroat trout: 1,750 pounds

Appendix 5. Fish transport operator costs for Grace Fish Hatchery, 2011.

Operator	Miles	Cost/Mile	Cost
Hagerman	3,447	\$2.218	\$7,645
Nampa ^a	0	\$0.00	\$0
Total	3,447	\$2.218	\$7,645

^a Redistributed only

GRACE FISH HATCHERY
2011 BEAR RIVER BONNEVILLE CUTTHROAT TROUT PRODUCTION REPORT

Eric Pankau, Fish Culturist
Beau J. Gunter, Assistant Fish Hatchery Manager
Bryan Grant, Fish Hatchery Manager I

ABSTRACT

Grace Fish Hatchery began the year with 17,025 Bear River Bonneville cutthroat trout (278 pounds) on station. A total of 17,003 fish (2,076 pounds) were stocked. The average size of a stocked fish was 8.19 fish per pound or 7.12 inches in length. There were 8,939 fish (115 pounds) on station at the end of the year. This results in a net production of 8,917 fish (1,913 pounds) for 2011. The amount of feed used was 1,750 pounds.

INTRODUCTION

The Idaho Department of Fish and Game has a cooperative agreement with PacifiCorp to develop a Bear River Bonneville cutthroat trout (BRBCT) broodstock 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).

In 2007, IDFG fisheries personnel began collecting wild, subadult BRBCT from the Cottonwood Creek drainage in the Thatcher MU. Wild fish are PIT tagged and released into a spring fed pond near Grace, Idaho owned by Mr. Kent Clegg, upon genetic confirmation that no hybridization is present. To date, approximately 667 wild BRBCT have been collected and released into the pond.

An attraction channel has been constructed at the pond using the spring creek that flows into it. A picket weir with trap box has been placed into the attraction channel to trap fish that attempt to migrate upstream to spawn. The trap is routinely monitored by personnel from the Grace Fish Hatchery (GFH) from April through June. Individual fish that enter the trap are scanned for a PIT tag. Upon confirmation of a PIT tag, individuals are placed into sex specific holding tanks and are regularly monitored for maturation.

Individual fish are spawned when GFH staff confirm ripeness. Green eggs are then transported to GFH for incubation. Upon hatching, fry are reared indoors and eventually moved to the small raceways as fingerling. Fish are reared until 6-8 inches in size. They are then stocked within the Thatcher MU as directed by the southeast regional fisheries manager.

PRODUCTION SUMMARY

There were 17,025 fish (278 lbs.) from the 2010 brood year on station at the beginning of 2011 (Appendix 1). These fish were stocked into various Bear River tributaries within the Thatcher MU to meet supplementation and reestablishment objectives. A total of 17,003 fish (2,076 lbs.) were stocked averaging 8.19 fish per pound or 7.12 inches in length (Appendix 1).

From May 4 through June 8, staff from GFH spawned 29 female and 52 male BRBCT from the pond. An estimated 25,328 green eggs were obtained (Appendix 2).

There were 8,939 fish (115 lbs.) from the 2011 brood year on station at the end of 2011 (Appendix 1). This results in a net production of 8,917 fish (1,913 lbs.) for 2011 (Appendix 1).

FISH FEED

The amount of feed used was 1,750 pounds at a cost of (Appendix 1). The average feed conversion was 0.92 pounds of feed to produce a pound of fish (Appendix 1).

FISH HEALTH SUMMARY

An array of tissue samples were taken from all BRBCT female spawners. *Renibacterium salmoninarum*, the causative agent for bacterial kidney disease, was present in 2/29 individuals. All eggs associated with these two females were culled (Appendix 2).

Data on relatedness of spawning crosses was analyzed by the Eagle Fish Genetics Lab (EFGL). Staff at EFGL determined that there was one related cross, most likely a half-sibling cross, so these eggs were culled (Appendix 2). Managers at EFGL advocate that fish are genetically screened prior to ponding in order to ensure that inbreeding is minimized and genetic diversity is maximized.

Significant mortality (~54%) occurred at the swim-up fry stage. Individuals either experienced protruding of the stomach and intestines from the abdomen or they did not take to feed and "pin-headed." The cause was determined unknown. Fish nutrition professionals at the Bozeman Fish Technology Center have been contacted and will assist GFH managers with the formulation of a special starter diet for use in future brood years.

FISH MARKING

All brood year 2010 fish received an adipose clip prior to being stocked.

All brood year 2011 fish will receive an adipose clip prior to being stocked.

ACKNOWLEDGMENTS

We thank Biological Aides Chad Smith and Janae Starnes for their very important contributions to the hatchery; Kent Clegg for allowing use of his property and his willingness to assist; Natividad Wilson and her crew for administering the adipose clips; Ryan Hillyard and his crew for assistance with spawning and wild fish collection; Doug Burton of the Eagle Fish Health Lab; Matt Campbell and the staff at Eagle Fish Genetics Lab; and PacifiCorp for funding operations related to the BRBCT broodstock development program.

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- Teuscher, D., and J. Capurso. 2007. Management plan for conservation of Bonneville cutthroat trout in Idaho. Idaho Department of Fish and Game, Report No. IDFG 07-48. Boise.

APPENDICES

Appendix 1. Grace Fish Hatchery Bear River Bonneville cutthroat trout production summary, 2011.

Species	Number (Pounds) on 1/1/2011	Number (Pounds) Stocked/ 12/31/11	Number (Pounds) on 12/31/11	Net Production Number (Pounds)	Feed Pounds	Avg. fpp When Stocked	Avg. Length When Stocked	Avg. C= When Stocked	Avg. Feed Conv. Net Prod
BRBCT	17,025 (278)	17,003 (2,076)	8,939 (115)	8,917 (1,913)	1,750	8.19	7.12"	3,400 $\times 10^{-7}$	0.92

Appendix 2. Bear River Bonneville cutthroat trout eggs received at Grace Fish Hatchery, 2011.

<u>Date</u>	<u>Female</u>	<u># green eggs</u>	<u># eyed eggs</u>	<u>% eye-up</u>	<u>Comment</u>
5/4/2011	1	1,060	892	84.15%	
5/4/2011	2	831	809	97.35%	
5/11/2011	3	864	844	97.69%	
5/11/2011	4	956	478	50.00%	
5/11/2011	5	746	706	94.64%	
5/18/2011	6	1,208	1,194	98.84%	
5/18/2011	7	472	372	78.81%	
5/18/2011	8	400	368	92.00%	
5/18/2011	9	1,136	1,077	94.81%	
5/18/2011	10	900	887	98.56%	
5/18/2011	11	424	410	96.70%	
5/18/2011	12	630	616	97.78%	
5/18/2011	13	1,344	1,326	98.66%	
5/18/2011	14	801	787	98.25%	
5/25/2011	15	1,131	1,100	97.26%	
5/25/2011	16	1,097	1,082	98.63%	
5/25/2011	17	713	658	92.29%	
5/25/2011	18	842	828	98.34%	
6/1/2011	19	840	778	92.62%	
6/1/2011	20	1,001	975	97.40%	
6/1/2011	21	1,110	1,043	93.96%	culled ELISA
6/8/2011	22	795	82	10.31%	Male = low milt
6/8/2011	23	472	356	75.42%	
6/8/2011	24	1,680	942	56.07%	
6/8/2011	25	564	541	95.92%	culled related
6/8/2011	26	1,024	677	66.11%	
6/8/2011	27	990	778	78.59%	culled ELISA
6/8/2011	28	979	966	98.67%	
6/8/2011	29	318	307	96.54%	
Total		25,328	21,879	86.38%	
Total minus culls		19,517			

HAGERMAN FISH HATCHERY

Joe Chapman, Hatchery Manager II
David May, Assistant Hatchery Manager I
Gregg Anderson, Fish Culturist
Daniel Anta, Fish Culturist
Ken Taylor, Fish Culturist

INTRODUCTION

Hagerman Fish Hatchery (HFH) is a state-owned resident trout production facility. The HFH raises several strains of rainbow trout *Oncorhynchus mykiss* and various specialty species for statewide distribution. The HFH is the 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 Dingell-Johnson (DJ) monies. The HFH used approximately \$839,602 this year: \$655,343 from DJ monies, \$115,212 from PCA 31843, \$12,471 from other accounts, and \$56,576 from the fish transportation budget, to rear and stock fish in the 2011 production year, not including capital outlay expenditures (Appendix 1). Most of the increase in the budget over the past few years has been caused by an increase in fish food cost, which has almost doubled in the past five years.

The HFH is staffed with a Hatchery Manager II, an Assistant Hatchery Manager, and three Fish Culturists. In the spring of 2011, the Fish Transport Operator position was upgraded to Fish Culturist. 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. 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 2011, the HFH reared and stocked 3,096,134 fish weighing 483,643 lbs. Of these, 1,217,179 were stocked 6 inches or longer and 1,878,955 were stocked smaller than 6 inches (Appendix 1). About 41.4% 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 89,920 steelhead were also stocked, and about 28,517 yellow-phase rainbows were stocked locally throughout the stocking season. The 2-inch to 6-inch fish consisted of 1,324,410 rainbow trout from Hayspur, 81,000 rainbow trout from Troutlodge, and 473,545 coho salmon (Appendix 1).

The 483,643 lbs stocked included 429,093 lbs of put-and-take fish averaging 9.5 inches, and 54,550 lbs of fingerlings that averaged 4.0 inches. The cost of planting the average 6.4 fish per pound (fpp) (7.1 inches) fish was approximately \$1.44 per lb, or \$224.29 per 1,000 fish (Appendix 1).

In addition to the fish reared and planted, 748,358 fish (82,433 lbs) were on hand at the HFH on December 31, 2011, all residing in the large raceways. The cost of producing these fish was \$1.76 per lb or \$193.98 per 1,000 (Appendix 1).

On hand January 1, 2011 were 1,210,481 fish (128,239 lbs). The HFH also received 953,864 fish (4,873 lbs) from other hatcheries. Consequently, these subtractions yielded a net production for 2011 of 1,680,147 fish (432,964 lbs), mortality excluded (Appendix 1). The cost of producing the net production was \$1.48 per lb, or \$218.39 per 1,000.

A total of 6,485,254 eggs and fry were acquired to yield the fish produced. Approximately 1,275,871 eggs were purchased and the balance was acquired from government sources at no cost (Appendix 4). Of the eggs and fry received, 4,988,557 were received for the fish planted and the balance was used for 2011 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 196 fpp (2.25 inches). Because of continued success, eggs were again shipped to MVFH for early rearing and will be transferred here in February 2012.

The overall survival rate of fish stocked was 62.1%, slightly better than last year's 58.4% (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. This virus continues to damage different organs, such as the skin and brain. Losses to Ichthyophthirius (ICH) in 2011 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 76% of the rainbow catchables stocked. 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 greater than 70% the last four years.

Fish Culturist Ken Taylor logged 25,020 miles delivering fish to state waters, while the rest of the crew logged 13,284 miles. This amounted to a total of 38,304 miles and 449 stocking trips during 2011, and included 33 trips for the private sector and other IDFG hatcheries.

In addition to the annual requests by regional fisheries managers, the HFH crew made 33 trips to haul and stock 834,280 fish weighing 100,375 lbs from other sources (Appendix 6). These included eight trips for the American Falls Fish Hatchery (AFFH) to stock 46,865 Bear Lake cutthroat weighing 5,150 lbs, 9,000 brown trout weighing 1,075 lbs, and 104,126 rainbow trout weighing 41,166 lbs; one trip to stock 20,582 channel catfish weighing 6,430 lbs; six trips for Grace Fish Hatchery (GFH) to stock 502,350 rainbow trout weighing 20,300 lbs and one to stock 47,700 Bear Lake Bonneville cutthroat trout weighing 5,300 lbs; one trip for Ashton Fish Hatchery (AFH) to stock 100,000 brook trout weighing 6,584 lbs; one trip for Idaho Trout Company to stock 103 yellow trout weighing 490 lbs; one trip for the University of Idaho to stock 264 rainbow trout weighing 1,250 lbs, and 15 trips for Clear Springs Foods to stock 3,290 rainbow trout weighing 12,630 lbs.

FISH FEED

The fish produced during 2011 were fed a total of 555,624 lbs of feed from Rangen Inc. (Appendix 5). The net weight gained during 2011 was 432,964 lbs, which resulted in an overall conversion of 1.28 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 0.60 per pound.

HATCHERY IMPROVEMENTS

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

- Added a pipeline to gain additional water from upper Tucker Springs.
- Installed a water line to the Riley Creek shed for disinfection of buckets.
- Replaced the broken valve in west raceway #5, and repaired the upper automatic gate.
- Converted the old clipping trailer to a storage/biosecurity area for Riley Creek raceways.
- Assisted engineering crew with installation of 4-foot high concrete dam at Riley Creek intake.
- Installed bollards around fuel storage tanks.
- Painted fishing access bridges, picnic tables, and boot room, and reorganized boot room.
- Removed downed trees above Riley Creek intake and below lower (Highway 30) bridge.
- Removed Russian olive trees above upper bridge to allow fishing access.
- Built and installed carp jump barrier at Oster Lake #1.
- Assisted with the carp removal in Oster Lake #1.
- Pruned trees with man lift around hatchery residences.
- Added gravel to the Tucker Springs raceway's roads.
- Removed, repaired, recalibrated, and installed the Riley Creek flow meter in June.
- Ordered and received new 1.5 ton truck and two new 4-wheelers.
- Repaired a leak in the domestic water supply line.
- Replaced the old fish feed scale system on the fish feeder.
- Installed new high-efficiency lighting in residences and hatchery buildings.

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 25 tours to 1,574 school kids during the spring and fall; two tours for area scouts; three tours for 4-H, Boy's Club, and a handicapped group; plus two for large groups of adults. Finally, the hatchery hosted a Free Fishing Day clinic here for about 600 participants on June 10. The Hagerman Boy Scouts and personnel from Hagerman National Hatchery and the Department assisted. Pepsi-Cola, Clear Springs Foods, Costco, Walmart, Trader Jack's, 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 non-enforcement training and spawning fish.

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. This program was presented at the AFS annual meeting where it received the best professional paper award and again at the Northwest Fish Culture Conference in Victoria, British Columbia.

ACKNOWLEDGMENTS

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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 2011. Costs reflect all costs budgeted, except capital outlay, and include \$56,576 of the fish transportation budget.

Species/Strain	Length/ Inches	Number Produced	Weight/ Pounds	Cost To Produce and Plant	Cost/ Cost/ 1,000 Pound
Fish On Hand January 1, 2011					
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>		
Totals	6.3	1,210,481	128,239		
Fish Planted					
Rainbow trout, yellow (YT,ITC,09)	13.1	28,517	28,516	\$15,131.49	\$530.61 0.53
Kamloops rainbow trout (TL,TT)	9.5	855,438	299,574	\$330,029.51	\$385.80 1.10
Hayspur rainbow trout (T9)	8.8	199,004	55,829	\$71,305.03	\$358.31 1.28
Rainbow trout, (R1,Cl.Springs)	9.8	44,300	17,274	\$17,572.65	\$396.67 1.02
Steelhead (SA)	<u>9.4</u>	<u>89,920</u>	<u>27,900</u>	<u>\$34,174.18</u>	<u>\$380.05 1.22</u>
Subtotals	9.5	1,217,179	429,093	\$468,212.86	\$384.67 1.09
Hayspur rainbow trout (T9)	4.0	1,324,410	39,100	\$217,198.44	\$164.00 5.55
Kamloops rainbow trout (TL,TT)	2.7	81,000	750	\$9,025.26	\$111.42 12.03
Coho	<u>4.3</u>	<u>473,545</u>	<u>14,700</u>	<u>\$83,548.58</u>	<u>\$176.43 5.68</u>
Subtotals Average	4.0	1,878,955	54,550	\$226,223.71	\$120.40 4.15
Total Planted Average	7.1	3,096,134	483,643	\$694,436.57	\$224.29 1.44
Fish On Hand December 31, 2011					
Kamloops rainbow trout (TL,TT)	5.8	574,934	47,354	\$134,760.23	\$234.39 2.85
Rainbow trout, yellow (YT,ITC,10)	11.0	8,210	4,756	\$3,687.00	\$449.09 0.78
Hayspur rainbow trout (T9)	<u>7.6</u>	<u>165,214</u>	<u>30,323</u>	<u>\$6,718.21</u>	<u>\$40.66 0.22</u>
	6.4	748,358	82,433	\$145,165.44	\$193.98 1.76
Total Fish Produced	7.0	3,844,492	566,076		
Planted in 2011	7.1	3,096,134	483,643		
On Hand December 31, 2011	6.4	748,358	82,433		
Totals	8.4	3,844,492	566,076	\$839,602.00	\$218.39 1.48
From other hatcheries	2.3	953,864	4,873		
On Hand January 1, 2011	6.3	1,210,481	128,239		
Total Gained	8.4	1,680,147	432,964		

Appendix 2. Fish distribution from Hagerman Fish Hatchery, 2011.

	Percent of number planted by Region								
	Number	Pounds	1	2	3	4	5	6	7
Catchables ≥6 inches									
Rainbow trout, yellow	28,517	28516	-	-	6.9	65.5	7.5	20.1	-
Kamloops rainbow trout (TT)	855,438	299,574	-	16.0	20.4	41.2	17.5	5.0	-
Hayspur Rbt (T9)	199,004	55,829	-	-	-	52.7	47.3	-	-
Steelhead (SA)	89,920	27,900	-	-	100.0	-	-	-	-
Rainbow trout (R1 Cl.Spr.)	44,300	17,274	-	-	99.5	0.5	-	-	-
Subtotal	1,217,179	429,093	-	11.2	25.5	39.1	20.2	4.0	-
Fingerlings <6 inches									
Hayspur rainbow trout (T9)	1,324,410	39,100	-	-	1.0	54.6	44.4	-	-
Kamloops rainbow trout (TT)	81,000	750	-	-	-	100.0	-	-	-
Coho	473,545	14,700	-	-	100.0	-	-	-	-
Subtotal	1,878,955	54,550	-	-	25.9	42.8	31.3	-	-
Total	3,096,134	483,643	-	4.4	25.7	41.4	26.9	1.6	-

Appendix 3. Fish survival from eyed-egg to stocking, 2011.

Species/Strain	Number Stocked	Eggs and Fry Received	Percent Survival
Catchables:			
Rainbow trout, Yellow	28,517	49,177	58.0
Rainbow trout (T9)	199,004	361,825	55.0
Kamloops, Troutlodge (TT)	855,438	1,263,247	67.7
Steelhead (SA)	89,920	127,147	70.7
Rainbow trout, Cl.Spr (R1)	44,300	114,250*	38.8*
Subtotal:	1,217,179	1,915,646	63.5
Fingerlings:			
Rainbow trout (T9)	1,324,410	2,219,560	59.7
Rainbow trout (TT)	81,000	103,351	78.4
Coho	473,545	750,000	63.1
Subtotal:	1,878,955	3,072,911	61.1
Total	3,096,134	4,988,557	62.1

*Poor survival due to air lock in pipeline.

Appendix 4. Number of eyed-eggs and fry received, species, and source for fish produced in 2011.

Species/Strain	Eggs/Fry received		Source
	For Fish Planted	For fish on hand December 31, 2011	
Received as eggs			
Catchables			
Rainbow/Yellow	49,177	38,808	Clear Lakes (ITC)
Rainbow (T9)	361,825	285,369	IDFG Hayspur
Rainbow/sterile (TT)	1,263,247	1,172,520	Troutlodge, WA
Steelhead	127,147	0	IDFG Pahsimeroi
Rainbow (R1, Cl. Spr)	114,250	0	Clear Springs Foods
Fingerlings			
Rainbow (T9)	1,265,696	0	IDFG Hayspur
Rainbow (TT)	103,351	0	Troutlodge, WA
Coho	750,000	0	Eagle Crk Nat'l Hatchery
Subtotal eggs	4,034,693	1,496,697	
Received as fry			
Rainbow from Magic Valley (T9)	953,864	0	IDFG Hayspur
Subtotal fry	953,864		
TOTAL	4,988,557	1,496,697	

Appendix 5. Fish feed used during 2011 at Hagerman Fish Hatchery.

Size	Source	Pounds	Cost/pound	Cost*
Starter	Rangen	500	\$0.953	\$476.53
Starter, soft moist	Rangen	88	1.660	\$146.08
Starter, 1/32" soft moist	Rangen	352	\$1.547	\$544.50
#1	Rangen	2,750	\$0.953	\$2,620.75
#2	Rangen	17,750	\$0.962	\$17,067.74
#3	Rangen	22,550	\$0.658	\$14,837.24
#3 TM	Rangen	500	\$1.000	\$500.00
#3 Aquaflor	Rangen	3,860	\$1.597	\$6,164.87
1/16 in, EXT450Float	Rangen	12,650	\$0.730	\$9,232.88
3/32 in, EXT450Float	Rangen	86,140	\$0.602	\$51,891.04
3/32 in, Aquaflor	Rangen	880	\$1.593	\$1,401.46
5/32 in, EXT450Float	Rangen	403,220	\$0.554	\$223,400.13
5/32 in, Aquaflor	Rangen	4,384	\$1.484	\$6,503.58
Subtotal		555,624	\$0.603	\$334,786.80

*Freight and fuel charges included in cost

Appendix 6 Fish stocked by Hagerman Fish Hatchery from other sources, 2011.

Hatchery Stocking	Species	Number	Pounds	Source	Destination
Hagerman	TT,C5, BN	159,991	47,391	American Falls Hatchery (IDFG)	Am. Falls Res., Little Wood R., Bear Lake, Blackfoot Res.
Hagerman	TT,C5, TD	550,050	25,600	Grace Fish Hatchery (IDFG)	Hayden Lake, Island Park Res., Bear Lake, Cocolalla Lake
Hagerman	R1	103	490	Idaho Trout Company	Oster 1, Riley P
Hagerman	BK	100,000	6,584	Ashton Fish Hatchery (IDFG)	Henrys Lake
Hagerman	R1	264	1,250	University of Idaho	Carmella Vineyard P, Gooding Golf Course P, Oster #1-4, Riley P, Rocky's P
Hagerman	R1	3,290	12,630	Clear Springs Foods	Filer P, Empire P, Emerald Lake, Crystal Lake, Dierkes Lake, Riley Crk, Oster #1, Carmela Vineyard P, Connor P, Dog Crk Res., Edson Fichter P, Ryder P, McTucker P, Freedom Park P, Settler's P, McDevitt P, Gooding Golf Course P
Hagerman	CC	20,582	6,430	Fish Processors, Buhl, ID	Alexander Res., Dierkes Lake
TOTAL:		834,280	100,375		

HAYSPUR FISH HATCHERY

Bradford W. Dredge, Fish Hatchery Manager II
Richard E. Park, Fish Hatchery Assistant Manager

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 goal. One captive rainbow trout *Oncorhynchus mykiss* broodstock, the Hayspur strain, was maintained on station during the 2011 season. The HSFH personnel maintain an on-site public campground, family fishing water (Gavers Lagoon), and trophy trout 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 EYED EGG PRODUCTION

The 2011 rainbow trout spawning season was a seven-month project, beginning in October and ending in May, with an egg take of 8,403,997 green eggs from 3,790 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 were manipulated. Hayspur rainbow trout eyed egg production totaled 6,555,111 with 3,790 females spawned, and overall eye-up was 78.00% (76.40% in 2010). The Hayspur seasonal eye-up was 78.00%, up from 76.5% in 2010, down from 80.07% in 2009, and up from 70.76% in 2008. All eggs produced, except for broodstock replacement eggs and some for Hagerman State Fish Hatchery, were pressure shocked for triploidy. Ashton Fish Hatchery, Grace Fish Hatchery, Hagerman State Fish Hatchery, Hagerman National Fish Hatchery, Mackay 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 \$32.25/1,000 for sterile triploid rainbow trout eggs and \$18.00/1000 for diploid rainbow trout eggs equates to \$118,457.24 (Appendix 2).

In 2011, almost all rainbow trout eggs produced for shipping were pressure shocked and made sterile. A total of 1,188,788 diploid rainbow trout eggs were produced for Hagerman State

Fish Hatchery. This was the eleventh 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 testing of randomly selected groups. A total of 149 individuals were sampled. Sample results indicated that 149 out of 149 were verified as being triploid (Hagerman 100/100 and Nampa 49/49). The overall induction rate was 100.00%, equal to 100% in 2010, and up from 99.74% in 2009.

FISH LIBERATIONS

Fish requested for the Big Wood and Little Wood drainages were reared at Nampa Hatchery (49,075). All fish were directly planted from the Nampa Fish Hatchery to complete HSFH 2011 plant requests. A total of 26 stocking trips into the Big Wood and Little Wood drainages were stocked with 46,075 catchable sized rainbow trout. A total of 5,904 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 26 separate stocking trips during the year. Fish from HSFH were planted by truck into 14 different bodies of water. Hayspur personnel traveled 8,179 miles for an average of 315.57 miles per trip. The fleet rental charge was \$305.00/month and 40 cents/mile for the 2-ton truck. Fleet rental for the 1-ton truck was \$225/month and 0.37 cents/mile. HSFH fish transport cost totaled \$9,409.29 for 2011.

FISH FEED

Rangen's was the primary source of all rearing feeds. Rangen's was fed to broodstock, brood replacements, and catchables that were held on station. The 1/4-in brood food was ordered with 150 grams per ton of canthaxanthin red additive to enhance egg color and other possible health benefits (Appendix 4).

HATCHERY IMPROVEMENTS AND NEEDS

Improvements

- G. J. Verti-Line Pumps removed, repaired, and reinstalled in well #3 during September.
- Energy Star high efficiency light bulbs were installed in all permanent employee residences, office, hatch house, incubation, and generator buildings.
- The TRC-APV was serviced and had the hydraulic reservoir and fluid replaced, valves replaced, pressure gauges replaced, and new gaskets installed.
- The Fish and Game 2-way radio was removed from the ½ TPU and returned to the Bureau of Communications in Twin Falls.
- All of the residences and the dormitory had the carpets cleaned.

