



MAGIC VALLEY HATCHERY

2002 Brood Year Report

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ABSTRACT

The sixteenth year (May 1, 2002 to May 10, 2003) of steelhead *Oncorhynchus mykiss* production at Magic Valley Steelhead Hatchery (MVSH) was completed with a total of 1,970,121 smolts planted. All smolts placed in the Squaw Creek Acclimation Pond either outmigrated volitionally or were forced out in 2003. Therefore, all steelhead smolts were given the opportunity to migrate to the ocean. Smolt production yielded a total weight of 432,292 pounds. Fish were fed 501,956 pounds of feed for a conversion of 1.16 (pounds of feed per pound of gain).

Five different stocks of steelhead were received as eyed eggs during May and June of 2002. The Dworshak B-run eggs totaled 1,019,468 and contributed 817,657 smolts to the river. The Upper Salmon B-run eggs totaled 81,206 and contributed 58,140 smolts to the river. East Fork Natural eggs totaled 32,382 and resulted in 27,707 fish planted as smolts. Sawtooth A-run eggs totaled 399,000, which produced 293,345 smolts. Pahsimeroi Fish Hatchery contributed 910,249 A-run steelhead eggs, and 773,272 as smolts. Further stocking information is located in Appendix A.

For the sixth 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.

Data collection for effluent characterization continued through September 2002. Additional data sets were provided to the Idaho Department of Environmental Quality (IDEQ) to assist them with the development of MVSH's phosphorus waste load allocation.

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INTRODUCTION

Magic Valley Steelhead Hatchery (MVSH) 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 US Army Corps of Engineers (USACE), is administered and funded by the US Fish and Wildlife Service (USFWS), and is operated by the Idaho Department of Fish and Game (Department).

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 (East Fork natural stock), Upper Salmon B (Squaw Creek Pond 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 to 75,000 eyed eggs. Two incubators are placed over each raceway. There are 20 concrete tanks (4-ft x 3-ft x 40-ft, containing 418 cuft of rearing space) with a capability of rearing 115,000 to 125,000 steelhead to 200 fish per pound (fpp) 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, containing 6,153 cuft 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 to 70,000 smolt-size steelhead. The raceways may be further divided to result in a total of 64 individual rearing sub-

units. A moveable bridge equipped with 16 automatic Neilsen fish feeders spans the outdoor raceways. Two 30,000 lb bulk feed bins, equipped with fish feed fines shakers and a feed conveyor, complete the outside feeding system.

There are two tailraces located outside 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.

Some 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 gallon per minute (gpm) per inch of fish length at the end of the rearing cycle. Water flows continued to decrease in recent years. Appendix J shows flows over the last nine years during early April representing flow at or near projected maximum loading. Currently, high flows are in the 85 to 90 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. 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 2001 brood year, MVH was staffed with the following permanent employees: Rick Lowell, Fish Hatchery Manager II; Dave May, Assistant Hatchery Manager; Wade Symons and Pat Moore, Fish Culturists. In addition, temporary Bio-aides or Laborers are hired to assist with essential fish culture duties during peak production, smolt transportation, and adipose fin clipping. Our Bio-aide at the beginning of this brood year was Pat Traxler. Jeff Walker was hired as an additional eight month Bio-Aide in early March 2003. Personnel from this hatchery continue to assist with adipose marking operations at the Niagara Springs, Hagerman National, and Magic Valley hatcheries.

