



MAGIC VALLEY HATCHERY

2003 Brood Year Report

By

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ABSTRACT

The seventeenth year (May 1, 2003 to May 10, 2004) of steelhead *Oncorhynchus mykiss* production at Magic Valley Steelhead Hatchery was completed with a total of 1,796,408 smolts planted. All smolts placed in the Squaw Creek Acclimation Pond out-migrated volitionally in 2004. Therefore, all steelhead smolts were given the opportunity to migrate to the ocean. Smolt production yielded a total weight of 413,419 pounds. Fish were fed 437,032 pounds of feed for a conversion of 1.06 (pounds of feed per pound of gain).

Five different stocks of steelhead were received as eyed eggs during May and June of 2003. The Dworshak B-run eggs totaled 932,191 and contributed 651,637 smolts to the river. The Upper Salmon B-run eggs totaled 78,006 and contributed 65,341 smolts to the river. East Fork Natural eggs totaled 57,876 and resulted in 42,953 fish planted as smolts. Sawtooth A-run eggs totaled 480,000 which produced 348,080 smolts. Pahsimeroi Fish Hatchery contributed 854,718 A-run steelhead eggs, and 688,397 as smolts. Further stocking information is located in Appendix A.

For the seventh 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.

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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, 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 (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 up to 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, bloodstock, 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 -125,000 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.

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 gal per minute per inch of fish length at the end of the rearing cycle. Water flows continue to decrease in recent years. Appendix J shows flows over the last ten years during early April representing flow at or near projected maximum loading. Currently, high flows are in the 80 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 2003 brood year, MVH was staffed with the following permanent employees: Rick Lowell, Fish Hatchery Manager II; Dave May, Assistant Hatchery Manager; Wade Symons and Darlene Snyder 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-aides during this brood year were Pat Traxler and Jeff Walker. 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 932,191 B-run (Dworshak) eyed eggs, 78,006 B-run eyed eggs (Upper Salmon B stock), and 57,876 East Fork Natural B stock. A-run eyed eggs included 854,718 (Pahsimeroi), and 480,000 (Sawtooth). The combined total number of steelhead eggs received this year was 2,402,791. All eggs were received in April, May, and June 2003. 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. Appendix L compares the fifteen-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 470 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 8.30-inch smolt. The fish had a conversion of 1.06 pounds of feed to produce a pound of fish.

Generally, 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 occurred during December at approximately 90 cfs. The majority of the time flows were recorded around 80 – 90 cfs. Each of the outside 32 raceways had about 2.65 cfs prior to distribution in April.

Steelhead smolt distribution began on April 9, 2004 and continued five days a week through April 29, 2004. An average of five trucks per day was used for the transportation of 413,419 lbs. of fish and involved 84 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

Mimicking a similar mortality pattern that was observed in BY'02 Dworshak steelhead trout B Group, one IHNV (Infectious Hematopoietic Necrosis Virus) epizootic was isolated to early rearing vat # 2. Hatchery personnel recommended removal of the survivors to either an alternative stocking location or for destruction. Potential receiving water conditions (primarily high water temps.) and the paucity of an appropriate release location precluded removal. In addition to the IHNV epizootic, Flavobacterium Psychrophilum (*F. psychrophilum*) was also found present in vat # 2. Therefore, one Oxytetracycline medicated feed treatment was applied at 10 g/100 pounds of biomass to be treated for 14 days, provided under INAD 9332. Overall, losses from *F. psychrophilum* were not as dramatic as in recent years.

During the mid- rearing phase (post fin clipping) BY' 03 Dworshak steelhead exhibited symptoms that resembled external lesions associated with *F. psychrophilum*. Although all stocks on station had varying degrees of external lesions, symptoms were more pronounced in the Dworshak stock. On an experimental basis, a Chloramine-T treatment was applied to control morbidity at 10 ppm for three treatments (INAD 9321). Since mortalities were not elevated, efficacy was difficult to determine. Noticeable improvement in saddleback lesions occurred in treated raceways.

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. *F. psychrophilum* was also detected in this group of fish. Mortality was high enough to warrant medicated feed treatment.