- All of the hatchery fire extinguishers were serviced.
- The domestic water pump water supply lines in the domestic water room were repaired.
- All hatchery and resident door locks were serviced and repaired if needed by Wood River Lock and Key.
- The 2½ ton stocking truck had the brake and suspension inspected. In addition, two new front tires were purchased and a front-end alignment was completed.
- New 10' x 10' garage doors were purchased and installed in the five shop bays.
- 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.
- New glass was cut and installed in the windows of the barn. The barn was also totally emptied and cleaned thoroughly.
- Additional fencing was installed around well #4.
- The park restrooms in the campground were pumped and serviced.
- The propane tank behind the office building was lifted and leveled.
- Overhead Door Company serviced garage doors and made repairs as needed.
- Five frost-free spigots were removed and replaced with new ones.
- The lawn mowers were serviced and repaired as needed.
- Buffalo Electric inspected the Generator #2 electrical panels that operate pumps 3 and 4 and made repairs as needed.
- All of the residence chimneys were inspected and cleaned.
- A new dormitory dryer was purchased and installed in temporary quarters.

Needs of the HSFH are:

- Purchase two ARED moist air incubators to supply eggs to receiving hatcheries at the proper time.
- Purchase/acquire new high power steam/pressure washer.
- Construct permanent roofed structures over both sets of small raceways and upper sections of large raceways E and F to make them more biologically secure.
- Outfit three round ponds with light excluding ventilation systems.
- Replace the roof on residence #3.
- Install vapor barrier and concrete wall insulation underneath residence #2. Make minor repairs to insulation in crawl space.
- Insulate heat ducts in crawl space of residence #3.

- Check vapor barrier and concrete wall insulation under all residences.
- Remove willows/trees between residence #1 and residence #3 that are located near/by overhead power lines.
- 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.
- Scrape, make repairs, and paint residence #2 siding.
- Purchase and install chain link fence material for yards of residences #1 and #2.

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 incubator trays were used to separate individual families. In 2011, three R9 families tested positive for bacterial kidney disease (BKD) and were culled. This was the first time in the last four years that BKD positives were detected in the replacement broodstock population. Isolation group #3 required that fish number 3 and fish number 9 be culled while isolation group #4 had fish number 13 removed.

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 February 10 (BY08) and again on September 13. The remaining BY08 and BY09 adults (6,626) were injected with erythromycin (Gallimycin-100) at a rate of 0.2 ml/kg from October 3 through October 24. In conclusion, all BY09 adults were injected with a coldwater disease vaccine July 18 and 19, 2011.

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), Carey Cub Scouts, Sun Valley Adaptive Sports Group, Wood River YMCA, local area Boys Scouts, Mountain Adventures of Sun Valley, Sun Valley Community

School, Carey Elementary School, Magic Valley High School, Hailey Elementary, Little River Preschool, Mountain School, Kimberly Middle School, and the Woodside Elementary School all brought groups in for tours. The tours consisted of history and significance of the hatchery, the life cycle of trout, water sources, and water treatment, followed up by a question and answer period (Appendix 6).

MISCELLANEOUS

- In January, Tom Frew, Kelton Hatch, and Brent Snider received 4,610, 1,700, and 200 eyed eggs for Trout in Classroom (TIC) programs, respectively.
- Richard Park attended a biosecurity workshop on March 1.
- Milt was collected and delivered to Henrys Lake Hatchery on March 8 and on March 28.
- Richard Park attended a Strategic Planning meeting on April 15.
- On May 12, Richard Park and Dan Trahan assisted by Doug Burton and Bob Esselman collected Williams Lake gametes for experimentation at Hayspur FH in order to attempt to develop a spring spawning broodstock.
- Richard Park attended ISTS the week of May 23.
- Brad and Richard attended a fish production meeting in Boise on May 26.
- On June 8, Brad Dredge and Jeff Harris (Industrial Safety Advisor) conducted the Hayspur Fish Hatchery's annual safety inspection.
- Light control timers were started in Round Ponds 2, 5, 7, 8, and 12 on June 21.
- Richard Park attended the U of I – CSI Coldwater Fish Culture course the week of the June 20 and the week of July 11.
- Brad attended a Fred Pryor Seminar on July 18 and 19 in Boise.
- Jamie Mitchell was promoted to Fish Hatchery Manager 2 at HSFH in December.

ACKNOWLEDGMENTS

In 2011, HSFH benefited from the capable assistance of Biological Aides Dan Trahan, Jeff McDonald, Kenyon Roark, Joe Buchanan, Sarah Wolf, Lindsay Purifoy, and Resident Fish Pathologist Doug Burton. The HSFH would like to thank IDFG employees who helped out during the spawning season: Jessica Buelow, Tim Ferguson, Greg Milner, Meghan Roos, Jim Sterling, Clint Rogers, Mike Stanton, Chad Wippermann, Steve Roberts, Dave May, Joe Chapman, Gregg Anderson, Dan Anta, Dan Fielding, Doug Meyer, Lee Garwood, and Rob Morris.

APPENDICES

Appendix 1. Egg production summary of Hayspur Fish Hatchery, 2011.

Species	¹Eggs Taken	²Eggs Shipped
T9's	5,366,323	3,017,742
R9's	1,188,788	1,188,788
Totals	6,555,111	4,206,530

¹Total is displaced (gram weight) of both good and bad eggs taken in 2011.
²Total is displaced (gram weight) of eyed eggs available for shipping in 2011.

Appendix 2. Eyed egg shipment summary from Hayspur Fish Hatchery, 2011.

Hatchery	¹Species	Total eggs shipped	²Estimated value
Hagerman	T9	1,110,274	\$35,806.34
	R9	1,188,788	\$21,398.18
Grace	T9	78,720	\$2,538.75
Magic Valley	T9	832,973	\$26,863.38
Mackay	T9	180,727	\$5,828.45
Nampa	T9	581,888	\$18,765.89
Hagerman NFH	T9	150,000	\$4,837.50
Tuccanon NFH	T9	0	\$0.00
Ashton	T9	75,000	\$2,418.75
Shipped		4,198,370	\$118,457.24
³ Other	Thrown out 2N	2,348,203	\$42,267.54
	Research	378	\$12.19
	TIC	8,160	\$263.16
Total		6,555,111	\$161,000.24

¹ T9 = sterile, R9 = diploid

² At contract value of \$32.25/1,000 sterile rainbow trout eggs and \$18.00/1000 for diploid rainbow trout eggs.

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

Appendix 3. Hayspur Fish Hatchery stocking summary, 2011.

Fish size	F/lb	Pounds of fish	Number of fish
3N Catchables	2.95	16,517	49,075
2N Fingerlings	34.28	172	5,904

Appendix 4. Hayspur Fish Hatchery feed summary, 2011.

Rangen's		
Size	Amount /pounds	Cost
1/4 in. Brood pellet	21,420	\$*13,162.88
Trout/Salmon Starter #0	50	\$47.30
Trout/Salmon Starter #1	100	\$94.95
Trout/Salmon Starter #2	150	\$142.25
Trout/Salmon Starter #3	300	\$285.55
Trout Grower #4	0	\$00.00
Extruded 450 1/8"	1500	\$*834.58
Extruded 450 3/32"	350	\$211.75
Extruded 450 5/32"	1500	\$822.75
Subtotal	3,950	\$2,439.13
Totals	25,370	\$15,602.01

*Freight and fuel surcharges included.

Appendix 5. Hayspur Hatchery adult brood vaccinations 2011.

		<u>Vaccine Administered</u>		
		<u>Fish</u>	<u>Dose</u>	<u>Dates</u>
		<u>Treated</u>	<u>(ml/kg)</u>	<u>Vaccinated</u>
02/10/11	Gallimycin-100 ¹	BY08 (R9) ³	0.2	2/10/11
07/18-19/11	CWD Vaccine ²	BY09 (R9) ⁴	0.2	7/18-19/11
09/13/11	Gallimycin-100 ¹	BY08 (R9) ³	0.2	9/13/11
10/3-24/11	Gallimycin-100 ¹	BY08-09 (R9) ⁵	0.2	10/3-24/11

¹ Gallimycin-100 Lot # 9M018 Expires 6/1/11.

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

³ Broodstock replacement pond vaccinated in February and September.

⁴ Four two-year-old ponds vaccinated (4,379 fish total).

⁵ All BY09 adults and remaining BY08 adults injected. Round Ponds 6, 3, 10, 7, 12, 2, and 5 injected between 10/3/11 and 10/24/11.

Appendix 6. Hayspur Fish Hatchery Tour Group Summary, 2011.

Month	Name of Tour Group	Grade/Age	Number in Group
May	Carey Cub Scouts		10
	Hailey Elementary		50
	Local area Boys Scouts		60
	Community School		10
June	BC School District/YMCA/SV Adaptive Sports		86
	BCSO PAL Program		12
	Little river preschool		6
	Mountain Adventures		12
July	BCSO PAL Program		20
August	Carey Elementary	Age 6-11	15
	Mountain School	8 th grade	20
	SV Adaptive Sports		21
	YMCA		20
September	Kimberly Middle School	Grade 6-8	88
October	Magic Valley High School	Age 15-17	25
General Public	34 additional tours/526 people recorded for the year.		

HENRYS LAKE FACILITY
2011 ANNUAL RESIDENT REPORT

Jessica Buelow, Regional Fisheries Biologist

ABSTRACT

The 2011 trapping numbers at Henrys Lake included 3,037 Yellowstone cutthroat trout and 104 hybrid trout. The 2011 spawning operations produced 1,529,063 eyed Yellowstone cutthroat trout eggs and 366,406 eyed hybrid trout eggs. Sufficient pressure was not reached during sterilization for two batches of hybrid trout so these eggs were considered fertile and were delivered to American Falls Hatchery to be stocked in Salmon Falls Reservoir (35,484 eggs).

Pathology reports from ovarian fluid sampling for viral or bacterial presence were positive in four lots of eggs. One tray in lot 6 and 11, two trays in lot 9, and 4 trays in lot 12 were discarded due to a positive test. Subsamples of Yellowstone cutthroat trout and hybrid trout in the Hatchery Creek run were recorded for total length. Mean lengths of 457 mm and 560 mm were calculated, respectively.

The percentage of adipose fin clipped Yellowstone cutthroat returning to the ladder was recorded daily throughout the 2011 spawning run. 4.5% of Yellowstone cutthroat trout returning to the ladder in 2011 were adipose fin clipped. This season 64% of the run was male YCT where 33% were female YCT. The other 3% were hybrids. The male/female ratio is somewhat higher than the year before where 49% were males and 48% were females.

Henrys Lake production hybrids were evaluated for sterility induction success. Induction for 2011 was 100% successful for the triploid condition.

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. Five new fish screens were installed as a replacement for existing screens this summer. Landowner Incentive Program funds replaced a screen on Duck Creek and one screen on Targhee Creek. Fisheries Restoration Irrigation Mitigation Act (FRIMA) funds replaced two fish screens on Duck Creek and the Stockton fish screen on Targhee Creek.

Fishery habitat improvement projects were identified, evaluated, and funded at several locations in the Upper Snake region, including a fencing project on Henrys Lake that was funded through Fish and Wildlife Service Partners (Partners) funding and a screen replacement project on Targhee Creek that is being funded through a second Partners grant and match from the Henrys Lake Foundation. Evaluation of Crooked Creek (a multiyear channel rehabilitation project) is occurring on The Nature Conservancy property near Dubois, Idaho. These projects will be carried out in 2012.

During the winter when the lake is iced over, 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 2010/2011.

A creel survey was conducted this year on Henrys Lake from November 15 through January 1 to determine the impact of a new season extension that allows ice fishing on the lake through January 1. This was the first year the lake was open to fishing in December and the survey was used to evaluate the potential impact the season extension may or may not have on the fishery. The ice fishery was also compared to the 2009 open water creel survey. No creel survey was conducted on Island Park Reservoir.

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. Approximately 40% of the Henrys Lake Regional Fisheries Biologist position is to operate the hatchery, where 40% of the position is directed as a habitat biologist for the Upper Snake Region. The final 20% of the position is to carry out duties as a fisheries biologist with an emphasis on surveys conducted at Henrys Lake. These surveys include annual gill netting surveys, creel surveys (every three years), dissolved oxygen monitoring, and other activities that arise. This report will include an analysis of the hatchery season, habitat evaluations, and a summary of the creel analysis.

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 trout were examined to detect the presence or absence of adipose fins. Yellowstone

cutthroat trout were produced using ripe females spawned into six fish pools and fertilized with pooled milt from six males. Hybrid trout were produced with Yellowstone cutthroat trout eggs from the Henrys Lake run and rainbow trout milt obtained from the Hayspur Hatchery broodstock in Picabo, Idaho. 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 in August 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 six 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 2011 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 2011.

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 2011.

Water Quality/Dissolved Oxygen Profiles

Winter (December 2010, January 2011) 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/m³ for each cubic meter sample. This calculation results in a direct conversion of mg/L to g/m³ (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 (m²). 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/m². 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.

Creel Surveys

Annual creel surveys are conducted every three 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 on Henrys Lake. Creel surveys have been conducted during November and December on Henrys Lake to collect data relative to the season extension initiated in 2006. In 2011, the season was extended through January 1 on Henrys Lake and a creel survey was conducted through this period. No creel survey was conducted on Island Park Reservoir.

Habitat Improvement Projects

During 2011, 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 2011. Further details, accomplishments, and specifics are available in the Upper Snake Regional Fisheries report.

RESULTS AND DISCUSSION

Spawning Operation

3,037 Yellowstone cutthroat trout ascended the spawning ladder between February 22 and April 18, with 1,999 males (Figure 1) and 1,038 females (Figure 2) enumerated. Average length for Yellowstone cutthroat trout was 446 mm for males and 468 for females. The average length combined was 455 mm (Figure 5).

104 hybrid trout ascended the spawning ladder between February 22 and April 11, with 100 males (Figure 3) and 4 females (Figure 4) enumerated. Hybrid trout males averaged 567 mm (Figure 6).

Species/sex ratio at the Henrys Lake trap during 2011 included: YCT females 33%, YCT males 64%, hybrid males 3%, and hybrid females 0% (Figure 7).

Historical species/sex ratio at Henrys Lake for the years 2001-2011 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 2,292,452 from 782 females for a mean fecundity of 2,932 eggs per female (Table 1). Eyed Yellowstone cutthroat eggs totaled 1,529,063 for an overall eye-up rate of 67.3% (Table 1). YCT eye-up varied throughout the spawn season from a low of 50.2% in Lot 12 to a high of 79.6% in Lot 4 (Figure 9). 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 2011 production were released back into Henrys Lake in the fall of 2011. Eleven spawn days during this year's spring run were devoted to Yellowstone cutthroat spawning.

Hybrid trout green eggs totaled 586,650 from 201 females for a mean fecundity of 2,919 eggs per female (Table 2). Eyed hybrid trout eggs totaled 366,406 for an overall eye-up rate of 61.9 % (Table 2). Lot 5 and lot 9 eggs were treated to induce sterility. Four trays in lot 5 did not meet proper pressure for the full five minutes, and were therefore considered fertile and designated for Salmon Falls Reservoir. Hybrid eye-up was 57% in Lot 5 and 64.9% in lot 9 sterile component. 318,750 of the hybrid eggs were shipped to Mackay (Table 3) for hatching, rearing, and subsequent release into Henrys Lake, and 35,484 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.

The entire hatchery run of Yellowstone cutthroat trout was inspected for the presence or absence 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 12 years, adipose clip ratios have been recorded at the ladder. Results of this year's data (Figure 11) indicate 4.5% (137/3,037) of the YCT returning to the ladder were adipose fin clipped. The percentage of adipose clipped fish at the fish ladder has historically been higher than the 10% adipose clip rate. For the past three years, the number of adipose clipped fish has been under 10%. 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. The percentage of adipose clipped fish relative to run timing throughout the season varied, but showed a slight increase toward the end of the season (Figure 12).

Historical run numbers (2001-2011) of both Yellowstone cutthroat and hybrids were evaluated (Figure 13). The 2011 Yellowstone cutthroat adult return numbers were slightly short to make all egg requests. Eye-up rate was good this season and the number of fish stocked into the lake in the fall was close to requested numbers. 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. This year, eight trays tested positive for bacteria and were destroyed. Lot 6 and 11 each had one tray test positive, lot 12 had four trays destroyed for Yellowstone cutthroat trout, and lot 9 had two trays test positive and destroyed for hybrid trout. 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. Spring flooding caused high water and shortages on many fences for a period of time in June, but the fences were mended and operating properly as soon as they could be.

One new barbed wire fence was installed near Duck Creek as part of an agreement with the landowner for installation of a riparian fence the year before. The fence was approximately 130 feet long.

The fish screens functioned well during the summer of 2011. Five new fish screens were installed this summer. Three fish screens were replaced on Duck Creek and two fish screens were replaced on Targhee Creek. These new structures will require less maintenance and will operate more efficiently. Fish 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 2011. Periodic angler reports indicated fishing was good overall and angler satisfaction appeared high.

Henrys Lake

A creel survey was conducted on Henrys Lake from November 15, 2011 through January 1, 2012 to determine the potential population impact of ice fishing to the fishery. Instantaneous counts and angler surveys were collected two weekdays and two weekend/holiday days a week. 18,338 hours of angling effort was estimated for the entire 48-day winter season. Ninety one percent of the anglers were residents and 9% were non-residents. The total catch rate was estimated at 0.74 fish/hour. An estimated 13,495 fish were caught, with 2,708 of those harvested and remaining 80% of the fish caught were released. Yellowstone cutthroat made up 47% of the catch, brook trout made up 32% of the catch, and hybrid trout made up 20% of the catch. Further analysis and results are available in the regional fisheries report.

Water Quality/Dissolved Oxygen Profiles

Oxygen profiles for the period December 28, 2010 through February 25, 2011 were calculated 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 at all sites from December to February. Total dissolved oxygen mass diminished from 41.75 g/m² to 36.0 g/m² at the Pittsburgh/Targhee site, 36.5 g/m² to 26.31 g/m² at the hatchery site, from 29.32 g/m² to 23.36 g/m² at the County dock, 36.65 g/m² to 27.27 g/m² at the Wild Rose site, and 23.3 g/m² to 19.86 g/m² at the Outlet site (Figure 14). Depletion estimates were determined from these readings. 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.

Historically, the level of concern of oxygen levels has been established at 10 g/m². 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 2010-2011, 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.

ACKNOWLEDGEMENTS

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 Lake program, mostly during the spawning cycle. Of special consideration is James Brower, 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 \$30,000 was pledged this year alone to improve habitat, purchase fishery equipment, and to improve fish passage for natural production benefits. Without the support of the Foundation, 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. 10th Biennial Report. 10:113-114.

Table 1. 2011 Henrys Lake Spring Yellowstone Cutthroat Spring Spawning Summary.

Spawn Date	Lot Number	Females Spawned	Number of Green Eggs	Mean Fecundity	ML Eggs	Number Eyed Eggs	Disease Status	Percentage Eye-up
2/28/2011	1	60	177,480	2,958	6,735	105,234	Neg.	59.3%
3/1/2011	2	55	147,840	2,688	6,100	95,313	Neg.	64.5%
3/3/2011	3	54	159,678	2,957	7,500	117,188	Neg.	73.4%
3/7/2011	4	90	254,070	2,823	12,950	202,344	Neg.	79.6%
3/10/2011	6	54	132,408	2,452	6,500	101,563	Pos.	76.7%
3/14/2011	7	118	309,750	2,625	15,400	240,625	Neg.	77.7%
3/17/2011	8	89	266,199	2,991	12,300	192,188	Neg.	72.2%
3/31/2011	10	87	310,155	3,565	10,450	163,281	Neg.	52.6%
4/5/2011	11	47	145,700	3,100	5,625	87,891	Pos.	60.3%
4/11/2011	12	84	270,900	3,225	8,700	135,938	Pos.	50.2%
4/18/2011	13	44	118,272	2,688	5,600	87,500	Neg.	74.0%
TOTALS		782	2,292,452	2,932		1,529,063		67.3%

Tray 6 of lot 6 tested positive for bacteria and was destroyed.

Tray 5 of lot 11 tested positive for bacteria and was destroyed.

Trays 2, 3, 13, and 15 in lot 12 tested positive for bacteria and were destroyed.

Table 2. 2011 Henrys Lake Hybrid Spring Spawning Summary.

Spawn Date	Lot Number	Females Spawned	Number of Green Eggs	Mean Fecundity	ML Eggs	Number Eyed Eggs	Disease Status	Percentage Eye-up
3/8/2011	5 Sterile	63	179,550	2,850	6,550	102,344	Neg.	57.0%
3/28/2011	9 Sterile	138	407,100	2,950	16,900	264,063	Pos.	64.9%
TOTALS		201	586,650	2,919		366,406		60.9%

Trays 18 and 19 of lot 9 tested positive for bacteria and were destroyed.

Table 3. 2011 Henrys Lake Egg Shipment Summary

Date	Lot	Stock	Egg Size	ML	Eggs	Tu's	Destination
5-Apr-11	1	YCT	3.1	6,735	105,234		MACKAY
5-Apr-11	2	YCT	3.1	6,100	95,313		MACKAY
8-Apr-11	3	YCT	3.1	7,500	117,188		MACKAY
8-Apr-11	4	YCT	3.1	12,950	202,344		MACKAY
12-Apr-11	5	HYBRID	3.1	2,200	34,375		AMERICAN FALLS
12-Apr-11	5	HYBRID	3.1	850	13,281		ASHTON
12-Apr-11	5	HYBRID	3.1	3,500	54,688		MACKAY
12-Apr-11	6	YCT	3.1	6,500	101,563		MACKAY
19-Apr-11	7	YCT	3.1	15,400	240,625		MACKAY
19-Apr-11	8	YCT	3.1	12,300	192,188		MACKAY
3-May-11	9	HYBRID	3.1	16,900	264,063		MACKAY
3-May-11	10	YCT	3.1	10,450	163,281		MACKAY
10-May-11	11	YCT	3.1	5,625	87,891		MACKAY
17-May-11	12	YCT	3.1	8,700	135,938		MACKAY
17-May-11	13	YCT	3.1	5,600	87,500		MACKAY
TOTALS				121,310	1,895,469		

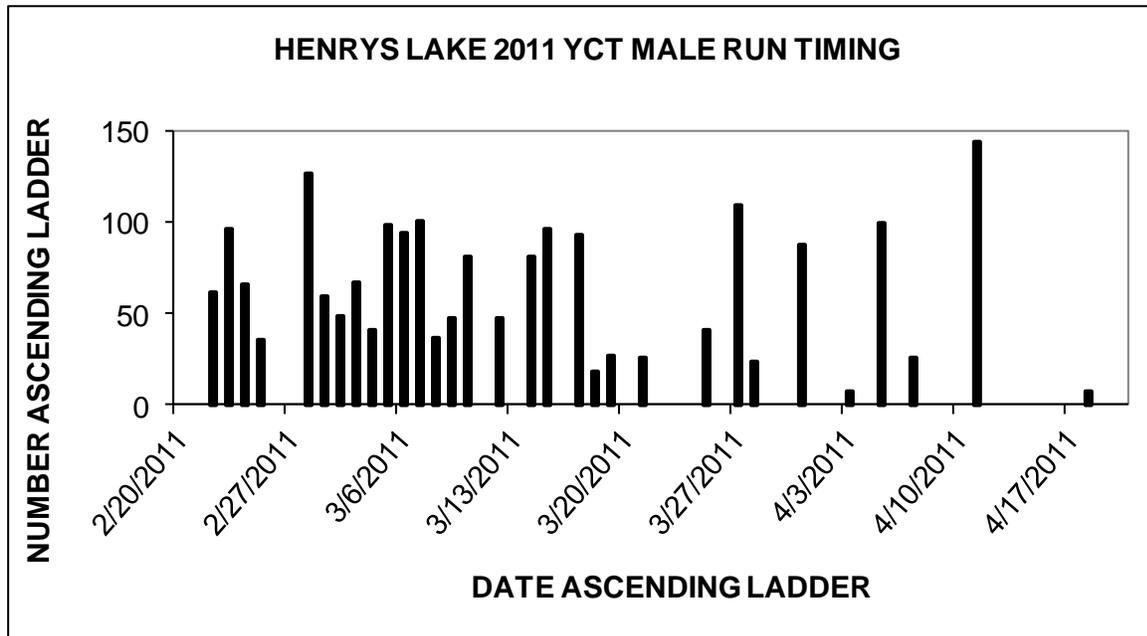


Figure 1. Henrys Lake 2011 Male Yellowstone Cutthroat Trout Run Timing (n = 1,999).

