

LOWER SNAKE RIVER
COMPENSATION PLAN
Hatchery Program

STEELHEAD FISH HATCHERY EVALUATIONS— IDAHO



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Steelhead Fish Hatchery Evaluations—Idaho

Period Covered: October 1, 1993 to September 30, 1994

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ABSTRACT

This annual report summarizes activities associated with Idaho Lower Snake River Compensation Plan (LSRCP) hatcheries' activities from October 1, 1993 to September 30, 1994. Included in this report are all fall 1993 and spring 1994 adult steelhead trout *Oncorhynchus mykiss* returns and all releases of juvenile steelhead trout made within the reporting period. Information presented in this report supersedes that included in previous reports.

An estimated 7,534 LSRCP steelhead returned to Idaho during this reporting period. Magic Valley Fish Hatchery produced an estimated 4,446 adult steelhead, and Hagerman National Fish Hatchery produced an estimated 3,088 adult steelhead. Steelhead returns to Idaho remain well below the LSRCP program mitigation goal of 39,260 adults.

Adult returns to Idaho LSRCP hatchery racks included 338 A-strain steelhead to Sawtooth Fish Hatchery and 73 B-strain steelhead to the East Fork Salmon River satellite facility. Approximately 52% of the hatchery steelhead that returned to Sawtooth Fish Hatchery were males as compared to 62% of the hatchery fish that returned to the East Fork Salmon River satellite.

Coded-wire tags were used to determine smolt-to-adult return rates. Dworshak B-stock steelhead, brood year 1989, reared at Hagerman National Fish Hatchery and released into the Little Salmon River had a mean smolt-to-adult return rate of 1.22%. Large size and normal size Sawtooth A-stock steelhead smolts, brood year 1990, reared at Hagerman National Fish Hatchery as part of a size-at-release experiment had mean smolt-to-adult return rates of 0.58 and 0.46%, respectively. Dworshak B- and East Fork B-stock smolts, brood year 1989, reared at Magic Valley Fish Hatchery and released into the East Fork Salmon River had mean smolt-to-adult return rates of 0.16% and 0.22%, respectively. Pahsimeroi A-stock steelhead smolts, brood year 1989, reared at Magic Valley Fish Hatchery and released into the Little Salmon River had a mean smolt-to-adult return rate of 0.34%.

In April and May 1994, Idaho LSRCP hatcheries released 4,161,359 brood year 1993 steelhead smolts. A total of 774,977 smolts were released with coded-wire tags, and 4,665 were released with passive integrated transponder tags.

INTRODUCTION

The Water Resources Development Act of 1976 (90 Stat. 2917) authorized the Idaho Lower Snake River Compensation Plan (LSRCP) to mitigate for fish losses caused by the construction and operation of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams on the lower Snake River. Mitigation for anadromous fishery losses included the construction and operation of fish hatchery facilities and smolt passage improvements at the lower Snake River dams. The United States Fish and Wildlife Service was authorized to administer the operation and maintenance for 12 hatcheries and 11 satellite facilities in Idaho, Oregon, and Washington.

In Idaho, the Idaho Department of Fish and Game (IDFG) operates Clearwater Fish Hatchery, McCall Fish Hatchery, Magic Valley Fish Hatchery, Sawtooth Fish Hatchery, South Fork Salmon River Trap, East Fork Salmon River Trap, and Red River, Crooked River, and Powell satellite facilities. The United States Fish and Wildlife Service operates Dworshak National Fish Hatchery and Hagerman National Fish Hatchery. Adult return goals for the entire LSRCP are 8,000 summer chinook salmon *Oncorhynchus tshawytscha*, 50,700 spring chinook salmon, 18,300 fall chinook salmon and 55,100 steelhead trout *O. mykiss* to the Snake River basin. Adult return goals for the Idaho portion of the LSRCP program call for the return of 8,000 adult summer chinook salmon, 40,432 adult spring chinook salmon, and 39,260 adult steelhead. Adult return goals for Idaho LSRCP steelhead hatcheries are as follows: Clearwater Fish Hatchery—14,000, Hagerman National Fish Hatchery—13,600, and Magic Valley Fish Hatchery—11,660.

The LSRCP includes a Hatchery Evaluation Study component to monitor and evaluate the mitigation hatchery program. The primary objective of the Hatchery Evaluation Study is to determine the best hatchery management practices for mitigation hatcheries to meet LSRCP and IDFG anadromous fisheries goals. Only if we understand the effects of hatchery operations on adult return characteristics (e.g., return rates, sex ratios, and age structure) can we prescribe effective management actions. Tasks we defined to satisfy the primary objective are divided into two categories: 1) documentation, and 2) investigation. We document hatchery practices for each brood year, or cohort, of fish and mitigation status in terms of annual adult returns. Our success at achieving LSRCP and IDFG goals can then be related to hatchery practices through the documentation tasks. Investigation tasks are manipulative experiments involving modified or alternative hatchery practices that show potential for increasing adult returns and achieving LSRCP and IDFG goals.

This report summarizes steelhead trout Hatchery Evaluation Study activities carried out from October 1, 1993 through September 30, 1994. Juvenile steelhead released from Clearwater, Hagerman National, and Magic Valley fish hatcheries during this reporting period are documented, as well as adult steelhead that returned to Idaho during the fall of 1993 and the spring of 1994 (hereafter referred to as the 1993-1994 return). Specific objectives identified in Cooperative Work Agreement 14-48-0001-94500 are covered in this report and are as follows:

- Objective 1. Document the success of the IDFG-LSRCP program in meeting specific adult return goals.

- Sub-objective 1.1 Develop a computerized hatchery database standardizing all necessary variables for monitoring and evaluation.
- Sub-objective 1.2 Document LSRCP fish rearing and release practices and adult returns in Idaho.
- Objective 2. Identify factors limiting hatchery success and recommend possible improvements based on existing knowledge and experimentation.
 - Sub-objective 2.1 Continue ongoing documentation and monitoring to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.
 - Sub-objective 2.2 Conduct controlled studies (short-term experiments) to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.

The results of experiments performed under Sub-objective 2.2 are printed separately from this report. Some results from those experiments, such as juvenile migration characteristics and adult return rates for experimental groups, are included in this report.

METHODS

IDFG LSRCP Program Success Documentation

To document the overall success of the program, we compared the estimated number of adult steelhead that returned above Lower Granite Dam between October 1, 1993 and September 30, 1994 to the Idaho LSRCP goal of 25,260 adult steelhead. The 39,260 fish goal was not used because 14,000 of these fish were charged to Clearwater Fish Hatchery, which only became operational in 1992. Adults from the first smolt release from Clearwater Fish Hatchery will return in 1995, 1996, and 1997. The Harvest Monitoring Project estimated the total number of returning adults and partitioned the total return between Hagerman National Fish Hatchery and Magic Valley Fish Hatchery based on coded-wire tag data. Results for Objective 1 are reported under *Results, Adult Returns*.

Hatchery Database Development

A team of IDFG personnel from Management, Hatcheries, Natural Resources, and the Fish Health and Coded-Wire Tag labs was organized to develop a computerized database for Idaho's anadromous hatcheries. The team will develop a detailed objective statement that describes the purpose of the database, input variables, and expected output functions. The team will ensure the database meets minimum standards for all parties. A database programmer will be hired to develop the product. Tasks for the programmer include writing

computer code, developing input screens, developing summary output screens and reports, field testing the program, and preparing database documentation.

Hatchery Operations Documentation

Hatchery operations between October 1, 1993 and September 30, 1994 are documented in this report. Pertinent rearing information affecting brood years 1993 and 1994 are discussed. Additional information which occurred prior to this reporting period may be included for brood year 1993 steelhead for completeness. Information was collected from Hatchery Brood Year and Run reports, memorandums, and from verbal communications with hatchery personnel. Fish marking and tagging information was provided by IDFG's Coded-Wire Tag Lab.

Migration Conditions

Snake River flow during smolt migration is a major factor affecting the survival of Idaho's anadromous fishes. This reporting period covers adult steelhead that returned to Idaho in the fall of 1993 and the spring of 1994. Returning adults could be from brood year 1989, 1990, or 1991, depending on their age at return. Since steelhead smolts for these brood years were released the following spring, flow conditions for 1990, 1991, and 1992 are reported. Flow conditions for the 1994 emigration period are also reported. Water flow data were obtained from Fish Passage Center reports and the United States Geological Survey Internet site.

Petrosky (1991) defined two time periods that accounted for most of the chinook emigration past Lower Granite Dam. The Peak period of emigration is from April 15 to May 5 and is the time period when approximately 50% of the yearling chinook salmon reach Lower Granite Dam. The Extended period is from April 20 to May 30 and encompasses the time when most of the wild and natural yearling chinook salmon reach Lower Granite Dam. Hatchery steelhead smolts are generally released in April and emigrate during the same time period as chinook. Therefore, flows during the Extended and Peak time periods are reported.

Juvenile Migration Timing and Survival

Passive Integrated Transponder (PIT) tags were used to evaluate downstream migration. The interrogation rate of PIT-tagged juvenile salmonids at lower Snake River dams serves as a minimum survival index because: 1) an unknown (but we believe small) number of PIT-tagged fish that die in the hatchery may go undetected, although we scan the dead fish; 2) not all fish pass through detectors; 3) some PIT tags fail (approximately 2%, R. Kiefer, IDFG, personal communication) or are lost between tagging and arrival at detection sites; 4) some fish arrive while detection gear is not being operated, and 5) mortality occurs between dams.

Brood year 1993 steelhead juveniles were PIT-tagged by IDFG Fish Marking personnel. The PIT tag data were submitted to PTAGIS, a computerized PIT tag database operated by Pacific States Marine Fisheries Commission (Columbia River Basin PIT Tag Information System 1997). Interrogation rates and median travel times for specific PIT-tagged groups of steelhead were calculated after retrieving relevant interrogation data from PTAGIS. Interrogation rates were calculated for each PIT tag file (or files depending on the purpose of the tagging), by dividing the number of unique interrogations at Lower Granite, Little Goose, Lower Monumental,

and McNary dams by the number of PIT-tagged fish released, multiplied by 100. Median travel times were calculated for each PIT tag file (or files) to Lower Granite Dam.

Adult Returns

Adult return goals for Clearwater Fish Hatchery, Hagerman National Fish Hatchery, and Magic Valley Fish Hatchery are 14,000, 13,600, and 11,660 adult steelhead above Lower Granite Dam, respectively. The Harvest Monitoring Project (i.e., Ball 1997) estimated the total number of LSRCP steelhead that returned to Idaho in the 1993-1994 return. This estimate included LSRCP-reared fish that were harvested in Idaho's sport fishery and LSRCP-reared fish that escaped to spawn naturally or returned to hatchery racks. Ball's (1997) estimate should be considered a minimum estimate because tributary and mainstem strays were not accounted for, nor were in-river pre-spawning mortalities. The number of steelhead smolts released and the estimated number of adults that returned were compared to facility design production targets and projected adult return goals for each facility.