Other Assessments

Early Rearing. A feed additive, β -glucan, appears to have relieved some of the mortality in the nursery stage of rearing. It has been suggested that beta β -glucan will boost non-specific immune response in salmonid fry. Further investigation into the effect of β -glucan is warranted. The hatchery staff is also interested in developing a hydrogen peroxide drip to treat the water during early rearing. The theory is that the concentration of hydrogen of peroxide will be sufficient to limit horizontal infection of *F. psychrophilum*. Fish pathology personnel have suggested to the Magic Valley staff that this investigation should include hydrogen peroxide treatment of the eggs while in incubation.

Final Rearing. Saddleback or external lesions have been observed in all stocks of steelhead for several consecutive years. Almost without exception, the timing of when the lesions appear occurs toward the end of adipose fin clipping or within a few weeks of the

completion of fin clipping. From a qualitative perspective, hatchery personnel hypothesize that the appearance of external lesions could be related to a life stage of development coupled with rearing in constant temperature water. We also hypothesize that when the timing of fin clipping overlaps the onset of saddleback, the severity and scope of the symptoms increase. In an effort to decrease or minimize saddleback, hatchery personnel decided to change the timing of fin clipping. Past production techniques included transferring steelhead fry from the indoor vats to the outside raceways during July. Then, during late August or early September, all fish would be handled a second time for fin clipping. For BY' 03, all fish except unmarked tribal fish, were fin clipped as they were moved outside. Thereby eliminating one major stressor event. Appendix M compares mortality rates post fin clipping between BY' 02 and BY' 03. Preliminary results are encouraging. Hatchery personnel will be replicating fish marking timing for BY' 04 and continue to monitor fish quality and health.

Precocial Male Observation

Fishery Research personnel continued a precocial steelhead smolt study on fish released into the Squaw Creek acclimation pond. Results continue to 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

A total of 77,748 Pahsimeroi A, and 49,956 Sawtooth A unmarked steelhead were produced for releases into the Lemhi River, Yankee Fork of the Salmon River, and Valley Creek respectively. Additionally, 42,953 East Fork Natural Steelhead were released as unmarked smolts.

At MVH the fin clipping crew Ad-marked 1,541,610 fish during June and July. During coded-wire tagging, a total of 65,341 USB stock were Ad-marked as well. Fin-clipping mortality was negligible. No treatment was necessary after handling.

A total of 401,576 fish received coded-wire tags in 2003, of which 378,239 survived and were out-planted as smolts in 2004. Ten different release locations were identified by coded wire tags. See (Appendix F) for CWT details.

In addition, a total of 3,185 smolts had Passive Integrated Transponder (PIT) tags inserted in them. All PIT tagged smolts were released.

MAINTENANCE PROJECTS

During the year, the following projects were completed:

1. Had community service workers here to remove sagebrush and weeds behind residence three.
2. Purchased and installed new ice-maker.
3. Received 159 new aluminum dam boards.
4. Received a free new electronic scale from Hagerman National Hatchery.
5. Hatchery personnel installed new feed loading chutes on both elevators.
6. New metal roofs and fire safety compliant windows were installed for all the residences.
7. Performed extensive removal of brush and logs and chipping of woody debris at the hatchery intake structure.
8. Installed new visitors hours and visitors parking signs.
9. New laminate flooring was installed in residence 2.
10. Received six semi-square early rearing tanks from Sawtooth Hatchery for use in our East Fork Natural and Upper Salmon B. program.

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

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APPENDICES

Appendix A. Brood Year 2003 Steelhead Survival Rates.

	DWORSHAK "B"	UPPER SALMON "B"	EAST FORK "B"	PAHSIMEROISAWTOOTH "A"	"A"	GRAND TOTAL
Eggs	932,191	78,006	57,876	854,718	480,000	2,402,791
% Hatched	87%	97%	97%	99%	99%	96%
Smolts Stocked	651,637	65,341	42,953	688,397	348,080	1,796,408
Weight Smolts	142,300	13,200	10,450	166,250	81,219	413,419
No./Lb.	4.58	4.95	4.11	4.14	4.29	4.35
% Survival						
Egg/Release	70%	84%	74%	81%	73%	75%
Pounds of Food	153,405	14,289	10,975	172,075	86,288	437,032
Conversion	1.08	1.08	1.05	1.04	1.06	1.06

Appendix B. Brood Year 2003 Production Feed Cost and Utilization.

