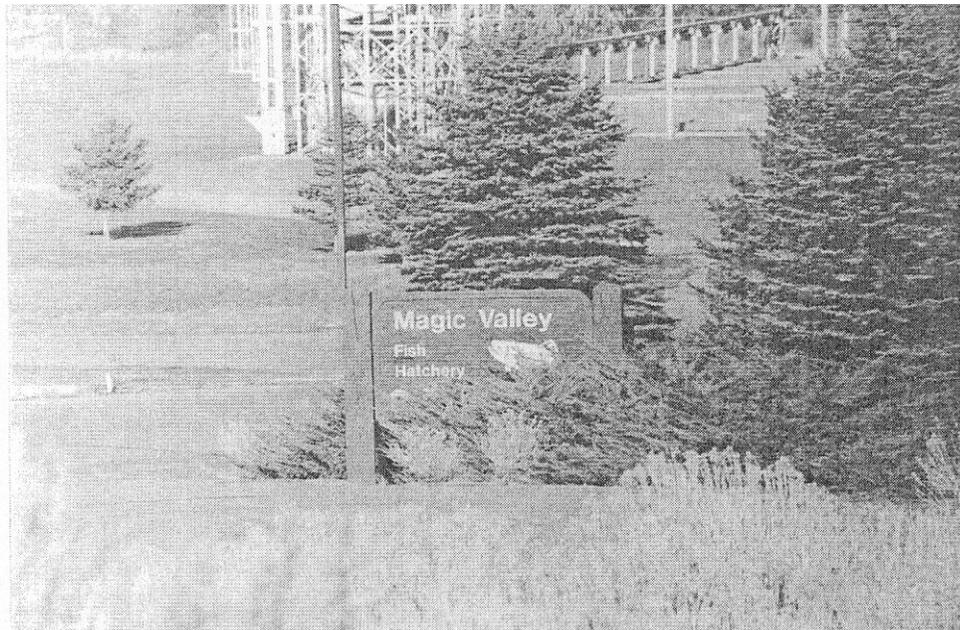




MAGIC VALLEY HATCHERY

2000 Brood Year Report



By

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ABSTRACT

The fourteenth year (May 1, 2000 to May 10, 2001) of steelhead *Oncorhynchus mykiss* production at Magic Valley Steelhead Hatchery was completed with a total of 2,022,017 smolts planted. All smolts placed in the Squaw Creek Acclimation Pond out-migrated in 2001. Therefore, all A-run and B-run steelhead smolts were stocked where they could migrate to the ocean. Smolt production yielded a total weight of 436,150 pounds. Fish were fed 509,926 pounds of feed for a conversion of 1.17 (pounds of feed per pound of gain).

Four different stocks of steelhead were received as eyed eggs during May and June of 2000. The Dworshak B-run eggs totaled 544,006 and contributed 317,650 smolts to the river. The B-run East Fork Salmon River eggs totaled 51,384. All 38,024 of the East Fork fish were planted as smolts. Sawtooth A-run eggs totaled 991,665, which produced 876,085 smolts. Pahsimeroi Fish Hatchery contributed 946,319 A-run steelhead eggs, and 790,258 as smolts. Further stocking information is located in Appendix A.

For the fourth consecutive year, Hayspur strain rainbow and kamloop trout eggs were started here to help Hagerman State Hatchery with their shortage of incubation space during the winter. Appendix I. summarizes Hayspur egg to fry survival.

An effluent characterization study was completed during calendar year 2000. Results confirmed maximum phosphorus output coincided with maximum fish production. Maximum phosphorus concentrations fell within permitted limits.

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INTRODUCTION

Magic Valley Steelhead Hatchery (MVH) is part of the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP), compensating for losses of steelhead, *Oncorhynchus mykiss* caused by the Lower Snake River Dams. The hatchery was constructed by the Army Corps of Engineers and is administered and funded by the U.S. Fish and Wildlife Service, and operated by the Idaho Department of Fish and Game (IDFG).

The hatchery is located in Twin Falls County, seven miles Northwest of Filer in the Snake River Canyon. When available, the hatchery can use a maximum 125 cubic foot per second (cfs) of 59°F water from Crystal Springs, located on the North shore of the Snake River.

All smolts were transported by truck to the Salmon River and associated tributaries. The brood sources were Dworshak Fish Hatchery (Dworshak) B-run stock, East Fork Salmon River B-run stock, Sawtooth Fish Hatchery (Sawtooth) A-run, and Pahsimeroi Fish Hatchery (Pahsimeroi) A-run stock.

OBJECTIVES

1. To hatch and rear 2.0 million A-run and B-run steelhead smolts for stocking in the Salmon River and its tributaries to achieve the mitigation goal of 11,660 adult steelhead back to Idaho waters.
2. Provide smolts and, consequently, returning adults that could be utilized for harvest, broodstock, supplementation, reintroduction, and research purposes.
3. Mark hatchery smolts prior to release to avoid mixed stock harvest and to maximize harvest and natural production management options.