Fisheries Contribution

Fish Marking personnel from IDFG tagged juvenile steelhead with coded-wire tags (CWTs) according to marking/tagging plans developed by fishery managers and research biologists. Steelhead tagged with CWTs had the left pelvic fin excised to indicate the presence of a tag. The snouts from tagged adult steelhead harvested in Idaho's sport fishery were sent to the Coded-Wire Tag Lab and processed. The Harvest Monitoring Project used these data, along with data from a statewide telephone survey, to estimate the total number of steelhead harvested in Idaho. The numbers of steelhead harvested from specific release groups were estimated by expanding coded-wire tag recoveries for specific groups. See Ball (1997) for methods.

Hatchery Weirs

The numbers of steelhead that returned to the East Fork Salmon River and Sawtooth Fish Hatchery weirs were documented by hatchery personnel. The length, sex, and disposition of each fish were recorded. Fish length and strain (A or B) were used to determine age-at-return. Snouts from coded-wire-tagged steelhead were sent to the Coded-Wire Tag Lab and processed. The Harvest Monitoring Project used these data to estimate the total number of LSRCP-reared steelhead that returned to hatchery racks or escaped to spawn naturally.

Smolt-to-Adult Return Rate

The Harvest Monitoring Project estimated the total number of LSRCP-produced steelhead that returned to Idaho. For each coded-wire tag (CWT) code, we summed the estimated number of steelhead that returned to Idaho in the 1991-1992 (Ball 1994), 1992-1993 (Ball 1996), and the 1993-1994 (Ball 1997) harvest seasons. For specific groups of fish (i.e., individual CWT codes by release site), we calculated a smolt-to-adult return rate (SAR) by dividing the estimated number of adults that returned (provided by the Harvest Monitoring Project) by the number of smolts released (provided by the Coded-Wire Tag Lab), multiplied by 100.

Experimentation

Interim progress reports, printed independently of this report, document the current status of Hatchery Evaluation Study experiments. Results from some experiments, particularly adult return rates and emigration rates for experimental groups, are included in this report.

Clearwater Fish Hatchery

Cover Experiment—This experiment was initiated in 1992 using Dworshak B-stock steelhead from the 1992 brood. The purpose of the experiment was to test the effects of shade covers on adult return and juvenile emigration rates. Adult returns will be complete in 1997. See Rhine et al. (In Press) for details of the experimental design.

Fin Erosion Experiment—The purpose of the experiment was to test the effects of raceways (design and feeding method) and baffles (raceways with and without baffles) on adult steelhead return and juvenile emigration rates. Dworshak B-stock steelhead from the 1993 brood were used for the study. Contact Clearwater Fish Hatchery personnel for study design and completion report.

Hagerman National Fish Hatchery

Size-at-Release Experiment—The purpose of this study was to determine the optimal size (length) to rear steelhead trout juveniles at Hagerman National Fish Hatchery. The experiment was conducted for two consecutive years using A-strain steelhead from the 1990 and 1991 broods. Adult returns will be complete in 1995. See Cannamela (1992) for complete details of the experimental design.

Acclimation Experiment—This study compared juvenile emigration and adult return rates of steelhead that were trucked from Hagerman National Fish Hatchery and acclimated at Sawtooth Fish Hatchery for two weeks (Acclimated Group) to steelhead that were trucked from Hagerman National Fish Hatchery two weeks later and released directly into the Salmon River (Non-acclimated Group). The two groups of fish were released at the same time and at the same location. This was the third year of the study. The study was initiated in 1992 and repeated in 1993 and 1994. Pahsimeroi A-stock steelhead were used in the 1992 and 1993 study years while Sawtooth A-stock steelhead were used in the 1994 study year. Adult returns from the 1991, 1992, and 1993 broods will be complete in 1995, 1996, and 1997, respectively. Adult return data and emigration data will be analyzed by brood year. The total number of adults that return from each group will be tested using chi-square analysis ($\alpha = .05$). Passive Integrated Transponder tags will be used to determine unique interrogation rates at Snake and Columbia river dams and median travel time to Lower Granite Dam for each group. Chi-square analysis will be used to test interrogation rates between groups. Travel times for the two groups will be tested for differences using the Mann-Whitney test ($\alpha = .05$) (SYSTAT Inc. 1992).

RESULTS

Hatchery Database Development

A team was formed to work on the project, and a computer programmer (Nuralima Boydston) was hired to develop the product. An objective statement was developed along with a description of the expected product. The database program was envisioned to increase efficiency, improve record keeping, and standardize hatchery operations. Each hatchery will be equipped with a version of the menu-operated program. A slightly different version, capable of compiling all of the individual hatchery records, will be operated from the Headquarters Office in Boise. Data will be transferred via modem or by diskette. The database program will document all phases of hatchery operations (e.g., trapping and incubation). It will provide the following benefits. First, the database program will serve as a working tool for hatchery personnel by providing summary output functions suitable for hatchery management and documentation tasks. Second, the database will be capable of storing many intricate, in-hatchery details that will be used for evaluation purposes. Third, the hatchery database program will serve as a standardizing mechanism for data collections among hatcheries. Finally, the program will provide easy access to hatchery data by storing data in one location and in one format.

Specification documents for the PTAGIS, Pacific States Marine Fisheries Commission, CIS, and Idaho CWT databases were obtained to standardize field names, data codes, and abbreviations. The database structure for the adult trapping and spawning components were developed. Nuralima Boydston developed the menu input screens for the trapping portion of the database and prepared database documentation. Nuralima Boydston resigned in July, and Wayne Worthen was hired in August to take over the project. Wayne began to develop an overall Project Manager Database used to manage the various databases required for the project.

Hatchery Operations Documentation

Clearwater Fish Hatchery

Brood Year 1993—Clearwater Fish Hatchery received 869,900 eyed eggs, Dworshak B-stock, from Dworshak National Fish Hatchery in April and May 1993 (George et al. 1995). Survival to the fry stage was 88.5% (769,862 fish). A total of 701,402 Dworshak B-stock steelhead were released: 50,027 fingerlings and 651,375 smolts (Appendix A, Table 1). Overall, eyed egg-to-release survival was 80.6%. Fingerlings, released as part of Idaho's Steelhead Supplementation Studies, were released into the South Fork Red River in September 1993. All fingerlings had a right ventral clip, and 5,000 were released with PIT tags. Dworshak B-stock smolts were released into Clear Creek (153,860), Crooked River (104,450), and the South Fork Clearwater River (393,065) in April and May 1994. There were 191,635 smolts released with CWTs and 1,364 fish released with PIT tags. Fish were tagged with CWTs in August 1993 and tagged with PIT tags in August 1993 and in March 1994. Fish were released in good health; no disease epizootic were reported.

A total of 136,476 green eggs, Selway B-stock, were collected during spawning operations at the Kamiah ponds (George et al. 1995). Of these, 93.2% (127,162) developed to the eyed stage. Survival to the fry stage was 86.8% (118,515). All Selway B-stock steelhead had the right pelvic fin excised in September 1993. Adipose fins were not excised. A total of

71,566 Selway B-stock steelhead smolts were released into Crooked River in April and May 1994. Green egg-to-release survival was 52.4%. The relatively low egg-to-smolt survival was attributed to heavy bird predation during rearing. A total of 300 steelhead were tagged with PIT tags; no fish were tagged with CWTs. Selway B-stock smolts were PIT-tagged in April 1994.

Dworshak B- and Selway B-stock steelhead released at Crooked River were acclimated at the site for 10 days (April 18-28). Volitional release started on April 29, and all steelhead were forced out of the raceways on May 3, 1994.

Of the 1,364 Dworshak B-stock smolts released with PIT tags, 55.3% (754) were interrogated at downstream dams (Table 1). Interrogation rates, by PIT tag file, ranged from 33% to 86.4% (Table 1). The median travel time to Lower Granite Dam for PIT-tagged fish, by PIT tag file, ranged from 6.9 to 13.2 days (Table 1).

For an unknown reason, the steelhead released at two locations, Stites and the Red House Hole, had some fish that were PIT-tagged in August 1993 and some fish that were PIT-tagged in March 1994. That is, there were some fish released at each site that were tagged on different dates. Interestingly, for both release locations, the fish tagged in March (PIT tag files DAC94075.C*E) were interrogated at higher rates than the fish tagged in August (PIT tag files DAC93237.C*E) (Table 1). Moreover, for both release locations, the fish tagged in August had shorter median travel times than the fish tagged in March (Table 1). The lower interrogation rates for fish tagged in August could be due to undocumented tag loss or undetected PIT-tagged mortalities at the hatchery. However, migrational differences between the two groups may also be associated with fish size at the time of tagging. Fish tagged in August averaged 74 mm fork length, whereas the steelhead tagged in March averaged 165 mm fork length. Although this subject requires additional study, these findings suggest that steelhead smolts should be tagged in the spring prior to release rather than in the fall.

Comparing interrogation rates for the two stocks of steelhead released at Crooked River, 33% of the Dworshak B-stock fish were interrogated at downstream dams while only 5.3% of the Selway B-stock smolts were detected (Table 1). In addition, the median travel time of the Dworshak B-stock fish was considerably shorter—13.2 days as compared to 41.3 days. Besides the stock difference, the other major distinguishing feature between the two groups was smolt size-at-release. The Dworshak B-stock steelhead averaged 8.92 fish per pound (fpp) whereas the Selway B-stock fish averaged 24.3 fpp (Appendix A. Table 1).

PIT tag interrogation results for steelhead fingerlings used for supplementation are outside the scope of this report. Contact Alan Byrne (IDFG) for information concerning Idaho's Steelhead Supplementation Studies.

Brood Year 1994—Clearwater Fish Hatchery received 905,000 eyed eggs, Dworshak B-stock, from Dworshak National Fish Hatchery in April and May 1994 (McGehee et al. In Press). Eggs were collected at Dworshak National Fish Hatchery during the Number 10 through 13 egg-takes. Survival to the fry stage was 96.5% (873,511 fish). A total of 136,603 of the Dworshak B-stock steelhead were put on a two-year rearing program. Outbreaks of *Columnaris* and *Aeromonas* occurred from August through October due to warm water temperatures. *Aeromonas* was treated by feeding 4% TM-100 feed.

Clearwater Fish Hatchery also received 67,516 eyed eggs for the National Biological Survey (NBS) to conduct a study which examined stock performance and stock productivity impacts of hatchery supplementation. Eggs were comprised of wild Selway B-stock fish,

hatchery Dworshak B-stock fish, and a cross between the two stocks. These fish were also reared on a two-year rearing program. See Rankin and McGehee (In Press) for details on egg collection and hatchery rearing and Rubin et al. (1994) for the experimental design of the NBS study.