Number of Fish	1,796,408
Lbs of Fish	413,419
Feed Cost	\$135,877.58
Lbs of Feed	437,032
Conversion	1.06
Total Cost	\$671,112.00
Cost Per 1,000 Fish	\$373.59
Cost Per Pound Fish	\$1.62
Feed Cost Per Pound Fish	\$0.33

Appendix C. Brood Year 2003 Steelhead Smolt Distribution in the Salmon River and Tributaries.

Destination	Number	Stock	Fish/lb.	Pounds
Little Salmon River (Stinky Springs)	198,623	B	4.96	40,050
Squaw Creek Acclimation Pond (acclimated fish) DWOR B	57,876	B	4.24	13,650
Squaw Creek Acclimation Pond (acclimated fish) USB	65,341	B	4.95	13,200
Squaw Creek DWOR B (direct release into Squaw Creek)	198,736	B	4.60	43,200
East Fork Salmon River (lower)	196,402	B	4.33	45,400
East Fork Salmon River (above E. Fk. Weir) (no clip)	42,953	B	4.11	10,450
Lemhi River	29,106	A	3.78	7,700
Lemhi River (no clip)	77,748	A	3.72	20,900
Yankee Fork	162,082	A	4.75	34,119
Yankee Fork (no clip)	25,800	A	4.30	6,000
Hammer Creek	178,984	A	4.15	43,150
(Red Rock)	132,528	A	4.42	30,000
(Colston Corner)	122,915	A	4.17	29,500
(Lemhi Hole)	70,780	A	3.95	17,900
(Pahsimeroi Trap)	26,838	A	3.78	7,100
(McNabb Point)	127,740	A	4.26	30,000
(Tunnel Rock)	57,800	A	3.85	15,000
(Valley Creek) (no clip)	24,156	A	3.96	6,100
Totals	1,796,408		4.35	413,419

Appendix D. Brood Year 2003 Final Raceway Inventory with Flow and Density Indices.

Raceway	Stock	Number	Weight	No/lb	Length	Flow Index	Density Index
E1	DWOR B	62,784	14,400	4.4	8.41	1.52	0.32
E2	DWOR B	63,619	13,450	4.7	8.19	1.46	0.31
E3	DWOR B	68,770	14,950	4.6	8.27	1.61	0.34
E4	DWOR B	69,641	14,300	4.9	8.11	1.57	0.33
E5	DWOR B	68,640	14,300	4.8	8.15	1.56	0.33
E6	DWOR B	60,342	11,450	5.3	7.90	1.29	0.27
E7	DWOR B	54,240	11,300	4.8	8.15	1.24	0.26
E8	DWOR B	63,054	13,950	4.5	8.31	1.49	0.31
E9	DWOR B	57,876	13,650	4.2	8.49	1.43	0.30
E10	USB	65,341	13,200	5.0	8.07	1.46	0.30
E11	EFK NAT	42,953	10,450	4.1	8.58	1.08	0.23
E12	SAW A	46,176	9,600	4.8	8.14	1.05	0.22
E13A	SAW A	24,156	6,100	4.0	8.69	0.63	0.26
E13B	SAW A	25,800	6,000	4.3	8.45	0.63	0.26
E14	SAW A	51,816	10,200	5.1	8.00	1.14	0.24
E15	DWOR B	31,871	7,850	4.1	8.62	0.81	0.17
E16	DWOR B	50,800	12,700	4.0	8.66	1.31	0.27
W1	PAH A	55,195	13,300	4.2	8.55	1.39	0.29
W2	PAH A	65,364	15,600	4.2	8.53	1.63	0.34
W3	PAH A	58,425	14,250	4.1	8.59	1.48	0.31
W4	PAH A	67,053	15,450	4.3	8.43	1.63	0.34
W5	PAH A	65,475	14,550	4.5	8.33	1.56	0.33
W6	PAH A	71,568	16,800	4.3	8.48	1.77	0.37
W7	PAH A	59,015	14,500	4.1	8.61	1.50	0.31
W8	PAH A	63,112	16,100	3.9	8.72	1.65	0.34
W9A	PAH A	26,838	7,100	3.8	8.82	0.72	0.15
W9B	PAH A	29,106	7,700	3.8	8.82	0.78	0.16
W10	PAH A	39,060	10,500	3.7	8.87	1.05	0.22
W11	PAH A	38,688	10,400	3.7	8.87	1.04	0.22
W12	PAH A	49,500	10,000	5.0	8.07	1.10	0.23
W13	SAW A	52,768	13,600	3.9	8.75	1.39	0.29
W14	SAW A	45,372	11,400	4.0	8.67	1.17	0.24
W15	SAW A	42,900	11,319	3.8	8.82	1.14	0.24
W16	SAW A	59,090	13,000	4.5	8.30	1.40	0.29
Total		1,796,408	413,419	4.3	8.42	1.37	0.29