FACILITIES

The hatchery building houses the incubation and early rearing room with 40 upwelling 12 gal capacity incubators. Each incubator is capable of handling and hatching 50,000-75,000 eyed eggs. Two incubators are placed over each raceway. There are 20 concrete tanks (4 ft x 3 ft x 40 ft, 418 cubic ft of rearing space) with a capacity of rearing 115,000-25,000 steelhead to 200 fish per pound size. The early rearing room also houses two fiberglass troughs (2 ft x 1 ft x 12 ft), and 60 automatic fry feeders. The hatchery building also contains an office, laboratory, wet laboratory, shop, dormitory, enclosed storage room, covered vehicle storage area, feed storage room, walk-in freezer, and mechanical room for water pumps, water chiller, and domestic water supply systems.

There are 32 outside rearing raceways (10 ft x 3 ft x 200 ft, with 6,153 cu ft of rearing space). These raceways slope in opposite directions resulting in 16 East raceways and 16 West raceways. Each raceway has the capacity to raise 60,000-70,000 smolt-size steelhead. The raceways may be further divided to result in a total of 64 individual rearing subunits. A moveable bridge equipped with 16 automatic Neilsen fish feeders spans the outdoor raceways. Two 30,000-

pound bulk feed bins, equipped with fish feed fines shakers and a feed conveyor, complete the outside feeding system.

There are two tailraces outside located on opposite ends of the facility. Each flows to the north where they join in a common 54-inch pipe before entering the flow-through settling pond. The hatchery effluent water is treated by opening valves in the bottom of quiescent zones and sweeping wastes into a cleaning wastewater pond (approximately 2.5 surface acres). A hatchery flow-through wastewater pond (about 1.5 surface acres in size) settles the non-cleaning wastewater. All cleaning effluent must pass through both ponds prior to discharge.

The limiting factors in producing more smolts at MVH are rearing space and water flows. Density and flow indices may exceed the maximum recommended levels of .30 lbs of fish per cubic foot of rearing space per inch of fish length, and 1.25 lbs per gal per minute per inch of fish length at the end of the rearing cycle. Water flows have decreased in recent years. Appendix J shows flows over the last seven years during early April representing flow at or near projected maximum loading. Currently, high flows are in the 90 to 95 cfs range.

WATER SUPPLY

The MVH water supply collection facility is located on the North wall of the Snake River canyon. It collects the 59°F spring water from Crystal Springs in a covered concrete channel system, which consolidates the flow in a metal building. A 42-inch pipeline has the capacity to deliver 125.47 cfs of water via gravity flow to a control tank that degasses and distributes the water to the outside raceways through a 42-inch pipeline. Water may be diverted from the headrace supply line for use in the auxiliary supply waterlines. The auxiliary supply line allows supplemental water usage between raceway sections to improve water quality in the lower sections and to clean upper quiescent zones without dewatering the bottom section. The hatchery building receives water through a 14-inch pipeline, which branches off prior to going through the outside degassing tower. Water going to the hatchery building is degassed in packed columns above each individual raceway.

STAFFING

During the 2000 brood year, MVH was staffed with the following permanent employees: Bob Moore, Fish Hatchery Manager II, Rick Lowell, Fish Hatchery Manager II; Dave May, Assistant Hatchery Manager; Damon Keene, Mark Olson, Wade Symons and Jeff Heindel Fish Culturists. In addition, temporary Bio-aides or Laborers are sometimes hired to assist with fish culture duties during peak production, smolt transportation, and adipose fin clipping. Our Bio-aide at the beginning of this brood year was Jes Erling. He left in November of 2000 and was replaced by Paul Badame in March 2001. Personnel from this hatchery continue to oversee adipose marking operations at the Niagara Springs and Magic Valley hatcheries.

FISH PRODUCTION

Egg Shipments and Early Rearing

The hatchery received 544,006 B-run (Dworshak) eyed eggs and 51,384 B-run eyed eggs (East Fork Salmon River stock). A-run eyed eggs included 946,319 (Pahsimeroi), and 991,665 (Sawtooth). The grand total of steelhead eggs received this year was 2,533,374. All eggs were received in April, May, and June 2000. The survival of eyed eggs to smolts is found in Appendix A.

All eggs received were treated with Povidone Iodine at 100-ppm for ten minutes, and put into the upwelling incubators (50,000-75,000 eggs per incubator, 15 gals/min). The eggs hatched within five days and emerged from the incubators into the hatchery tanks twelve days after hatching. Each of the 20 hatchery tanks (with a flow of 100-250 gals/min) averaged 120,000 feeding fry until they reached 300 per pound or almost two inches long. At that time, fish were transferred to the larger outside raceways. The highest mortality rate occurred during the hatching, swim-up, and early-rearing stages. Survival was comparable in most stocks of eggs. Historically, Dworshak progeny survive at a significantly lower rate than other stocks. Appendix L compares the twelve-year average of survival from the eyed egg stage to final release for all stocks cultured at Magic Valley Steelhead Hatchery.

Final Production Rearing

Fish were fed Rangen 440 extruded salmon diet using Haskell's (1967) feeding rate formula. The feeding rate was calculated using a 10.0 hatchery constant. Fish are started on feed as one-inch swim-up fry and hatchery growth ends with an approximate 8.3-inch smolt. The fish had a conversion of 1.17 pounds of feed to produce a pound of fish.