Hagerman National Fish Hatchery

Brood Year 1993—Hagerman National Fish Hatchery received a total of 2,019,973 eyed steelhead eggs in May and June 1993 comprised of two different stocks: Sawtooth A-stock (1,014,960 eggs) and Pahsimeroi A-stock (1,005,013 eggs) (Hagerman National Fish Hatchery 1993). Survival rates from the eyed egg stage to the fry stage for the Sawtooth A- and Pahsimeroi A-stocks were 96.4% and 95.6%, respectively. A total of 338,000 fingerlings were transferred to Niagara Springs Fish Hatchery in November 1993. Survival rates from eyed eggs to smolt release for Sawtooth A- and Pahsimeroi A-stocks were 94.1% (955,217 fish) and 84.6% (563,951 fish), respectively. No major health problems were reported.

Adipose fins were excised from all fish in October and November 1993. In November, approximately 246,000 steelhead were tagged with CWTs and marked by excising the left pelvic fin. Fish were tagged with CWTs to estimate adult contribution to the fishery and to test the effects of acclimating smolts at Sawtooth Fish Hatchery. In February 1994, 1,302 steelhead were tagged with PIT tags to evaluate emigration survival and timing to downstream dams.

Hagerman National Fish Hatchery released 1,519,168 steelhead smolts into the Salmon and Little Salmon rivers between April 6 and 29, 1994 (Appendix A. Table 2). The total fish release included 955,217 Sawtooth A-stock and 563,951 Pahsimeroi A-stock steelhead. Fish were released at four locations: Sawtooth Fish Hatchery weir (773,134), Little Salmon River (328,163), Lemhi River (235,788), and Bruno's Landing (Salmon River) (182,083). Of the steelhead released at Sawtooth Fish Hatchery weir, 712,362 were acclimated in raceways at Sawtooth Fish Hatchery between 8 and 17 days prior to being released. Some of these fish were tagged with CWTs and PIT tags as part of the Sawtooth Acclimation Experiment. Acclimated fish were released volitionally on April 25; all fish were forced from the raceways on April 29. Overall, there were 245,567 fish released from Hagerman National Fish Hatchery with CWTs and 1,300 fish released with PIT tags.

Excluding the Acclimation Experiment, interrogation rates for groups of PIT-tagged fish ranged from 48% to 64% (Table 1). Median travel times to Lower Granite Dam for groups of PIT-tagged fish ranged from 14.3 to 26.6 days (Table 1). See *Results, Experimentation – Objective 2, Hagerman National Fish Hatchery, Acclimation Experiment* for PIT tag interrogation rates of acclimated and non-acclimated steelhead.

Brood Year 1994—Hagerman National Fish Hatchery received a total of 1,673,647 eyed steelhead eggs comprised of three different stocks: Sawtooth A-stock (593,953 eggs), Pahsimeroi A-stock (362,118 eggs), and Oxbow A-stock (717,576 eggs) (Hagerman National Fish Hatchery 1994). Survival rates from eyed eggs to the fry stage for the Sawtooth A-, Pahsimeroi A-, and Oxbow A-stocks were 92.5% (549,312 fish), 98.1% (355,234 fish), and 94.7% (679,699 fish), respectively.

Magic Valley Fish Hatchery

Brood Year 1993—Magic Valley Fish Hatchery received a total of 2,767,613 eyed steelhead eggs comprised of three different stocks: Dworshak B-stock (1,507,033 eggs), Pahsimeroi A-stock (1,081,500 eggs), and East Fork B-stock (179,080 eggs) (Ainsworth et al. 1995). Survival rates from the eyed egg stage to the fry stage were as follows: Dworshak B-stock—97.1%, Pahsimeroi A-stock—99.3%, and East Fork B-stock—99.4%. In July 1993, 392,300 surplus fry, Dworshak B-stock, were shipped to Salmon Falls (227,600 fry) and Oakley (164,700 fry) reservoirs. Overall survival to release was 83.5% (2,311,550 fish—includes 392,300 fry).

In October and November 1992, 2,166,596 steelhead were marked with adipose fin clips. In November, 341,249 fish were tagged with CWTs and marked by excising the left pelvic fin. Coded-wire tags were used to determine fishery contribution. In February 1993, 1,701 steelhead (not tagged with CWTs) were tagged with PIT tags.

Magic Valley Fish Hatchery released a total of 1,919,250 brood year 1993 steelhead smolts at five different locations between April 11 and 28, 1994 (Appendix A. Table 3). The total release included 807,220 Dworshak B-stock, 951,990 Pahsimeroi A-stock, and 160,040 East Fork B-stock steelhead. A total of 337,775 fish, marked with a left pelvic fin clip, were released with CWTs. In addition, 1,701 steelhead were released with PIT tags (Appendix A. Table 3). Infectious pancreatic necrosis virus was isolated in all three stocks of fish; however, few fish died of the virus. Hatchery personnel reported that the fish were healthy at liberation.

Interrogation rates for groups of PIT-tagged fish ranged from 33% to 68% (Table 1). Median travel times to Lower Granite Dam for groups of PIT-tagged fish ranged from 11.5 to 24.1 days (Table 1). Overall, 49.4% of the PIT-tagged fish were interrogated at downstream dams.

Brood Year 1994—Magic Valley Fish Hatchery received a total of 2,396,340 eyed eggs comprised of three different stocks of steelhead: Dworshak B-stock (1,520,160 eggs), Pahsimeroi A-stock (800,785 eggs), and East Fork B-stock (75,395 eggs) (Moore et al. 1996). Overall survival to the fry stage was 80.5% (1,929,210 fish).

Migration Conditions

Snake River inflow (mean inflow) at Lower Granite Dam during the Peak and Extended periods in 1994 was 64.1 and 77.5 thousand cubic feet per second (kcfs), respectively (Table 2). With the exception of 1993, flows recorded during these periods were the largest since 1989.

Comparing Snake River flow conditions for the three brood years of steelhead that returned to Idaho as adults during this reporting period (broods 1989, 1990, and 1991), the 1989 brood, which emigrated in 1990, had the largest river discharge during the Peak migration period (Table 2). The 1990 brood, which emigrated in 1991, had the lowest river discharge during the Peak migration period. However, of the three broods, the 1990 brood had the largest river discharge during the Extended migration period (Table 2).

Migration Timing and Juvenile Survival

A total of 4,665 steelhead smolts were released with PIT tags in 1994: Clearwater Fish Hatchery—1,664, Hagerman National Fish Hatchery—1,300, and Magic Valley Fish Hatchery—1,701 (Table 1). Overall, 48.4% (2,256) of the PIT-tagged fish were interrogated at downstream dams. Interrogation rates of PIT-tagged steelhead, by PIT tag file, ranged from 5.3% to 73.7% (Table 1). Median travel times to Lower Granite Dam for PIT-tagged steelhead, by PIT tag file, ranged from 6.9 to 41.3 days (Table 1). Most of the steelhead tagged with PIT tags were interrogated at Lower Granite Dam between April 20 and May 15 (Figure 1). Flow conditions for the Snake River at Lower Granite Dam during this time period ranged from approximately 65 to 90 kcfs.

Adult Returns

The Harvest Monitoring Project (Ball 1997) estimated that Magic Valley Fish Hatchery and Hagerman National Fish Hatchery returned 7,534 steelhead to Idaho in 1993-1994 (Table 3). Ball (1997) estimated that 5,811 steelhead were harvested in Idaho's sport fishery and 1,723 steelhead returned to hatchery racks or escaped to spawn naturally. These estimates do not include tributary and mainstem strays or pre-spawning mortalities. The 1993-1994 steelhead return included 1-ocean, 2-ocean, and 3-ocean fish. The number of steelhead smolts released and the estimated number of adults that returned are compared to facility design production targets and projected adult return goals in Table 4. Hagerman National Fish Hatchery and Magic Valley Fish Hatchery achieved a minimum of 30% of their combined adult return goals (Table 4). Adult return estimates include only steelhead that returned to hatchery weirs, steelhead that were harvested in Idaho's sport fishery, and steelhead that escaped to spawn naturally.

Fisheries Contribution

Ball (1997) estimated that 5,811 LSRCP-reared hatchery steelhead were harvested during the 1993-1994 Idaho sport fishing season. See Ball (1997) for creel survey methods and results.

Hatchery Weirs

Sawtooth Fish Hatchery Weir—Hatchery fish returning to the Sawtooth weir in 1994 were released at the weir in 1991 and 1992 (brood years 1990 and 1991, respectively). Smolts were reared at Hagerman National and Magic Valley fish hatcheries prior to being trucked to Sawtooth Fish Hatchery and released.

A total of 338 adult steelhead (A-strain), comprised of 174 males (51.5%) and 164 females (48.5%), returned to the Sawtooth Fish Hatchery weir between March 16 and May 9, 1994 (Table 5) (Coonts 1994). The male component of the run was comprised of 173 hatchery-origin fish and one natural-origin (unmarked) fish; the female component was made up of 159 hatchery-origin fish and 5 natural-origin fish. All of the natural-origin fish and 54 of the hatchery-origin fish (32 males and 22 females) were released to spawn naturally. A total of 136 females and 141 males were spawned on seven different dates to yield 725,205 green eggs. A total of 660,989 eggs (91.1%) developed to the eyed stage.

East Fork Salmon River Weir—Hatchery fish returning to the East Fork Salmon River weir in 1994 were released at the weir in 1990, 1991, and 1992 (brood years 1989, 1990, and 1991, respectively). Smolts released at the East Fork Salmon River weir were reared at Hagerman National and Magic Valley fish hatcheries.

A total of 73 adult steelhead (B-strain), comprised of 43 males (58.9%) and 30 females (41.1%), returned to the East Fork Salmon River weir between April 5 and May 4, 1994 (Table 6) (Coonts 1994). The male component of the run was comprised of 40 hatchery-origin fish (93%) and 3 natural-origin (unmarked) fish (7%); the female component was comprised of 25 hatchery-origin fish (83.3%) and 5 natural-origin fish (16.7%). All of the natural-origin fish and three male hatchery-origin fish were released to spawn naturally. Twenty-five females and 37 males were spawned on three different dates and produced 103,100 green eggs. A total of 76,087 eggs (73.8%) developed to the eyed stage.

Smolt-to-Adult Return Rates

Clearwater Fish Hatchery

Clearwater Fish Hatchery became operational in 1992. The first steelhead smolts were released in April 1993 (brood year 1992). Adults resulting from this release will return in 1995, 1996, and 1997.