Appendix E. Brood Year 2003 Organosomatic Index Expresses in Percent of Normals.

Date	Stock	Eyes	Gills	Pseudo-Branch	Thymus	Mesentery Fat	Spleen	Hind Gut	Kidney	Liver
3/2/2004	SAW A	100	100	100	100	100	100	100	100	100
3/2/2004	PAH A	100	100	100	100	100	100	100	100	100
3/2/2004	USB	100	100	100	100	100	100	100	100	100
3/2/2004	DWOR B	100	100	100	100	100	100	100	100	100

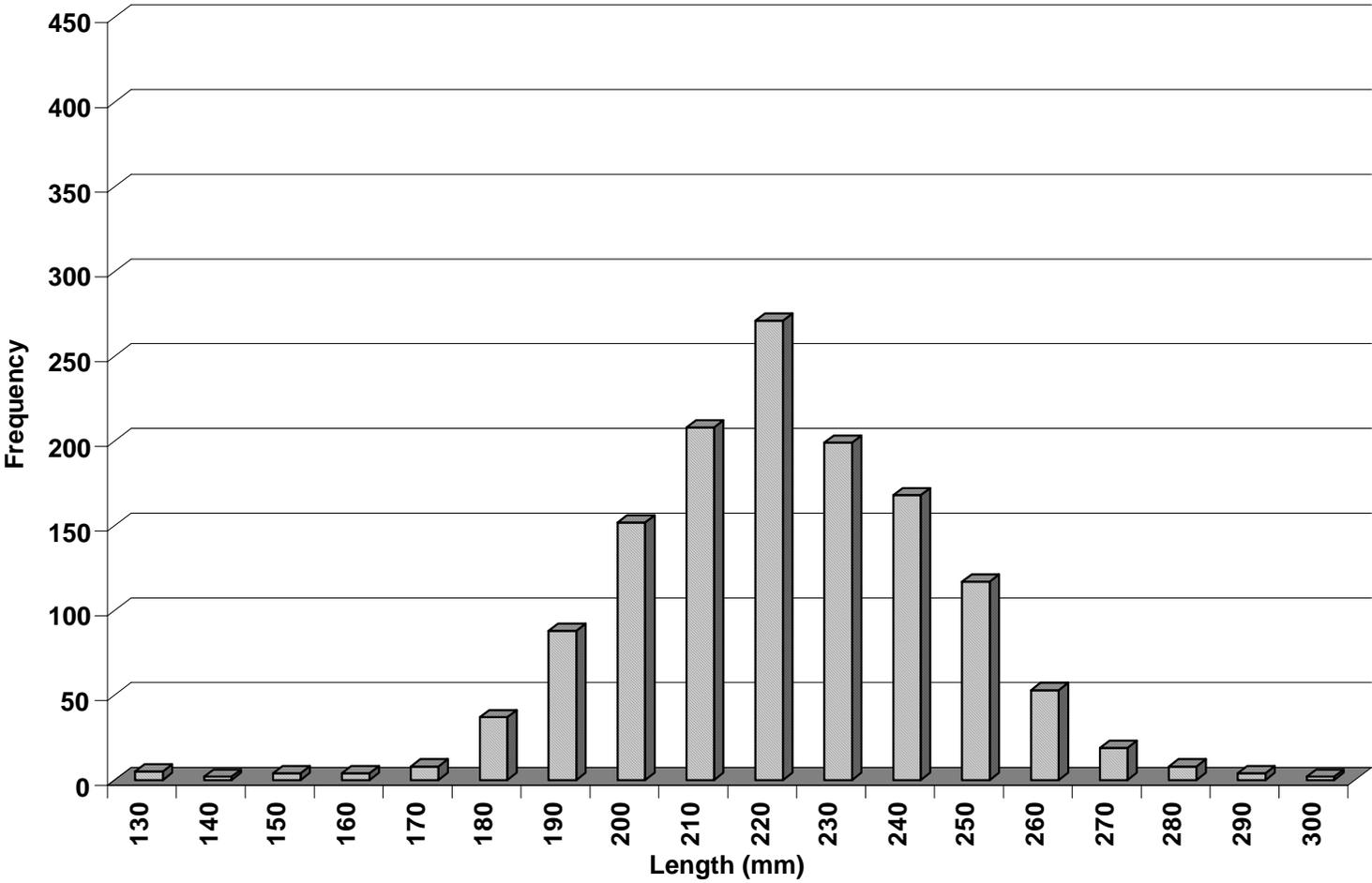
Appendix F. Brood Year 2003 Coded-Wire and PIT Tag Releases.