FISH PRODUCTION

Egg Shipments and Early Rearing

The hatchery received 1,019,468 B-run (Dworshak) eyed eggs, 81,206 B-run eyed eggs (Upper Salmon B stock), and 32,382 East Fork Natural B stock. A-run eyed eggs included 910,249 (Pahsimeroi), and 399,000 (Sawtooth). The grand total of steelhead eggs received this year was 2,442,305. All eggs were received in April, May, and June 2002. 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 122,000 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. However, Brood Year 02 Dworshak stock yielded a twenty three percent increase in survival over Brood Year 01. Appendix L compares the fourteen-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 primarily fed Rangen 440 extruded salmon diet with an extra vitamin pack and two percent extra oil 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 8.30-inch smolt. The fish had a conversion of 1.16 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 September 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. Cumulative average density and flow indices at time of release remained below the maximum parameters set by the LSRCP performance indicator program. 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 2002 through March 2003. The majority of the time flows were recorded around 80 – 90 cfs. Each of the outside 32 raceways had about 2.8 cfs prior to distribution in April.

Steelhead smolt distribution began on April 7, 2003 and continued five days a week through May 1, 2003. An average of five trucks per day was used for the transportation of 432,292 lbs. of fish and involved 92 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

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

FISH HEALTH

Diseases Encountered and Treatment

Infectious Hematopoietic Necrosis (IHN) was found in BY02 Dworshak STB. To reduce mortalities and stress, the fish were taken off feed. Once mortalities were declining in the population, feeding resumed. *Aeromonas salmonicida*, the causative agent of furunculosis was detected in these fish in April just prior to release. The mortality rate was not high enough to warrant treatment, plus the 42-day mandatory withdrawal period would have placed release of these fish in June '03. That would not have been acceptable

ORGANOSOMATIC INDEX. See Appendix E.

Acute Losses

The epizootic of IHNV was contained to one population in one rearing vat. The daily mortality averaged 720 fish/day for approximately four weeks. *Flavobacterium psychrophilum*, the causative agent of coldwater disease was also detected in this group of fish, but mortality was not high enough to warrant medicated feed treatment.

Other Assessments

The IHNV found at this facility was DNA typed to be similar to the Hagerman variety. This suggests that the virus was transmitted horizontally into this population of steelhead at Magic Valley Hatchery, as opposed to being vertically transmitted from brood fish to egg. In the coming year, IDFG personnel must monitor the water supply and pest exclusion to make sure all preventative measures are in place to keep this virus from reoccurring.

Precocial Male Observation

Fishery Research personnel continued a precocial steelhead smolt study on fish released into the Squaw Creek acclimation pond. Results indicate a higher occurrence of precocity in non-migrant fish compared to direct release fish. Appendix K shows the results of precocial male steelhead sampled in each group. For more detailed information regarding steelhead smolt precocity, contact Idaho Department of Fish and Game Nampa Research.

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 third year that fish were reared for supplementation releases for the Shoshone – Bannock Tribe. A total of 85,040 Pahsimeroi A and 66,065 Sawtooth A strain steelhead were set-aside to produce 83,157 and 60,124 unmarked fish respectively for releases into the Lemhi River, Yankee Fork of the Salmon River, and Valley Creek. Additionally, 27,707 East Fork Natural Steelhead were released as unmarked smolts.

At MVH the fin clipping crew Ad-marked 1,966,640 fish during August and September. Fin-clipping mortality was negligible. No treatment was necessary after handling.

A total of 478,633 fish received coded-wire tags in 2002, of which 389,345 survived and were outplanted as smolts in 2003. Ten different release locations were identified by coded wire tags. See (Appendix F) for CWT details.

In addition, a total of 3,294 smolts had Passive Integrated Transponder (PIT) tags inserted in them. Thirty one mortalities were discovered in those fish resulting in 3,263 PIT tagged fish being released.

PHOSPHORUS CHARACTERIZATION STUDY

Data collection for effluent characterization continued through September 2002. Additional data sets were provided to the Idaho Department of Environmental Quality (IDEQ) to assist them with the development of Magic Valley Steelhead Hatchery's phosphorus waste load allocation.