Generally, approximately an inch of growth per month for the first three months is achieved when the fish are fed every day. An intermittent schedule of five days on and two days off feed was implemented in October to insure the fish met target size. The steelhead maintained an average .65 to .75-inch per month growth using this system. This schedule was used through the middle of March at which time all fish were put on feed seven days a week. See Appendix B for feed and total costs for the year.

Piper's (1970) formulas for density and flow indices were used to calculate the densities and flows for each tank or raceway. The maximum recommended density index of .30 or 1.25 flow index was not reached until the end of March in some raceways. Final pond inventories and indices for the individual raceway numbers, densities, and flows are found in Appendix D.

Maximum flows for the year were approximately 94 cfs from October 2000 through March 2001. The majority of the time flows were recorded around 90 – 95 cfs. Each of the 32 outside raceways had about 2.9 cfs prior to distribution in April.

Steelhead smolt distribution began on April 9, 2001 and continued five days a week through May 7, 2001. An average of five trucks per day was used for the transportation of 436,150 lbs. of fish and involved 98 truckloads (Appendix C). This year we continued to haul 5,000 lbs. Per load to

meet IHOT (Integrated Hatcheries Operation Team) recommendations

Length Frequency Data

Length frequencies were taken from all stocks again this year and are shown in Appendix H.

FISH HEALTH

Diseases Encountered and Treatment

Flavobacterium psychrophilum, the causative agent of Bacterial Coldwater Disease, became established in the Brood Year 2000 Dworshak B stock steelhead (00 Dwor STB) and caused extensive mortalities in these fish. This infection was eventually found in both the Brood Year 2000 Pahsimeroi A (00 PAH STA) and Sawtooth A (00 SAW STA) stocks as well. The (00 SAW STA) fish did not experience extensive mortality and did not receive medicated feed treatments. The (00 SAW STA) stock did have a concomitant infection of Infectious Hematopoietic Necrosis Virus (IHNV) with *F. psychrophilum*. The *F. psychrophilum* infections, in the 00 Dwor STB and 00 PAH STA stocks, were treated with a 10 day treatment of oxytetracycline medicated feed under Investigational New animal Drug (INAD) 9332, protocol numbers 111-2K and 113-2K. Organosomatic index is shown in appendix E.

Acute Losses

Acute and chronic losses were experienced in the 00 DWOR STB and 00 PAH STA from *F. psychrophilum*. Losses peaked at 2000+ fish/day/raceway. A concomitant infection of *F. psychrophilum* and IHNV caused mortalities in 00 SAW STA. Mortalities reached 15-30 fish per day per raceway.

Other Assessments

A precocious male study was implemented on several raceways at MVH. The data was collected by Eagle Fish Health Lab and MVH staff and sent to Department research biologists to analyze. (D. Munson, personal comm.)

Despite early epizootics, the fish from this facility at preliberation sampling appeared to be healthy fish by all sampling parameters.

Precocial Male Observation

Fishery Research personnel continued a precocial male study on four raceways at MVH. This study continues to research the effect of coded wire tags (CWT) on precocity. As with the previous year's study, groups were randomly selected. After selection, raceway assignments were identical to the previous years study. The first group of fish were merely anesthetized and counted back into the raceway (Raceway 2E). The second group had the needle of the CWT machine inserted into the nose of the fish (Raceway 3E). A third group had non-magnetized wire inserted into the nose of the fish (Raceway 4E). Lastly, the fourth group received magnetized blank wire to simulate a regular CWT tag (Raceway 5E). Each group consisted of 5,000 fish and were all treated identically during rearing. Sixty fish per raceway were sampled to obtain precocity data. Appendix K shows the results of precocial male steelhead sampled in each group.

In past years, there seems to have been a direct relationship between the incidence of precocial males and the proximity of the fish to security yard lights. These nearby security lights remain turned off.

FISH MARKING

Normally, all of the A-run and B-run hatchery steelhead are required to have an adipose fin-clip distinguishing them from wild steelhead. However, this year was the second year that fish were reared for supplementation releases for the Nez Perce Tribe. A total of 144,000 Pahsimeroi A strain steelhead were set-aside in West raceways 1-2 to produce 134,363 unmarked fish for release.

At MVH the fin clipping crew Ad-marked 1,957,790 fish during August and September. Fin-clipping mortality was negligible. No treatment was necessary after handling.

Four groups of steelhead were coded-wire tagged this 2000 brood year. A total of 491,631 fish received coded-wire tags in 2000, of which 472,336 survived and were out-planted as smolts in 2001. See (Appendix F) for CWT details.

In addition, a total of 2,701 A and B stocks had Passive Integrated Transponder (PIT) tags inserted in them. Only five mortalities were discovered in those fish resulting in 2,696 PIT tagged fish being released.

PHOSPHORUS CHARACTERIZATION STUDY

In late 1999, the Environmental Protection Agency (EPA) issued new effluent discharge permits for aquaculture facilities in the Magic Valley area. As part of the permitting process, each fish culture facility was required to participate in an effluent characterization study. The EPA's primary area of concern was the monitoring of phosphorus. Hatchery personnel conducted a twelve-month effluent characterization study beginning in January 2000, and ending in December of the same year. Appendix M shows the results of the 2000 Phosphorus characterization study.