Hagerman National Fish Hatchery

The 1993-1994 steelhead return included three age classes of fish which were released from Hagerman National Fish Hatchery in 1990 (brood year 1989), 1991 (brood year 1990), and 1992 (brood year 1991). Brood year 1989, 1990, and 1991 steelhead returned as 3-ocean, 2-ocean, and 1-ocean fish, respectively. The Harvest Monitoring Project estimated that 3,088 of the adult steelhead that returned to Idaho in 1993-1994 were reared at Hagerman National Fish Hatchery (Table 3). This equals 22.7% of the hatchery's adult return goal (13,600 fish). The adult return goal for Hagerman National Fish Hatchery was calculated based on the release of 2,400,000 smolts. However, smolt production for brood years 1989, 1990, and 1991 was 60% of the production goal (Table 4).

A total of 1,439,266 steelhead smolts were released from Hagerman National Fish Hatchery in 1990 (brood year 1989). An estimated 6,137 adult steelhead returned to Idaho from these smolts to yield a smolt-to-adult return rate (SAR) of 0.43% (Appendix B. Table 1). In 1991, 1,436,910 brood year 1990 steelhead smolts were released from Hagerman National Fish Hatchery (Appendix B. Table 2). The 2-ocean adult component for this brood returned in 1993-1994. To date, an estimated 5,269 adult steelhead have returned to Idaho from this brood to yield a SAR of 0.37%. In 1992, Hagerman National Fish Hatchery released 1,448,155 steelhead smolts from the 1991 brood (Appendix B. Table 3). Adult return data for this brood, specifically the 2- and 3-ocean components, are incomplete at this time.

The final adult steelhead from the 1989 (B-strain) and 1990 (A-strain) broods returned to Idaho during this reporting period. Smolt-to-adult return rates were calculated for coded-wire-tagged smolts, by stock and release site (Table 7). Dworshak B-stock steelhead smolts, brood year 1989, released into the Little Salmon River had a SAR of 1.28%. Large and normal size

Sawtooth A-stock steelhead smolts, brood year 1990, released at Sawtooth Fish Hatchery weir had smolt-to-adult return rates of 0.59% and 0.46%, respectively.

Magic Valley Fish Hatchery

The 1993-1994 steelhead return included three age classes of fish which were released from Magic Valley Fish Hatchery in 1990 (brood year 1989), 1991 (brood year 1990), and 1992 (brood year 1991). Brood year 1989, 1990, and 1991 steelhead returned as 3-ocean, 2-ocean, and 1-ocean fish, respectively. The Harvest Monitoring Project estimated that 4,446 of the adult steelhead that returned to Idaho in 1993-1994 were reared at Magic Valley Fish Hatchery (Table 3). This equals 38.1% of the hatchery's adult return goal (11,660 fish).

A total of 2,122,900 steelhead smolts were released in 1990 (brood year 1989) from Magic Valley Fish Hatchery (Appendix C. Table 1). An estimated 6,928 of these smolts returned to Idaho as adults (Appendix C. Table 1). The SAR for brood year 1989 was 0.33%. A total of 2,062,000 brood year 1990 steelhead smolts were released from Magic Valley Fish Hatchery in 1991 (Appendix C. Table 2). An estimated 7,256 of these smolts returned to Idaho as adults. The 3-ocean adult component of brood year 1990 is not complete. To date, the SAR for brood year 1990 is 0.35%. In 1992, Magic Valley Fish Hatchery released 2,160,400 brood year 1991 steelhead smolts (Appendix C. Table 3). Adult return data, specifically the 2- and 3-ocean components, for brood year 1991 are incomplete at this time.

The final adult steelhead from the 1989 (B-strain) and 1990 (A-strain) broods returned to Idaho during this reporting period. Smolt-to-adult return rates were calculated for coded-wire-tagged smolts, by stock and release site (Table 7). Smolt-to-adult return rates for Dworshak B- and East Fork B-stock steelhead smolts, brood year 1989, released into the East Fork Salmon River were 0.16% and 0.23%, respectively. Pahsimeroi A-stock steelhead smolts, brood year 1990, released into the Little Salmon River had a SAR of 0.35%.

Experimentation

Clearwater Fish Hatchery

Cover Experiment—Adults will return in 1995, 1996, and 1997. See Rhine et al. (In Press) for PIT tag results.

Hagerman National Fish Hatchery

Size-at-Release Experiment—The 2-ocean component of the 1990 brood returned during this reporting period. The total recoveries for the 1990 brood included 129 adults from large size smolts and 93 adults from regular size smolts (Table 8). Adult returns for the large size smolts were composed of 40% (51) females and 60% (78) males, whereas adults that returned from the regular size smolts were composed of 51% (47) females and 49% (46) males. Seventy-nine percent of the adults recovered from the large size smolts returned as 1-ocean fish, whereas 83% of the adults from the regular size smolts returned as 1-ocean fish.

The 1-ocean component of the 1991 brood returned during this reporting period. The total recoveries for the 1991 brood included ten adults from large size smolts and six adults from

regular size smolts (Table 8). Complete results of this study will be reported under a separate title.

Acclimation Experiment—For brood year 1993, a total of 101 (33.9%) of the PIT-tagged acclimated steelhead were interrogated at downriver dams, as compared to 129 (42.7%) of the non-acclimated fish (Table 1). Interrogation rates were not significantly different ($P > 0.05$) among replicate raceways for each group. Therefore, data from replicate raceways, within group, were pooled and tested for differences using chi-square analysis. Significantly ($\chi^2 = 4.23$, $P = 0.040$) more of the non-acclimated steelhead smolts were interrogated as compared to the acclimated fish. Median travel times to Lower Granite Dam ranged from 11.3 to 17.8 days for the acclimated group and from 11.8 to 13.3 days for the non-acclimated group. Travel time to Lower Granite Dam was not significantly ($P = 0.08$) different between groups. Adult returns for brood year 1993 will be complete in 1997. Complete results of this study will be reported under a separate title.

The 1-ocean component of the 1991 brood returned during this reporting period. The total recoveries for the 1991 brood included eight adults from the acclimated smolts and six adults from non-acclimated smolts (Table 9). Adults from the acclimated group were all males, whereas 33.3% (2) of the adults from the non-acclimated group were males. Complete results of this study will be reported under a separate title.

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Table 1. Number of unique PIT tag interrogations of LSRCP steelhead smolts, by PIT tag file, at Lower Granite Dam (GRJ), Little Goose Dam (GOJ), Lower Monumental Dam (LMJ), and McNary Dam (MCJ) for the 1994 migration period. A total of 4,665 PIT-tagged steelhead were released from Hagerman National Fish Hatchery, Magic Valley Fish Hatchery, and Clearwater Fish Hatchery between April 5 and May 3, 1994. Median travel time is to Lower Granite Dam.

File Name	Release Site	Rel. Date	No. Rel.	Number / Percent Interrogated								Median Travel Time (Days)		
				GRJ		GOJ		LMJ		MCJ			TOTAL	
				No.	%	No.	%	No.	%	No.	%		No.	%
<u>MAGIC VALLEY FISH HATCHERY</u>														
<i>Pahsimeroi A-stock</i>														
<u>Hazard Creek</u>														
DAC94045.M14	Hazard Cr.	4/26	100	41	41.0	10	10.0	2	2.0	5	5.0	58	58.0	13.4
DAC94045.M16	Hazard Cr.	4/26	100	52	52.0	12	12.0	1	1.0	3	3.0	68	68.0	12.9
Hazard Creek Total			200									126	63.0	
<i>Dworshak B-stock</i>														
<u>Hazard Creek</u>														
DAC94044.M4E	Hazard Cr.	4/28	100	46	46.0	6	6.0	0	0.0	0	0.0	52	52.0	12.0
DAC94044.M4W	Hazard Cr.	4/28	100	39	39.0	9	9.0	1	1.0	3	3.0	52	52.0	12.1
DAC94044.M7E	Hazard Cr.	4/28	100	35	35.0	10	10.0	3	3.0	4	4.0	52	52.0	11.5
Hazard Creek Total			300									156	52.0	
<i>Pahsimeroi A-stock</i>														
<u>Pahsimeroi Weir</u>														
DAC94045.M9E	Pahsimeroi Weir	4/19	150	63	42.0	9	6.0	4	2.7	4	2.7	80	53.3	18.4
DAC94045.M11	Pahsimeroi Weir	4/19	151	74	49.0	13	8.6	3	2.0	3	2.0	93	61.6	16.3
Pahsimeroi Weir Total			301									173	57.5	
<i>Dworshak B-stock</i>														
<u>East Fork Salmon River</u>														
DAC94044.M1E	E.F. Salmon R.	4/15	100	30	30.0	6	6.0	3	3.0	0	0.0	39	39.0	21.6
DAC94044.M2E	E.F. Salmon R.	4/15	100	39	39.0	6	6.0	1	1.0	0	0.0	46	46.0	23.7
DAC94044.M3E	E.F. Salmon R.	4/15	100	36	36.0	3	3.0	4	4.0	1	1.0	44	44.0	17.9
East Fork Salmon River Total			300									129	43.0	

Table 1. Continued.

File Name	Release Site	Rel. Date	No. Rel.	Number / Percent Interrogated								Median Travel Time (Days)		
				GRJ		GOJ		LMJ		MCJ			TOTAL	
				No.	%	No.	%	No.	%	No.	%		No.	%
<i>East Fork B-stock</i>														
<u>East Fork Salmon River</u>														
DAC94045.M7W	E.F. Salmon R.	4/16	100	41	41.0	8	8.0	1	1.0	0	0.0	50	50.0	20.5
DAC94045.M8E	E.F. Salmon R.	4/16	100	26	26.0	4	4.0	2	2.0	1	1.0	33	33.0	24.1
DAC94045.M8W	E.F. Salmon R.	4/16	100	41	41.0	8	8.0	3	3.0	3	3.0	55	55.0	21.2
East Fork Salmon River Total			300											
<i>Dworshak B-stock</i>														
<u>Slate Creek (upper Salmon River)</u>														
DAC94044.M5E	Slate Cr.	4/18	150	53	35.3	8	5.3	3	2.0	0	0.0	64	42.7	22.6
DAC94044.M6E	Slate Cr.	4/18	150	46	30.7	6	4.0	1	0.7	1	0.7	54	36.0	20.8
Slate Creek Total			300											
MAGIC VALLEY GRAND TOTAL			1,701											
<u>HAGERMAN NATIONAL FISH HATCHERY</u>														
<i>Sawtooth A-stock</i>														
<u>Acclimation Study, Treatment (Acclimated) Group</u>														
DAC94047.H54	Sawtooth FH	4/27	100	26	26.0	8	8.0	2	2.0	2	2.0	38	38.0	17.8
DAC94048.H55	Sawtooth FH	4/27	98	24	24.5	4	4.1	3	3.1	2	2.0	33	33.7	13.6
DAC94048.H56	Sawtooth FH	4/27	100	20	20.0	7	7.0	1	1.0	2	2.0	30	30.0	11.3
Treatment Group Total			298											
<i>Sawtooth A-stock</i>														
<u>Acclimation Study, Control (Non-Acclimated) Group</u>														
DAC94047.H51	Sawtooth FH	4/29	102	30	29.4	10	9.8	3	2.9	1	1.0	44	43.1	11.8
DAC94047.H52	Sawtooth FH	4/29	100	30	30.0	9	9.0	6	6.0	2	2.0	47	47.0	12.6
DAC94047.H53	Sawtooth FH	4/29	100	25	25.0	3	3.0	5	5.0	5	5.0	38	38.0	13.3
Control Group Total			302											
<i>Pahsimeroi A-stock</i>														
<u>Hazard Creek</u>														
DAC94048.H85	Hazard Cr.	4/25	100	43	43.0	8	8.0	5	5.0	4	4.0	60	60.0	14.3
DAC94048.H86	Hazard Cr.	4/25	100	42	42.0	11	11.0	7	7.0	2	2.0	62	62.0	14.5
Hazard Creek Total			200											

Table 1. Continued.