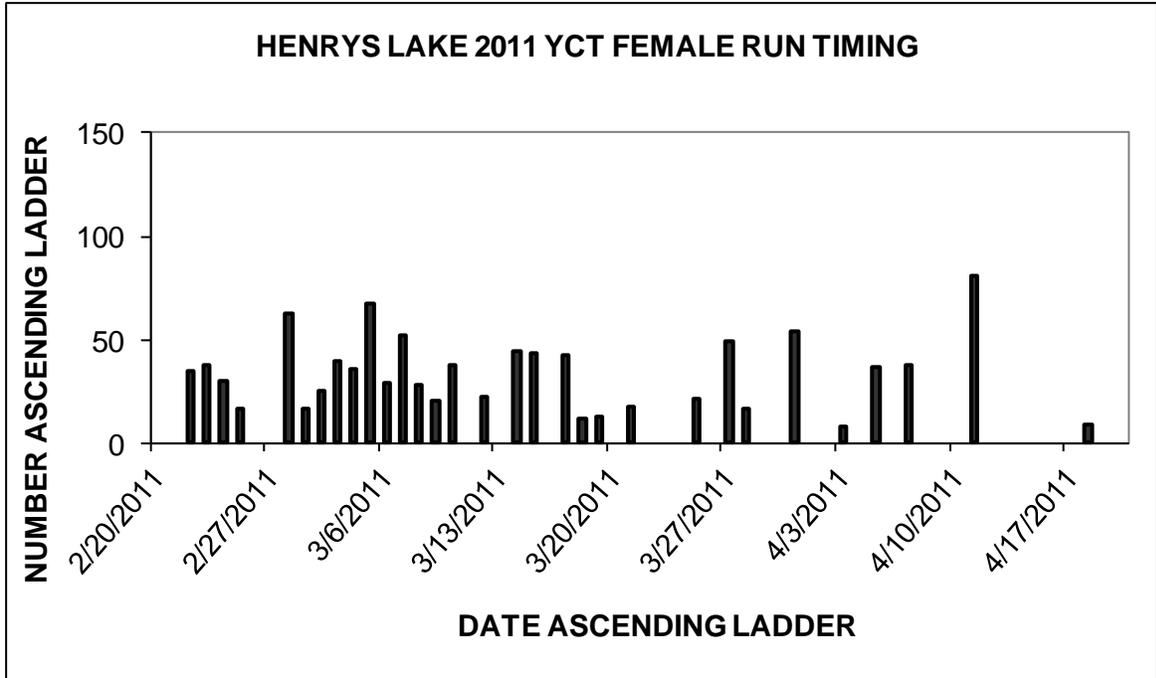


Figure 2. Henrys Lake 2011 Female Yellowstone Cutthroat Trout Run Timing (n = 1,038).

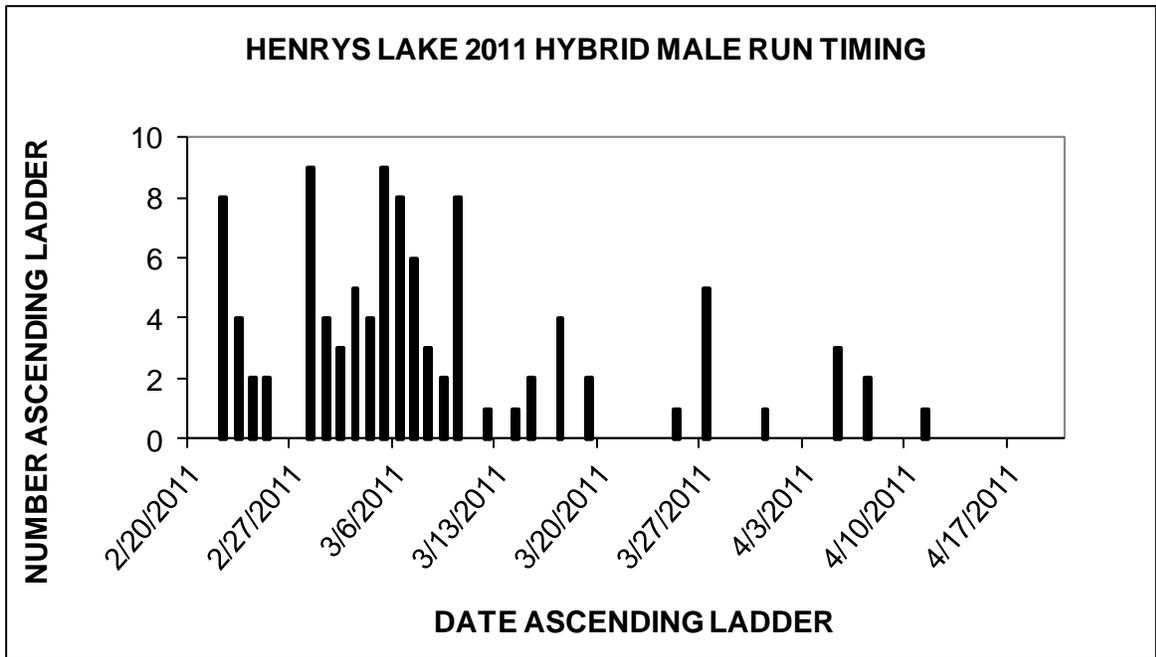


Figure 3. Henrys Lake 2011 Male Hybrid Trout Run Timing (n = 100).

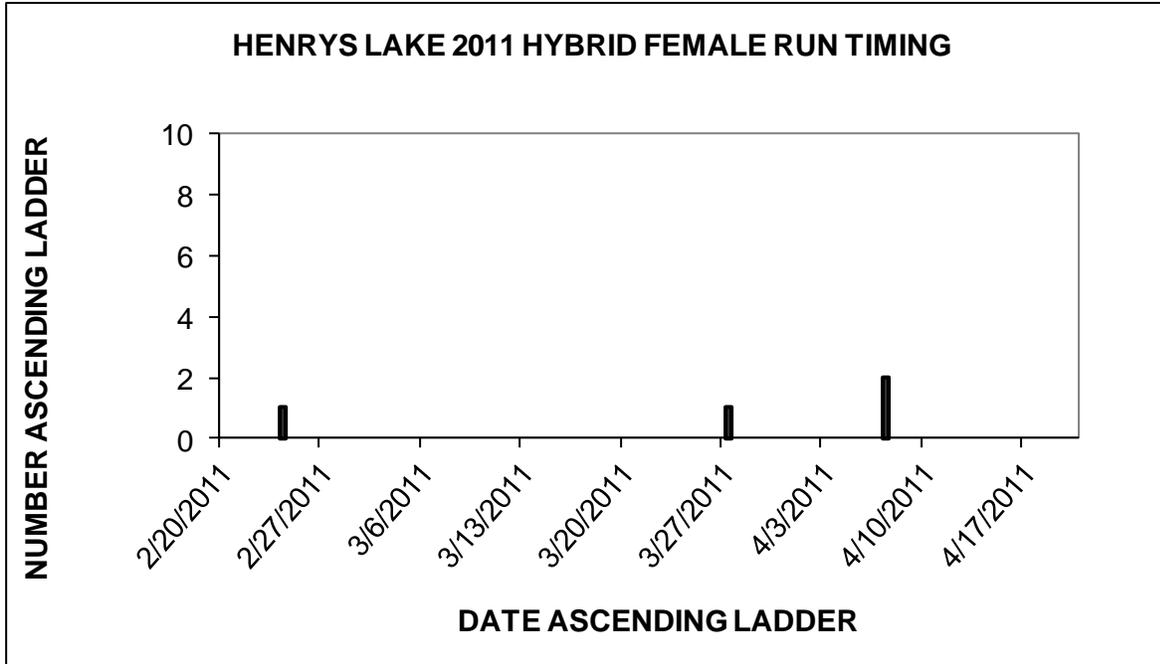


Figure 4. Henrys Lake 2011 Female Hybrid Trout Run Timing (n = 4).

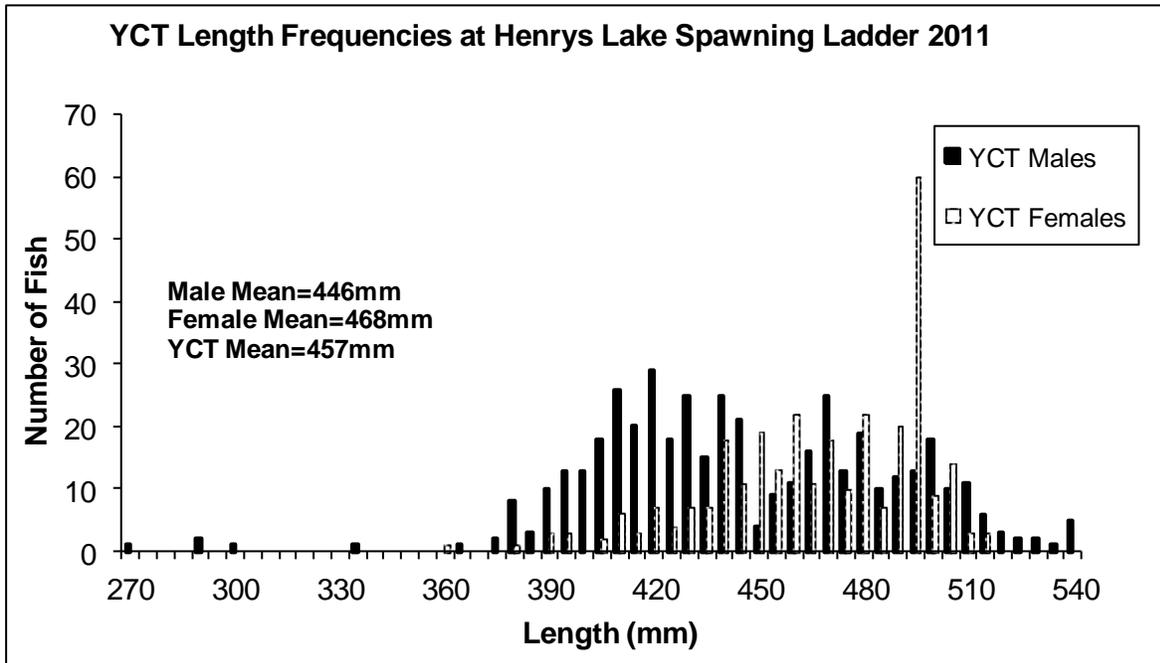


Figure 5. Henrys Lake 2011 Length Frequencies of YCT Spawning Run (n = 746).

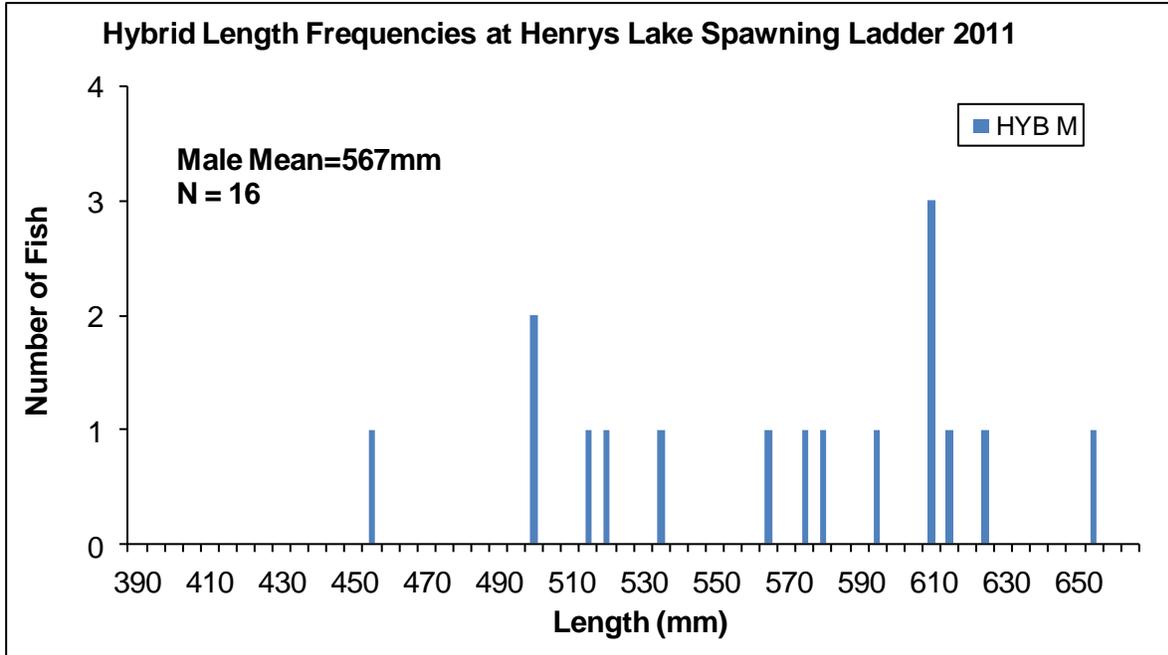


Figure 6. Henrys Lake 2011 Length Frequencies of Hybrid Trout Run (n = 16).

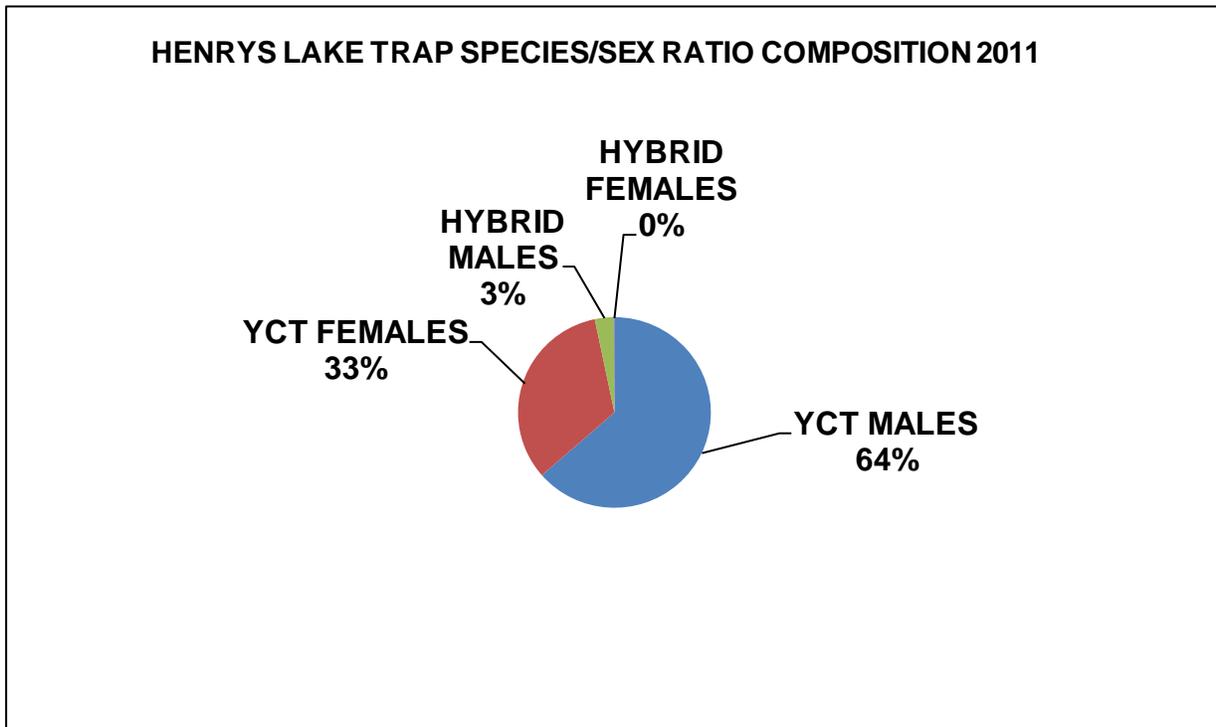


Figure 7. Henrys Lake Trap Species/Sex Ratio Composition 2011 (n = 3,141).

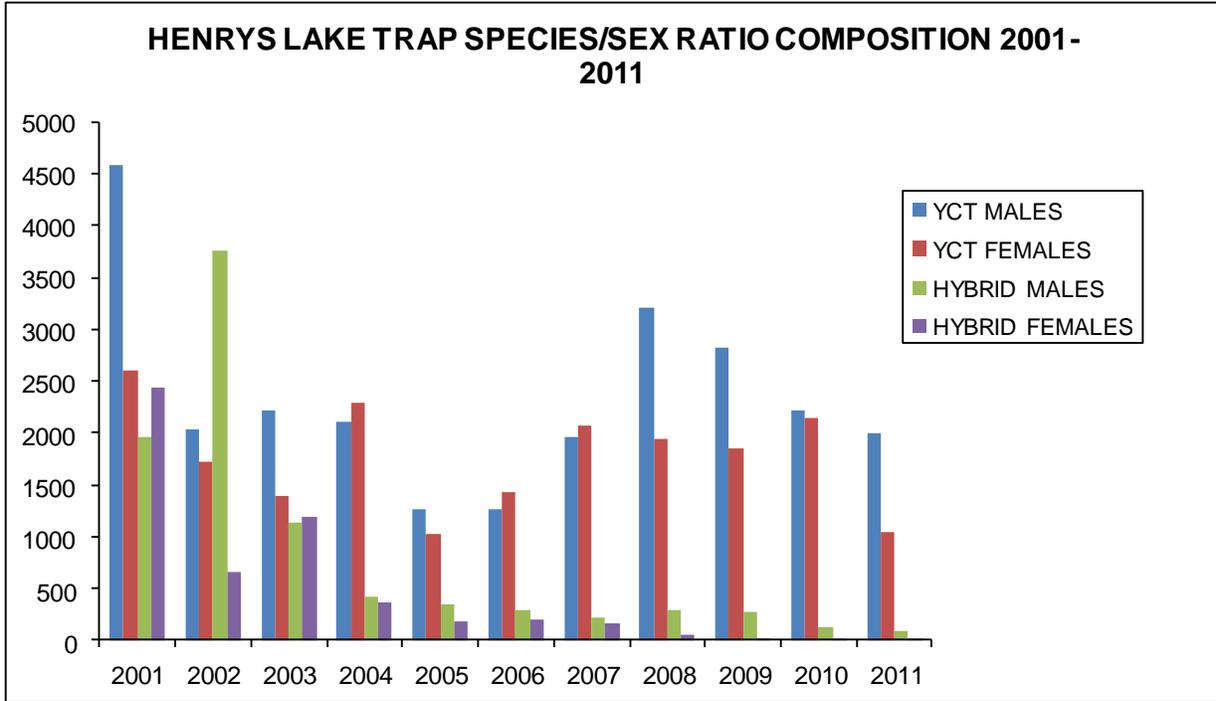


Figure 8. Henrys Lake Trap Historical Species/Sex Ratio Composition 2001-2011.

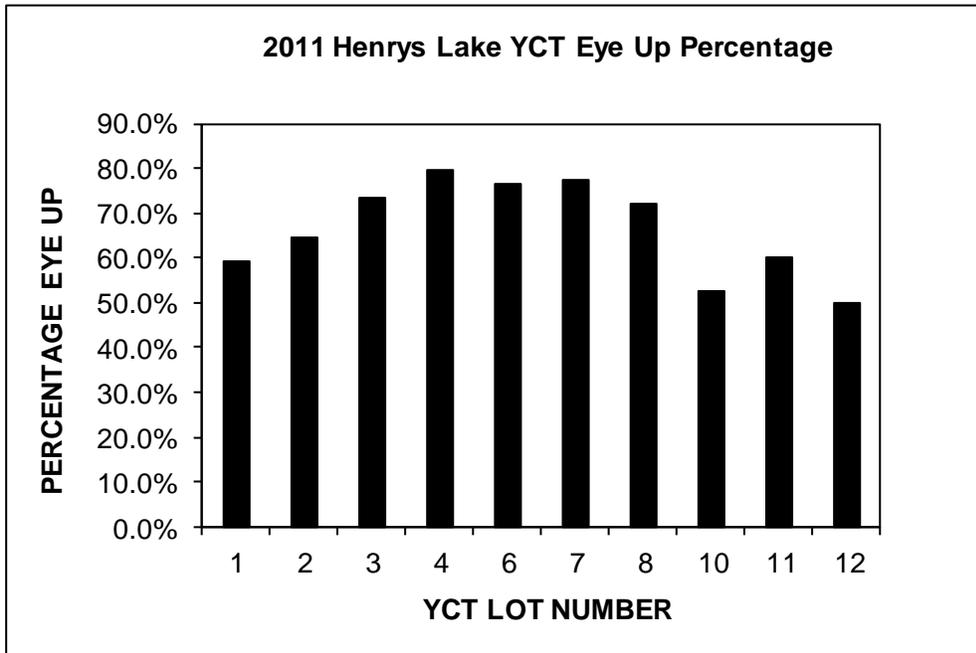


Figure 9. Henrys Lake YCT Eye-Up Percentages by Lot Number.

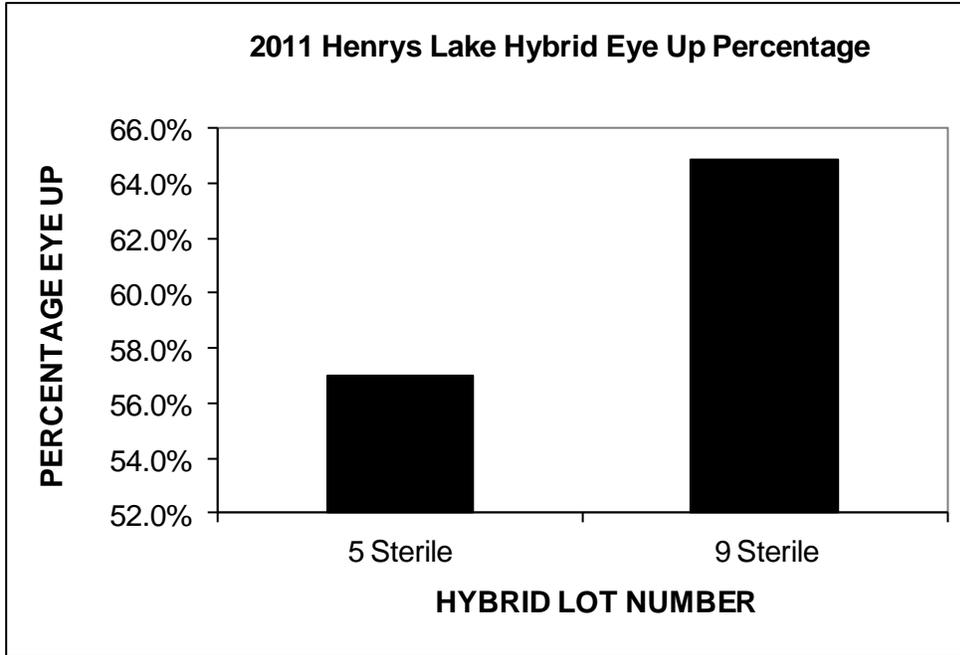


Figure 10. Henrys Lake Hybrid Eye-Up Percentages by Lot Number

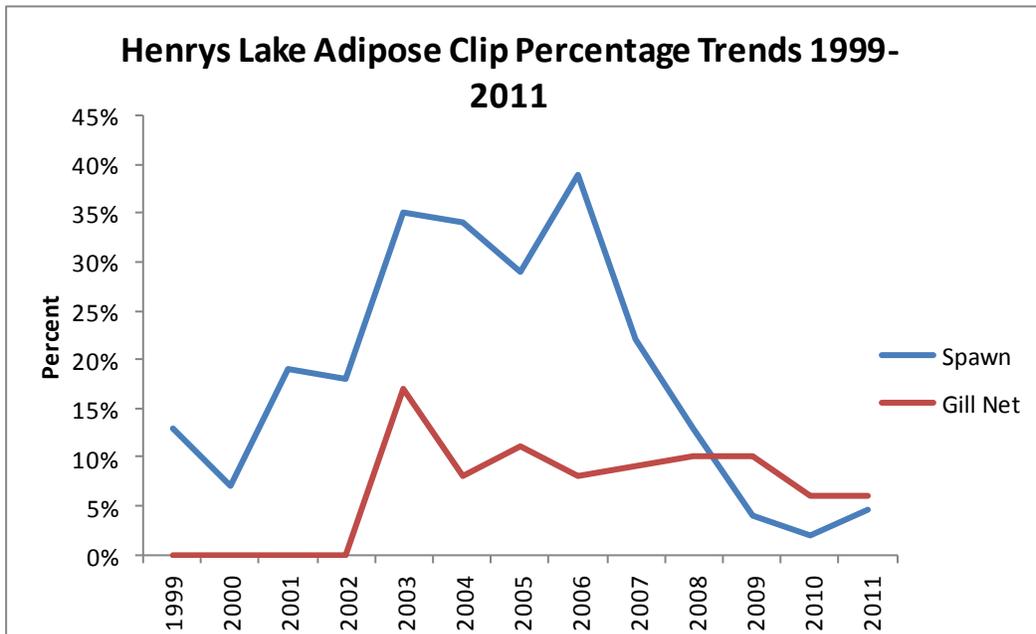


Figure 11. Henrys Lake Adipose Clipped Yellowstone Cutthroat Trends

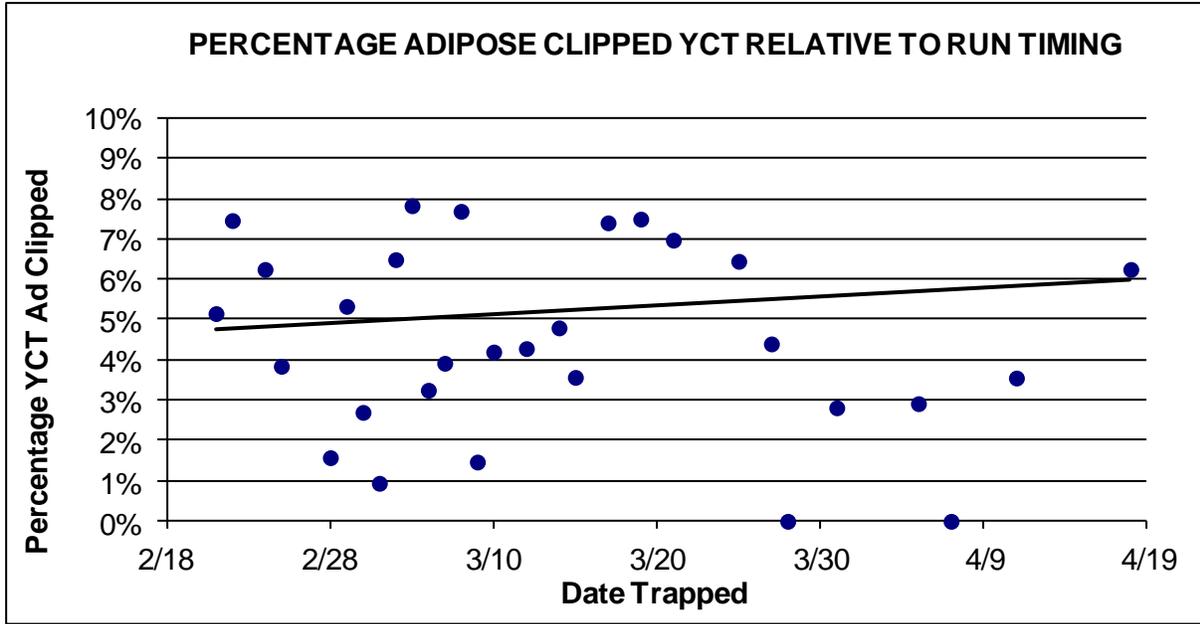


Figure 12. Henrys Lake Adipose Clipped Yellowstone Cutthroat Run Timing (n = 137).