The highest phosphorus results recorded occurred predictably during maximum production load. Although phosphorus levels have been monitored annually by either the Idaho Department of Environmental Quality (IDEQ) or the EPA, phosphorus levels recorded during inspections have yielded a wide range of results.

MAINTENANCE PROJECTS

During the year, the following projects were completed:

1. Installed ten, 15" diameter packed columns in the incubation room.
2. Installed a new dishwasher in residence four.
3. Installed 16 new 3" intake valves in the incubation room.
4. Purchased bird netting for the production raceways.
5. Continued patching and filling cracks in raceway walls.

LITERATURE CITED

Haskell, D.C. 1967. Calculations of amounts to feed trout in hatcheries. *Progressive Fish Culturist* 19 (4).

Piper, R.G. 1970a. Know the proper carrying capacities of your farm. *American Fishes and U.S. Trout News* 15 (1):

APPENDICES

Appendix A. Brood Year 2000 Steelhead Survival Rates.

	DWORSHAK "B"	EAST FORK "B"	PAHSIMEROI "A"	SAWTOOTH "A"	GRAND TOTAL
EGGS	544,006	51,384	946,319	991,665	2,533,374
% HATCHED	87%	97%	99%	99%	96%
SMOLTS STOCKED	317,650	38,024	790,258	876,085	2,022,017
WEIGHT SMOLTS	70,525	9,800	170,525	185,300	436,150
NO./LB.	4.5	3.9	4.6	4.7	4.6
TOTAL NUMBER	317,650	38,024	790,258	876,085	2,022,017
TOTAL WEIGHT	70,525	9,800	170,525	185,300	436,150
% SURVIVAL					
EGG/RELEASE	58%	74%	84%	88%	80%
POUNDS OF FOOD	88,856	10,442	191,460	219,169	509,927
CONVERSION	1.26	1.07	1.12	1.18	1.17

Appendix B. Brood Year 2000 Production Feed Cost And Utilization.

Number Of Fish	2,022,017
Lbs Of Fish	436,150
Lbs Of Feed	509,927
Conversion	1.17
Feed Cost	\$135,998.51
Total Cost	\$558,213.00
Feed Cost/Lb. Fish	\$0.3118
Cost Per 1000 Fish	\$276.07

Appendix C. Brood Year 2000 Steelhead Smolt Distribution in the Salmon River and Tributaries.

Date	Destination	Number	Stock	Fish/lb.	Pounds
4/9-4/10/01	Little Salmon R (Stinky Sp)	58,346	B	4.33	13,475
4/9-4/10/01	Squaw Creek Pond	75,912	B	4.57	16,600
4/10-4/16/01	Little Salmon R (Stinky Sp)	430,210	A	4.66	92,125
4/16-4/17/01	Salmon R (Hammer)	175,385	A	4.79	36,750
4/17-4/19/01	Salmon R (Lemhi Hole)	100,374	A	4.77	21,050
4/18/2001	Transfer to Sawtooth	1,145	B	3.27	350
4/18/2001	Salmon R (Coloston Corner)	50,300	A	5.03	10,000
4/19/2001	Salmon R (Red Rock)	67,410	A	5.35	12,600
4/19-4/24/01	Salmon R (Shoup Bridge)	60,992	A	4.68	13,100
4/22-4/23/01	Salmon R (Eye Hole)	45,270	A	5.03	9,000
4/23-4/24/01	Salmon R (Lewis/Clark)	76,182	A	4.77	16,000
4/24/2001	Salmon R (Challis Ramp)	41,850	A	4.65	9,000
4/24-4/25/01	Salmon R (Tunnel Rock)	65,280	A	5.10	12,800
4/25/2001	Salmon R (Cottonwood)	77,790	A	4.56	17,200
4/26/2001	Salmon R (Wagon Hammer)	67,950	A	4.48	15,200
4/26-2/27/01	Salmon R (McNabb)	84,389	A	4.44	19,000
4/27/01	East Fork Salmon River	51,810	B	4.71	11,000
4/30-5/2/01	Squaw Creek DWORB	130,437	B	4.48	29,450
5/2/2001	Squaw Creek E.F.B	38,024	B	3.88	9,800
5/2-5/3/01	Yankee Fork Salmon River	98,623	A	4.49	21,950
5/4-5/7/01	Lemhi River PAH A	134,363	A	4.25	31,650
5/7/2001	Lemhi River PAH A & SAW A	89,975	A	4.97	18,050
	Total A's	1,667,488		4.69	355,825
	Total B's	354,529		4.41	80,325
	Grand Total	2,022,017		4.63	436,150

Appendix D. Brood Year 2000 Final Raceway Inventory with Flow and Density Indices.