MAINTENANCE PROJECTS

During the year, the following projects were completed:

1. Continued sealing and patching of raceway wall cracks.
2. Purchase and installation of new smoke alarms for all hatchery residences. All alarms were equipped with ten-year lithium batteries.
3. Installation of new smoke and heat alarms in the hatchery dormitory. Alarms were hard-wired into the existing hatchery alarm system.
4. Hatchery fire safety brush removal day. Personnel from LSRCP and Nampa Research assisted.

5. Installed replacement stainless steel plumbing fittings for inside the incubation building.
6. Replaced 8" fish pump hydraulic motor.
7. Installation of towing hitch for Dodge 4X4.
8. Completion of a fire safety access road behind residences one and two.
9. Repairs to hatchery office heat pump.
10. Installation of lighted safety exit signs in the hatchery building.
11. Had several repairs and modifications done to the fish pump tower to improve personnel safety and efficiency.
12. Received new fire hoses for the fire hose boxes around the hatchery building and all hatchery residences.
13. Egress/safety compliant windows were installed in the master bedrooms of all four hatchery residences.
14. The hatchery intake de-gassing tower koch rings in the top layer were removed, disinfected and re-installed in the tower. Afterward, the entire volume of the tower was disinfected with chlorine.

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):

Munson, Doug 2003. Preliberation necropsy report.

APPENDICES

Appendix A. Brood Year 2002 Steelhead Survival Rates.

	DWORSHAK "B"	UPPER SALMON "B"	EAST FORK "B"	PAHSIMEROI "A"	SAWTOOTH "A"	GRAND TOTAL
EGGS	1,019,468	81,206	32,382	910,249	399,000	2,442,305
% HATCHED	87%	97%	97%	99%	99%	96%
SMOLTS STOCKED	817,657	58,140	27,707	773,272	293,345	1,970,121
WEIGHT SMOLTS NO./LB.	179,175 4.6	12,750 4.6	7,050 3.9	166,192 4.7	67,125 4.4	432,292 4.6
% SURVIVAL EGG/RELEASE	80%	72%	89%	85%	74%	81%
POUNDS OF FOOD CONVERSION	226,574 1.26	14,456 1.13	8,481 1.20	171,557 1.03	80,888 1.21	501,956 1.16

Appendix B. Brood Year 2002 Production Feed Cost And Utilization.

Number Of Fish	1,970,121
Lbs Of Fish	432,292
Feed Cost	\$156,441.55
Lbs Of Feed	501,956
Conversion	1.16
Total Cost	\$658,376.76
Cost Per 1000 Fish	\$334.18
Cost Per Pound Fish	\$1.52
Feed Cost/Lb. Fish	\$0.36

Appendix C. Brood Year 2002 Steelhead Smolt Distribution in the Salmon River and Tributaries.

MVBY02REPORT

Destination	Number	Stock	Fish/lb	Pounds
Little Salmon R (Stinky Springs)	336,983	B	4.5	74,925
Squaw Creek Acclimation Pond (acclimated fish) DWORB	62,930	B	4.3	14,500
Squaw Creek Acclimation Pond (acclimated fish) USB	58,140	B	4.6	12,750
Squaw Creek DWORB (direct release into Squaw Creek)	202,079	B	4.5	44,700
East Fork Salmon River (lower)	215,666	B	4.8	45,150
East Fork Salmon River (above E. Fk. Weir)	27,707	B	3.9	7,050
Lemhi River	32,560	A	4.4	7,400
Lemhi River (no clip)	83,157	A	5.2	15,900
Yankee Fork	139,322	A	4.2	32,950
Yankee Fork (no clip)	27,469	A	4.0	6,850
Hammer Creek	183,634	A	4.6	40,150
(Red Rock)	132,342	A	4.5	29,700
(Colston Corner)	161,020	A	4.6	34,700
(Lemhi Hole)	70,848	A	4.9	14,400
(Pahsimeroi Trap)	33,862	A	4.6	7,442
(McNabb Point)	93,104	A	4.7	20,000
(Tunnel Rock)	76,643	A	4.8	16,050
(Valley Creek)	32,655	A	4.2	7,775
Totals	1,970,121		4.6	432,292

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Appendix D. Brood Year 2002 Final Raceway Inventory with Flow and Density Indices.