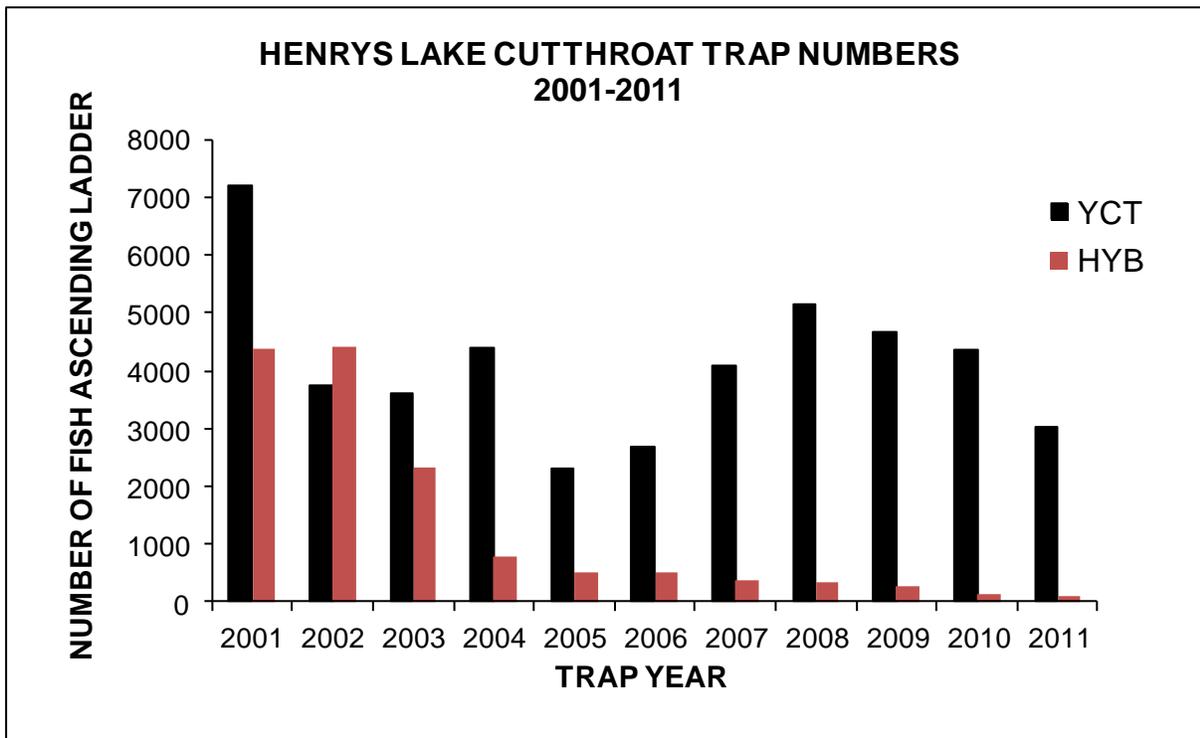


Figure 13. Henrys Lake Cutthroat Run Numbers 2001-2011.

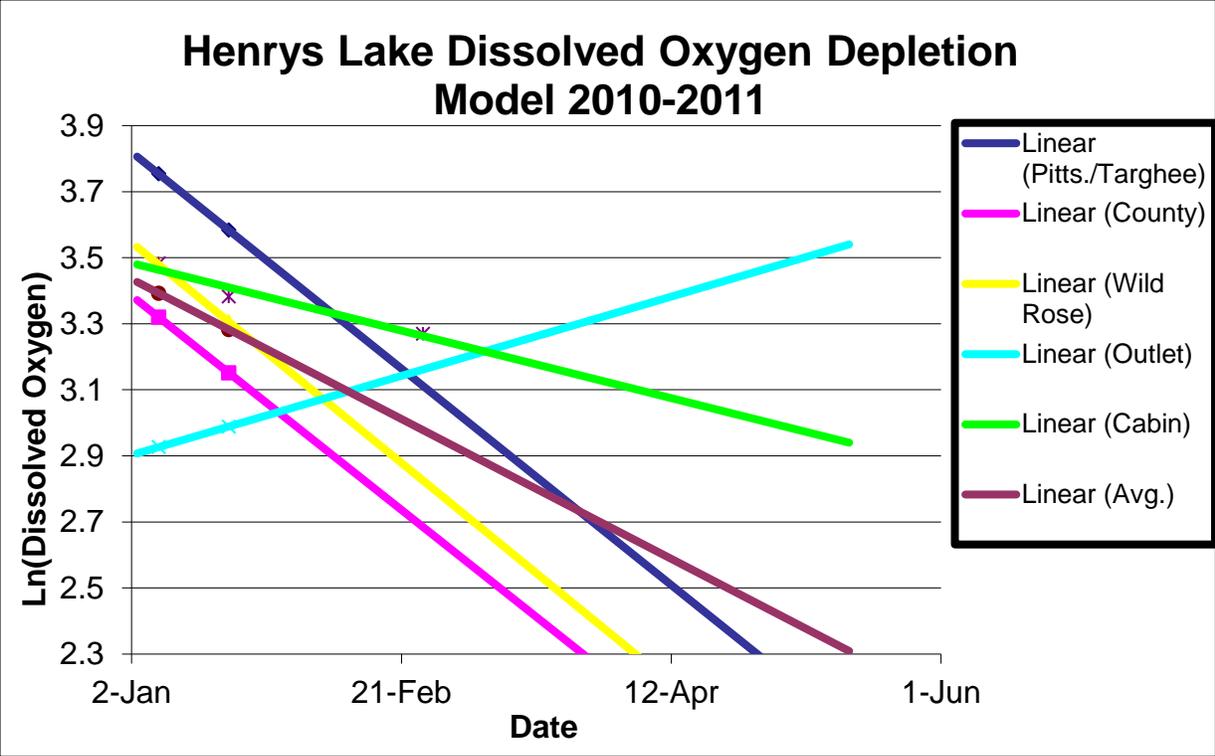


Figure 14. Dissolved Oxygen Depletion Model Henrys Lake 2010-2011.

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 Idaho Department of Fish and Game (IDFG) employees: three full-time, one year-round benefitted bio-aide, and 9.8 months of non-benefitted bio-aide time. In 2011 MFH spent \$310,955 for personnel, fish feed, and all other operations. These expenditures are used for production cost calculations in calendar year 2011 (Appendix 1). This year's fish production included six species and nine strains (Appendix 2).

Rainbow trout *Oncorhynchus mykiss*
Troutlodge triploid (Sumner, WA)

Rainbow trout *Oncorhynchus mykiss*
Hayspur triploid, Hayspur Hatchery (Picabo, ID)

Yellowstone cutthroat trout *Oncorhynchus clarkii bouvierii*
Henrys Lake, Henrys Lake Hatchery (Island Park, ID)
Snake River fine spotted, Jackson NFH (Jackson, WY)

Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*)
Cabinet George fish hatchery (CGFH) (Clark Fork, ID)

Henrys Lake triploid hybrids
Hayspur rainbow *Oncorhynchus mykiss* male x Henrys Lake cutthroat *Oncorhynchus clarkii bouvierii* female

Kokanee salmon *Oncorhynchus nerka*
Early spawner (Deadwood Reservoir, ID)

Arctic grayling *Thymallus arcticus*
Meadow Lake (Dubois, WY)

Golden trout *Salmo aguabonita*
Story Hatchery (Story, WY)

WATER SUPPLY

The hatchery's water comes from artesian springs 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.

Remote temperature loggers were again deployed to address the Total Maximum Daily Load (TMDL) limits for temperature required in the current National Pollutant Discharge Elimination System (NPDES) permit. Work with Idaho Department of Environmental Quality continues as we attempt to correct these TMDL limits for the new NPDES permit in 2012.

HATCHERY IMPROVEMENTS

There were no capital projects completed at the MFH in 2011. The hatchery purchased a John Deere riding lawn mower. Ed Wright from the IDFG engineering crew repaired and remodeled the bathroom in residence 1. Mick Hoover and Pat Moore replaced the domestic water pump. Contractors replaced the feed room garage door and the pressure tank for the domestic water system. Hatchery staff continues to maintain the hatchery grounds, buildings, and equipment as needed. Mick Hoover built bird screens for the top 100 feet, where fingerlings are raised, of one large raceway. Screens will be built to cover the top 100 feet of two more large raceways in 2012.

FISH STOCKED

Fingerlings were stocked in Upper Snake, Magic Valley, Southeast, and Southwest regions. These put-grow-and-take fish numbered 2,297,334 and weighed 25,638 pounds (Appendix 2).

Catchable rainbow trout were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 61,622 and weighed 23,545 pounds (Appendix 2).

Catchable Snake River fine spotted cutthroat trout were stocked in the Upper Snake region. These put-and-take fish numbered 23,220 and weighed 11,843 pounds (Appendix 2).

Henrys Lake cutthroat trout (16,296), Troutlodge triploid rainbow trout (13,171), Westslope cutthroat trout (90,787), golden trout (12,018), and Arctic grayling (6,888) were stocked in 118 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, Sawtooth flying service employees and volunteers.

FISH TRANSFERS

Mackay Fish Hatchery transferred 19,995 catchable rainbows weighing 6,850 pounds to Clearwater Fish Hatchery (CFH) May 04, 2011 and 9,935 catchable rainbows weighing 3,205 pounds to McCall Fish Hatchery (MCFH) May 06, 2011. MFH also received a transfer of 2,475 catchable rainbow trout weighing 825 pounds September 12, 2011. The transport tankers from Nampa Fish Hatchery (NFH) hauled these fish.

TRANSPORT COSTS

The two fish transport trucks assigned to MFH made 67 separate stocking trips during the year. Fish from MFH were planted by truck into 26 different bodies of water. Hatchery personnel traveled 13,920 miles for an average of 208 miles per trip. The fleet rental charges for FY 2011 are \$421.96/month and 77 cents/mile for the 2-ton truck. Fleet rental for the 1-ton truck is \$158.93/month and 34 cents/mile. The fleet rental charges for FY 2012 are \$305.00/month and 40 cents/mile for the 2-ton truck. Fleet rental for the 1-ton truck is \$159.00/month and 31 cents/mile. MFH fish transport cost totaled \$11,849 for 2011.

The fish transport tanker trucks from NFH made nine trips to six different waters and CFH, traveling 3,807 miles for MFH during the year. The cost for the use of the two tankers were \$11,191 bringing the total fish transportation cost to \$23,040.

FISH FEED

A total of 88,650 pounds of feed was purchased from Rangen, Inc. in 2011. This feed cost \$57,955, including shipping charges and fuel surcharges (Appendix 3). Feed conversions ranged from a low of 0.88 for the 2011 Henrys Lake cutthroat and to a high of 1.4 for the 2010 Troutlodge triploid rainbow catchables. The average conversion for all lots of fish reared at MFH during the year was 1.05 (Appendix 3).

FISH MARKING

Adipose fins were clipped on 114,550 Henrys Lake cutthroat trout during the third week of August 2011. 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 again shipped to CGFH in 2011. They were incubated to the eyed stage, shocked, picked, and shipped to MFH.

The 2010 kokanee exhibited normal mortality between the eyed egg and feeding fry stage. After the kokanee are on feed for approximately two weeks, they exhibit a significant pinhead die off. They do quite well after they pass this stage.

The Henrys Lake triploid hybrids have a history of cold water disease (CWD) at MFH. A Veterinary Feed Directive was administered in 2011 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.

MFH experienced an excessive loss in kokanee, rainbow, and cutthroat fingerling during the late winter and spring of 2011. During this time hatchery staff chased off a large number (10-

30) of Great Blue Herons daily with cracker shells and motorcycles. These herons are the only known reason for the excessive fish losses.

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 fourth grade class, Mackay 4-H, Mackay and Rigby High School Envirothon teams, a Pocatello Boy Scout troop, and Junior High students from a charter school in Boise. 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, 2011.

Pounds of fish stocked, 2011 =	72,399
Pounds of fish on station, 12/31/2010 =	27,699
Total pounds of fish on site for 2011 =	100,098
Pounds of fish on hand, 12/31/2011 =	16,152
Net pounds of fish produced, 2011 =	83,946

Production Costs			
6 months FY 2012 budget		6 months FY 2011 budget	
personnel =	\$91,609	personnel =	\$95,853
operating =	\$62,899	operating =	\$60,594
total	\$154,508	total	\$156,447
TOTAL 2011 costs =		\$310,955	

Note: operating costs include fixed wing flights for mountain lakes not included in the MFH budget prior to 2011.

Appendix 2. Mackay Fish Hatchery stocking summary, 2011.

Species/Strain	Lot	Number Planted	Pounds Planted	Size at Release
Yellowstone cutthroat-Snake River fine spot	09-WY-C4	23,220	11,843	catchable
Yellowstone cutthroat-Snake River fine spot	10-WY-C4	143,921	5,400	fingerling
Golden Trout	11-WY-GN	12,018	4	fingerling
Story Hatch. Wyoming				
Yellowstone cutthroat-Henrys Lake	11-ID-C3	1,168,084	9,537	fingerling
Rainbow x Cutthroat	11-ID-TH	205,097	2,135	fingerling
Triploid hybrid				
Triploid rainbow - Troutlodge	09-WA-TT	1,996	1,140	catchable
Triploid rainbow - Troutlodge	10-WA-TT	61,622	23,545	catchable
Triploid rainbow - Troutlodge	11-WA-TT	13,171	17	fingerling
Early spawner kokanee-Deadwood Reservoir	10-ID-KE	786,532	7,830	fingerling
Arctic grayling	11-WY-GR	6,888	6	fingerling
Meadow Lake, Wyoming				
Hayspur Triploid Rainbow	11-ID-T9	9,996	760	fingerling
Hayspur Hatchery				
Westslope Cutthroat	11-ID-C2	90,787	127	fingerling
Cabinet George Hatchery				
Total Fish Stocked, 2011				
		Number of Fish	Pounds of Fish	
Fingerlings		2,436,494	25,816	
Rainbow catchables		63,618	24,685	
Cutthroat catchables		23,220	11,843	
Total		2,523,332	62,344	

Appendix 3. Feed purchased and feed conversions at Mackay Fish Hatchery, 2011.

Rangen Feeds	Avg. cost/pound	Pounds purchased	Cost
TSS # 0	\$0.951	1,350	\$1,282.00
TSS # 0 Aquaflor	\$1.541	250	\$385.13
TSS # 1	\$0.950	2,100	\$1,993.60
TSS # 2	\$0.951	8,250	\$7,843.00
TSS # 3	\$0.950	250	\$237.55
#3 Grower	\$0.625	11,000	\$6,875.00
2.0 mm 470 slw snk	\$0.659	2,000	\$1,318.00
1/8" 450 sinking	\$0.549	3,250	\$1,782.63
3/32" 450 sinking	\$0.605	9,000	\$5,445.00
5/32" 450 sinking	\$0.549	51,200	\$28,102.95
Shipping/freight			\$2,689.78
Totals		88,650	\$57,954.64

Feed conversions	
Stock	Conversion
11-C3	0.88
10-C4	1.15
10-KE	0.96
10-TT	1.40
11T9	1.17
11-TT	0.88
11-TH	0.90
AVERAGE	1.05

Appendix 4. Eggs Received at Mackay Fish Hatchery, 2011.

Date	Species	Lot Number	Strain	Green Eggs	Eyed Eggs
03/02/11	Rainbow	11-ID-T9-1	Hayspur triploid	N/A	157,348
TOTAL					157,348
04/12/11	C3XRF	11-TH-5	Henrys Lk/triploid RF Cross	N/A	51,538
05/03/11	C3XRF	11-TH-9	Henrys Lk/triploid RF Cross	N/A	157,143
TOTAL					208,681
04/05/11	Cutthroat	11-C3-01	Yellowstone (Henrys Lake)	N/A	98,052
04/05/11	Cutthroat	11-C3-1.2	Yellowstone (Henrys Lake)	N/A	96,488
04/08/11	Cutthroat	11-C3-03	Yellowstone (Henrys Lake)	N/A	90,914
04/08/11	Cutthroat	11-C3-3,4	Yellowstone (Henrys Lake)	N/A	104,172
04/08/11	Cutthroat	11-C3-04	Yellowstone (Henrys Lake)	N/A	112,127
04/12/11	Cutthroat	11-C3-06	Yellowstone (Henrys Lake)	N/A	95,384
04/19/11	Cutthroat	11-C3-07	Yellowstone (Henrys Lake)	N/A	240,636
04/19/11	Cutthroat	11-C3-8	Yellowstone (Henrys Lake)	N/A	196,898
05/03/11	Cutthroat	11-C3-9	Yellowstone (Henrys Lake)	N/A	240,299
05/03/11	Cutthroat	11-C3-10	Yellowstone (Henrys Lake)	N/A	157,143
05/10/11	Cutthroat	11-C3-11	Yellowstone (Henrys Lake)	N/A	84,375
05/17/11	Cutthroat	11-C3-12	Yellowstone (Henrys Lake)	N/A	134,375
05/17/11	Cutthroat	11-C3-13	Yellowstone (Henrys Lake)	N/A	83,582
TOTAL					1,734,445
06/09/11	Rainbow	11-WA-TT-1	Troutlodge triploid	N/A	15,957
TOTAL					15,957
6/28/2011	Cutthroat	11-ID-C2-9	Westslope	N/A	46,551
6/28/2011	Cutthroat	11-ID-C2-10	Westslope	N/A	95,835
TOTAL					142,386
10/08/11	Kokanee	11-KE-3	Deadwood	N/A	112,868
10/08/11	Kokanee	11-KE-4	Deadwood	N/A	335,260
10/13/11	Kokanee	11-CG-3	Cabinet George	N/A	241,406
10/13/11	Kokanee	11-KE-5	Deadwood		438,776
10/13/11	Kokanee	11-KE-5&6	Deadwood		118,309
10/13/11	Kokanee	11-KE-6	Deadwood		114,286
10/31/11	Kokanee	11-KE-3N	Deadwood		91,549
TOTAL					1,452,454
TOTAL EGGS FOR 2011					3,711,271

Appendix 5. Mackay Fish Hatchery Cost Summary 2011.

Put and Take Number	116,768
Put and Take Pounds	46,583
Put, Grow & Take Number	2,436,494
Put, Grow and Take Pounds	25,816
Fish/lb Average	40.47
Total Pounds of Feed	88,650
Feed Cost	\$57,594
AVG Length in Inches	4.1
Total Cost *	\$310,955
Cost per 1,000 Fish Stocked	\$121.79
Cost per Pound of Fish Stocked	\$4.30

** Total Cost includes permanent & temporary employee wages and benefits, and 2011 all operating budget expenditures.*

Appendix 6. Fish on Hand December 31, 2011.

Stock	Fish Numbers	Pounds	Avg. Length
10-TT	1,928	1,015	11.00
11-TT	2,471	94	4.60
10-C4	14,325	4,093	9.34
11-R9	76,648	10,950	7.10
10-KE	~1,150,000	N/A	N/A

MCCALL SUMMER CHINOOK HATCHERY RESIDENT PROGRAM

Jamie Mitchell, Assistant Fish 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 five months of assistant fish hatchery manager and six 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 water temperature control through mixing. The surface intake is located at Lardo Dam at the outlet of Payette Lake. The deep-water 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. Up to 18 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 *Oncorhynchus Clarkii lewisi*, domestic Kamloops rainbow trout *O. Mykiss*, golden trout *O. Aguabonita* and rear grayling *Thymallus arcticus* fry for stocking into mountain lakes in the Panhandle, Clearwater, and Southwest regions.
- Redistribute up to 100,000 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

A total of 166 lakes located in Regions 1, 2, 3B, and 3M received 175,620 fry from MCFH in 2011. Fry available for out-plants included westslope cutthroat trout, sterile rainbow trout, golden trout, and grayling (Appendix 1). Three locations received roughly 20,000 fry that were available and in excess of program needs.

Eleven fixed-wing fish stocking flights were conducted during the period of August 4 through October 1. The average cost, based on flight time, to stock a mountain lake out of MCFH in 2011 was \$119 and ranged from \$68.76 to \$238.33 for individual regions, (these costs reflect total flight costs including the grayling transport flight from Ashton to McCall via Mackay). Volunteers and McCall regional staff backpacked 35,035 fry into 22 lakes in the McCall area. It is estimated that these efforts saved the IDFG \$1,300 in comparable flight time costs. The Morrison Knudsen Nature Center received 50 westslope cutthroat trout fry to place on display for educational purposes.

Bio-Oregon BioVita Starter #0 and mash was used throughout the rearing period with good results. A total of 112 pounds of feed was fed resulting in a conversion of 0.55 (Appendix 2). Total feed cost for resident fry was \$221.62 and averaged \$1.17 per 1,000 fish stocked.

Golden trout fry numbering 4,000 were transferred to Mackay FH on September 3. Also, on September 22 a golden trout flight was sent off from McCall contracted out by Mackay Hatchery to plant 8,225 fry. Between the two transfer flights, approximately 12,225 golden trout were shipped for Mackay Hatchery.

Catchable Rainbow Trout Redistribution

A total of 109,595 all-female sterile Troutlodge rainbow trout triploids were stocked into 31 water bodies in the McCall vicinity during the period of May 16 to September 22. Catchables were Troutlodge triploids reared at Grace, American Falls, and for the most part Nampa hatcheries. Additionally, two tagging events occurred for the Nampa Research catchable exploitation study. Two groups of 125 Floy-tagged catchables went into Rowlands Pond. The first group was planted with the May request and the second group with the July request. MCFH staff completed all of the tagging and measuring events for the study.

Transportation costs to bring catchable size rainbow trout from all three hatcheries totaled \$11,919. MCFH Hatchery personnel made 74 stocking trips driving 4,807 miles to complete requests at an approximate transportation cost of \$3,322. The combined transport and redistribution cost was \$139 for each 1,000 fish stocked or \$.14 per fish (Appendix 3).

Payette Lake Net Pens

Two net pens (20' x 20' x 17' each) are utilized to provide for continued rearing of catchable size rainbow trout in Payette Lake during the summer months at Brown's Park. Efforts to maintain and rear fish in the net pens were completed by resident hatchery staff, McCall subregional fishery management staff, and McCall City Parks and Recreation staff. For the record, it is highly advised avoiding assistance from the Parks and Recreation staff for future net

pen programs. Take the feed over with the boat. A little extra effort will be worth it in the long run.

Rainbow trout numbering 5,940 were placed into the nets on June 14 at a size of 3.3 fpp (9.5 inch TL) and an estimated release of 5,240 occurred on September 1 at a size of 1.4 fpp (12.5 inch TL). During the 79-day rearing period, fish were fed 3,432 pounds of BioDry-1000 LP feed at a cost of \$2,781. This resulted in an overall feed conversion of 1.76 in 2011 (Appendix 2).

Feeding was primarily done during the day using a Sweeney Brand automated feeder that broadcast feed into the pens. Overall, the net pen program was a success producing a quality product that appears to be returning to the creel.

Special Projects

Nampa Research initiated an ongoing mountain lake product evaluation study. Since the availability of triploid westslope cutthroat trout in 2011, the opportunity was seized to mark and release roughly 25,000 adipose fin clipped Westslope cutthroat into region 2 and 3M mountain lakes in this year's rotation, 13,500 of which were sterile and 12,000 fertile. The lakes that received marked cutthroat this year will be surveyed in four years and an assessment will be made then on the success of this new product. This project will be replicated in the upcoming stocking seasons.

Hatchery Improvements/Needs

A new 2-ton stocking truck has been ordered and will be ready for the 2012 stocking season. For streamlining the fry clipping process, a fry counter was rented in 2011. This eliminated counting errors often incurred while hand clipping. Purchasing one of these fry counters for the resident program would be beneficial to several hatcheries that hand clip small groups of fry and fingerlings for various programs statewide.

Miscellaneous

Jamie Mitchell attended the USFWS Introduction to Fish Health class in Bozeman, Montana August 15-19.

Public Relations

Fish stocking opportunities were provided to several groups of volunteers who backpacked 35,035 fry into 22 mountain lakes in the McCall area saving the Department approximately \$1,300 in comparable flight time costs. Hatchery personnel participated in Free Fishing Day events held at Council Park Pond, Rowlands Pond, and Kimberland Meadows Pond. Numerous hatchery tours were given to visitors and several school groups throughout the summer. The Boy Scouts received three catchables a week throughout the summer for educational activities. Hatchery staff also participated in Trout in the Classroom at Donnelley Elementary School in November.

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, and Joel Patterson, MCFH Fish Culturist for their support and for making available seasonal employees who were utilized on resident program endeavors. Individuals assisting on resident program activities in 2011 included Matt Hershel, Paul Lemons, Logan Miller, Mike Morton, and Fisheries Technician Matt Watterson. I would also like to thank Ron Dean and Ed Allen, two of the most tenacious and dedicated volunteers known to the hatchery program. These two gentlemen stocked 17 lakes on foot this summer with a combined age of over 130 years.

APPENDICES

Appendix 1. Fry Distribution by Region, MCFH, 2011.