Raceway	Run	Number	Weight	No/lb	Length	Flow Index	Density Index
E1	DWOR B	58,346	13,475	4.3	8.43	1.18	0.30
E2	DWOR B	53,012	11,600	4.6	8.28	1.04	0.26
E3	DWOR B	47,595	10,350	4.6	8.27	0.93	0.23
E4	DWOR B	47,100	10,000	4.7	8.20	0.90	0.23
E5	DWOR B	53,997	12,300	4.4	8.40	1.09	0.27
E6	DWOR B	57,600	12,800	4.5	8.33	1.14	0.29
E7	EFK B	38,024	9,800	3.9	8.75	0.83	0.21
E8	DWOR B	67,044	15,100	4.4	8.36	1.34	0.34
E9	DWOR B	65,581	14,300	4.6	8.27	1.28	0.32
E10	DWOR B	68,443	15,450	4.4	8.37	1.37	0.34
E11	DWOR B	67,950	15,200	4.5	8.34	1.35	0.34
E12	DWOR B	68,850	15,300	4.5	8.33	1.36	0.34
E13	DWOR B	65,280	12,800	5.1	7.99	1.19	0.30
E14	DWOR B	68,820	14,800	4.7	8.24	1.33	0.33
E15	DWOR B	67,166	14,200	4.7	8.19	1.28	0.32
E16	DWOR B	67,402	13,400	5.0	8.02	1.24	0.31
W1	PAH A	68,586	16,100	4.3	8.48	1.41	0.35
W2	PAH A	67,046	15,850	4.2	8.50	1.38	0.35
W3	PAH A	65,760	13,700	4.8	8.15	1.25	0.31
W4	SAW A	63,106	13,900	4.5	8.30	1.24	0.31
W5	SAW A	66,007	14,900	4.4	8.37	1.32	0.33
W6	SAW A	65,945	13,625	4.8	8.13	1.24	0.31
W7	SAW A	65,910	13,000	5.1	8.00	1.20	0.30
W8	PAH/SAW A	66,008	14,800	4.5	8.35	1.31	0.33
W9	PAH A	66,036	14,450	4.6	8.28	1.29	0.32
W10	PAH A	66,276	12,600	5.3	7.90	1.18	0.30
W11	PAH A	63,948	14,600	4.4	8.40	1.29	0.32
W12	PAH A	66,899	13,300	5.0	8.02	1.23	0.31
W13	PAH A	67,500	13,500	5.0	8.04	1.24	0.31
W14	PAH A	67,410	12,600	5.4	7.86	1.19	0.30
W15	OXBOW A	67,770	14,450	4.7	8.21	1.30	0.33
W16	OXBOW A	65,600	13,900	4.7	8.20	1.26	0.32
Total		2,022,017	436,150	4.6	8.24	1.22	0.31

Appendix E. Brood Year 2000 Organosomatic Index Expressed in Percent of Normals

Date	Stock	Eyes	Gills	Pseudo-Branch	Thymus	Mesentery Fat	Spleen	Hind Gut	Kidney	Liver
3/21/01	Saw A	100	100	100	100	100	100	100	100	100
3/21/01	Pah A	100	100	100	100	100	100	100	100	100
3/21/01	EFK.	100	100	100	100	100	100	100	100	100
3/21/01	Dwor. B	100	100	100	100	100	100	100	100	100

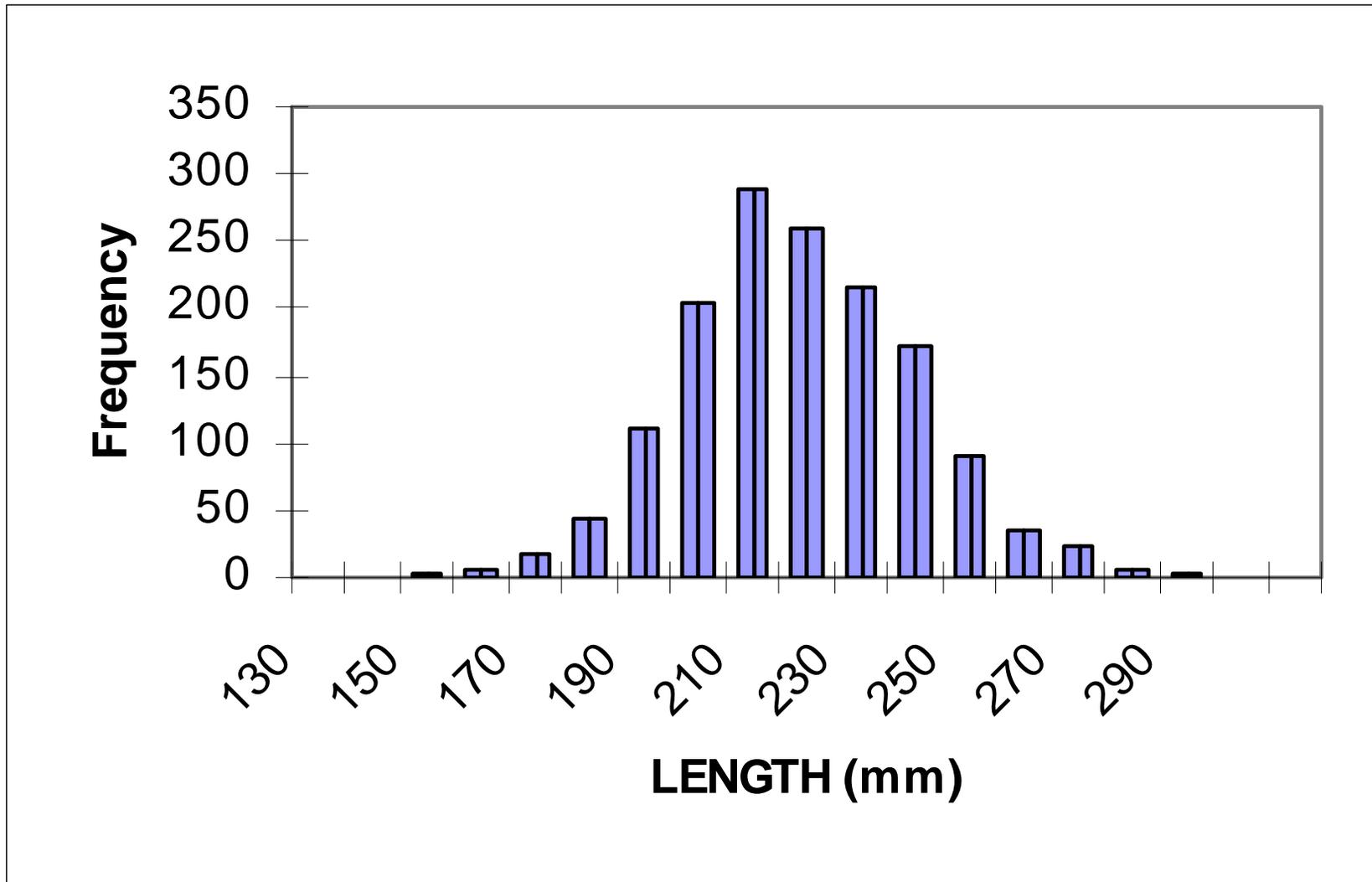
Appendix F. Brood Year 2000 Coded-Wire Releases