CWT Code	Stock	# CWT	# Stocked	# PIT Tag	# Stocked	Site & Purpose	Raceway #
10/06/71	PAH A	22,420				Red Rock	4W
10/04/73	PAH A	11,205	31,849	291	291	Red Rock	4W
10/35/75	DWOR B	36,250				Little Salmon	5E
10/35/75	DWOR B	32,646	68,640	300	300	Little Salmon	5E
10/05/71	PAH A	21,236		0		Colston Corner	7W
10/03/73	PAH A	10,796	31,817	297	297	Colston Corner	7W
10/22/75	DWOR B	32,743				Squaw Pond	9E
10/23/75	DWOR B	32,770	57,876			Squaw Pond	9E
10/26/75	PAH A	33,756	26,838			Pahsimeroi Trap	9WA
10/68/73	PAH A	33,319	29,106	299	299	Lemhi River	9WB
10/01/71	USB	16,282				Squaw Pond	10E
10/02/71	USB	15,575				Squaw Pond	10E
10/01/71	USB	7,426				Squaw Pond	10E
10/02/71	USB	7,015				Squaw Pond	10E
10/03/71	USB	21,015	65,341			Squaw Pond	10E
10/25/75	PAH A	33,298	33,194	300	300	McNabb	13W
10/24/75	SAW A	33,824	33,578	0		Yankee Fork	16W
	PAH A			300	300	Lemhi River	10W
	PAH A			300	300	Hammer Creek	1W
	DWOR B			500	500	Squaw Creek	E2
	SAW A			299	299	Yankee Fork	13EB
	SAW A			299	299	Valley Creek	13EA
Total		401,576	378,239	3,185	3,185		

Appendix G. Historical Release Data.