Raceway	Stock	Number	Weight	No/lb	Length	Flow Index	Density Index
E1	USB	58,140	12,750	4.6	8.29	1.14	0.29
E2	DWOR B	2,930	14,500	4.3	8.43	1.27	0.32
E3	DWOR B	73,360	13,100	5.6	7.74	1.25	0.32
E4	DWOR B	63,492	14,800	4.3	8.46	1.30	0.33
E5	DWOR B	69,518	14,950	4.7	8.24	1.34	0.34
E6	DWOR B	64,125	13,850	4.6	8.25	1.24	0.31
E7	DWOR B	69,069	14,950	4.6	8.25	1.34	0.34
E8	DWOR B	69,768	16,225	4.3	8.45	1.42	0.36
E9	DWOR B	65,730	15,650	4.2	8.52	1.36	0.34
E10	DWOR B	61,849	12,700	4.9	8.11	1.16	0.29
E11	DWOR B	62,522	12,700	4.9	8.08	1.16	0.29
E12	DWOR B	60,920	13,000	4.7	8.21	1.17	0.29
E13A	DWOR B	30,376	6,750	4.5	8.33	1.20	0.30
E13B	EFK B	27,707	7,050	3.9	8.71	0.60	0.30
E14	SAW A	42,872	9,200	4.7	8.23	0.83	0.21
E15	SAW/PAH	51,025	10,350	4.9	8.08	0.95	0.24
E16	SAW/PAH	64,000	16,000	4.0	8.66	1.37	0.34
W1	PAH A	68,478	15,150	4.5	8.31	1.35	0.34
W2	PAH A	64,308	13,800	4.7	8.23	1.24	0.31
W3	PAH A	64,014	14,100	4.5	8.30	1.26	0.32
W4	PAH A	62,325	13,850	4.5	8.33	1.23	0.31
W5	PAH A	56,850	12,950	4.4	8.40	1.14	0.29
W6	PAH A	67,032	14,700	4.6	8.29	1.31	0.33
W7	PAH A	64,112	14,200	4.5	8.32	1.26	0.32
W8	PAH A	62,436	13,200	4.7	8.19	1.19	0.30
W9	PAH A	70,848	14,400	4.9	8.08	1.32	0.33
W10	PAH A	63,913	13,742	4.7	8.24	1.24	0.31
W11	PAH A	45,798	10,200	4.5	8.33	0.91	0.23
W12	PAH A	83,157	15,900	5.2	7.92	1.49	0.37
W13	PAH A	60,124	14,625	4.1	8.58	1.26	0.32
W14	SAW A	36,660	9,400	3.9	8.73	0.80	0.20
W15	SAW A	36,168	9,250	3.9	8.73	0.79	0.20
W16	SAW A	66,496	14,300	4.7	8.24	1.29	0.32
Total		1,970,121	432,292	4.6	8.29	1.21	0.30

Appendix E. Brood Year 2002 Organosomatic Index Expresses in Percent of Normals.

Date	Stock	Eyes	Gills	Pseudo-Branch	Thymus	Mesentery Fat	Spleen	Hind Gut	Kidney	Liver
3/6/2003	Saw A	100	100	100	100	100	100	100	100	100
3/6/2003	Pah A	100	100	100	100	100	100	100	100	100
3/6/2003	USB	100	100	100	100	100	100	100	100	100
3/6/2003	Dwor. B	100	100	100	100	100	100	100	100	100

Appendix F. Brood Year 2002 Coded-Wire and PIT Tag Releases.