CWT Code	Stock	Number CWT	Number Stocked	PIT Tag	Site & Purpose	Raceway Number
10/51-53/70	Dwor-B	61,074	58,346	299	L.Salmon @ Stinky Sp	1 East
10/48/21&22	Dwor-B	46,086	43,900	300	Lower Squaw Creek	5 East
10/48/15&16	Dwor-B	39,901	38,024	298	Lower Squaw Creek	7 East
10/48/18-20	Saw-A	68,391	65,280	299	Tunnel Rock	13 East
10/54-56/70	Pah-A	68,360	66,276	300	Hammer Creek	10 West
10/57-59/70	Saw-A	69,667	67,500	300	Lemhi River	13 West
10/60-62/70	Saw-A	69,842	67,410	299	Red Rock	14 West
10/48/35	Saw-A	34,132	32,996	301	Shoup Bridge	16 West A
10/48/36	Saw-A	34,178	32,604	0	Lemhi Hole	16 West B
N/A	Saw-A	N/A	N/A	300	Yankee Fork	8 East
Total		491,631	472,336	2,696		

Appendix G. Historical Release Data

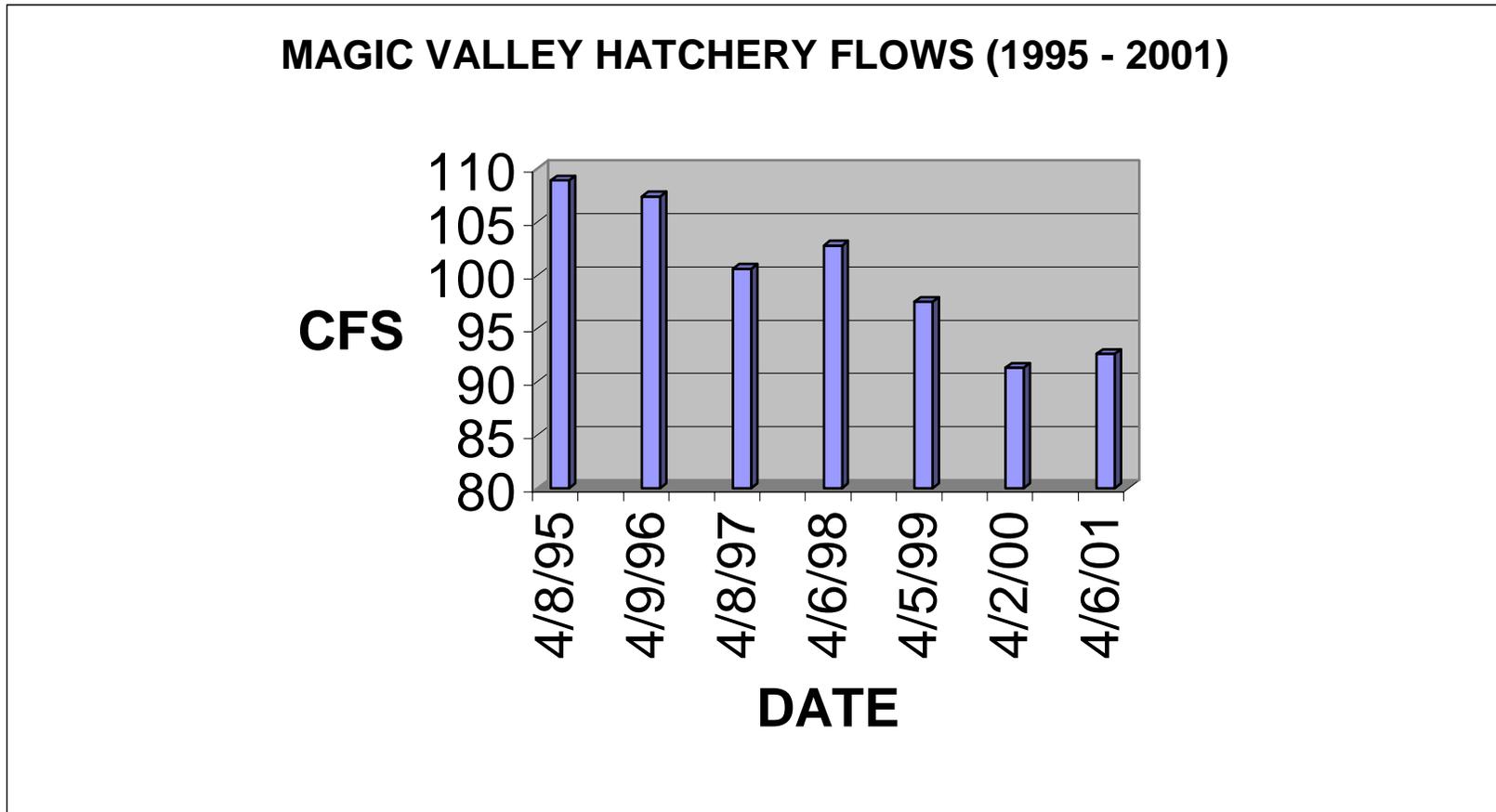
Year	Combined A-run Eggs	East Fork B-run Eggs	Dworshak B-run Eggs	Total Eggs	Spring/Smolt Releases	Fall/Fry Releases	Total Fish Released	Fish per Lb.	Lbs Released	Lbs Feed	Food Conv.
1982-83				145,206	135,361		135,361	4.23	32,000	57,700	2.24
1983-84	238,000		68,000		264,574		264,574	2.77	95,430	154,120	1.62
1984-85				NONE	231,991		231,991	4.37	52,990	HNFH	
1985-86				NONE	NONE				-		
1986-87				NONE	264,415		264,415	4.39	60,215	HNFH	
1987-88		FRY		2,109,780	2,064,661		2,064,661	4.54	454,500	554,000	1.32
1988-89	2,047,748	357,506		2,405,254	2,202,800		2,202,800	4.32	509,100	703,373	1.38
1989-90	1,306,674	333,537	1,212,066	2,852,277	2,285,800		2,285,800	4.67	489,430	687,077	1.40
1990-91	1,269,000	463,730	900,000	2,632,730	2,062,000		2,062,000	4.11	501,100	662,326	1.32
1991-92	1,127,928	91,317	1,207,699	2,426,944	2,160,400		2,160,400	4.21	513,000	624,573	1.22
1992-93	1,031,274	133,826	1,322,740	2,487,840	1,925,700		1,925,700	5.75	334,500	529,936	1.58
1993-94	1,081,500	179,080	1,507,033	2,767,613	1,919,250	392,300	2,311,550	4.73	405,450	654,693	1.61