Species	Panhandle	Clearwater	Southwest (3B)	Southwest (3M)	Total Stocked
Westslope Cutthroat Trout (Cabinet Gorge– C2)	20,125*	18,000	1,000	30,385	69,510
Rainbow Trout Triploid (Troutlodge – TT)	14,000	5,500	30,860	10,200	60,560
Golden Trout (Story Hatchery, WY– GN)	3,900	-	6,050	16,429	26,379**
Grayling WY	3,700	-	3,000	12,471	19,171
Total	43,725	23,500	40,910	69,485	175,620
# Lakes Stocked by Plane	18	37	51	38	144
# Lakes Stocked by Other Means	-	-	-	22	22
Total Lakes Stocked	18	37	51	60	166
Approximate Flight Costs	\$ 4,290	\$ 2,654	\$ 3,507	\$ 2,760	\$ 14,372
Average Cost to Stock Each Lake by Plane	\$ 238.33	\$ 71.71	\$ 68.76	\$ 72.62	\$99.80

*On the first flight one drop missed lake, was made up on a later flight

**An additional 12,225 golden trout fry were transferred to Mackay FH.

***Strictly based on stocking missions costs. Does not include Grayling transport flight.

Appendix 2. Resident feed usage and conversion data, MCFH, 2011.

Species	# Stocked/ Transferred	Feed Used (lb)	Pounds Gained	Conversion	Cost per Lb Gain	Cost per 1000 fish	Total Feed Cost
Westslope Cutthroat Trout (Cabinet Gorge– C2)	69,510	40.0	102.7	0.4	\$ 0.98	\$ 1.45	\$100.74
Rainbow Trout Triploid (Troutlodge – TT)	60,560	48.00	86.41	.55	\$ 1.40	\$ 1.99	\$ 120.88
Golden Trout (Story Hatchery, WY– GN)	38,604**	12.0	12.0	1.0	\$ 0	\$ 0.00	\$ 0.00
Grayling	19,171	12.0	3.79	3.17	\$ 0	\$ 0.00	\$0.00
Fry Total	187,845*	112.0	204.9	.55	\$ 0.91	\$ 1.21	221.62
Rainbow Trout Triploid Catchables (Troutlodge – TT) Payette Lake Net Pens Total Feed 2011 Cost	5,940	3,432	1,942	1.76	\$ 1.43	\$2.14	\$2,781 \$3,003

*All feed fed to Grayling and Golden Trout came from Ashton Hatchery at no cost to MCFH.

**Includes 12,225 golden trout fry transferred to Mackay FH.

Appendix 3. Production and distribution costs, MCFH, 2011.

Species	Eggs/ fish Received	Stocked/ Transfer	Transportation Cost	Pounds Gained	Cost per LB Gained	Egg Cost	Cost per 1000 Stocked
Fish Production Breakdown							
Westslope Cutthroat Trout (Cabinet Gorge– C2)	92,907	69,510	\$5,495	102.7	\$ 55	\$0	\$81
Rainbow Trout Triploid (Troutlodge – TT)	80,000	60,560	\$5,683	86.41	\$97	\$2,530	\$137
Golden Trout (Story Hatchery, WY– GN)	40,919	38,604	\$1,329	12	\$111	\$0	\$34
Grayling	18,000	19,171	\$1,880	3.79	\$496	\$0	\$98
Totals	231,826	187,845	\$14,387	205	\$ 84	\$2,530	\$ 91
Note: Breakdown based on \$14,387 flight costs plus eggs and feed cost. Fry stocked by volunteers, or as excess, are included at no cost.							
Fish Transfers							
Golden Trout (Story Hatchery, WY– GN)	-	12,225	-	4	\$111	-	-
Transferred to Mackay FH who covered transportation costs.							
Catchable Rainbow Trout Redistribution							
Troutlodge RBT Triploid (Reared at Nampa FH)	109,595	109,595	\$ 15,241				\$ 139
Note: Based on transportation costs of \$ 9,451 (\$ 3,322 MCFH and \$ 11,919 Nampa FH).							

MULLAN FISH HATCHERY

John Rankin, Fish Hatchery Manager
Mary Vanbroeke, 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 2011 were also involved with the Kokanee spawning operation at Granite Creek, and assisted with Mountain Lake stocking, catfish stocking, and catchable stocking from Sandpoint Hatchery.

HATCHERY IMPROVEMENTS

Hatchery improvements during 2011 included:

- Scraped and painted shops #1 and #2.
- 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.
- Constructed a 4' x 4' information frame for a new stocking map.
- Constructed new storm shutters for the new windows on the main hatchery building.
- Replaced secondary water line in hatchery with ½" water pipe.

FISH STOCKED OR TRANSFERRED

A total of 35,132 (9-inch) rainbow trout, weighing 10,978 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 pick-up 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 \$33,799. This amount included \$10,397 in operating costs, \$19,205 in personnel costs, and \$4,197 in transportation costs from NFH. The streamside cost of catchable redistribution from MFH in 2011 was \$0.96/fish or \$3.08/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 2011. The hatchery also hosted the Silver Valley Good Samaritan RV rally. The Shoshone County Sportsman had their annual meeting at the hatchery with over 67 members attending. A total of four school tours were given this year.

NAMPA FISH HATCHERY

Rick Alsager, Fish Hatchery Manager II
Bob Becker, Assistant Fish Hatchery Manager
Michael Dill, Fish Culturist
Gary Ady, Fish Culturist
Dick Bittick, 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 30 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/catchable 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 2011 fish year, the NFH net fish production was 702,688 at a net weight of 247,897 pounds (Appendix 1). The net cost for rearing fish at the NFH from grow out through stocking was \$482,445 (Appendix 2). Fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout *Oncorhynchus mykiss* comprised 93.4% 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 2011 (Appendix 3). Another 837 fish weighing 280 pounds were produced at NFH and given to schools for educational purposes and department personnel for various research programs. A total of 1,489,727 eyed eggs were received during the 2011 fish year (Appendix 4).

Total net production was affected by a drastic drop in fish requests, fish allocations to other hatcheries, and delivery dates of eggs. This resulted in a year-end net difference of 800,000 fish and their associated weight. This loss adversely affected cost per thousand, cost per pound, and cost per inch figures.

FISH HEALTH

Fish health in general was excellent at NFH in 2011. Medicated feed treatments in response to aeromonads and coldwater disease were limited to a single 10-day treatment. Other chemical use was also greatly reduced from past years. Chemical use totaled 20 days.

Monitoring for the *Ichthyophthirius sp.* (ICH) parasite continued in 2011, while pre-emptive formalin treatments were discontinued. Pathologists sampled 60 fish per raceway prior to hauling to Clearwater, McCall, and Sawtooth hatcheries. No ICH was diagnosed.

FISH STOCKED/TRANSFERRED

The NFH personnel stocked or transferred 1,425,918 fish, weighing 279,163 pounds, during the 2011 fish year. These fish do not include warm water transfers or fish reared in non-IDFG hatcheries that were stocked into Idaho waters. NFH made 217 stocking trips to 289 planting waters during 2011.

NFH stocked or transferred a total of 669,688 fingerlings (Appendix 5) and 756,230 catchables (Appendix 6), which are listed by species/strain in each table. A total of 364,261 catchables (Appendix 7) were transferred to eight other hatcheries throughout the state.

FISH TRANSPORTATION

Fish Culturists (Gary Ady and Dick Bittick) stocked waters in all seven regions throughout the state. They transported fish to and from 18 different state and federal fish hatcheries. These culturists made 142 trips totaling 44,353 miles during 2011. When not transporting fish, Gary and Dick assist other 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 two culturists stocked 111,975 rainbow trout fingerlings weighing 1,850 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 November, NFH personnel assisted in transporting and stocking 1,000 surplus A-run adult steelhead from IDFG's Oxbow Fish Hatchery into the Boise River. These adult anadromous fish create a very popular local fishery.

BROWN TROUT

During 2011, NFH reared and stocked 52,425 brown trout fingerlings, weighing 1,500 pounds, into waters in the Southwest Region (Appendix 5). Eyed brown trout eggs were provided by the Wyoming Game and Fish Daniel Hatchery. Estimated survival from eyed egg to fingerling was 62.05%.

LAHONTAN CUTTHROAT TROUT

During 2011, NFH stocked 13,200 Lahontan cutthroat trout fingerlings (240 pounds) into two 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 plant was 16.78%. Due to poor survival in 2011, only two of the four requested waters received Lahontan cutthroat fingerlings.

FALL CHINOOK

In 2011, NFH stocked 25,408 fall Chinook fingerlings (2,300 pounds) (Appendix 5). Two trips totaling 20,132 Chinook were stocked in Coeur d'Alene Lake, as well as one trip to Deadwood Reservoir totaling 5,276 fingerlings. An additional 3,574 Chinook weighing 271 pounds were euthanized when the maximum allowable number for the Deadwood Reservoir plant was met. Chinook were received as fry from Cabinet Gorge Fish Hatchery. Cabinet Gorge acquired the eggs from Big Creek Hatchery in Astoria, Oregon. Estimated survival from fry to plant was 99.82%.

FISH FEED

A total of 262,688 pounds of feed was fed during 2011 at a cost of \$161,141.65 (Appendix 8). The average cost per pound of feed was 61.35 cents. Rangen's Inc. made up 100% of the feed purchased by weight. No feed was received from other hatcheries throughout the year. The overall feed conversion was 1.06 pounds of feed fed to produce one pound of fish (Appendix 1).

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.

FISH SPAWNING

Early Kokanee

In 2011, Nampa Hatchery continued to utilize Deadwood Reservoir for the kokanee spawning operation. The Deadwood River weir was installed on August 16, 2011 with no issues. The weir location was moved upstream approximately 400 yards from the typical site due to high water levels at the time of installation. Two other weirs were installed this year: one on Basin Creek just south of the main weir, and one on Trail Creek across the reservoir. Basin Creek was installed to divert kokanee upriver to the main weir. Trail Creek was installed as a management tool to reduce the number of spawners in the Deadwood system. These weirs were installed on August 17, 2011.

Operation of the Trail Creek weir involved coordination with the Bureau of Reclamation (BOR) due to an ongoing bull trout project. The cooperative effort on Trail Creek went very well. BOR was able to check the Trail Creek weir during the week while NFH personnel were busy spawning. The hatchery crew checked the weir on weekends and non-spawn days. The Trail Creek run seemed depressed from years past, although kokanee were observed above the weir. Three hundred two kokanee were euthanized in Trail Creek, between IDFG and BOR, from weir installation through September 13, 2011.

NFH again used conservation officers to assist with weir operations. Charlie Justus, Paul Alexander, Ben Cadwallader, Dave McGonigal, and Jon Hunter all worked shifts in which they assisted with weir operation and spawning as well as conducting enforcement checks throughout the area. This worked well and benefited both the officers and the weir personnel, who got to see a little of how the enforcement side of things worked.

After a successful trial in 2010, all green kokanee eggs taken at Deadwood were again flown to Cabinet Gorge Hatchery. Mackay Hatchery coordinates with Cabinet Gorge to receive their allotment of eyed eggs.

The goal for 2011 was increased to 3 million green eggs. Egg numbers reported from Cabinet Gorge Hatchery were 3,115,101 green eggs. 220,689 of these green eggs were sterilized using pressure treatment on the final spawn day (9/14/11). Percent eye-up at Cabinet was an average of 64.86% (Appendix 9).

HATCHERY IMPROVEMENTS

Several important improvements were implemented at NFH during 2011:

- Replaced irrigation pump.
- Replaced two office computers.
- Replaced refrigerator in hatchery dormitory.
- Built irrigation/storage shed at residence #2.
- Replaced water adjustment bars in A raceways.
- Installed new 100-gallon diesel tank for tractors.
- Replaced office furnace.
- Replaced all lights and ballasts with new energy efficient equipment.
- Replaced ¾ ton Ford extended cab pickup with new ¾ ton Ford crew cab.
- Replaced GMC 1 ton with new GMC 1 ton.
- Replaced windows in dorm and Residences #1 and #3
- Rebuilt motor and shaft on wells #2 and #5.
- Replaced impeller on well #1.

NFH improvements scheduled for 2012 include:

- Replace 1 ton GMC pickup.
- Replace ¾ ton GMC pickup.
- Replace bathroom sinks in Residences #2 and #3.
- Replace roof on upper shop.

- Remove loft flooring in upper shop and replace.
- Replace carpeting and vinyl in office and dorm.
- Replace impeller in well #2
- Replace 2-way radios in vehicles and office with new satellite phone.

PUBLIC RELATIONS

As in past years, NFH was a focal point for many visitors, tours, and special groups. In 2011, an estimated 3,300 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 46 guided tours were given to area school, church, and Boy Scout groups. Several disabled veterans groups were allowed to fish the settling pond six times during the summer months. Free Fishing Day in 2011 was held at Wilson Ponds rather than the hatchery settling pond. NFH, with the help of regional personnel and reservists, hosted the Free Fishing Day clinic, which saw 700 visitors/fishermen, with an estimated 750 fish caught. The largest fish caught was a 4.8 pound rainbow trout, and two more over four pounds were caught. Free Fishing Day at Wilson Ponds was a big success and will be continued in the future. NFH accommodated regional fishing trailer events with 25 different releases at various sites. 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 20 different schools.

ACKNOWLEDGEMENTS

The NFH staff saw extensive changes in 2011. Rick Alsager remained in place as the Fish Hatchery Manager II. Bob Turik, Assistant Fish Hatchery Manager, resigned in July to take a position with the U.S. Fish and Wildlife Service. Bob Becker, Fish Culturist, accepted a lateral transfer to the Eagle Fish Hatchery in April, and then returned in August to fill the vacant Assistant Fish Hatchery Manager position. Michael Dill was hired in April as the new Fish Culturist. Gary Ady and Dick Bittick, Fish Transport Operators, were reclassified as Fish Culturists. Bio-aides for 2011 included Travis Balls, Andrew Endicott, Kent Jennings, Todd Gross, and Kelci Roberts. Chuck Kiester assisted with fish marking and helped facilitate the installation of the Deadwood kokanee weirs. Four groups of correctional inmates from the state prison worked at the hatchery scraping raceways and doing grounds maintenance. Volunteers, community service, and several young adults from the juvenile detention center have also helped on a number of projects throughout the year donating over 200 hours of time.

APPENDICES

Appendix 1. Total net fish production at Nampa Fish Hatchery, 2001 through 2011.

Year	Put-and-Take		Put-Grow-and-Take		Total Number	Total Pounds	Feed Pounds	Costs	Feed Conversion
	Number	Pounds	Number	Pounds					
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
2011	623,641	224,806	79,047	23,091	702,688	247,897	262,688	\$161,142	1.06

* 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, 2001 through 2011.

Year	Total Cost Through Grow-Out				Mean Length in inches	Total Cost Through Stocking			
	Total Cost	Cost/1000 Fish	Cost/Pound	Cost/Inch		Total Cost	Cost/1000 Fish	Cost/Pound	Cost/Inch
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
2011	\$461,461	\$657.35	\$1.86	\$0.048	7.62	\$482,445	\$687.24	\$1.95	\$0.050

Appendix 3. Fish requested and produced at Nampa Fish Hatchery, 2011.

Species/Strain	Size	Production Goal	Actual Production	% of Goal Achieved
Brown Trout (BN)	3-5 Inches	55,000	52,425	95.32%
Lahontan cutthroat trout (C6)	3-5 inches	43,000	13,200	30.70%
Fall Chinook (FC)	5-7 inches	25,000	28,982	115.93%
Triploid rainbow trout (T9)	8-12 inches	600,000	575,081	95.85%
Troutlodge Triploid Kamloops (TT)	8-12 inches	800,000	786,333	98.29%
Totals:		1,523,000	1,456,021	95.60%

Appendix 4. Eyed-eggs received at Nampa Hatchery, January 1 to December 31, 2011.

Date Received	Species/Strain	Source	Number	Pond	Destination	Cost / 1000 eggs
1/03/2011	Triploid rainbow trout(T9)	Hayspur	272,366	A8-11	SW/Reg	N/C
2/21/2011	Triploid rainbow trout(T9)	Hayspur	72,716	A12	SW/Reg	N/C
5/4/2011	Lahontan cutthroat trout(C6)	Omak, WA	78,670	A16	SW/Reg	N/C
6/16/2011	Troutlodge Triploid Kamloops (TT)	Troutlodge	566,351	A1-8	Statewide	\$30.25
7/14/2011	Troutlodge Triploid Kamloops (TT)	Troutlodge	307,316	A9-12, A14-15	Statewide	\$30.25
12/20/2011	Triploid rainbow trout(T9)	Hayspur	192,308	A9-12	SW/Reg	N/C
Total:			1,489,727			

Designation Key	
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 2011.

Species/Strain	Source	Number Received	Number Produced	Pounds Produced	% Survival Egg to Plant	Destination
Triploid rainbow trout(T9)	Hayspur	831,518	575,081	13,554	69.16%	SW Reg
Lahontan Cutthroat (C6)	Omak, WA	78,670	13,200	240	16.78%	SW Reg
Brown Trout (BN)	Daniel Hatchery, WY	84,490	52,425	1,500	62.05%	SW Reg
Fall Chinook (FC)	Big Creek Hatchery Astoria, OR	29,035*	28,982	2,571	99.82%	SW Reg/Panhandle
Totals:		1,023,713	669,688	17,865	65.42%	

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

Appendix 6. Catchables produced at Nampa Fish Hatchery in 2011.

Species/Strain	Source	Number Received	Number Produced	Pounds Produced	% Survival Egg to Plant	Destination
Troutlodge Triploid Kamloops (TT)	Troutlodge	1,161,783	786,333	263,041	67.68%	Statewide
Totals:		1,161,783	786,333	263,041	67.68%	

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

Hatchery	Species	Number	Pounds	Fish/pound
Clearwater Fish Hatchery	TT	22,837	7,875	2.90
McCall Fish Hatchery	TT	72,816	24,900	2.92
Mullan Fish Hatchery	TT	35,060	10,500	3.34
Sawtooth Fish Hatchery	TT	42,650	15,850	2.69
Sandpoint Fish Hatchery	TT	131,950	41,100	3.21
Hayspur Fish Hatchery	TT	50,293	16,425	3.06
Hagerman Fish Hatchery	TT	6,180	2,400	2.58
Mackay Fish Hatchery	TT	2,475	825	3.00
Totals:		364,261	119,875	3.04

Appendix 8. Nampa Hatchery feed costs in 2011.

Supplier/Source	Size/Type	Pounds	Price/lb.	Feed Charges
Rangen				
Dry Crumble	Starter #0	725	0.953	\$690.93
Dry Crumble	Starter #1	1,600	0.953	\$1,524.80
Dry Crumble	Starter #2	5,200	0.953	\$4,955.60
Dry Crumble	Grower #3	14,250	0.625	\$8,906.25
Soft Moist	#0	25	1.750	\$43.75
Soft Moist	1/32"	220	1.540	\$338.80
Soft Moist	3/64"	264	1.520	\$401.28
Soft Moist	1/16"	660	1.490	\$983.40
Soft Moist	3/32"	1,232	1.460	\$1,798.72
Soft Moist	1/8"	2,508	1.460	\$3,661.68
450 Floating	1/16" sack	6,500	0.720	\$4,680.00
450 Floating	3/32" sack	3,500	0.605	\$2,117.50
450 Floating	1/8" sack	3,112	0.549	\$1,708.49
450 Floating	5/32" sack	18,000	0.549	\$9,882.00
450 Floating	3/32" bulk	27,600	0.595	\$16,422.00
450 Floating	1/8" bulk	66,972	0.595	\$36,097.91
450 Floating	5/32" bulk	109,700	0.539	\$59,128.30
Dry Crumble med. TM 4K	3/32" pellet	600	0.964	\$578.40
Total:		262,668		\$153,919.81
Freight:				\$7,221.84
Grand Total:		262,688		\$161,141.65

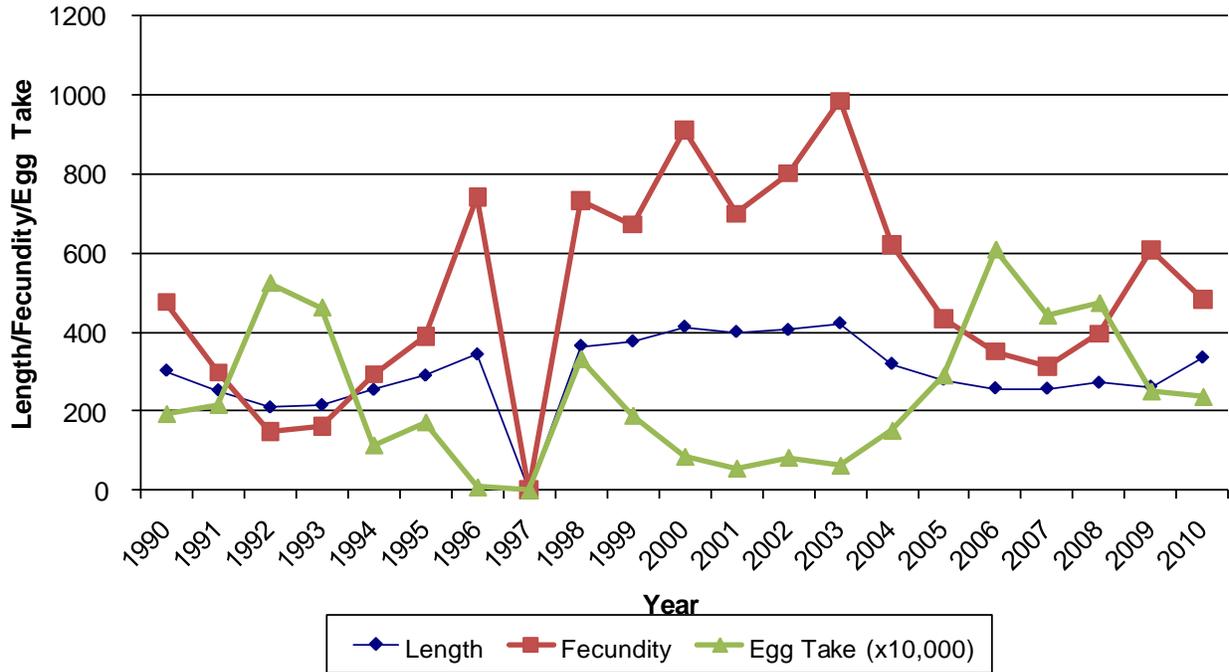
Appendix 9. Kokanee egg take at Deadwood Reservoir by Nampa Fish Hatchery in 2011. (Numbers determined by Jensorter Egg Counter).

Cabinet Gorge						
Spawn Date	Lot Number	Females Spawned	Green Eggs	Eyed Eggs	% Eye-up	
8/29/2011	1	345	154,504	104,190	67.4%	
8/31/2011	2	1,160	310,876	192,955	62.1%	
9/2/2011	3	1,301	418,665	238,698	57.0%	
9/5/2011	4	1,379	601,818	370,944	61.6%	
9/7/2011	5	1,770	734,443	441,918	60.2%	
9/9/2011	6	1,348	674,106	482,922	71.6%	
9/14/2011	7	360	220,689*	188,811*	85.6%	
Totals:		7,663	3,115,101	2,020,438	64.86%	

*3N kokanee eggs.

Appendix 10. Kokanee spawning length, fecundity, and egg take Nampa Fish Hatchery, (1991-2011).

Deadwood Kokanee Spawning Summary (1990-2010)



SANDPOINT HATCHERY

**John Rankin, Fish Hatchery Manager II
Will Demien, 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 the time working at Cabinet Gorge Fish Hatchery (CGFH) assisting with the late Kokanee salmon *Oncorhynchus nerka* (KE/KL) spawning operation and egg incubation. The Hatchery 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 Kamloops rainbow trout *Oncorhynchus mykiss* (TT). The catchables are delivered to SPFH via IDFG semitrailer 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. Additionally, on even years, 54,200 westslope cutthroat trout *Oncorhynchus clarkii* (C2) fry and 22,200 TT fry are raised for planting 30 mountain lakes in the Idaho Panhandle.

WATER SUPPLY

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

REARING FACILITIES

The hatchery rearing facilities include four half-stack Heath tray incubators (7 trays/stack), and 18 concrete vats (15 x 2.5 x 3 ft) located inside the main hatchery building. There are also two outdoor concrete raceways measuring (10 x 60 x 4 ft) used for holding catchables during redistribution.

FISH STOCKING

Catchable size triploid rainbow trout (~9.0-10.0 inches) were received from Nampa in seven shipments ranging from ~4,000 to ~24,000 fish. These shipments were stocked in various

lakes and reservoirs in Region 1 to support a put-and-take fishery. The position of Fish Culturist who is in charge of stocking was open for the first two months of fish stocking season before being filled. The combined effort by Cabinet Gorge and Mullan hatchery staff made the stocking possible with the unfilled position. All fish supplied for redistribution in 2011 were Troutlodge triploids (TT). A total of 120,548 fish weighing 37,181 lbs (3.24 f/lb) were stocked between the third week of April and the first week of October. Streamside cost to redistribute fish was \$0.40 per fish (Appendix 1).

Efforts were made to examine the effectiveness of the catchable stocking program throughout the region through exploitation studies. Fish at Sandpoint were tagged with Floy T-bar anchor tags and released into lakes on the normal stocking schedule. There were two tagging programs implemented on the fish this year from Sandpoint: one from research and another from management. Martin Koenig, a fisheries research biologist, was responsible for ~600 tagged fish that were stocked to Crystal and Hauser lakes as a return-to-creel study. Mark Liter and Ryan Hardy, regional fisheries biologists, were responsible for ~800 tagged fish that were divided into Jewel, Smith, Freeman, Robinson, Bull Moose, and Hayden lakes as part of a regional return-to-creel evaluation (Appendix 2). Each year different lakes are chosen to have tagged fish released providing a complete picture of the fish stocking effort as seen in Appendix 3. Continuing data from past and future lakes stocked with tagged fish will be a major contribution to the stocking programs effectiveness.