File Name	Release Site	Rel. Date	No. Rel.	Number / Percent Interrogated								TOTAL		Median Travel Time (Days)
				GRJ		GOJ		LMJ		MCJ				
				No.	%	No.	%	No.	%	No.	%	No.	%	
<i>Sawtooth A-stock</i>														
<i>Salmon River (Bruno's Landing)</i>														
DAC94048.H74	Salmon R.	4/12	100	54	54.0	5	5.0	3	3.0	2	2.0	64	64.0	19.5
DAC94048.H75	Salmon R.	4/12	100	37	37.0	6	6.0	3	3.0	2	2.0	48	48.0	18.9
DAC94048.H76	Salmon R.	4/12	100	58	58.0	1	1.0	3	3.0	4	4.0	66	66.0	17.9
Salmon River Total			300									178	59.3	
<i>Pahsimeroi A-stock</i>														
<i>Lemhi River</i>														
DAC94048.H98	Lemhi R.	4/5	200	96	48.0	8	4.0	8	4.0	4	2.0	116	58.0	26.6
HAGERMAN NFH GRAND TOTAL			1,300									646	49.7	
<u>CLEARWATER FISH HATCHERY</u>														
<i>Dworshak B-stock</i>														
<i>Clear Creek</i>														
DAC94075.C3W	Clear Cr.	5/3	300	188	62.7	18	6.0	10	3.3	5	1.7	221	73.7	6.9
<i>Dworshak B-stock</i>														
<i>South Fork Clearwater River</i>														
DAC94075.C4W	Cottonwood Cr.	4/25	200	115	57.5	14	7.0	7	3.5	2	1.0	138	69.0	8.5
DAC93237.C6E	Stites	4/26	158	72	45.6	9	5.7	2	1.3	1	0.6	84	53.2	8.8
DAC94075.C6E	Stites	4/26	39	18	46.2	7	17.9	1	2.6	1	1.0	27	69.2	12.4
Stites Total			197									111	56.3	
DAC93237.C7E	Red House Hole	4/26	156	78	50.3	8	5.2	5	3.2	1	0.6	92	59.0	7.7
DAC94075.C7E	Red House Hole	4/26	44	33	75.0	1	2.3	3	6.8	1	2.3	38	86.4	9.5
Red House Hole Total			200									130	65.3	
<i>Dworshak B-stock</i>														
<i>Crooked River</i>														
DAC93236.MIX	Crooked R.	5/1	467	76	16.3	52	11.1	17	3.6	9	1.9	154	33.0	13.2

Table 1. Continued.

File Name	Release Site	Rel. Date	No. Rel.	Number / Percent Interrogated								Median Travel Time (Days)			
				GRJ		GOJ		LMJ		MCJ			TOTAL		
				No.	%	No.	%	No.	%	No.	%		No.	%	
<i>Selway B-stock</i> Crooked River TGC94102.SEL	Crooked R.	5/1	300	12	4.0	2	0.7	1	0.3	1	0.3	16	5.3	41.3	
CLEARWATER GRAND TOTAL			1,664											770	46.3

Table 2. Snake River mean daily in-flow (thousand cubic feet per second) at Lower Granite Dam during the Peak and Extended chinook salmon smolt migration periods, 1977-1994. The migration periods are as defined by Petrosky (1991).

Year	Peak (04/15 - 05/05)	Extended (04/20 - 05/30)
1977	39.1	40.2
1978	85.4	95.8
1979	64.8	89.9
1980	87.5	102.9
1981	76.2	86.7
1982	116.8	131.6
1983	85.6	111.3
1984	121.9	146.1
1985	86.9	87.2
1986	93.4	105.7
1987	59.0	62.4
1988	55.1	64.2
1989	93.6	87.2
1990	63.8	66.4
1991	44.0	70.5
1992	54.2	57.3
1993	69.8	114.0
1994	64.1	77.5

Table 3. Estimated number of LSRCP steelhead that returned to Idaho in 1993-1994. The adult return in 1993-1994 included fish from three age classes. Steelhead were reared at Hagerman National and Magic Valley fish hatcheries. These estimates were prepared by the Idaho Department of Fish and Game's Harvest Monitoring Project and only include steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and steelhead that escaped to spawn naturally. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

HATCHERY	BROOD YEAR	3-OCEAN	2-OCEAN	1-OCEAN
Hagerman	1989	11	---	---
Hagerman	1990	---	1,811	---
Hagerman	1991	---	---	1,266
Estimated Return				3,088
Magic Valley	1989	47	---	---
Magic Valley	1990	---	3,757	---
Magic Valley	1991	---	---	642
Estimated Return				4,446
Total Return for Both Hatcheries				7,534

Table 4. Steelhead smolts released from Magic Valley and Hagerman National fish hatcheries that contributed to the 1993-1994 Idaho steelhead return. The number of steelhead smolts released and the estimated number of adults that returned were compared to facility design production targets and projected adult return goals.

Releases Contributing to 1993-1994 Adult Returns					
Brood Year	Fish Hatchery	Number Released	Design Target	Percent of Target	1993-94 Adult Returns
1989	Magic Valley	2,122,900	2,000,000	106%	47
1989	Hagerman NFH	1,439,266	2,400,000	60%	11
	Total	3,562,166	4,400,000	81%	58
1990	Magic Valley	2,062,000	2,000,000	103%	3,757
1990	Hagerman NFH	1,436,910	2,400,000	60%	1,811
	Total	3,498,910	4,400,000	80%	5,568
1991	Magic Valley	2,160,400	2,000,000	108%	642
1991	Hagerman NFH	1,448,155	2,400,000	60%	1,266
	Total	3,608,555	4,400,000	82%	1,908
Mean annual release as percent of target:				81%	
				Total adult return: ^a	7,534
				Adult return goal:	25,260
				Percent of goal achieved:	30%

^a Estimate includes only steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and off-site escapement. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

Table 5. Summary of the 1994 A-strain steelhead trout return to the Sawtooth Fish Hatchery weir. The fish return included fish of hatchery and natural origin. Hatchery aging criteria, based on length, were used to determine age^a. ND indicates "no data" (i.e., data were not available).

HATCHERY ORIGIN n = 332										
Age^b	Males n = 173					Females n = 159				
	Trapped	Released	Spawne	Dead	Other	Trapped	Release d	Spawne d	Dead	Other
1-ocean	85	ND	ND	0	0	46	ND	ND	0	ND
2-ocean	88	ND	ND	0	0	113	ND	ND	0	ND
Total	173	32 ^c	141	0	0	159	22 ^c	136	0	1 ^d

NATURAL ORIGIN n = 6										
Age^b	Males n = 1					Females n = 5				
	Trapped	Released	Spawne	Dead	Other	Trapped	Release d	Spawne d	Dead	Other
1-ocean	1	1	0	0	0	0	0	0	0	0
2-ocean	0	0	0	0	0	5	5	0	0	0
Total	1	1 ^c	0	0	0	5	5 ^c	0	0	0

Total number trapped	338	Green egg number	725,205
Trapping period	3/16 - 5/9/94	Eyed egg number	660,989 (91.1% eye - up)

^a Fish were aged using the following aging criteria:

<u>RUN</u>	<u>SEX</u>	<u>LENGTH</u>	<u>AGE</u>
A	male	≤ 68 cm	1-ocean
A	male	> 68 cm	2-ocean
A	female	≤ 65 cm	1-ocean
A	female	> 65 cm	2-ocean

^b Hatchery fish classified as 1-ocean were released in 1992, brood year 1991. Hatchery fish classified as 2-ocean were released in 1991, brood year 1990.

^c Fish were released above the weir.

^d The fish was killed, but the eggs were not used.

Table 6. Summary of the 1994 B-strain steelhead trout return to the East Fork Salmon River weir. The fish return included fish of hatchery and natural origin. Hatchery aging criteria, based on length, were used to determine age^a. ND indicates "no data" (i.e., data were not available).

HATCHERY ORIGIN n = 65										
Age ^b	Males n = 40					Females n = 25				
	Trapped	Release d	Spawned	Dead	Other	Trapped	Release d	Spawne d	Dead	Othe r
1-ocean	14	ND	ND	0	0	1	0	ND	0	0
2, 3-ocean	26	ND	ND	0	0	24	0	ND	0	0
Total	40	3 ^c	37	0	0	25	0	25	0	0

NATURAL ORIGIN n = 8										
Age ^b	Males n = 3					Females n = 5				
	Trapped	Release d	Spawned	Dead	Other	Trapped	Release d	Spawne d	Dead	Othe r
1-ocean	2	2	0	0	0	0	0	0	0	0
2, 3-ocean	1	1	0	0	0	5	5	0	0	0
Total	3	3 ^c	0	0	0	5	5 ^c	0	0	0

Total number trapped	73	Green egg number	103,100
Trapping period	4/5 - 5/4/94	Eyed egg number	76,087 (73.8% eye - up)

^a Fish were aged using the following aging criteria:

<u>RUN</u>	<u>SEX</u>	<u>LENGTH</u>	<u>AGE</u>
B	male	≤ 73 cm	1-ocean
B	male	> 73 cm	2- or 3-ocean
B	female	≤ 68 cm	1-ocean
B	female	> 68 cm	2- or 3-ocean

^b Hatchery fish classified as 1-ocean were released in 1992, brood year 1991. Hatchery fish classified as 2 or 3-ocean were released in 1991 and 1990, respectively, (brood years 1990 and 1989, respectively).

^c Fish were released above the weir.