Year	Combined A-run Eggs	USB 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	1.4
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	4.5	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	1.2
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	1.2
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	4.6	432,292	501,956	1.16
2003-04	1,334,718	78,006	57,876	932,191	2,402,791	1,796,408		1,796,408	4.34	413,419	437,032	1.06

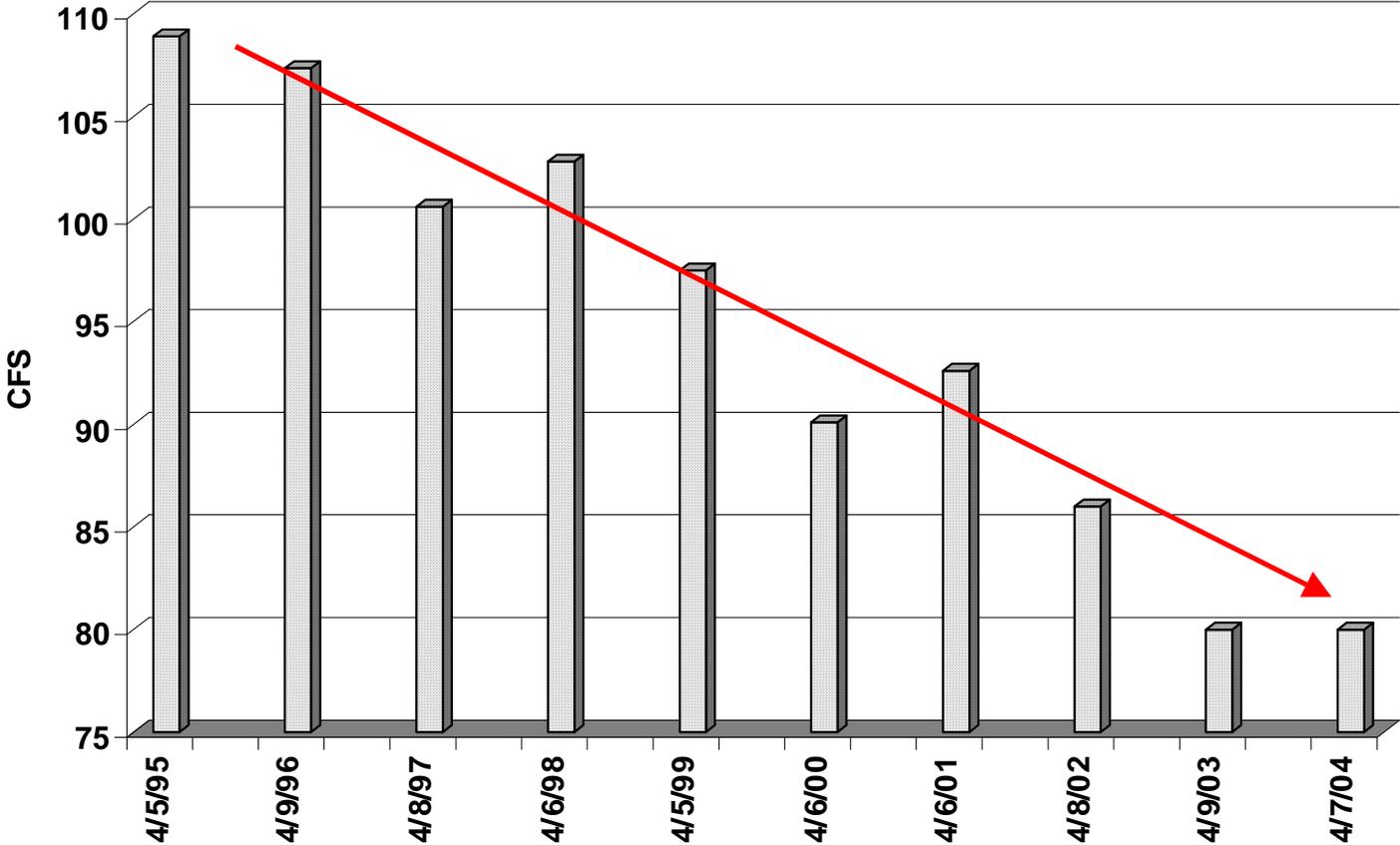
Appendix H. Brood Year 2003 Length Frequency Graph.



Appendix I. Hayspur Rainbow and Kamloop Trout started for Hagerman State Hatchery 2003–2004.