The Mountain Lakes program takes place on even years and will continue in 2012.

HATCHERY IMPROVEMENTS

No major improvements were completed this year at SPFH. Some construction has been completed on the Water Life Discovery Center (WLDC) this year including an enlarged parking lot, which will allow greater parking for tours and meetings. The Center consists of a pond with viewing windows, handicap accessible interpretive trail system, public boat dock on the Pend Oreille River, and an educational building.

HATCHERY NEEDS

- Repair/replace hatchery building interior ceiling panels.
- New hatch house windows
- Catwalk over headbox and tailbox of outside raceways.
- Upgrading interior electric service of workshop 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 annual events: 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 and MFH: John Rankin (Fish Hatchery Manager II), Todd Braunschweig (Maintenance Technician), Sam Van Liew (Assistant Hatchery Manager), and Mary Vanbroeke (Fisheries 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 the Panhandle Region for all the work and dedication he has put into the WLDC. Additionally we would like to thank Mark Liter, Ryan Hardy, Martin Koenig, and all the staff that tagged and monitored the tagged fish.

LITERATURE CITED

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- Liter, N. and J. Fredericks. 2011. Chapter 4: Lowland Lakes Hatchery Trout Exploitation. Idaho Department of Fish and Game. Boise.

APPENDICES

Appendix 1. TT Catchable Redistribution Cost.

Employee Costs	\$22,302.00
Nampa Transportation cost	\$11,191.00
Operating	\$14,611.69
Total	\$48,104.69

Cost	Number of Catchables	Streamside Cost Per Fish
\$48,104.69	120,548	\$40

Appendix 2. (Preliminary) Input information: 2011 NonRWD Tags, within 1 year of release (Koenig and E.H.).

Region	Project Leader	Water Body	Tag Date	Treatment	Number Tagged	Number Harvested	Adjusted Exploitation	Adjusted Use
1	Liter Mark	Bull Moose Lake	17-May-11	Regional evaluation	99	10	19%	19%
1	Koenig Martin	Crystal Lake	03-May-11	Normal production	117	4	6%	6%
1	Koenig Martin	Crystal Lake	18-May-11	Normal production	117	1	2%	2%
1	Liter Mark	Freeman Lake	18-Apr-11	Regional evaluation	100	6	11%	13%
1	Liter Mark	Freeman Lake	10-May-11	Regional evaluation	99	8	15%	15%
1	Koenig Martin	Hauser Lake	03-May-11	Normal production	192	7	7%	8%
1	Koenig Martin	Hauser Lake	18-May-11	Normal production	193	6	6%	7%
1	Hardy Ryan	Hayden Lake	16-Jun-11	Regional evaluation	100	3	6%	11%
1	Liter Mark	Jewel Lake	10-May-11	Regional evaluation	98	30	57%	59%
1	Liter Mark	Robinson Lake	26-Apr-11	Regional evaluation	100	14	26%	26%
1	Liter Mark	Smith Lake	26-Apr-11	Regional evaluation	100	15	28%	28%
1	Liter Mark	Smith Lake	17-May-11	Regional evaluation	100	15	28%	31%

Appendix 3. Estimates of angler exploitation, percentage resident anglers, and days-at-large for hatchery rainbow trout at various Panhandle Region lakes sampled in 2009-2011 (Liter and J.F.)

Lake	Year of Study	Number of Tags	Tags Returned as of 12/31	Tags Returned w/in 1 year	Number of different anglers	Corrected Exploitation Rate	Percent Idaho Resident	Mean Days at Large *
Round	2009	200	29	36	34	36%	91%	103
Kelso	2009	200	67	73	58	79%	86%	50
Hauser	2010	199	3	3	3	2%	100%	8.3
Fernan	2010	198	35	40	31	39%	100%	90
LTwin	2010	193	14	18	13	20%	85%	52
Stoneridge	2010	199	33	33	22	33%	77%	49
Freeman	2011	200	15	N/A	14	17%	87%	32
Jewel	2011	200	60	N/A	47	71%	93%	36
Robinson	2011	200	30	N/A	26	32%	97%	33
Smith	2011	200	29	N/A	28	32%	90%	45
Bull Moose	2011	100	13	N/A	13	31%	46%	32

*mean days @ large as of 12/31.

SAWTOOTH FISH HATCHERY

Daniel Fielding, Fish Culturist
Jeff McDonald, Biological Aide
Shelby Richins, Biological Aide

INTRODUCTION

The Sawtooth Fish Hatchery (SFH) began operations in 1985 and is owned and managed by the Idaho Department of Fish and Game (IDFG). 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 the Sawtooth Hatchery is to trap, spawn, rear, and release spring Chinook salmon *Oncorhynchus tshawytscha*. Two other fish species are also trapped at this facility. Sockeye salmon *O. nerka* are trapped, reared, and released here, although they are not spawned at the SFH. Anadromous steelhead *O. mykiss gairdneri* are also trapped and spawned, but are not reared here. Since 1990, IDFG and SFH have conducted a program to stock rainbow trout *O. mykiss* into the surrounding area waters for the purpose of improving angling opportunities. SFH also stocks Yellow Belly Lake with westslope cutthroat *O. clarkii lewisi* fry from the Mackay Fish Hatchery (MFH).

FISH STOCKING

SFH met its adjusted stocking request in 2011 for the rainbow trout stocking program. Between May 7 and September 21, a total of 40,595 hatchery rainbows were stocked in 53 stocking trips (Appendix 1).

Nampa Fish Hatchery (NFH) supplied SFH with Troutlodge triploid rainbows for stocking. A total of 42,650 fish were delivered to SFH from June 6 to July 5. Based on 15 sample counts, the fish averaged 2.75 fish per pound and 9.67 inches in length (246 mm). A separate group of 1,429 rainbow trout from the previous brood year had been held overwinter and reared to an average size of .98 fish per pound (13.66 inches in length). Due to stocking protocol, these larger fish were stocked only in Sawtooth Kids Pond, Blue Mountain Meadow Pond, and Squaw Creek Pond. These fish were very popular with anglers.

SFH employees drove approximately 2,725 miles to stock fish in the Salmon River, local lakes, ponds, and streams. NFH stocked Stanley, Pettit, Perkins, Alturas, and other large lakes in the Salmon region in 2011. This summer, SFH stocked 3,005 fewer fish into the Salmon River than scheduled due to unusually high river flows and poor angling conditions through June and July. Little Bayhorse Lake was stocked with 1,000 fewer fish due to road closures. Sawtooth Kids Pond was visited by many anglers this year and was stocked with an additional 2,199 rainbows throughout the summer to compensate for fishing pressure. Blue Mountain Meadow Pond in Challis also received 1,100 fish more than scheduled from SFH in lieu of fish from MFH. There were 450 fewer fish stocked in Kelly Creek Pond due to a mysterious absence of water.

NOAA permit # 1188, which expired December 31, 2004, outlines resident rainbow trout release 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 trout with the adipose fin-clipped may be kept with the exception of brook trout *Salvelinus fontinalis*, thereby protecting native wild fish. Rainbow trout received at SFH and stocked into the river were adipose clipped by NFH personnel and then delivered to SFH over 21 days later to allow for withdrawal of MS-222 to comply with label directions.

The rainbow trout were fed a maintenance diet of Rangen's extruded floating pellets 3/16 inch size. A total of 300 pounds of 3/16 pellets was purchased at a cost of \$164.70.

Weekly notices informing the public of the latest stocking locations were distributed to the local businesses and posted at SFH. Brochures titled "Fishing the Sawtooth Valley" were distributed by IDFG staff to local businesses making them available to summertime visitors. A repeating message, updated weekly, containing stocking information and current news about SFH can be heard over the local IDFG radio transmitter. Current stocking information can also be found on IDFG's web site.

Cutthroat Stocking

SFH in conjunction with MFH planted 34,939 westslope cutthroat fingerlings at 489 fish to the pound into Yellow Belly Lake. The fish were reared at MFH then transferred to a 300-gallon distribution truck from SFH for delivery to the lake (see MFH resident report).

Free Fishing Day

Free Fishing Day was held throughout the state of Idaho on Saturday, June 11, 2011. SFH participated by providing assistance to anglers from 10:00 a.m. to 3:00 p.m. at our Kids Fishing Pond. SFH's tour guide, Shelby Richins, organized the Free Fishing Day event this year. Its success was also due in part to the help of Merritt and Liz Horsmon, Tony Folsom, and Jeff McDonald. Approximately 119 people attended Free Fishing Day, 50 of whom were children under the age of 18 years old. Participating children traveled from all over Idaho and as far as California and Missouri.

Refreshments and snacks were provided consisting of juice, bottled water, granola bars, fruit roll-ups, candy bars, 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. A derby was also conducted and awards given for the heaviest four fish in each of four age classes. Fish were also tagged for awards, but no tagged fish were caught.

Prizes were donated by the following local businesses: McCoy's Tackle & Gift Shop, The River Company, Riverwear, Back Eddy's Market, Jerry's Country Store, Stanley Baking Company, Papa Brunee's, River 1, High Country Inn, Bridge Street Grill, Mountain Village Mercantile, and Smiley Creek Lodge.

PLANS FOR 2012

SFH will continue to stock the flowing water sites and small area ponds with adipose clipped rainbows from the NFH. NFH will continue to stock the larger Sawtooth basin lakes and designated ponds. SFH will continue to plant westslope cutthroat fingerlings into Yellow Belly Lake as determined by IDFG.

This year SFH will overwinter 1,800 of the Troutlodge rainbows in order to do early summer 2012 stocking in Sawtooth Kid's Pond and Kelly Creek Pond. These fish were graded to a size of 4.41 fish per pound and too small for stocking during the summer. Provided our new well (#5) is operational by January as expected, these fish can be reared to a larger size by spring. They are currently not being fed due to cold river water temperatures.

ACKNOWLEDGEMENTS

The SFH would like to thank Rick Alsager and the NFH crew for their cooperation in making 2011 successful. Special thanks go to the transport staff at NFH for transporting fish from Nampa and stocking the big lakes in the Stanley basin. Fish Culturist Dan Fielding provided excellent guidance and supervision of the stocking operations at SFH. Tour Guide Shelby Richins did a great job of delivering the stocking notices in a timely manner and Bio Aide Jeff McDonald met stocking requests or adjusted stocking levels due to environmental conditions. Tom Frew provided valuable coordination for SFH resident fish programs. We would also like to thank the staff at the MFH 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 May through September 2011.

Site	Number
Sawtooth Kids Pond	3,199
Perkins Lake	540
Little Bayhorse Lake	1,000
Kelly Creek Pond	750
Salmon River	25,867
Yankee Fork Dredge Ponds	1,500
Valley Creek	4,800
Blue Mountain Meadow Pond	1,700
Squaw Creek Pond	1,239
Totals	40,595

Appendix 2. Planting site and number of westslope cutthroat fry stocked into one basin lake by Sawtooth Fish Hatchery on September 20, 2011.

Site	Number
Yellow Belly Lake	34,939

RESIDENT FISH HEALTH REPORT-2011

Douglas R. Burton, Fishery Pathologist

INTRODUCTION

As the resident hatchery pathologist, I am based at 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. The EFHL examined 107 cases for IDFG resident hatchery programs during 2011 (46 diagnostic cases, 45 routine hatchery inspections including 18 captive broodstock cases, and 16 inspections of feral broodfish). In addition, tests were completed on three rainbow trout sample sets submitted by Rangen's Aquaculture (fish purchased by Idaho Power Co. for mitigation release in the Snake River), and on three sets of wild fish samples.

Idaho Department of Fish and Game is a member of the Pacific Northwest Fish Health Protection Committee. 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 during 2011. Confirmed detections of Class B pathogens in the resident hatchery system were limited to infectious hematopoietic necrosis virus (IHNV) at Hagerman State Hatchery. Hagerman State Hatchery also has a history of two Class B parasitic agents, *Tetracapsuloides bryosalmonae* (PKX) and *Nucleospora salmonis* (NS) that were not detected by EFHL in 2011 but should still be presumed present.

The most significant fish disease in the statewide resident hatchery system continued to be bacterial coldwater disease (CWD), caused by *Flavobacterium psychrophilum* (FP). Clinical or epizootic CWD was diagnosed 19 times at three resident hatcheries in 2011, which was a slight reduction from previous years (Appendix 1). All clinical or epizootic cases were diagnosed in rainbow trout. Eight carrier states were identified: seven 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 FP 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. There have been no signs of CWD at Mackay since this treatment regimen was initiated in 2008. Clear Springs Foods, of Buhl, Idaho, provided IDFG with a group of rainbow trout eggs from their "disease resistant" broodstock selection program. The resulting fish were reared at Hagerman State Hatchery, where their percent survival to stocking was better than that of a side-by-side group of Hayspur-strain fish (see Hagerman State Hatchery below).

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 2011, but carrier states were

identified in adult rainbow and cutthroat trout populations. Injections with Erythromycin (ERY) have been initiated to reduce RS detections in brood rainbow trout at Hayspur Hatchery.

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 2011. *Myxobolus* sp. spores were detected from adult Yellowstone cutthroat at Henrys Lake (previously confirmed MC-positive host species and location). *Myxobolus cerebralis* genetic material was detected by polymerase chain reaction (PCR) in mountain whitefish from the Big Lost River, a new host species from a previously confirmed location.

The EFHL issues IDFG fish import/transport/release permits to IDFG personnel, co-managing agencies, and private individuals. I signed 111 of the 152 permits issued in 2011. 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. Dr. Debra Lawrence, the Assistant State Veterinarian at ISDA, has been outstanding to work with in this cooperative effort.

The following are descriptions of the work done for IDFG resident programs in 2011.

AMERICAN FALLS HATCHERY

Three of four diagnostic examinations at American Falls determined that CWD was the cause of mortality in rainbow trout (Appendix 2). One of those cases had a concomitant motile *Aeromonas septicemia* (MAS) that may have been artificially amplified in the whole-fish samples that were shipped overnight to EFHL. The fish in the first and last cases (January and December) were treated successfully with Aquaflor-medicated feed. In the second case (March), the raceway was split to reduce density and mortality rate dropped without medicated treatment.

The other diagnostic case followed a power outage in the early morning hours of April 20. The hatchery manager heard a loud bang, and Idaho Power Company reported a large breaker was activated at their compound just up the hill from the hatchery. At daybreak, every outside raceway had 10-40 fish observed laying on their sides. Most were still alive when I arrived at noon. Many showed darkened marks on the lateral and dorsal aspects or tried to swim with an "S" curvature in the body. Internally, I found hemorrhage in the muscle below the external dark marks. One larger individual had hemorrhage between two vertebrae. No other obvious clinical signs were evident. I considered all the signs to be consistent with electrocution from an electrical power surge. Idaho Power performed tests around the hatchery but could not find a short or other obvious source of such electricity. The disconcerting aspect of this episode is that it could happen again when hatchery personnel are working in the raceways.

Three groups of catchable rainbow trout were inspected in April as part of the hatchery evaluation biologist's research project to test post-release performance of fish reared at different density levels. Organosomatic index data were collected from 20 individuals in each group (Appendix 3), as well as disease samples. The only potential pathogen detected in any of the

experimental groups was FP, isolated at carrier levels from two fish from the low-density raceway. A *Pasteurella* sp. of bacteria was also cultured that was likely not pathogenic.

Standard cell culture testing detected no evidence of replicating viral agents from 87 individuals tested at American Falls in 2011, and no signs indicating viral infection were observed on station. The last record of any virus at American Falls Hatchery in the EFHL database was infectious pancreatic necrosis virus (IPNV) in 1980.

ASHTON HATCHERY

Ashton Hatchery personnel did not report any significant fish losses in 2011. I inspected the BY10 Troutlodge rainbow trout in March (Appendix 4). No *Myxobolus* (MYXOB) spores or replicating viruses were detected. I returned in September to check the triploid brook trout prior to release in Henrys Lake. No replicating viruses were detected. Direct fluorescent antibody tests (DFAT) were negative for RS, as were pepsin/trypsin tests (PTD) for MYXOB spores. One of ten fish was found to carry a very light infection of *Aeromonas hydrophila*.

One hundred twenty individual fish tested negative for replicating viruses at Ashton in 2011. The last record of any virus at Ashton Hatchery in the EFHL database was IPNV in 1985. The PCR monitoring program for epizootic epitheliotropic disease virus (EEDV) was discontinued as there continues to be no evidence connecting the PCR test to any actual infection or clinical disease.

Work has progressed on covering the hatchery springs, but more cobble fill is required to complete the job. Until then, the hatchery water supply is still at risk of contamination.

CABINET GORGE HATCHERY

This was the first year that Cabinet Gorge Hatchery took broodstock replacement eggs from the captive Kings Lake westslope cutthroat trout population. No eggs were collected from the original Kings Lake source in Washington state. Four-year-old females from the BY07 group were crossed with males from BY08 to avoid sibling crosses and maintain genetic diversity. Such brood year crosses will be the standard operation to maintain the captive population. I traveled to the hatchery on May 4 to sample BY07 females from the first replacement crosses. I collected ovarian fluids and tissues for virology and kidney tissues to test for RS. Hatchery personnel collected ovarian fluid samples on two more spawning dates and shipped them to EFHL. In all, samples from 120 individual females were tested. No viral agents or RS were detected in those samples (Appendix 5), so no eggs were culled from the program due to pathogen detections.

I sampled 60 spawning kokanee salmon adults at Sullivan Springs (Lake Pend Oreille) in November. No replicating viruses were detected by cell culture. No MYXOB spores were detected by PTD, and no evidence of RS was detected by either DFAT or by enzyme-linked immunosorbent assays (ELISA). 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.

I also took inspection samples from 60 juvenile Kings Lake cutthroat trout during my November trip (30 fish each from the BY10 and BY11 populations). No replicating viruses, RS, significant bacteria, or MYXOB spores were detected.

The EFHL database indicates that no replicating viruses have ever been detected from fish sampled at Cabinet Gorge Hatchery. There is one record of IPNV in juvenile Sullivan Springs kokanee reared at Clark Fork Hatchery in 1979, but there are no recorded detections of any virus from spawning kokanee adults at Sullivan Springs.

GRACE HATCHERY

This was the second year of a Bonneville cutthroat trout spawning and broodstock development program at Grace Hatchery. Regional personnel captured fish from the wild and held them to maturity in a private pond northeast of the hatchery. Thirty-one females were spawned and sacrificed for disease samples between May 4 and June 15 (Appendix 6). Individual egg lots were kept in isolation at the hatchery until tests were complete. No replicating viruses or MYXOB spores were detected in the samples. Nineteen females tested positive for RS antibodies by ELISA, with optical density values ranging from 0.106 to 0.273. Eggs from two females were culled from the program.

Elevated mortality rates were reported from the Bonneville cutthroat trout fry in July. Examination showed that overfilled stomachs were causing first-feeding fry to rupture the ventral medial suture. Several measures were taken, including reducing the size of feed particles, changing feeding schedules and rates, and even changing feed manufacturer. No single measure was obviously successful, and losses seemed to persist until the fish outgrew the most susceptible size. No such issues occurred in 2010, which was the first year of the Bonneville cutthroat program at Grace. We obviously have more to learn when culturing this species/population.

Hatchery personnel felt that some Troutlodge rainbow trout fry experienced higher-than-usual prevalence of blue-sac in the incubators. I tested these fish and isolated *A. hydrophila* from the yolk sac, but I believe it likely that this was a secondary opportunist or a plate contaminate. This condition has been observed at Grace many times over the years but is usually of minor significance. Literature on the subject agrees that no infectious agent has ever been associated with blue-sac, but the actual cause is still uncertain. Various speculations include high ammonia/metabolic waste levels, low oxygen, or some other water quality issue that occur sometime during incubation.

One diagnostic case involved fingerling Troutlodge rainbow in a large raceway that was also experiencing some heron depredation. Very low numbers of FP bacteria were isolated from moribund fish, but not enough to justify an immediate response. The hatchery manager reports that the episode resolved without the need for an antibiotic treatment.

The BY10 Story lake trout tested negative for replicating viruses. The monitoring program for EEDV in this population was discontinued. The parent population at Story, Wyoming, has tested positive for EEDV by PCR, and it can be assumed that this population would have tested positive as well. There is still no evidence linking PCR results to actual infection or clinical disease, so the effort and expense of further testing was not justified.

No replicating viruses were detected from 95 individual fish sampled at Grace in 2011. The last record of any virus at Grace Hatchery in the EFHL database was IPNV in 1983.

HAGERMAN STATE HATCHERY

Thirty-two diagnostic and five inspection cases were examined at Hagerman State Fish Hatchery in 2011 (Appendix 7). Hagerman State easily surpasses all other hatcheries in the IDFG system in the variety of pathogens on station, often in combinations of two or more at once. Hagerman is also the only resident hatchery that rears fish on surface water effluent from another hatchery (Riley Creek; Hagerman National Hatchery). Viral IHN and bacterial CWD are the two most significant diseases at Hagerman, followed by motile *Aeromonas/Pseudomonas* infections, Columnaris disease (COL), and bacterial furunculosis (FUR). 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 add stress to 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. Other external parasites identified in 2011 included *Salmincola californiensis* and a species of *Apiosoma* (a ciliated protozoan). The last detection of IPNV at Hagerman was in 1994.

The EFHL confirmed IHN 13 times at Hagerman Hatchery in 2011, all after June 1. This meant that survival of younger fish was very good, but then losses came when the fish were larger with more time and money invested. By the end of the year, all lots designated as 2012 catchables had undergone viral episodes. It can be hoped that IHN will not reoccur in those groups.

Flavobacterium psychrophilum was cultured from Hagerman fish in 21 cases (6 carrier levels and 15 clinical to epizootic levels). Antibiotic therapies continued to have inconsistent success, although in vitro tests at EFHL do not indicate significant antibiotic resistance has developed. There are many complicating factors at Hagerman that may influence a response to therapy, including concomitant infections with other bacteria or IHN. A significant piece of information was gained when two raceways of the same lot of fish were used to compare the response to side-by-side treatment of Aquaflor and the standard dose of OTC. Appendix 8 shows the daily percent mortality for the two raceways, demonstrating that the response to Aquaflor was much quicker. Appendix 9 shows that total cumulative mortality was less for the Aquaflor-treated group.

One bright spot in the IHN/CWD saga at Hagerman was a trial group of diploid rainbow trout raised from eggs given to IDFG by Clear Springs Foods, Inc. (CSF) of Buhl, Idaho. The CSF fish health laboratory and hatchery personnel have been selecting for disease resistance in their broodfish programs for many years. Fish from the CSF eggs were reared in a side-by-side comparison with a similar group of Hayspur-strain (T9) rainbow trout. At one point, I isolated FP from clinical CSF individuals, but the group did not experience a CWD epizootic when the T9 group did. Both groups then experienced mortality from IHN, but the CSF group experienced more chronic losses compared to an acute mortality spike in the T9 group. Final percent survival to stocking was 39.1% for the CSF group compared to 22.9% for the T9 group. The difference would have been even more dramatic if the CSF losses did not include approximately 20,000, fish lost in one single day to a dewatering event. All surviving fish from both groups were stocked as catchables in the fall with a portion of each marked with Floy Tags to evaluate returns to the creel. This data will not be available until next spring, but will be important in

determining if the CSF fish would be a viable alternative for use in fishery enhancement programs. Another group of eggs has been received in order to repeat the trial in 2012.

Aeromonas salmonicida infection (FUR) was diagnosed twice at Hagerman State. Neither case involved mortality rates above a chronic level. One case had concomitant infections of IHNV, COL, and *P. fluorescens*, while the other case also involved COL and external copepods (*Salmincola californiensis*) on the gills. Both cases were in catchable-size fish that had been vaccinated against *A. salmonicida* as juveniles. General opinion holds that the effectiveness of such vaccines is time-limited (perhaps 6-8 months), so these fish were likely approaching the limit of protection. No antibiotic treatment was applied to either case.

Ichthyophthirius multifiliis (ICH) has an unusual manifestation at Hagerman State Hatchery. For several years, including 2011, it has appeared quite predictably in December and declined by April. This period is when the water temperature of Riley Creek is dropping to seasonal lows. Because ICH is supposed to replicate faster and cause more infections in warmer temperatures, these winter appearances at Hagerman are counter to the accepted biology of the parasite. On the other hand, the appearance of ICH does coincide with the highest numbers and densities of fish on the hatchery. The hatchery manager believes the annual influx of migratory birds to the Wildlife Management Area lakes that surround the hatchery somehow affects the level of infectious theronts in the inflow water. I have no hard evidence to either support or challenge his theory.

What I believe to be an adverse response to Aquaflor at Hagerman in the summers of 2009 and 2010 has convinced me that the drug can cause a photosensitivity leading to acute sunburn. With agreement from the hatchery manager, no Aquaflor-medicated feed was used on station from May to August 2011. Treatments during the other months were mostly effective, and no signs of acute sunburn were reported during the summer. Other cases of skin disorders were also less evident at Hagerman in 2011.