Table 7. Smolt-to-adult return rates of coded-wire-tagged steelhead smolts released from Hagerman National and Magic Valley fish hatcheries. The number of adults was estimated by Ball (1997) and only include steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and steelhead that escaped to spawn naturally. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

HATCHERY	STOCK	BROOD	RELEASE SITE	NUMBER CWT	NUMBER ADULTS	SAR (%)
Hagerman	DWOR B	1989	Little Salmon R.	42,322	542	1.28
Hagerman	SAW A	1990	Sawtooth FH (large smolts)	53,245	312	0.59
Hagerman	SAW A	1990	Sawtooth FH (regular smolts)	61,431	283	0.46
Magic	E.F. B	1989	E.F. Salmon R.	87,308	198	0.23
Magic	DWOR B	1989	E.F. Salmon R.	44,763	72	0.16
Magic	PAH A	1990	Little Salmon R.	65,997	229	0.35

Table 8. Total number^a of steelhead recovered with CWTs designating them as either large size^b or regular size^c. Recovered fish were released as smolts at the Sawtooth Fish Hatchery weir in 1991 (brood year 1990) and 1992 (brood year 1991). Recovery data were not available for the 2-ocean component of brood year 1991 (i.e., ND indicates “no data”).

Size Group	Brood Year	Number CWT	Return Composition				Total Return
			1-Ocean		2-Ocean		
			Male	Female	Male	Female	
Large	1990	53,245	66	36	12	15	129
Regular	1990	61,431	41	36	5	11	93
Large	1991	53,463	5	5	ND	ND	10
Regular	1991	45,646	4	2	ND	ND	6

^a Includes all Idaho fishery harvest returns, Idaho hatchery returns, and tributary stray recoveries

^b Large size steelhead averaged 241 mm (3.0 fish per pound) at time of release

^c Regular size steelhead averaged 221 mm (4.5 fish per pound) at time of release

Table 9. Total number^a of steelhead recovered with CWTs designating them as either acclimated (ACC) or non-acclimated (NON-ACC). Recovered fish were released as smolts at the Sawtooth Fish Hatchery weir in 1992 (brood year 1991). ND indicates “No Data” (i.e., data were not available).

Exp. Group	Brood Year	Number CWT	Return Composition				Total Return
			1-Ocean		2-Ocean		
			Male	Female	Male	Female	
ACC	1991	55,632	8	0	ND	ND	8 ^b
NON-ACC	1991	45,646	4	2	ND	ND	6 ²
ACC	1992	65,865	ND	ND	ND	ND	ND
NON-ACC	1992	59,846	ND	ND	ND	ND	ND

^a Includes all Idaho fishery harvest returns, Idaho hatchery returns, and tributary stray recoveries

^b Includes only 1-ocean returns

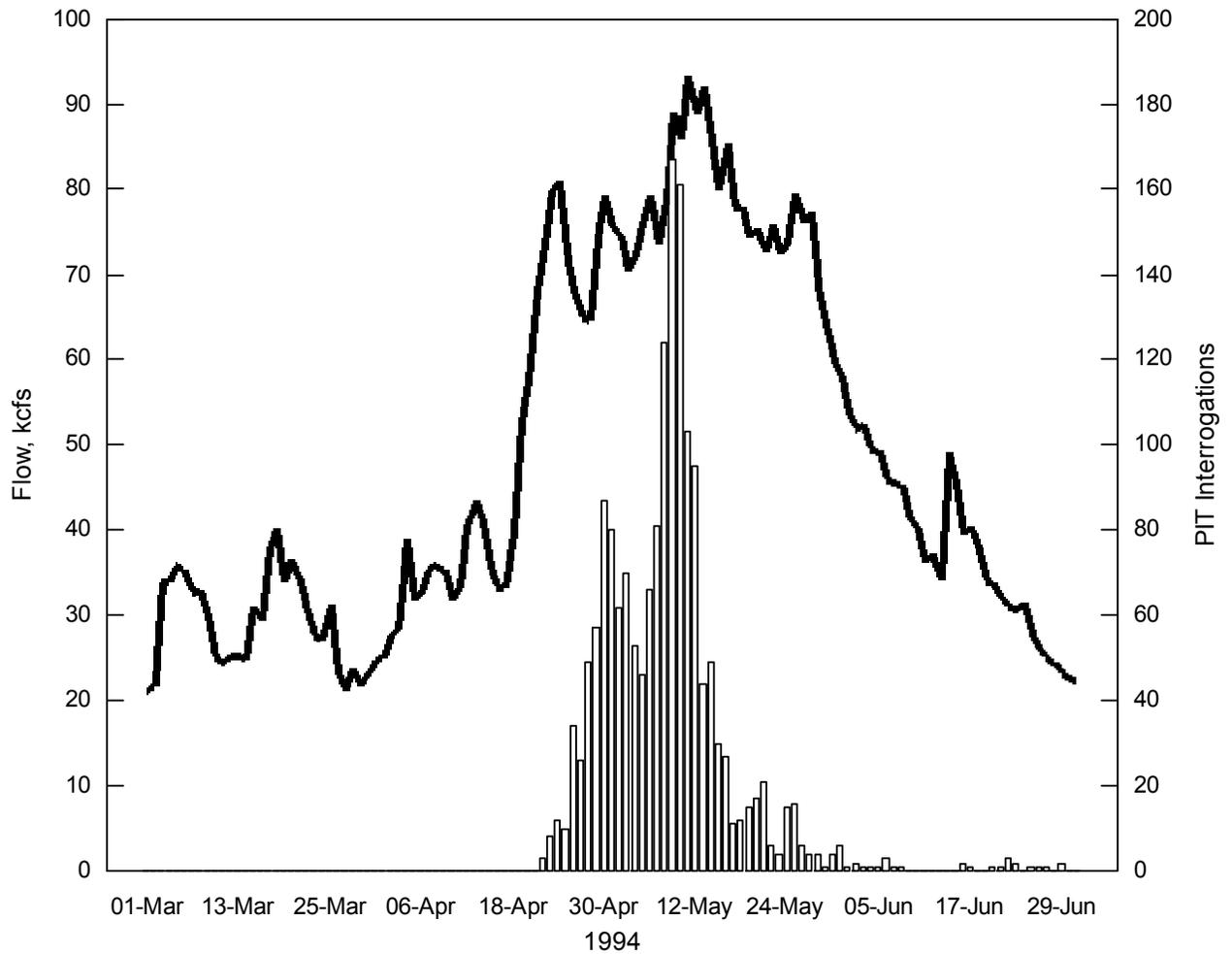


Figure 1. Number of unique interrogations of LSRCP juvenile steelhead at Lower Granite Dam, Washington, plotted with the average daily in-flow of the Snake River (at Lower Granite Dam) in 1994. A total of 4,665 PIT-tagged steelhead were released from Hagerman National, Magic Valley, and Clearwater fish hatcheries between April 5 and May 3, 1994. Thirty-seven percent (1,728) of the PIT-tagged fish were interrogated at Lower Granite Dam. Data for 16 fish fall outside of this date range and are not shown.

APPENDICES

Appendix A. Table 1. Release data and estimated adult returns for Clearwater Fish Hatchery summer steelhead trout, brood year 1993. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Clearwater FH Brood Year: 1993													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
S.F. Clearwater R. 4/25/94	2W	28,417	DWOR B	CWT/LV/AD	104731	20,424	8.3	Contribution	1	ND	ND	ND	ND
				*LV/AD		741			2	ND	ND	ND	ND
				*AD		7,252			3	ND	ND	ND	ND
S.F. Clearwater R. 4/25-26/94	7E	52,419	DWOR B	CWT/LV/AD	104736	21,430	8.3	Contribution	1	ND	ND	ND	ND
				CWT/LV/AD/PIT		(200)			2	ND	ND	ND	ND
				*LV/AD		550			3	ND	ND	ND	ND
				*AD		30,439							
S.F. Clearwater R. 4/25-26/94			DWOR B	**NON-CWT (Includes all *)		143,213	8.3						
S.F. Clearwater R. Milept. 18 above Stites 4/25-26/94	6E	52,103	DWOR B	CWT/LV/AD	104735	22,137	8.3	Contribution	1	ND	ND	ND	ND
				CWT/LV/AD/PIT		(197)			2	ND	ND	ND	ND
				*LV/AD		127			3	ND	ND	ND	ND
				*AD		29,839							
S.F. Clearwater R. Milept. 18 above Stites 4/25-26/94			DWOR B	**NON-CWT (Includes all *)		82,165	8.3						
S.F. Clearwater R. Cottonwood Creek 4/25/94	4W	52,048	DWOR B	CWT/LV/AD	104734	21,086	9.99	Contribution	1	ND	ND	ND	ND
				CWT/LV/AD/PIT		(35)			2	ND	ND	ND	ND
				*LV/AD		630			3	ND	ND	ND	ND
				*AD		30,332							
				AD/PIT		(165)							
S.F. Clearwater R.			DWOR B	**NON-CWT		82,610							

Cottonwood Creek 4/25/94		(Includes all *)											
Appendix A. Table 1. Continued.													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
S.F. Clearwater R. Includes all release dates that have mark type indicated by **			DWOR B	NON-CWT (Includes all **)		307,988		Production	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
									3	ND	ND	ND	ND
				TOTAL CWT RELEASE		85,077							
			TOTAL NON-CWT RELEASE		307,988								
			TOTAL SITE RELEASE		393,065			TOTAL RETURN:		ND	ND	ND	ND
Crooked River Pond 4/29-5/3/94	3E	52,188	DWOR B	CWT/LV/AD	104732	21,779	8.92	Contribution	1	ND	ND	ND	ND
				*LV/AD		242			2	ND	ND	ND	ND
				LV/AD/PIT		(233)			3	ND	ND	ND	ND
				*AD		30,167							
Crooked River Pond 4/29-5/3/94	7W	52,262	DWOR B	CWT/LV/AD	104737	20,883	8.92	Contribution	1	ND	ND	ND	ND
				*LV/AD		535			2	ND	ND	ND	ND
				LV/AD/PIT		(234)			3	ND	ND	ND	ND
				*AD		30,844							
Crooked River Pond 4/29-5/3/94	12E 12W		SELWAY	RV		71,566	24.6	Selway Program Smolt Release	1	ND	ND	ND	ND
				RV/PIT		(300)			2	ND	ND	ND	ND
									3	ND	ND	ND	ND
Crooked River Pond 4/29-5/3/94			DWOR B	NON-CWT (Includes all *)		61,788	8.92	Production	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
									3	ND	ND	ND	ND
				TOTAL CWT RELEASE		42,662							
			TOTAL NON-CWT RELEASE		133,354								
			TOTAL SITE RELEASE		176,016			TOTAL RETURN:		ND	ND	ND	ND
S.F. Red River 9/1-2/93	V9		DWOR B	RV		50,027	24.6	Supplementatio n Finger.-Fall Rel. Alan Byrne's	1	ND	ND	ND	ND
				RV/PIT		(5,000)			2	ND	ND	ND	ND
									3	ND	ND	ND	ND
			TOTAL CWT RELEASE		0								
			TOTAL NON-CWT RELEASE		50,027								