MVBY02RPT

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CWT Code	Stock	# CWT	# Stocked	# PIT Tag	# Stocked	Site & Purpose	Raceway #
10/57/73	USB	25,319		0		Squaw Pond	1EA
10/58/73	USB	8,140		0		Squaw Pond	1EA
10/57/73	USB	9,384		0		Squaw Pond	1EB
10/58/73	USB	23,407	58,140	0		Squaw Pond	1EB
10/98/72	DWOR B	67,761	62,930	0		Squaw Pond	2EA/B
10/97/72	DWOR B	71,908	70,870*	301	298	Squaw Creek	4EB/5EB
10/99/72	DWOR B	68,894	67,098	300	275	Little Salmon	8EB/9EB
	PAH A	NONE		298	297	Hammer Creek	2WB
10/63/73	PAH A	33,859	33,445	301	300	Red Rock	4WB
	PAH A			299	299	Colston Corner	6WB
10/64/73	PAH A	33,368	14,960	298	298	Lemhi River L6	7WB
10/64/73	PAH A		17,600	0		Lemhi River County Scales	7WB
10/59/73	PAH A	33,107	32,733	300	299	Colston Corner	8WB
10/60/73	PAH A	34,255	33,862	0		Pahsimeroi Trap	10WB
10/61/73	PAH A	34,261	33,906	300	300	McNabb	11WB
	PAH A			299	299	Hayden X Lemhi	12WB
	PAH A			298	298	Valley Creek	13WB
10/62/73	SAW A	34,970	34,671	300	300	Yankee Fork	14WB/15WB
Total		478,633	389,345	3,294	3,263		

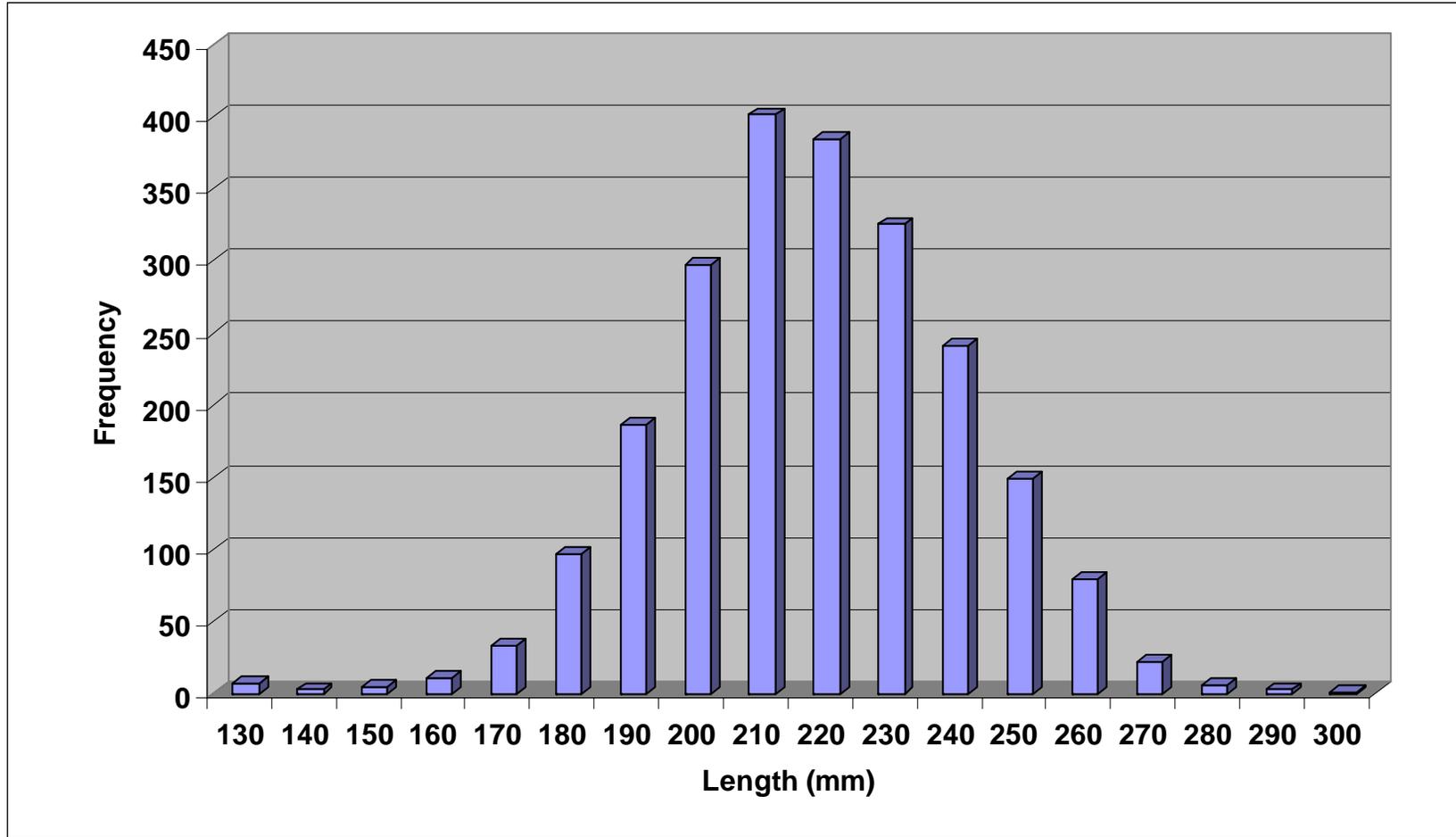
Appendix G. Historical Release Data.