1994-95	800,785	75,395	1,520,160	2,396,340	1,731,355	26,531	1,757,886	4.41	391,825	548,400	1.49
1995-96	803,000	40,000	1,502,200	2,345,200	1,868,085		1,868,085	4.63	402,926	453,662	1.13
1996-97	947,796	139,400	940,391	2,027,587	1,643,210		1,643,210	4.50	364,775	380,647	1.03
1997-98	855,000	356,340	1,403,900	2,615,240	1,658,825		1,658,825	4.47	370,900	419,222	1.14
1998-99	1,010,540	7,700	1,287,712	2,305,952	1,962,624	106,950	2,069,574	4.12	471,608	574,392	1.20
1999-00	1,052,109	57,954	1,340,756	2,450,819	2,050,039	111,820	2,164,859	4.22	490,850	589,434	1.20
2000-01	1,937,984	51,384	544,006	2,533,374	2,022,017		2,022,017	4.63	436,150	509,927	1.17

Appendix H. Broodyear 2000 Length Frequency Graph



Appendix I. Hayspur Rainbow and Kamloop Trout started for Hagerman State Hatchery.

Hayspur Eggs Received @ Magic Valley Hatchery								Percent Survival
2000-2001				Moved to Hagerman				Percent Survival
Date	Vat #	Egg #	Stock	Date	Pounds	#/lb	Number	Eggs
11/17/00	11	69,903	T9	1/30/01	300	176	52,800	76%
11/17/00	12	69,903	T9	1/30/01	350	145	50,750	73%
11/17/00	13	79,309	KT	2/12/01	500	90	45,000	57%
11/17/00	14	79,309	KT	2/12/01	450	93	41,850	53%
11/20/00	15	70,878	KT	2/12/01	300	134	40,200	57%
11/20/00	16	70,878	KT	2/12/01	300	126	37,800	53%
11/20/00	17	70,878	KT	2/12/01	325	136	44,200	62%
11/20/00	18	84,274	T9	1/30/01	375	154	57,750	69%
11/20/00	19	84,274	T9	1/30/01	350	142	49,700	59%
11/20/00	20	84,274	T9	1/30/01	350	145	50,750	60%
11/20/00	10	84,274	T9	1/30/01	350	164	57,400	68%
11/27/00	9	69,250	T9	2/20/01	550	130	71,500	103%
11/27/00	8	69,250	T9	2/20/01	450	116	52,200	75%
11/27/00	7	69,250	T9	2/20/01	450	75	33,750	49%
11/27/00	6	69,250	T9	1/30/01	200	172	34,400	50%
11/27/00	5	74,900	KT	1/30/01	400	129	51,600	69%
11/27/00	4	74,900	KT	1/30/01	300	145	43,500	58%
GRAND TOTAL		1,274,954					815,150	64%
TOTAL KT		753,902					511,000	68%
TOTAL T9		521,052					304,150	58%