TOTAL SITE RELEASE	50,027	TOTAL RETURN:	ND	ND	ND	ND
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Appendix A. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Clear Creek 5/3/94	1E	51,498	DWOR B	CWT/LV/AD	104729	21,507	8.92	Contribution	1	ND	ND	ND	ND
				*LV/AD		261			2	ND	ND	ND	ND
				*AD		29,730			3	ND	ND	ND	ND
Clear Creek 5/3/94	2E	51,411	DWOR B	CWT/LV/AD	104730	21,562	8.92	Contribution	1	ND	ND	ND	ND
				*LV/AD		240			2	ND	ND	ND	ND
				*AD		29,609			3	ND	ND	ND	ND
Clear Creek 5/3/94	3W	50,951	DWOR B	CWT/LV/AD	104733	20,827	8.92	Contribution	1	ND	ND	ND	ND
				CWT/LV/AD/PIT		(104)			2	ND	ND	ND	ND
				*LV/AD		360			3	ND	ND	ND	ND
				*AD		29,764							
				AD/PIT		(196)							
Clear Creek 5/3/94			DWOR B	NON-CWT		89,964	8.92	Production	1	ND	ND	ND	ND
				(Includes all *)					2	ND	ND	ND	ND
								3	ND	ND	ND	ND	ND
				TOTAL CWT RELEASE		63,896							
				TOTAL NON-CWT RELEASE		89,964							
				TOTAL SITE RELEASE		153,860		TOTAL RETURN:		ND	ND	ND	ND
TOTAL DWOR B-STOCK CWT RELEASE						191,635							
TOTAL DWOR B-STOCK NON-CWT RELEASE						509,767							
TOTAL DWOR B-STOCK RELEASE						701,402							
TOTAL SELWAY STOCK CWT RELEASE						0							
TOTAL SELWAY STOCK NON-CWT RELEASE						71,566							
TOTAL SELWAY STOCK RELEASE						71,566							
TOTAL CWT RELEASE FOR CLEARWATER FH						191,635							
TOTAL NON-CWT RELEASE FOR CLEARWATER FH						581,333							
TOTAL CLEARWATER FH RELEASE						772,968							
TOTAL PIT TAGS						6,664							

TOTAL SMOLT RELEASE

722,941

Appendix A. Table 2. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1993. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman National FH		Brood Year: 1993												
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery			
Little Salmon R. 4/25/94	85	164,679	PAH A	CWT/LV/AD	104601	20,529 (100)	4.7	Contribution	1	ND	ND	ND	ND	
				CWT/LV/AD/PIT					2	ND	ND	ND		
				*LV/AD								156		
				*AD								143,994		
Little Salmon R. 4/25/94	86	163,484	PAH A	CWT/LV/AD	104602	20,365 (100)	4.5	Contribution	1	ND	ND	ND	ND	
				CWT/LV/AD/PIT					2	ND	ND	ND		
				*LV/AD								275		
				*AD								142,844		
Little Salmon R. 4/25/94			PAH A	NON-CWT (Includes all *)		287,269		Production	1	ND	ND	ND	ND	
				2	ND				ND	ND	ND			
TOTAL CWT RELEASE						40,894								
TOTAL NON-CWT RELEASE						287,269								
TOTAL SITE RELEASE						328,163	TOTAL RETURN:			ND	ND	ND	ND	
Lemhi River 4/6/94	98	235,788	PAH A	CWT/LV/AD	104603	21,155 (200)	4.7	Contribution	1	ND	ND	ND	ND	
				CWT/LV/AD/PIT					2	ND	ND	ND		
				*LV/AD								145		
				*AD								214,488		
Lemhi River 4/6/94			PAH A	NON-CWT (Includes all *)		214,633		Production	1	ND	ND	ND	ND	
				2	ND				ND	ND	ND			
TOTAL CWT RELEASE						21,155								
TOTAL NON-CWT RELEASE						214,633								

TOTAL SITE RELEASE 235,788 **TOTAL RETURN:** ND ND ND ND ND

Appendix A. Table 2. Continued

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
Salmon River	51-3	61,321	SAW A	CWT/LV/AD	104628	60,772	4.7	Acclimation Control	1	ND	ND	ND	ND
Sawtooth Weir 4/29/94				CWT/LV/AD/PIT *LV/AD		(302) 549			2	ND	ND	ND	ND
Salmon River Sawtooth Weir 4/15/94	54-6	711,813	SAW A	CWT/LV/AD CWT/LV/AD/PIT *LV/AD *AD	104629	60,929 (298) 507 650,377	4.4	Acclimation Test	1 2	ND ND	ND ND	ND ND	ND ND
Salmon River Sawtooth Weir 4/15-29/94			SAW A	NON-CWT (Includes all *)		651,433		Production	1 2	ND ND	ND ND	ND ND	ND ND
				TOTAL CWT RELEASE		121,701							
				TOTAL NON-CWT RELEASE		651,433							
				TOTAL SITE RELEASE		773,134		TOTAL RETURN:		ND	ND	ND	ND
Bruno Landing 4/12/94	74-6	182,083	SAW A	CWT/LV/AD CWT/LV/AD/PIT *LV/AD *AD	104626	61,817 (300) 778 119,488	4.7	Contribution	1 2	ND ND	ND ND	ND ND	ND ND
Bruno Landing 4/12/94			SAW A	NON-CWT (Includes all *)		120,266		Production	1 2	ND ND	ND ND	ND ND	ND ND
				TOTAL CWT RELEASE		61,817							
				TOTAL NON-CWT RELEASE		120,266							
				TOTAL SITE RELEASE		182,083		TOTAL RETURN:		ND	ND	ND	ND
TOTAL PAH A-STOCK CWT RELEASE						62,049							
TOTAL PAH A-STOCK NON-CWT RELEASE						501,902							
TOTAL PAH A-STOCK RELEASE						563,951							
TOTAL SAW A-STOCK CWT RELEASE						183,518							
TOTAL SAW A-STOCK NON-CWT RELEASE						771,699							
TOTAL SAW A-STOCK RELEASE						955,217							
TOTAL CWT RELEASE FOR HAGERMAN NATIONAL FH						245,567							

TOTAL NON-CWT RELEASE FOR HAGERMAN NATIONAL FH	<u>1,273,601</u>
TOTAL HAGERMAN NATIONAL FH RELEASE	1,519,168
TOTAL PIT TAGS	1,300

Appendix A. Table 3. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1993. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley FH		Brood Year: 1993		Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery			
E. Fk. Salmon River 4/13-14/94	1E	63,970	DWOR B	CWT/LV/AD	104721	20,443	5.6	Contribution	1	ND	ND	ND	ND	
				*LV/AD		181				2	ND	ND	ND	ND
				*AD		43,346				3	ND	ND	ND	ND
				AD/PIT		(100)								
E. Fk. Salmon River 4/14/94	2E	59,925	DWOR B	CWT/LV/AD	104722	20,974	5.5	Contribution	1	ND	ND	ND	ND	
				*LV/AD		319				2	ND	ND	ND	ND
				*AD		42,737				3	ND	ND	ND	ND
				AD/PIT		(100)								
E. Fk. Salmon River 4/15/94	3E	64,400	DWOR B	CWT/LV/AD	104710	21,296	4.4	Contribution	1	ND	ND	ND	ND	
				*AD		43,104				2	ND	ND	ND	ND
				AD/PIT		(100)				3	ND	ND	ND	ND
E. Fk. Salmon River 4/11-12/94	1-3W	164,740	DWOR B	*AD		164,740								
E. Fk. Salmon River 4/12/94	7W	54,720	E. FK. B	CWT/LV/AD	104711	20,648	4.8	Contribution	1	ND	ND	ND	ND	
				*LV/AD		179				2	ND	ND	ND	ND
				*AD		33,893				3	ND	ND	ND	ND
				AD/PIT		(100)								
E. Fk. Salmon River 4/12-13/94	8W	54,400	E. FK. B	CWT/LV/AD	104712	21,377	4.8	Contribution	1	ND	ND	ND	ND	
				*LV/AD		201				2	ND	ND	ND	ND
				*AD		32,822				3	ND	ND	ND	ND
				AD/PIT		(100)								

E. Fk. Salmon River 4/15-16/94	8E	50,920	E. FK. B	CWT/LV/AD	104713	21,369	4.8	Contribution	1	ND	ND	ND	ND
				*AD		29,551			2	ND	ND	ND	ND
				AD/PIT		(100)			3	ND	ND	ND	ND

Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
E. Fk. Salmon River 4/11-16/94			E. FK. B DWOR B	NON-CWT		391,073		Production	1	ND	ND	ND	ND
				(Includes all *)					2	ND	ND	ND	ND
									3	ND	ND	ND	ND
TOTAL CWT RELEASE						126,107							
TOTAL NON-CWT RELEASE						391,073							
TOTAL SITE RELEASE						517,180		TOTAL RETURN:		ND	ND	ND	ND
L. Salmon River at Warm Spring 4/26/94	14E	58,000	PAH A	CWT/LV/AD	104723	20,958	4.4	Contribution	1	ND	ND	ND	ND
				*LV/AD		180			2	ND	ND	ND	ND
				*AD		36,862							
				AD/PIT		(100)							
L. Salmon River at Warm Spring 4/27/94	16E	56,730	PAH A	CWT/LV/AD	104724	21,530	4.1	Contribution	1	ND	ND	ND	ND
				*LV/AD		200			2	ND	ND	ND	ND
				*AD		35,000							
				AD/PIT		(100)							
L. Salmon River at Warm Spring 4/23-27/94	13-15E 13-16W		PAH A	*AD		352,820							
L. Salmon River at Warm Spring 4/23-27/94			PAH A	NON-CWT		425,062		Production	1	ND	ND	ND	ND
				(Includes all *)					2	ND	ND	ND	ND
TOTAL CWT RELEASE						42,488							
TOTAL NON-CWT RELEASE						425,062							
TOTAL SITE RELEASE						467,550		TOTAL RETURN:		ND	ND	ND	ND
Slate Creek U. Salmon R. 4/14-18/94	5E	120,215	DWOR B	CWT/LV/AD	104925	62,510		Contribution	1	ND	ND	ND	ND
	6E			*LV/AD		625			2	ND	ND	ND	ND
				*AD		57,080			3	ND	ND	ND	ND