Hayspur Eggs Received at Magic Valley Hatchery 2002-2003				Moved to Hagerman				
Date	Vat #	Egg #	Stock	Date	Pounds	#/lb	Number	Percent Survival Eggs
12/3/2003	11	89,056	Mix T9	2/23/2004				
12/3/2003	11	55,995	Mix KT	2/23/2004	550	216	118,800	82%
12/3/2003	12	149,987	KT	2/23/2004	580	208	120,640	80%
12/3/2003	13	141,192	T9	2/23/2004	560	221	123,760	88%
12/10/2003	14	39,215	Mix KT	3/3/04				
12/10/2003	14	90,143	Mix T9	3/3/04	775	139	108,035	84%
12/10/2003	15	129,980	T9	3/3/04	720	133	96,048	74%
12/10/2003	16	128,966	KT	3/15/04	700	150	105,000	81%
12/31/2003	17	63,394	KT	3/15/04	350	186	65,100	103%
1/7/2004	18	98,524	T9	3/15/04	375	225	84,375	86%
1/7/2004	19	69,597	T9	3/15/04	280	215	60,200	86%
1/7/2004	20	147,269	KT	3/15/04	450	255	114,750	78%
TOTAL		1,203,318			5,340	187	996,708	83%

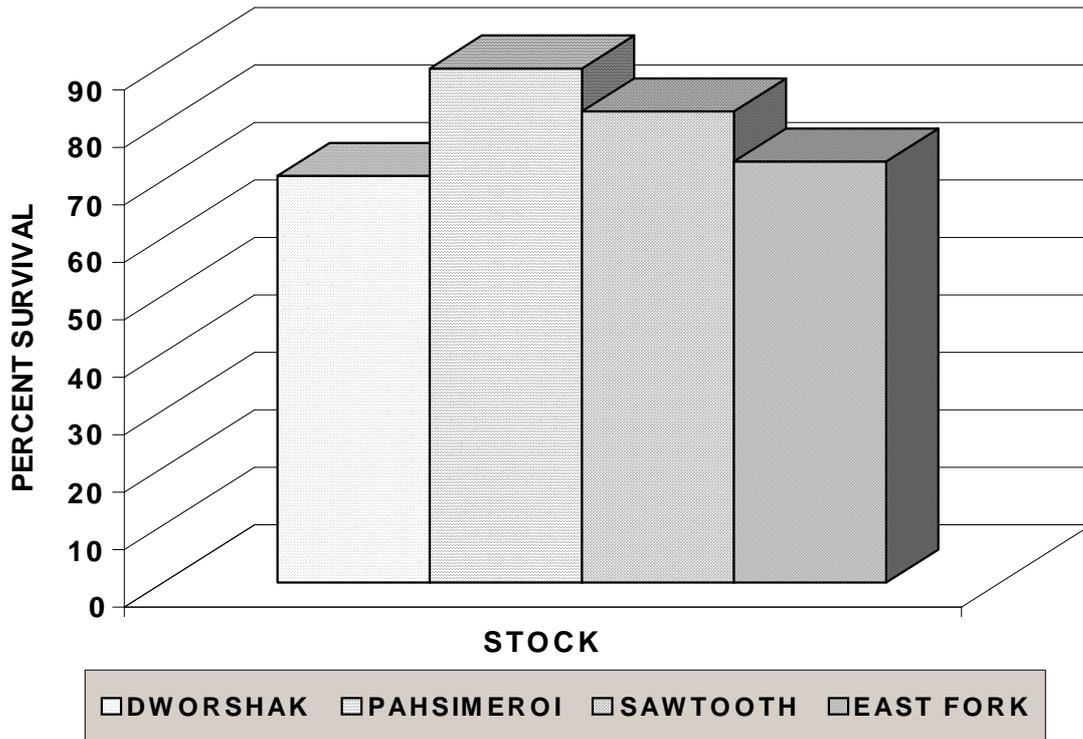
MAGIC VALLEY HATCHERY FLOWS (1995 - 2004)