A new disease syndrome was identified among catchable-size triploid Hayspur rainbow in Raceway L-22 (Riley Creek water source). Chronic mortality was reported in the raceway. On 4 January, I observed a number of individuals with blotchy light and dark discoloration. Most had bilateral exophthalmia, pale gills, and soft, distended abdomens. Internally, there was bloody ascetic fluid, livers and other organs were pale, the swim bladder was opaque and leathery, and there were multifocal necrotic lesions in the kidney. Although the signs were similar to BKD, both DFAT and ELISA tests for RS were negative. No replicating viral agents were cultured on standard cell lines. A few colonies of FP were cultured from kidney and spleen, but not enough to suggest clinical CWD. Polymerase chain reaction tests for NS and PKX were negative. Because I was unable to identify an etiologic agent, I resampled the fish on 26 January. Again, virology and bacteriology samples were negative, while no evidence of NS or PKX could be found in kidney smears. I also fixed and mailed tissues to the Washington Animal Disease Diagnostic Laboratory (WADDL) at Washington State University for histology. The histology report indicated a generalized inflammatory response in all tissues examined, including kidney, liver, spleen, heart, swim bladder, mesenteries and fatty tissues, muscle and skeleton, spinal cord, choroid gland (eye), and gills. No pathogenic organisms were detected in histological sections using a number of standard stains. Test results from a third sampling on 14 February (including more tissues to WADDL) found nothing that had not already been described. In desperation, we applied an Aquaflor treatment under VFD-approval, justified by the few colonies of FP. Signs eventually declined, although there was no way to determine if the Aquaflor had had any effect. The fish were nearly to stocking size when the episode began and had been intended for general distribution in several drainages. All stocking was stopped while we looked

for a cause, and was only resumed to locations in the immediate vicinity of the hatchery when we had done all we could to eliminate any known infectious agents. Doug Ramsey, Rangen Research Laboratory, reports he has seen this syndrome and believes it to be an unusual manifestation of proliferative kidney disease (*Tetracapsuloides bryosalmonae* infection). He did find PKX organisms in a smear taken near the end of the episode (late March), but that is the time of year I expect them to appear.

Two groups of catchable rainbow trout were inspected in March as part of the hatchery evaluation biologist's research project to test post-release performance of fish reared at different density levels. Organosomatic index data were collected from 20 individuals in each group (Appendix 10), as well as disease samples. No replicating viruses or systemic bacterial infections were detected. Kidney lesions similar to the new syndrome described in the previous paragraph were observed in one fish from the standard production density group in raceway L-5. No external signs were evident on the individual nor were there other fish in the raceway showing external indications.

HAYSPUR HATCHERY

A significant issue at Hayspur Hatchery continued to be 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. All fish in the large raceways were destroyed, shipments of Hayspur eggs were restricted, and an intense sampling protocol was implemented in all fish populations remaining on station. From the time of the outbreak to the end of 2011, a total of 3,098 individual fish from five year classes had been sampled, (juveniles through spawning adults; tissues and ovarian fluids; individual and pooled samples), with no further detections of any replicating viruses. Restrictions on egg shipments were lifted in 2010 after the third consecutive hatchery-wide sample set, taken at a minimum interval of six months, came back with negative test results. The last viral detection in a Hayspur Hatchery broodstock population was IPNV in 1992.

Hayspur Hatchery produces broodstock replacement eggs every year by crossing individual males from one age class with individual females from another age class to avoid sibling crosses. Ovarian fluid is sampled from every individual female and 60 females from within the group are sacrificed for tissue testing. Fertilized eggs from each female are kept separate until the test results are complete. In 2011, 192 females (age 3+) from round pond #1 were crossed with age 2+ males from pond #2. No evidence of IHNV or any other replicating virus was detected from either ovarian fluids or kidney/spleen tissue samples (Appendix 11). 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. However, ELISA tests on 60 kidney tissue samples produced positive results for RS antigen from three individual females (optical densities of 0.116, 0.441, and 0.237). Eggs from those fish were culled from the replacement population.

All fish in round pond #1 had received two injections with Gallimycin (the injectable form of ERY) prior to the spawning season. The positive ELISA-RS results reported above were the first from such treated fish in four years. Erythromycin is not registered for use on food fish, so all such treated fish have been destroyed, including those in round pond #1. Previous trials have indicated that injections with OTC may have inhibited RS, but feeding OTC at the dosage that allows use of treated fish for food animals was not effective (see Appendix 11, Accession 11-185). Success in three out of four seasons of ERY injections, plus years of data from the Chinook salmon programs, indicates that injections with ERY may still be the best route to

pursue. Unlike OTC, ERY is not used in any other resident hatchery program to treat bacterial infections, thus there is no concern about developing antibiotic resistance by using it. Following considerable literature search and several discussions, Dr. Phil Mamer has written a Veterinary Extra-label prescription to allow use of Gallimycin on rainbow trout at Hayspur. Specifically, a single annual injection 20 mg/kg active ERY must be followed by a 270-day withdrawal time before treated fish may be released for a fishery/human consumption. Seven ponds of 2- and 3-year-old fish were injected under this prescription in October. The withdrawal period will allow excess fish to be stocked for fishing by July 2012. The goal is for all fish on station above one year of age to be treated annually. A possible side benefit is that nearly all isolates of FP tested at EFHL are susceptible to erythromycin. It is my hope that this will be an effective therapy for both RS and FP in the brood fish at Hayspur without the risk of developing resistance to either OTC or Aquaflor.

HENRYS LAKE HATCHERY

Yellowstone cutthroat trout spawning occurred at Henrys Lake Hatchery from February through April 2011. Hatchery personnel collected ovarian fluids from all spawned females and shipped 176 pooled samples to EFHL for testing (Appendix 12). Virology tests were done on 26 random samples (154 individuals) while OCP-FAT for RS was done on all samples (1043 individuals). There was no evidence of replicating viruses in any sample. A detection of IPNV in 1989 is the only record of replicating virus at Henrys Lake in the EFHL database. Fluorescing bacteria of size and shape consistent with RS were observed in eight of the 176 pooled OCP-FAT samples. All eggs from the RS-positive groups were culled.

I visited the hatchery on March 10 and collected lethal tissues samples from a group of 60 fish (mixed males and females) to supplement the ovarian fluid samples collected by the hatchery personnel. Virology tests were negative, while RS antigen was detected by ELISA at low levels in three of twelve 5-fish pooled kidney samples. These results were consistent with the findings in previous years. Bacteriology samples were taken from 20 individuals. *Flavobacterium psychrophilum* was isolated from seven fish, a *Pseudomonas* species from three, and a *Pasteurella* species from two. This 35% prevalence of FP was slightly above recent years (20-25% in 2008-2010) but much lower than 2007 (44%) or 2006 (88%). No signs of clinical CWD have ever been evident in the adult cutthroat trout at Henrys Lake. The *Pseudomonas* and *Pasteurella* were probably opportunists rather than pathogens. I have theorized that varying ice or snow conditions on the lake may have a direct effect on pathogen detections in spawning adult cutthroat. There was a heavier snow pack on top of the ice this year, but the lake conditions were reportedly not as severe as in 2006 or 2007.

MACKAY HATCHERY

I visited Mackay Hatchery in August and collected a 60-fish inspection sample from the Henrys Lake rainbow X cutthroat hybrid fingerlings. No replicating viruses were detected (Appendix 13). The EFHL database contains one record of IPNV at Mackay Hatchery in 1977.

First-feeding Henrys Lake cutthroat and rainbow X cutthroat hybrid fry at Mackay historically experienced significant losses due to CWD. Onset of signs was always within the first two weeks of swim-up, and heavy losses would have already occurred by the time the bacterium could be isolated and identified. 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. Justification for this treatment is based on the hatchery history and the persistent culture of FP from brood fish at Henrys Lake (see Henrys Lake Hatchery, above). 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%. Without untreated controls, it is impossible to state that CWD losses would or would not have occurred. However, the last year when a major mortality event occurred at Mackay was 2006, when poor overwinter/high stress conditions were reported in Henrys Lake and the detected prevalence of FP in brood fish was 88%. Metaphylactic Aquaflor treatment was initiated in 2007.

Mackay Hatchery has historically received green early-spawning kokanee eggs that originated from Deadwood Reservoir. This year the eggs were flown from Deadwood to Cabinet Gorge Hatchery for early incubation, and then transferred to Mackay at the eyed stage. The rationale is that Cabinet Gorge experiences better incubation survival of kokanee eggs than Mackay, possibly due to different water chemistry (lower alkalinity) and lower temperature. 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 the mountain lake fry, but did have one episode of elevated mortality in catchable rainbow transferred from Nampa Hatchery (Appendix 14). Doug Munson sampled the fish and determined that the cause of mortality was most likely loading or hauling stress before the fish reached McCall.

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 2011. I did not sample any fish from Mullan Hatchery during 2011.

NAMPA HATCHERY

I examined six inspection and four diagnostic cases at Nampa Hatchery in 2011 (Appendix 15). There were no clinical CWD or MAS episodes at the hatchery for the first time in years. No antibiotics were used on station during the year. A carrier level of FP was detected once in rainbow trout fry, but the clinical signs did not indicate CWD. An intestinal parasite, *Hexamita salmonis*, was detected in gut smears from the CWD-carrier group and was successfully treated by adding 1% Epsom salt to the diet for three days.

Four inspection cases were done in March as part of the hatchery evaluation biologist's research project to test post-release performance of fish reared at different density levels. Organosomatic index data were collected from 20 individuals in each group, as well as disease samples. A summary of the organosomatic observations is presented in Appendix 16. The only possibly significant organism detected in any of the experimental groups was a *Pasteurella* species of bacteria from two fish in the low-density group. This genus includes organisms that

cause disease in warm-blooded animals but have never been reported pathogenic in fish. We know that Nampa Hatchery's wells are impacted by surface water from the local irrigation canal system and these bacteria may be common in that source.

Infections by motile *Aeromonas* or *Pseudomonas* bacteria have become more common at Nampa than FP. Many seem to begin as superficial skin infections before becoming systemic. The signs are mottled areas on the skin where the normal mucous layer is absent and pigmentation is lost. I only diagnosed one case of external *Pseudomonas* infection in 2011. Juvenile rainbow trout in the "A" raceways had a moderate case and bath treatments with potassium permanganate controlled the infections.

I diagnosed one case of environmental gill disease (EGD) with secondary fungus in juvenile brown trout at the end of March. Salt treatments were not effective, so I recommended a treatment with formalin. Chronic mortality persisted, and another sample in May found a very low level of systemic *Pseudomonas* bacteria. Poor water flows in the A-raceways seem to lead to similar problems with brown trout every year.

Eighty-six individual fish from five cases tested negative for replicating viral agents by standard cell culture tests in 2011. The last record of any virus at Nampa Hatchery in the EFHL database was IHNV in 1986.

Phil Mamer and Doug Munson assisted me with one screening for ICH at Nampa. One raceway of fish destined for transfer to specific anadromous hatcheries was sampled. Gills from 60 fish were examined under a light microscope. No ICH trophonts were detected, so no further steps were taken before transfer. No ICH has been detected at Nampa since 2008.

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 water. This 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 Mudsnaills. 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. This pipeline issue would be much easier and cheaper to remedy than rebuilding the large raceways.

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 2011.

WILD FISH

Fisheries biologists from IDFG submitted wild fish samples to EFHL for a variety of reasons in 2011 (Appendix 17). Age-0 mountain whitefish from the Big Lost River were submitted to EFHL to be tested for MC. Initial PTD results were negative, but due of the very young age of the fish, there may not have been enough time from initial exposure for spores to

develop. Single-round PCR detected MC genetic material in one of 14 individuals. Heavy infections of MC in rainbow trout from the Big Lost River were first detected in 1988, but this was the first confirmation from mountain whitefish. Without corroborating spore development or clinical signs, it is not prudent to attempt to extrapolate a potential impact of whirling disease on the whitefish population from such low-prevalence PCR detection.

Spawning female rainbow trout were sampled in May from Lake Creek, above Williams Lake in Lemhi County (see Other Activities, below). No replicating viruses or *Myxobolus* spores were detected in the samples, while 100% (6 of 6) were positive for RS antigen by ELISA at low levels.

Regional biologists have moved adult channel catfish from the lower Snake River, where they are underexploited, to a number of urban ponds in the Southwest Region where the summer water conditions are not conducive for stocked rainbow trout survival. This year, the Magic Valley regional fish manager wanted to make a similar move to Dog Creek Reservoir. Because the reservoir is in the Big Wood River drainage and does have an outflow that can connect to other surface water, it was decided that we should gather some fish health information from this population. Ten adult fish were delivered to EFHL on July 18. No replicating viral agents were detected in the samples. Common parasites such as leaches and tapeworms were observed but were not considered exotic to any water where catfish have been introduced.

OTHER ACTIVITIES

The vast majority of the catchable-size rainbow trout produced by IDFG hatcheries are of Troutlodge stock. This is not because the Troutlodge fish are necessarily better for this purpose, but because most hatcheries require 10 to 12 months to grow a 10-inch fish. Thus, eyed rainbow trout eggs are needed in June to August in order to produce “catchables” by the next spring. The Hayspur Hatchery broodstock are primarily October to December spawners with a few fish on light control producing eggs in February to March. Hence, Hayspur throws away eggs in the fall that IDFG does not need, the cost per 1000 usable Hayspur eggs is high, and IDFG is far too dependent on an expensive outside egg source. In an attempt to remedy this situation, Salmon Regional Biologist Bob Esselman, crewmembers from Hayspur Hatchery, and I captured and spawned a small group of wild adult rainbow trout migrating out of Williams Lake in May. I transferred green eggs from six females to the EFHL wet laboratory. After they hatched and grew to an adequate size, I sampled them for replicating viruses. Once I determined they were a minimal fish health risk, I transferred about 600 fish (average 85 mm total length) to Hayspur Hatchery. The first goal is to see if these fish will retain their parents’ spawn timing after being reared in a hatchery with constant water temperatures. If they do, the next step will be to determine if this population will meet other needs, such as survival in a production hatchery and adequate return to creel when stocked.

Stocking sterile triploid hatchery trout to avoid introgression with wild populations has become an important part of IDFG’s statewide fishery management. Triploidy is induced by treating freshly fertilized eggs with very high hydraulic pressure, thus causing 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 is expelled during the earliest cell divisions. Because this technique is not perfect, IDFG has established a goal of at least 95% triploidy in “sterile” production lots. The triploid fish genome contains half again more genetic material 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 samples taken in 2011 tested 100% triploid. Fish species tested included Hayspur-stock rainbow trout lots at Hagerman, Nampa, and Hayspur hatcheries (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).

The first steps to implement a biosecurity audit program have been taken in the resident hatchery system. I solicited input from all hatchery managers in developing a general audit checklist, and then started customizing that list for each individual facility. By the end of the year, I had completed my first audits at Ashton, American Falls, and Nampa hatcheries.

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 Carla Hogge, Sharon Landin, 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.

APPENDICES

Appendix 1. Annual record-count of cases where *Flavobacterium psychrophilum* (bacterial coldwater disease) was detected on IDFG resident hatchery programs (Eagle Fish Health Laboratory Database).

Resident Hatchery	Infection Level*	2004	2005	2006	2007	2008	2009	2010	2011	Totals
American Falls	Carrier		1						1	2
	Clinical	1				1	4	2		8
	Epizootic	4	3	1	6	3	4	5	3	29
Ashton	Carrier									0
	Clinical			1		1	1	1		4
	Epizootic				1	1	1			3
Cabinet Gorge (Sullivan Springs adult kokanee)	Carrier		1	1		1	1			4
	Clinical									0
	Epizootic									0
Grace	Carrier								1	1
	Clinical				1		1			2
	Epizootic	2		2	2	1	1	1		9
Hagerman	Carrier	1	1	3	4	2	7	2	4	25
	Clinical	12	2	6	10	4	6	11	10	61
	Epizootic	2	4	3	9	7	5	10	5	45
Hayspur	Carrier	2				1	1			4
	Clinical				1		2			3
	Epizootic									0
Henrys Lake (Feral cutthroat broodstock)	Carrier		1	1	1	1	1	1	1	7
	Clinical									0
	Epizootic									0
Mackay	Carrier				1					1
	Clinical	1		1						2
	Epizootic		1		1					2
Nampa	Carrier	1			2			2		4
	Clinical	2		2	4	1	2	1	1	11
	Epizootic	1	5	2	4	7	3	4		25
Totals:		29	19	23	47	31	40	40	26	255

*Level definitions:

Carrier-Bacteria isolated from fish with no gross signs of disease.

Clinical-Bacteria isolated from fish with gross signs of disease, but with no elevated mortality rate in the population.

Epizootic-Bacteria isolated from fish with gross signs of disease and the population mortality rate was elevated.

Note: All reported levels were observed at the time of sampling and may have subsequently changed. Antibiotic treatments may or may not have been applied, depending on the individual circumstances.

Appendix 2. Summary of Eagle Fish Health Laboratory results for American Falls Hatchery, January 1–December 31, 2011.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, triploid	11-001	01/04/11	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>Flavobacterium psychrophilum</i> 5/5
2010	Troutlodge	Rainbow trout, triploid	11-099	03/28/11	-	-			-	-	+	+			DX: CWD, MAS; VIRO 0/17, <i>F. psychrophilum</i> 17/17, <i>Aeromonas sobria</i> 13/17
2010	Troutlodge	Rainbow trout, triploid	11-108	04/06/11	-	-			-	-	-	-			IX: NPD; VIRO 0/20, BACTE 0/20
2010	Troutlodge	Rainbow trout, triploid	11-109	04/06/11	-	-			-	-	-	-			IX: NPD; VIRO 0/20, BACTE 0/20
2010	Troutlodge	Rainbow trout, triploid	11-110	04/06/11	-	-			-	-	+	-			IX: CWD, PAST; <i>F. psychrophilum</i> 2/20, <i>Pasteurella sp.</i> 1/20
2010	Troutlodge	Rainbow trout, triploid	11-137	04/20/11					-	-	-	-			DX: NPD; BACTE 0/2, ELECTROCUTION
2011	Troutlodge	Rainbow trout triploid	11-512	12/09/11	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 5/5

Appendix 3. Preliberation organosomatic data for BY2010 Troutlodge triploid rainbow trout catchables reared at American Falls Hatchery using the Goede (1993) assessment method. Sample date: April 6, 2011.

EFHL Accession No.:	11-110	11-109	11-108	
Raceway:	20	18	13	
Relative Density:	High	Medium	Low	
Sample size:	20	20	20	
<hr/>				
Scored Means	Hematocrit	38.35	41.95	41.75
	Leucocrit	0.80	0.58	0.95
	Serum protein	3.58	3.22	3.54
	Fat	3.50	3.35	3.65
	Fins	0.75	1.10	1.10
	Thymus	0.50	0.90	0.80
	Hindgut	0.0	0.0	0.0
	Opercles	0.0	0.10	0.0
	Bile	2.40	2.10	2.10
<hr/>				
Percent Normal	Eyes	100	100	100
	Gills	100	100	100
	Pseudobranchs	100	100	100
	Spleens	100	100	100
	Kidneys	100	100	100
	Livers	100	100	100
	Normality Index*	100	100	100
<hr/>				
<u>Calculated Index Values:</u>				
Fat Index (scored mean/4 x 100)	87.5	83.8	91.3	
Bile Index (scored mean/3 x 100)	80.0	70.0	70.0	
Thymus Index (scored mean/2 x 100)	25.0	45.0	40.0	
Gut Index (scored mean/2 x 100)	0.0	0.0	0.0	
Fin Index (scored mean/2 x 100)	3.75	55.0	55.0	
Opercle Index (scored mean/2 x 100)	0.0	5.0	0.0	
Severity Index**	15.63	26.25	23.75	
<hr/>				
Precocial individuals	0	0	0	
Individuals with gross deformities	2	4	1	

Comments: Tim Klucken told me the inventory for Raceway 18 may have underestimated the actual number of fish. This would explain the greater size variation observed in the sampled fish. Underfeeding can also lead to deformities of the opercles or other issues.

*Normality Index is the average of the percent normal values. A higher index indicates better fish quality.

**Severity Index is the average of the calculated index values for thymus, hindgut, fin, and opercles. A lower index indicates better fish quality.

Appendix 4. Summary of Eagle Fish Health Laboratory Results for Ashton Hatchery, January 1 – December 31, 2011.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, triploid	11-059	03/09/11	-	-							-		IX: NPD; VIRO 0/60, PTD-MYXOB 0/60
2010	British Columbia	Brook trout, triploid	11-376	09/27/11	-	-		-	-	-	-	+	-		IX: MAS; VIRO 0/60, DFAT 0/60 <i>Aeromonas hydrophila</i> 1/10, PTD-MYXOB 0/60

Appendix 5. Summary of Eagle Fish Health Laboratory Results for Cabinet Gorge Hatchery, January 1–December 31, 2011.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007 Brood	Kings Lake	Westslope Cutthroat trout	11-166	05/04/11	-	-	-	-							IX: NPD; VIRO 0/30, VHSV 0/3, DFAT 0/30, ELISA 0/30
2007 Brood	Kings Lake	Westslope Cutthroat trout	11-182	05/11/11	-	-	-	-							IX: NPD; VIRO 0/60, VHSV 0/6, OCP-FAT 0/60
2007 Brood	Kings Lake	Westslope Cutthroat trout	11-188	05/18/11	.	.	.	-							IX: NPD; VIRO 0/30, VHSV 0/3, OCP-FAT 0/30
Brood	Sullivan Springs	Kokanee salmon	11-468	11/07/11	-	-		-					-		IX: NPD; VIRO 0/60, DFAT 0/60, ELISA 0/60 PTD-MYXOB 0/60
2011	Kings Lake	Westslope Cutthroat trout	11-469	11/07/11	-	-		-	-	-	-	-	-		IX: NPD; VIRO 0/30, DFAT 0/30, BACTE 0/15
2010	Kings Lake	Westslope Cutthroat trout	11-470	11/08/11	-	-		-	-	-	-	-	-		IX: NPD; VIRO 0/30, DFAT 0/30, BACTE 0/15, PTD-MYXOB 0/30

Appendix 6. Summary of Eagle Fish Health Laboratory results for Grace Hatchery, January 1–December 31, 2011.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
Brood	Bear River	Bonneville Cutthroat	11-172	05/04/11	-	-		+					-		IX: RS; VIRO 0/2, ELISA 1/2 (LOW), PTD-MYXOB 0/2
Brood	Bear River	Bonneville Cutthroat	11-181	05/12/11	-	-		+					-		IX: RS; VIRO 0/3, ELISA 1/3 (LOW), PTD-MYXOB 0/3
Brood	Bear River	Bonneville Cutthroat	11-187	05/18/11	-	-	-	+					-		IX: RS; VIRO 0/9, VHSV 0/3, ELISA 6/9 (LOW), PTD-MYXOB 0/9
Brood	Bear River	Bonneville Cutthroat	11-190	05/25/11	-	-		+					-		IX: RS; VIRO 0/4, ELISA 2/4 (LOW), PTD-MYXOB 0/4
2009	Story, WY	Lake Trout	11-207	06/01/11	-	-									IX: NPD; VIRO 0/60
Brood	Bear River	Bonneville Cutthroat	11-208	06/01/11	-	-		+					-		IX: RS; VIRO 0/3, ELISA 3/3 (LOW), PTD-MYXOB 0/3
2011	Troutlodge	Rainbow trout, triploid	11-209	06/01/11					-	-	-	+			DX: BLUE SAC, MAS; <i>Aeromonas hydrophila</i> 2/4
Brood	Bear River	Bonneville Cutthroat	11-217	06/08/11	-	-	-	+					-		IX: BKD; VIRO 0/8, VHSV 0/2, ELISA 6/8 (5 LOW, 1 HIGH) PTD-MYXOB 0/8
2011	Troutlodge	Rainbow trout, triploid	11-218	06/09/11	-	-			-	-	+	-			DX: CWD; VIRO 0/4, <i>Flavobacterium psychrophilum</i> 3/4
Brood	Bear River	Bonneville Cutthroat	11-223	06/15/11	-	-		-					-		IX: NPD; VIRO 0/2, ELISA 0/2, PTD-MYXOB 0/2

Appendix 6. Continued.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2011	Bear River	Bonneville Cutthroat	11-261	07/19/11					-	-	-	-			DX: NPD; BACTE 0/4, Feeding issues
2009	Story, WY	Lake Trout	11-318	08/15/11											IX: Triploid induction rate 60/60 (100%)

Appendix 7. Summary of Eagle Fish Health Laboratory results for Hagerman State Hatchery, January 1 – December 31, 2011.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, Triploid	11-002	01/04/11	-	-			-	-	+	-			DX: CWD; VIRO 0/10, <i>Flavobacterium psychrophilum</i> 6/10
2010	Hayspur	Rainbow trout, Triploid	11-003	01/04/11				-	-	-	+	-		+	DX: CWD, GYRO, ICH; DFAT 0/4, ELISA 0/2, <i>F. psychrophilum</i> 1/4, <i>Ichthyophthirius multifiliis</i> 1/3, <i>Gyrodactylus</i> sp. 3/3 PCR-NS 0/2, PCR-PKX 0/2
2010	Big Creek	Coho salmon	11-016	01/26/11	-	-			-	-	+	+			DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 5/5, <i>Aeromonas hydrophila</i> 4/5
2010	Hayspur	Rainbow trout, triploid	11/017	01/26/11	-	-			-	-	-	-			DX: NPD; VIRO 0/5, BACTE 0/5, PKX 0/4, NS 0/4, HISTO-Significant inflammation in multiple tissues with no definite cause (WADDL).
2010	Hayspur	Rainbow trout, triploid	11-017B	02/14/11					-	-	+	-			DX: CWD; <i>F. psychrophilum</i> 2/5, HISTO-Significant inflammation (WADDL)
2010	Clear Springs	Rainbow trout, diploid	11-036	02/24/11	-	-			-	-	-	-			DX: NPD; VIRO 0/5, BACTE 0/5
2010	Troutlodge	Rainbow trout, triploid	11-037	02/24/11	-	-			-	-	-	-			DX: NPD; VIRO 0/5, BACTE 0/5