MVBV02REPORT

Year	Combined A-run Eggs	Upper Salmon B-run Eggs	East Fork Natural Eggs	Dworshak B-run Eggs	Total Eggs	Spring/Smolt Releases	Fall/Fry Releases	Total Fish Released	Fish /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
2001-02	1,305,282	81,622		1,131,772	2,518,676	1,899,530		1,899,530	4.12	461,460	519,982	1.13
2002-03	1,309,249	81,206	32,382	1,019,468	2,442,305	1,970,121		1,970,121	4.60	432,292	501,956	1.16

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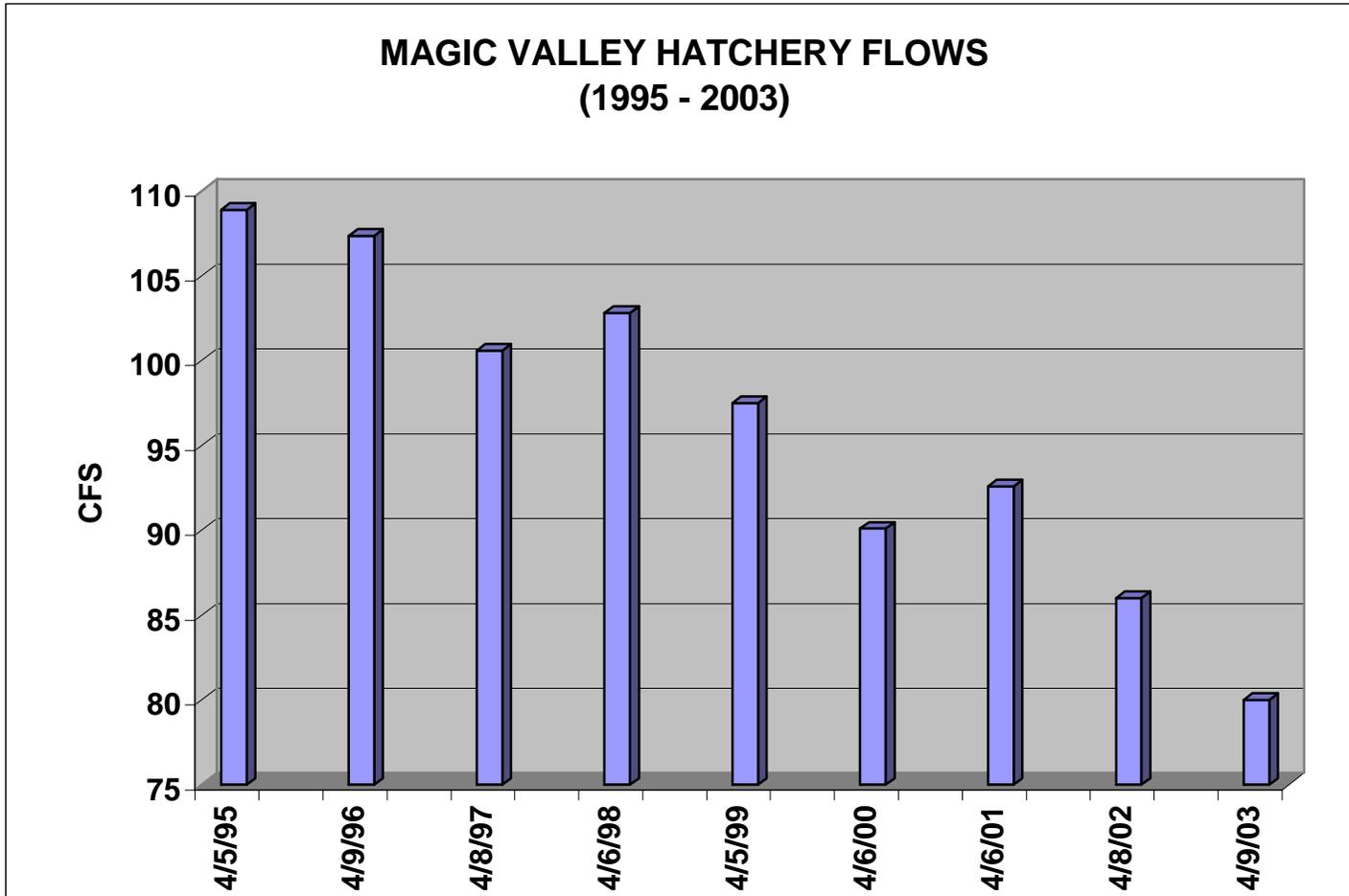
Appendix H. Brood Year 2002 Length Frequency Graph.



Appendix I. Hayspur Rainbow and Kamloop Trout started for Hagerman State Hatchery 2002 – 2003.

Hayspur Eggs Received @ Magic Valley Hatchery 2002-2003				Moved to Hagerman			Percent Survival
Date	Vat #	Egg #	Stock	Date	Pounds	#/lb	Number Eggs
11/27/2002	11	138,830	KT	2/14/03	800	137	109200 79%
11/27/2002	12	138,849	KT	2/14/03	725	148	107227 77%
11/27/2002	13	122,900	T9	2/14/03	635	128	81534 66%
11/27/2002	14	122,900	T9	2/14/03	650	146	94575 77%
11/27/2002	15	122,900	T9	2/14/03	700	120	84070 68%
12/4/2002	16	131,635	T9	2/14/03	500	164	81850 62%
12/4/2002	17	128,285	T9	2/14/03	575	155	88952 69%
12/4/2002	18	129,950	KT	2/14/03	425	164	69912 54%
12/4/2002	19	128,715	KT	2/14/03	460	148	68172 53%
12/4/2002	20	128,535	KT	2/14/03	550	132	72325 56%
TOTAL		1,293,499			6020	144	857817 66%