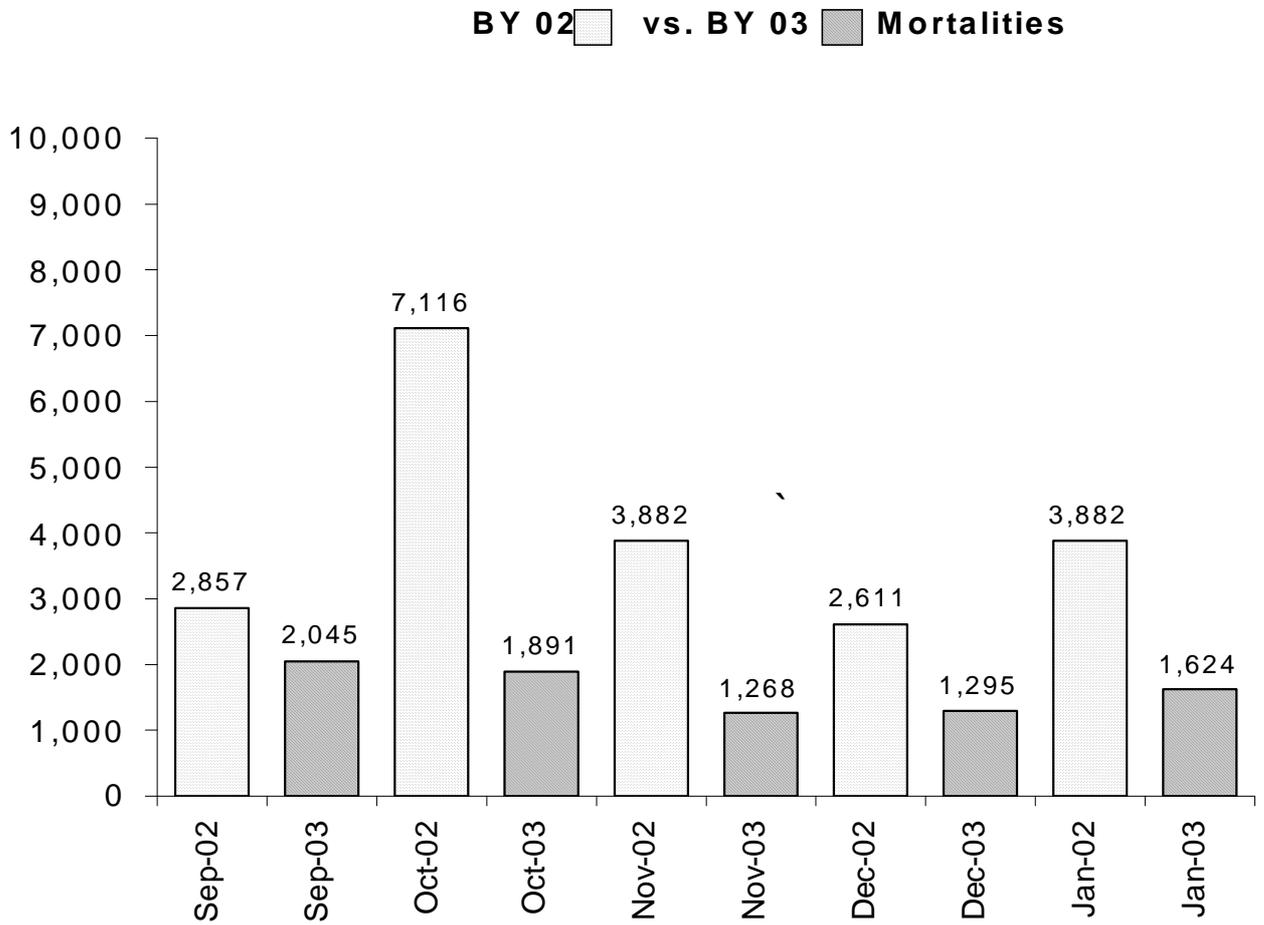
Appendix K. Brood Year 2003 Precocial Male Sampling Results.

Group	% Precocity (Males)	Sample Size	Date of Sample
Early Migrants	0	100	4/26/04
Non-Migrant	38	100	5/11/04

STOCK SURVIVAL COMPARISON



Appendix M. Comparison of Brood Year 2002 vs. Brood Year 2003 Mortality Rate.



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