Appendix K. Brood Year 2000 Precocial Male Sampling Results

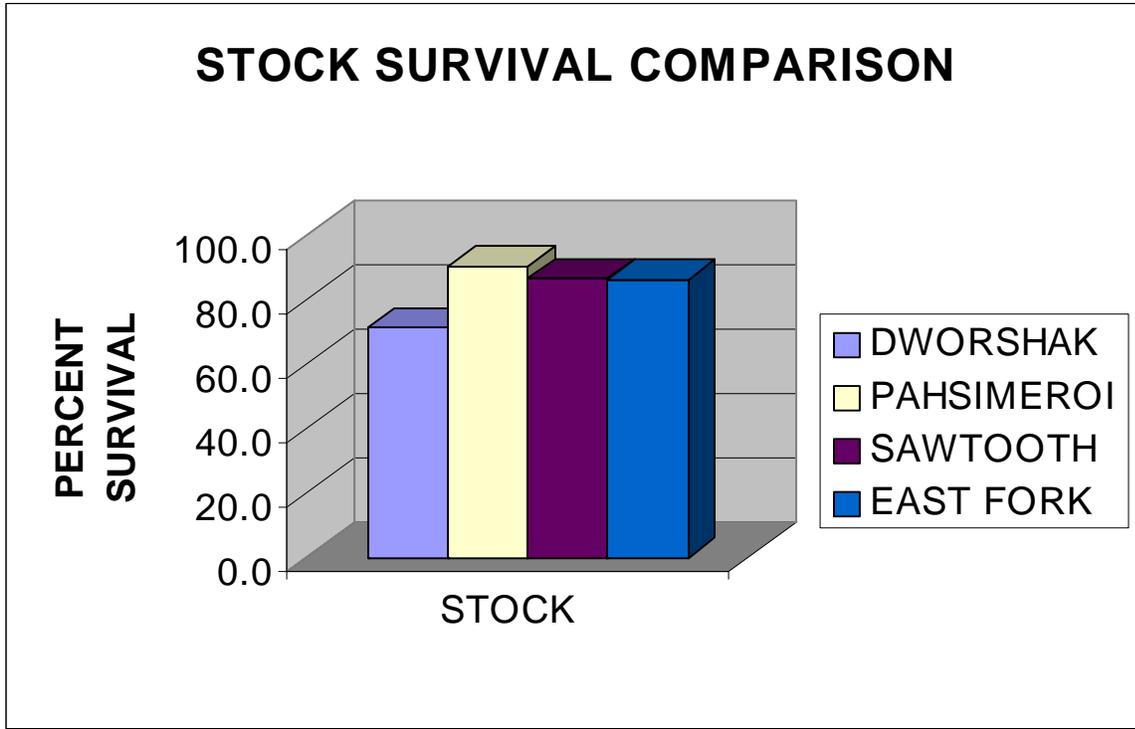
RACEWAY	NUMBER OF FISH SAMPLED	NUMBER OF PRECOICIAL MALES SAMPLED	PERCENT PRECOICIAL
2E	60	2	3.33
3E	60	3	5.00
4E	60	2	3.33
5E	60	1	1.67

2E ADIPOSE, COUNT THROUGH CWT TRAILER

3E ADIPOSE, POKED WITH NEEDLE ON CWT MACHINE

4E ADIPOSE, CWT WITH BLANK UNMAGNETIZED WIRE

5E ADIPOSE, CWT, WITH BLANK MANGETIZED WIRE



Appendix M. Phosphorus Characterization Study

CHARACTERIZATION STUDY

DATE	FLOW	PRODUCTION (lbs)	Net TP (mg/L)	Net TP (lbs/day)
1/26/2000	98.1	261,029	0.025	13.24
2/22/2000	98.8	326,270	0.005	2.67
3/13/2000	98.2	430,499	0.032	16.97
4/3/2000	98.2	116,850	0.027	14.32
5/7/2000	54.2	449	0.004	1.17
6/12/2000	8.0	6,079	0.012	0.52
7/9/2000	19.7	15,750	0.01	1.06
8/8/2000	70.8	34,436	0.011	4.21
9/5/2000	66.3	62,289	0.005	1.79
10/10/2000	94.6	99,899	0.004	2.04
11/13/2000	97.1	152,185	0.004	2.10
12/11/2000	94.1	196,716	0.009	4.57
			AVERAGE:	5.39

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