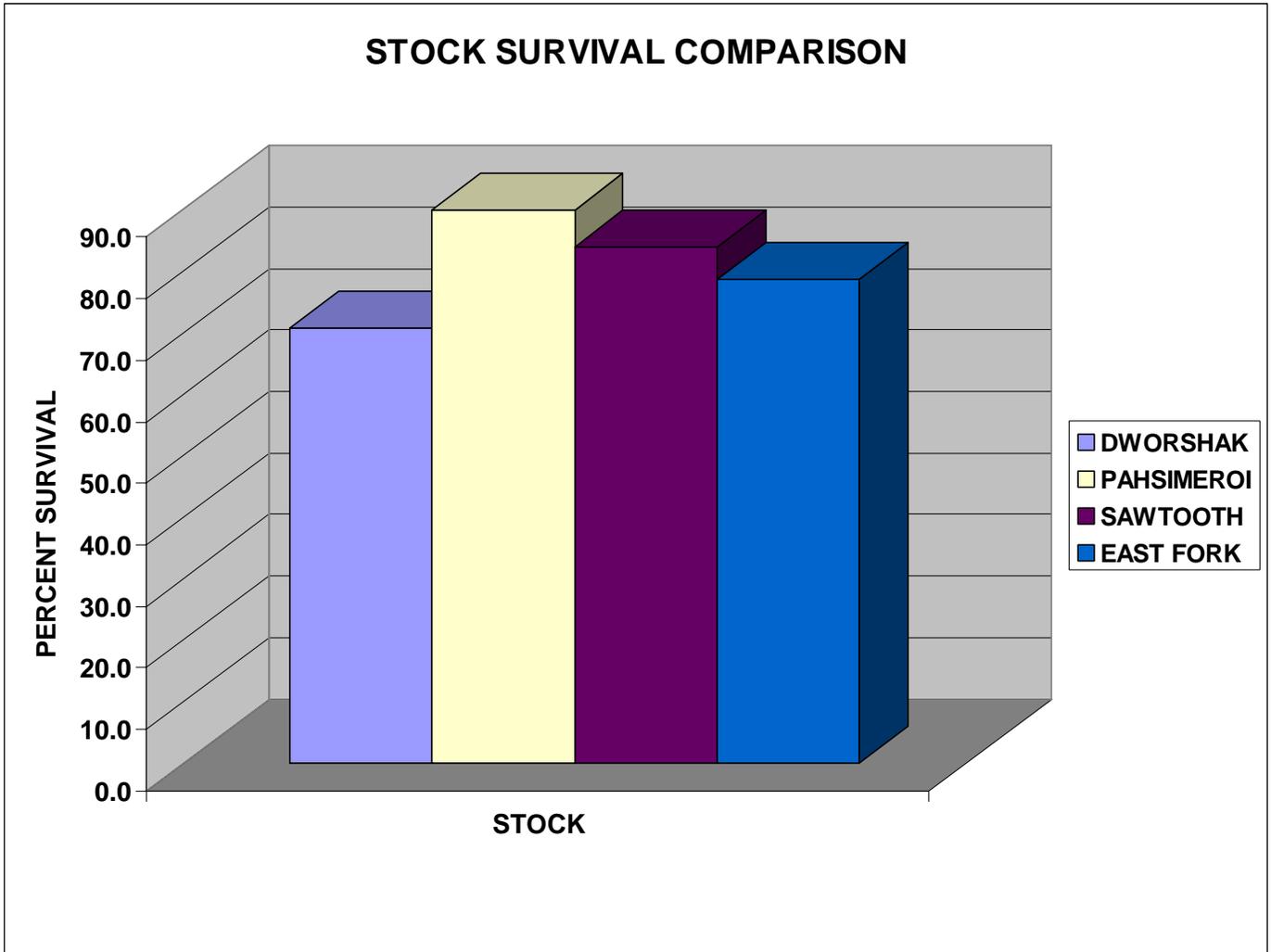
Appendix J. Hatchery Water Flows 1995-2003.



Appendix K. Brood Year 2002 Precocial Male Sampling Results.

Group	% Precocity (Males)	Sample Size	Date of Sample
Early Migrants	0	200	4/21/03
Non-Migrant	18.63	104	6/3/03

Appendix L. Fourteen-Year Average of Stock Survival.



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