Appendix 7. Continued.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2011	Hayspur	Rainbow trout, triploid	11-038	02/24/11	-	-			-	-	+	+			DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 5/5, <i>A. sobria</i> 3/5
2010	Troutlodge	Rainbow trout, triploid	11-039	02/24/11	-	-			-	-	+	+		+	DX: CWD, MAS, ICH, GYRO; <i>F. psychrophilum</i> 3/5, <i>A. hydrophila</i> 1/5, <i>I. multifiliis</i> 5/5, <i>Gyrodactylus</i> 2/5
2010	Troutlodge	Rainbow trout, Triploid	11-040	02/24/11	-	-			-	-	+	-			DX: CWD, GYRO, API; VIRO 0/5 <i>F. psychrophilum</i> 3/4 <i>Gyrodactylus</i> 1/3, <i>Apiosoma</i> 1/3
2010	Troutlodge	Rainbow trout, Triploid	11-085	03/22/11	-	-			-	-	-	-			IX: NPD; VIRO 0/20, BACTE 0/20 PKX 0/20
2010	Troutlodge	Rainbow trout, triploid	11-086	03/22/11											IX: NPD; VIRO 0/20, BACTE 0/20
2010	Clear Springs	Rainbow trout diploid	11-162	05/03/11	-	-	-		-	-	-	-			DX: NPD;VIRO 0/20, BACTE 0/20
2010	Hayspur	Rainbow trout, triploid	11-163	05/03/11	-	-			-	-	+	-			DX: CWD; VIRO 0/10, <i>F. psychrophilum</i> 3/5
2010	Big Creek	Coho salmon	11-164	05/03/11	-	-			-	-	-	-			DX: NPD; VIRO 0/10, BACTE 0/5
2010	Big Creek	Coho salmon	11-165	05/03/11	-	-			-	-	-	-			DX: NPD; VIRO 0/10, BACTE 0/5

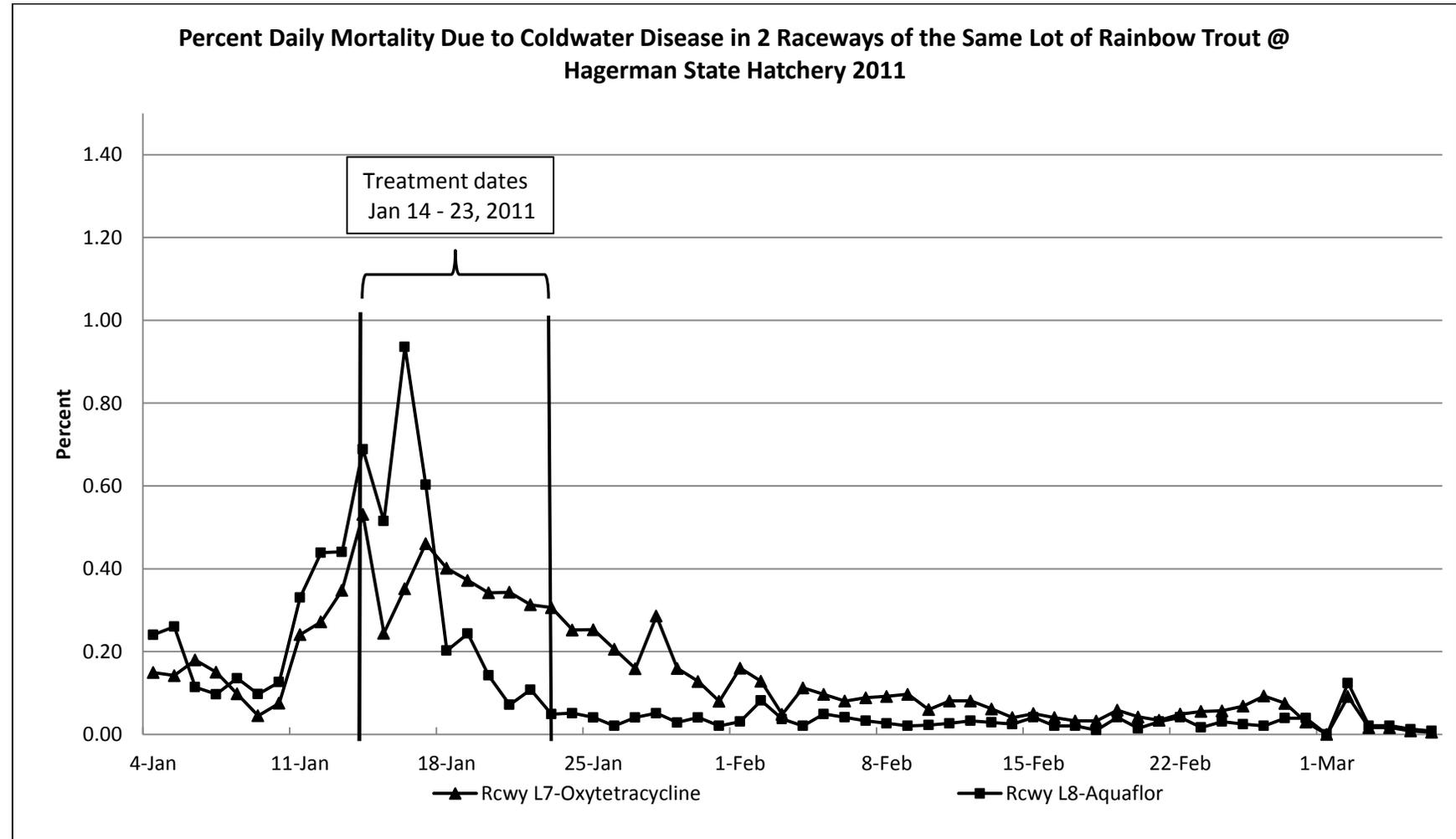
Appendix 7. Continued.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Hayspur	Rainbow trout, triploid	11-213	06/09/11	+	-			-	-	-	-			DX: IHN; IHNV 1/1(x5), IPNV 0/5, BACTE 0/5
2010	Clear Springs	Rainbow trout, diploid	11-214	06/09/11	-	-			-	-	+	+			DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 3/5, <i>A. hydrophila</i> 3/5
2010	Troutlodge	Rainbow trout, triploid	11-215	06/09/11	+	-			+	-	-	-			DX: IHN, FUR, COL, PSEU, SAL; IHNV 1/1 (x4), IPNV 0/4, <i>A. salmonicida</i> 1/4, <i>F. columnare</i> 3/4, <i>Pseudomonas fluorescens</i> 3/4, <i>Salmincola californiensis</i> 1/4
2010	Hayspur	Rainbow trout, triploid	11-228	06/27/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 2/2(x5), IPNV 0/10, <i>F. psychrophilum</i> 1/10
2010	Hayspur	Rainbow trout, triploid	11-238	04/18/11											IX: TRIPLOID INDUCTION 119/119 (100%)
2011	Hayspur	Rainbow trout, triploid	11-340	09/01/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1(x5), IPNV 0/5, <i>F. psychrophilum</i> 3/5
2011	Hayspur	Rainbow trout, triploid	11-341	09/01/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1 (X4), IPNV 0/4, <i>F. psychrophilum</i> 1/4
2011	Hayspur	Rainbow trout, triploid	11-364	09/16/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1 (x5), IPNV 0/5, <i>F. psychrophilum</i> 1/5

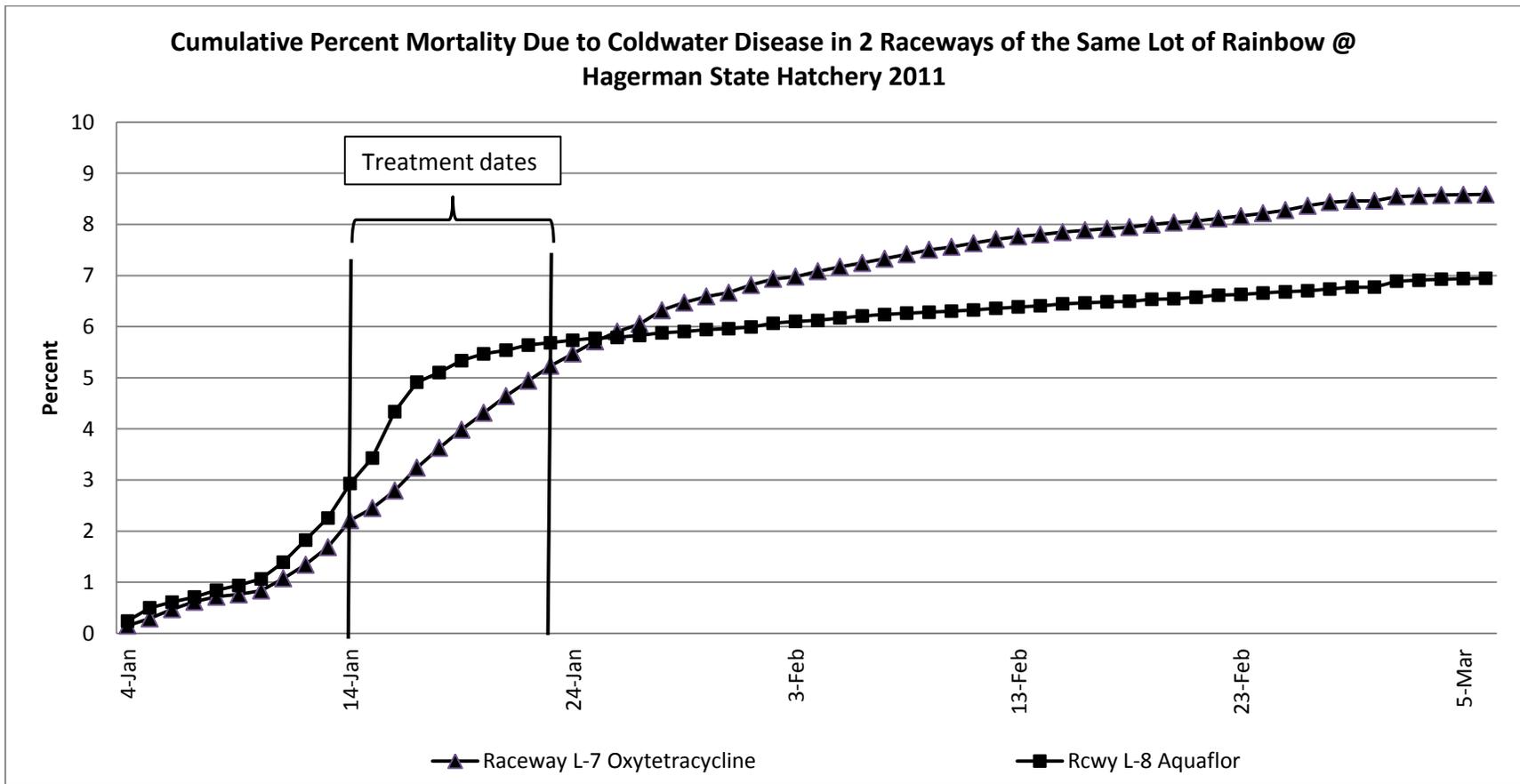
Appendix 7. Continued.

Brood		Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
Year	Stock														
2011	Troutlodge	Rainbow trout, triploid	11-365	09/16/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1 (x5), IPNV 0/5, <i>F. psychrophilum</i> 4/5
2011	Hayspur	Rainbow trout, triploid	11-366	09/16/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/1 (X4), IPNV 0/4, <i>F. psychrophilum</i> 1/4
2011	Troutlodge	Rainbow trout, triploid	11-377	09/28/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 1/2 (x5), IPNV 0/10, <i>F. psychrophilum</i> 4/5
2011	Hayspur	Rainbow trout, triploid	11-378	09/28/11	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 3/5
2011	Troutlodge	Rainbow trout, triploid	11-449	11/03/11	+	-			-	-	+	-			DX: IHN, CWD; IHNV 2/2 (X5), IPNV 0/10, <i>F. psychrophilum</i> 3/5
2011	Troutlodge	Rainbow trout, triploid	11-450	11/03/11					-	-	+	-			DX: PSEU, CWD; VIRO 0/3, <i>Pseudomonas sp.</i> 3/3 <i>F. psychrophilum</i> 1/3
2011	Troutlodge	Rainbow trout, triploid	11-522	12/23/11	-	-									DX: VIRO 0/5, PCR Pending
2011	Hayspur	Rainbow trout, triploid	11-523	12/23/11	-	-			-	-	+	-			DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 1/5

Appendix 8. Comparison of the percent daily mortality that occurred in two raceways (L-7 and L-8) containing fish from the same lot of triploid Troutlodge rainbow trout at Hagerman State Fish Hatchery. The fish were diagnosed with bacterial coldwater disease (*Flavobacterium psychrophilum*) on January 4. Raceway L-7 received Oxytetracycline-medicated feed at 3.75 g OTC/100 lbs of fish/day while raceway L-8 received Aquaflor-medicated feed at 10 mg Florfenicol/kg of fish/day. Both treatments ran for 10 days, from January 14 - 23.



Appendix 9. Cumulative percent mortality that occurred in two raceways (L-7 and L-8) containing fish from the same lot of triploid Troutlodge rainbow trout at Hagerman State Fish Hatchery. The fish were diagnosed with bacterial coldwater disease (*Flavobacterium psychrophilum*) on January 4. Raceway L-7 received Oxytetracycline-medicated feed at 3.75 g OTC/100 lbs of fish/day while raceway L-8 received Aquaflor-medicated feed at 10 mg Florfenicol/kg of fish/day. Both treatments ran for 10 days, from January 14 - 23.



Appendix 10. Preliberation organosomatic data for BY2010 Troutlodge triploid rainbow trout catchables reared at Hagerman State Fish Hatchery. Sample date: March 22, 2011.

EFHL Accession No.:	11-085	11-086	
Raceway:	L-5	L-11	
Relative Density:	Production	Low	
Sample size:	20	20	
Scored Means	Hematocrit	39.35	37.00
	Leucocrit	0.93	0.98
	Serum protein	3.27	3.34
	Fat	3.75	3.60
	Fins	0.50	0.45
	Thymus	0.55	0.65
	Hindgut	0.0	0.0
	Opercles	0.10	0.0
Percent Normal	Bile	2.00	1.65
	Eyes	100	95
	Gills	85	90
	Pseudobranchs	100	100
	Spleens	95	100
	Kidneys	95	100
	Livers	100	100
	Normality Index*	95.83	97.50
<u>Calculated Index Values:</u>			
Fat Index (scored mean/4 x 100)	93.8	90.0	
Bile Index (scored mean/3 x 100)	66.7	55.0	
Thymus Index (scored mean/2 x 100)	27.5	32.5	
Gut Index (scored mean/2 x 100)	0.0	0.0	
Fin Index (scored mean/2 x 100)	25.0	22.5	
Opercle Index (scored mean/2 x 100)	5.0	0.0	
Severity Index**	14.38	13.75	
Precocial individuals	0	0	
Individuals with gross deformities	3	2	

Comments: Some erosion and hemorrhage was observed in the jaws consistent with external *Flavobacterium columnare* infections.

*Normality Index is the average of the percent normal values. A higher index indicates better fish quality.

**Severity Index is the average of the calculated index values for thymus, hindgut, fin, and opercles. A lower index indicates better fish quality.

Appendix 11. Summary of Eagle Fish Health Laboratory Results for Hayspur Hatchery, January 1–December 31, 2011.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2007	Hayspur	Rainbow trout, broodstock	11-006	01/04/11	-	-	-								IX: NPD; VIRO 0/18, VHSV 0/6
2007	Hayspur	Rainbow trout, broodstock	11-007	01/04/11	-	-	-								IX: NPD; VIRO 0/30, VHSV 0/6
2006	Hayspur	Rainbow trout, broodstock	11-008	01/04/11	-	-	-								IX: NPD; VIRO 0/6, VHSV 0/6
2007	Hayspur	Rainbow trout broodstock	11-014	01/11/11	-	-	-								IX: NPD; VIRO 0/12, VHSV 0/12
2006	Hayspur	Rainbow trout, adult	11-185	05/07/11				+							IX: BKD; ELISA 26/60 (18 LOW, 8 HIGH)
2010	Hayspur	Rainbow trout, triploid	11-237	04/18/11											IX: TRIPLOID INDUCTION 50/50 (100%), DIPLOID CONTROLS 2/2
2009	Hayspur	Rainbow trout, diploid	11-306	08/17/11	-	-		-							IX: NPD; VIRO 0/60, DFAT 0/60
2008	Hayspur	Rainbow trout, broodstock	11-487	11/15/11	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/5, DFAT 0/15, OCP-FAT 0/48, ELISA 0/15
2008	Hayspur	Rainbow trout, broodstock	11-498	11/22/11	-	-	-	-							IX: NPD; VIRO 0/48, VHSV 0/5, DFAT 0/15, OCP-FAT 0/48, ELISA 0/15

Appendix 11. Continued.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2008	Hayspur	Rainbow trout, broodstock	11-506	11/29/11	-	-	-	+							IX: BKD; VIRO 0/48, VHSV 0/5, DFAT 0/15, OCP-FAT 0/48, ELISA 2/15 (1 low, 1 high)
2008	Hayspur	Rainbow trout, broodstock	11-511	12/06/11	-	-	-	+							IX: NPD; VIRO 0/48, VHSV 0/5, DFAT 0/15, OCP-FAT 0/48,

Appendix 12. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 2011.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-044	02/28/11	-	-		-							IX: NPD; VIRO 0/12, OCP-FAT 0/60
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-046	03/01/11	-	-	-	-							IX: NPD; VIRO 0/12, VHSV 0/12, OCP-FAT 0/54
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-051	03/03/11	-	-	-	-							IX: NPD; VIRO 0/12, VHSV 0/6, OCP-FAT 0/60
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-052	03/07/11	-	-	-	-							IX: NPD; VIRO 0/12, VHSV 0/6, OCP-FAT 0/90
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-060	03/08/11	-	-		-							IX: NPD; VIRO 0/10, OCP-FAT 0/65
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-061	03/10/11	-	-		+							IX: BKD; VIRO 0/12, OCP-FAT 1/10 (x6)
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-062	03/10/11	-	-		+	-	-	+	-	+		IX: CWD, RS, PSEU, PAST, WHD; VIRO 0/60, PCR-EEDV 0/60, ELISA 3/12 (X5, all low), <i>Flavobacterium psychrophilum</i> 7/20, <i>Pseudomonas sp.</i> 3/20, <i>Pasteurella sp.</i> 2/20, PTD-WHD 1/8 (x5)
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-069	03/14/11	-	-		-							IX: NPD; VIRO 0/18, OCP-FAT 0/120
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-087	03/17/11	-	-		-							IX: NPD; VIRO 0/24, OCP-FAT 0/90

Appendix 12. 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	11-100	03/28/11	-	-		+							IX: BKD; VIRO 0/24, OCP-FAT 2/25 (x6)
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-104	03/31/11	-	-		-							IX: NPD; VIRO 0/12, OCP-FAT 0/90
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-122	04/05/11				+							IX: BKD; OCP-FAT 1/9 (x6)
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-123	04/11/11				+							IX: BKD; OCP-FAT 4/18 (x6)
Brood	Henrys Lake	Yellowstone Cutthroat trout	11-136	04/18/11	-	-		-							IX: NPD; VIRO 0/6, OCP-FAT 0/42

Appendix 13. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery, January 1--December 31, 2011.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2011	Henrys Lake	Rainbow X Cutthroat Hybrids	11-296	08/15/11	-	-									IX: NPD; VIRO 0/60, Triploid induction rate 60/60 (100%)
Brood	Deadwood Reservoir	Kokanee salmon	11-347	09/07/11	-	-		+					-		IX: NPD; VIRO 0/60, , ELISA 12/12 (x5), PTD-MYXOB 0/60

Appendix 14. Summary report of Eagle Fish Health Laboratory results for McCall Hatchery Resident Programs, January 1—December 31, 2011.

Brood year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, triploid	11-197	05/28/11	-	-			-	-	-	+			IX: MAS; VIRO 0/3, <i>Aeromonas sobria</i> 1/3

Appendix 15. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery, January 1 - December 31, 2011.

Brood Year	Stock	Species	Accession	Sample Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	ICH	Diagnoses
2010	Troutlodge	Rainbow trout, triploid	11-070	03/16/11	-	-			-	-	-	-			IX; NPD; VIRO 0/20, BACTE 0/20
2010	Troutlodge	Rainbow trout, triploid	11-071	03/16/11	-	-			-	-	-	-			IX; NPD; VIRO 0/20, BACTE 0/20
2010	Troutlodge	Rainbow trout, triploid	11-072	03/16/11	-	-			-	-	-	-			IX; PAST; VIRO 0/20, <i>Pasteurella sp.</i> 2/20
2010	Troutlodge	Rainbow trout, triploid	11-078	03/21/11	-	-			-	-	-	-			IX; NPD; VIRO 0/20, BACTE 0/20
2010	Troutlodge	Rainbow trout, triploid	11-093	03/24/11					-	-	+	-			DX: CWD, HEX; <i>Flavobacterium psychrophilum</i> 1/5, <i>Hexamita salmonis</i> 2/3
2010	Daniel, WY	Brown trout	11-094	03/24/11											DX: EGD; ENVIRONMENTAL GILL DISEASE/MYCOSIS 5/5
2010	Troutlodge	Rainbow trout, triploid	11-184	05/16/11										-	IX: GYRO; ICH 0/120, <i>Gyrodactylus sp.</i> 3/120
2010	Daniel, WY	Brown trout	11-205	05/31/11	-	-			-	-	-	-			DX: PSEU; VIRO 0/6, <i>Pseudomonas sp.</i> 1/2
2010	Hayspur	Rainbow trout, triploid	11-239	04/19/11										-	IX: TRIPLOID INDUCTION RATE 30/30 (100%)
2011	Troutlodge	Rainbow trout, triploid	11-503	11/28/11					-	-	-	-			DX: EXTERNAL PSEU; <i>P. vesicularis</i> 3/3 from skin

Appendix 16. Preliberation organosomatic data for BY2010 Troutlodge triploid rainbow trout catchables reared at Nampa Hatchery. Sample dates: March 16, 2011 (March 21 for Production group).

EFHL Accession No.:	11-070	11-071	11-072	11-078	
Raceway:	B1	B2	B3	C3	
Relative Density:	High	Medium	Low	Production	
Sample size:	20	20	20	20	
Scored Means	Hematocrit	39.25	40.20	37.45	40.55
	Leucocrit	<1	<1	<1	1.38
	Serum protein	2.74	3.19	3.35	2.91
	Fat	2.90	2.95	3.35	3.25
	Fins	0.35	0.85	0.05	1.15
	Thymus	0.90	0.15	0.80	0.20
	Hindgut	0.0	0.0	0.0	0.0
	Opercles	0.20	0.15	0.15	0.20
	Bile	1.00	0.95	1.05	1.55
Percent Normal	Eyes	100	100	100	95
	Gills	70	90	95	70
	Pseudobranchs	100	100	100	100
	Spleens	95	95	100	100
	Kidneys	100	100	100	100
	Livers	100	100	100	95
	Normality Index*	94.17	97.50	99.17	93.33
<u>Calculated Index Values:</u>					
Fat Index (scored mean/4 x 100)	72.5	73.8	83.8	81.3	
Bile Index (scored mean/3 x 100)	33.3	31.7	35.0	51.7	
Thymus Index (scored mean/2 x 100)	45.0	7.5	40.0	10.0	
Gut Index (scored mean/2 x 100)	0.0	0.0	0.0	0.0	
Fin Index (scored mean/2 x 100)	17.5	42.5	2.5	57.5	
Opercle Index (scored mean/2 x 100)	10.0	7.5	7.5	10.0	
Severity Index**	18.13	14.38	12.50	19.38	
Precocial individuals	0	0	0	0	
Individuals with gross deformities	1	0	0	3	

Comments: A confusing issue with this set of observations is in the fin index number. Goede envisioned this as a measure of fish health, not fin quality. Fins that are missing but healed score better than near-full fins with active erosion at the margins. Hence, raceway B1 scored better than B2, although more fins were completely missing.

*Normality Index is the average of the percent normal values. A higher index indicates better fish quality.

**Severity Index is the average of the calculated index values for thymus, hindgut, fin, and opercles. A lower index indicates better fish quality.

Appendix 17. Summary report of Eagle Fish Health Laboratory results for resident wild fish inspections, January 1—December 31, 2011.

Sample Location	Species	Accession	Sample											Diagnoses	
			Date	IHN	IPN	VHS	BKD	FUR	ERM	CWD	MAS	WHD	MN		
<u>SOUTHWEST REGION</u>															
Snake River															
Main Stem, Payette Co.	Channel Catfish	11-259	07/18/11			-		-		-		-			IX: PLES, MULTIPLE - PARASITISMS; VIRO 0/10, <i>Plesiomonas shigelloides</i> 5/10, <i>Myzobdella lugubris</i> (leach) 2/10, Unidentified intestinal tapeworm
<u>UPPER SNAKE REGION</u>															
Big Lost River															
Chilly Reach	Mountain Whitefish	11-047	09/24/10										+	IX: WHD; PTD-MYXOB 0/25, PCR- <i>Myxobolus cerebralis</i> 1/14	
<u>SALMON REGION</u>															
Salmon River															
Lake Creek															
Williams Lake	Rainbow trout	11-179	05/12/11	-	-	-		+					-	-	IX: RS; VIRO 0/10, ELISA 6/6 (all low), PTD-MYXOB 0/6

Appendix 18. 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>
CSF	Clear Springs Foods, Inc.
CWD	Bacterial coldwater disease, caused by <i>Flavobacterium psychrophilum</i>
DFAT	Direct fluorescent antibody test
DX	Diagnostic examination
EEDV	Epizootic 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> ; Not detected in 2011
ERY	Erythromycin antibiotic
FP	<i>Flavobacterium psychrophilum</i> ; causative agent bacterial coldwater disease
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
MC	<i>Myxobolus cerebralis</i> ; causative agent of whirling disease of salmonids
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	<i>Renibacterium salmoninarum</i> ; 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 <i>Myxobolus cerebralis</i>

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