				AD/PIT	(300)
Slate Creek U. Salmon R. 4/12-20/94	5W 6W		DWOR B	*AD	91,140

Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code					Harvest	Hatchery			
Slate Creek U. Salmon R. 4/12-20/94			DWOR B	NON-CWT (Includes all *)		148,845		Production	1	ND	ND	ND	ND	
							2		ND	ND	ND	ND		
							3		ND	ND	ND	ND		
			TOTAL CWT RELEASE		62,510									
			TOTAL NON-CWT RELEASE		148,845									
			TOTAL SITE RELEASE		211,355		TOTAL RETURN:			ND	ND	ND	ND	
Pahsimeroi River 4/16-18/94	9E	60,580	PAH A	CWT/LV/AD *LV/AD *AD AD/PIT	104725	21,294	4.7	Contribution	1	ND	ND	ND	ND	
						113			2	ND	ND	ND	ND	
						39,173								
						(150)								
Pahsimeroi River 4/19/94	11E	60,920	PAH A	CWT/LV/AD *LV/AD *AD AD/PIT	104726	21,660	5.6	Contribution	1	ND	ND	ND	ND	
						330			2	ND	ND	ND	ND	
						38,930								
						(151)								
Pahsimeroi River 4/18-22/94	9-12W 10-12E		PAH A	*AD		362,940								
Pahsimeroi River 4/16-22/94			PAH A	NON-CWT (Includes all *)		441,486		Production	1	ND	ND	ND	ND	
							2		ND	ND	ND	ND		
			TOTAL CWT RELEASE		42,954									
			TOTAL NON-CWT RELEASE		441,486									
			TOTAL SITE RELEASE		484,440		TOTAL RETURN:			ND	ND	ND	ND	
Hazard Creek Little Salmon River	4W	64,770	DWOR B	CWT/LV/AD *LV/AD	104714	20,891	5.1	Contribution	1	ND	ND	ND	ND	
						297			2	ND	ND	ND	ND	

4/22/94				*AD AD/PIT		43,582 (100)			3	ND	ND	ND	ND
Hazard Creek Little Salmon River 4/25-28/94	4E	63,840	DWOR B	CWT/LV/AD *AD AD/PIT	104715	21,243 42,597 (100)	4.2	Contribution	1 2 3	ND ND ND	ND ND ND	ND ND ND	ND ND ND

Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Hazard Creek Little Salmon River 4/28/94	7E	60,390	DWOR B	CWT/LV/AD *LV/AD *AD AD/PIT	104716	21,582 154 38,654 (100)	4.5	Contribution	1 2 3	ND ND ND	ND ND ND	ND ND ND	ND ND ND
Hazard Creek Little Salmon River 4/22-23/94	3W 6W	49,725	DWOR B	*AD		49,725	5.1						
Hazard Creek Little Salmon River 4/22-28/94			DWOR B	NON-CWT (Includes all *)		175,009		Production	1 2 3	ND ND ND	ND ND ND	ND ND ND	ND ND ND
				TOTAL CWT RELEASE		63,716							
				TOTAL NON-CWT RELEASE		175,009							
				TOTAL SITE RELEASE		238,725		TOTAL RETURN:		ND	ND	ND	ND
Oakley Reservoir 7/14/94	1W	164,700	DWOR B	No Mark		164,700	183	Fry Outplants					
				TOTAL CWT RELEASE		0							
				TOTAL NON-CWT RELEASE		164,700							
				TOTAL SITE RELEASE		164,700		TOTAL RETURN:		ND	ND	ND	ND
Salmon Falls Reservoir 7/13/94	V's	227,600	DWOR B	No Mark		227,600	228	Fry Outplants					

	TOTAL CWT RELEASE	0				
	TOTAL NON-CWT RELEASE	227,600				
	TOTAL SITE RELEASE	227,600			TOTAL RETURN:	ND ND ND ND
	TOTAL E. FK. B-STOCK CWT RELEASE	63,394				
	TOTAL E. FK. B-STOCK NON-CWT RELEASE	96,646				
	TOTAL E. FK. B-STOCK RELEASE	<u>160,040</u>				
	TOTAL DWOR B-STOCK CWT RELEASE	188,939				
	TOTAL DWOR B-STOCK NON-CWT RELEASE	1,010,581				
	TOTAL DWOR B-STOCK RELEASE	<u>1,199,520</u>				
	Appendix A. Table 3. Continued.					
	TOTAL PAH A-STOCK CWT RELEASE	85,442				
	TOTAL PAH A-STOCK NON-CWT RELEASE	866,548				
	TOTAL PAH A-STOCK RELEASE	<u>951,990</u>				
	TOTAL CWT RELEASE FOR MAGIC VALLEY FH	337,775				
	TOTAL NON-CWT RELEASE FOR MAGIC VALLEY FH	1,973,775				
	TOTAL MAGIC VALLEY FH RELEASE	<u>2,311,550</u>				
	TOTAL PIT TAGS	1,701				
	TOTAL SMOLT RELEASE	<u>1,919,250</u>				

(includes 392,300 fry released at Salmon Falls and Oakley Res.)
Smolt Release = 807,220

Appendix B. Table 1. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1989. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1989											
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Sawtooth Weir 4/5/90	70	99,878	SAW A	CWT/LV/AD	104214	14,597	4.7	Contribution	1	76	19	113	0.77
	71			*LV/AD		147			2	12	6		
				*AD		85,134							
Sawtooth Weir 4/5/90	70	100,772	SAW A	CWT/LV/AD	104215	15,482	4.7	Contribution	1	48	12	98	0.63
	71			*LV/AD		156			2	33	5		
				*AD		85,134							
Sawtooth Weir 4/5/90	70	100,506	SAW A	CWT/LV/AD	104216	15,218	4.7	Contribution	1	60	15	78	0.51
	71			*LV/AD		154			2	3	0		
				*AD		85,134							
Sawtooth Weir Includes all release dates that have Mark Type indicated by *			SAW A	NON-CWT (Includes all *)		255,859	4.7	Production (Includes all *)	1	2,072	518	2,948	1.15
									2	314	44		
TOTAL CWT RELEASE						45,297							
TOTAL NON-CWT RELEASE						255,859							
TOTAL SITE RELEASE						301,156	TOTAL RETURN:		2,618	619	3,237	1.07	
Salmon R. at Shoup Bridge 4/12/90	92	67,001	SAW A	CWT/LV/AD	104227	15,528	5	Contribution	1	24	17	41	0.26
	93			*AD		51,473			2	0	0		
Salmon R. at Shoup Bridge 4/12/90	92	66,669	SAW A	CWT/LV/AD	104228	15,196	5	Contribution	1	30	23	61	0.40
	93			*AD		51,473			2	8	0		
Salmon R. at Shoup Bridge 4/12/90	92	66,576	SAW A	CWT/LV/AD	104229	15,104	5	Contribution	1	19	14	42	0.28
	93			*AD		51,472			2	9	0		

Salmon R. at Shoup Bridge	92	SAW A	NON-CWT	154,418	5	Production	1	179	119	355	0.23
Includes all release dates that have Mark Type indicated by *	93		(Includes all *)			(Includes all *)	2	57	0		

Appendix B. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
				TOTAL CWT RELEASE		45,828							
				TOTAL NON-CWT RELEASE		154,418							
				TOTAL SITE RELEASE		200,246	TOTAL RETURN:		326	173	499	0.25	
Little Salmon R. at Hazard Cr. 4/30/90	48	131,854	DWOR B	CWT/LV/AD	104230	14,841	4.4	Contribution	1	0	0	516	3.48
	49			*LV/AD		49			2	258	258		
				*AD		116,964			3	0	0		
Little Salmon R. at Hazard Cr. 4/30/90	48	131,075	DWOR B	CWT/LV/AD	104231	14,065	4.4	Contribution	1	0	0	8	0.06
	49			*LV/AD		47			2	4	4		
				*AD		116,963			3	0	0		
Little Salmon R. at Hazard Cr. 4/30/90	49	130,423	DWOR B	CWT/LV/AD	104232	13,416	4.4	Contribution	1	0	0	18	0.13
				*LV/AD		44			2	9	9		
				*AD		116,963			3	0	0		
Little Salmon R. at Hazard Cr. 4/23/90	ND	ND	SAW A	*AD		80,465	4.2	Production	1	33	33	126	0.16
									2	30	30		
Little Salmon R. at Hazard Cr. Includes all release dates that have Mark Type indicated by *	ND	ND	DWOR B	NON-CWT	(Includes all *)	351,030	4.4	Production	1	0	0	332	0.09
									2	166	166		
									3	0	0		
				TOTAL CWT RELEASE		42,322							
				TOTAL NON-CWT RELEASE		431,495							
				TOTAL SITE RELEASE		473,817	TOTAL RETURN:		500	500	1,000	0.21	
Salmon R. at Ellis Bridge 4/9-11/90	ND	ND	SAW A	*AD		200,295	4.4	Production	1	252	168	700	0.35
									2	256	24		
				TOTAL CWT RELEASE		0							

					TOTAL NON-CWT RELEASE	200,295								
					TOTAL SITE RELEASE	200,295				TOTAL RETURN:	508	192	700	
Salmon R. at N. Fk Ramp	ND	ND	SAW A	*AD		199,602	4.3	Production	1	251	167	677	0.34	
4/18-20/90									2	250	9			
					TOTAL CWT RELEASE	0								
					TOTAL NON-CWT RELEASE	199,602								
					TOTAL SITE RELEASE	199,602				TOTAL RETURN:	501	176	677	0.34

Appendix B. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery			
East Fork Salmon R.	ND	ND	DWOR B	*AD		64,150	3.8	Production	1	3	0	24		
4/11/90									2	9	1			
					TOTAL CWT RELEASE	0			3	11	0			
					TOTAL NON-CWT RELEASE	64,150								
					TOTAL SITE RELEASE	64,150				TOTAL RETURN:	23	1	24	0.04
TOTAL SAW A-STOCK CWT RELEASE						91,125								
TOTAL SAW A-STOCK NON-CWT RELEASE						890,639								
TOTAL SAW A-STOCK RELEASE						981,764				RETURN IS COMPLETE				
TOTAL DWOR B-STOCK CWT RELEASE						42,322				RETURN				
TOTAL DWOR B-STOCK NON-CWT RELEASE						415,180				GRAND TOTAL:	4,476	1,661	6,137	0.43
TOTAL DWOR B-STOCK RELEASE						457,502								
TOTAL CWT RELEASE FOR HAGERMAN NFH						133,447								
TOTAL NON-CWT RELEASE FOR HAGERMAN NFH						1,305,819								
TOTAL HAGERMAN NFH RELEASE						1,439,266								

Appendix B. Table 2. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1990. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1990													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)		
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery				
Sawtooth Weir 4/13/91	71- 74	22,652	SAW A	CWT/LV/AD	104333	21,050	2.9	Size at release	1	45	24	132	0.63		
				*LV/AD		213		Large size group		2				60	3
				*AD		1,389									
Sawtooth Weir 4/13/91	71- 74	21,580	SAW A	CWT/LV/AD	104334	20,129	2.9	Size at release	1	55	27	113	0.56		
				*LV/AD		122		Large size group		2				26	5
				*AD		1,329									
Sawtooth Weir 4/15/91	74- 75	12,864	SAW A	CWT/LV/AD	104335	12,066	2.6	Size at release	1	32	12	67	0.56		
				*AD		798		Large size group		2				19	4
Sawtooth Weir 4/13/91	76- 78	326,644	SAW A	CWT/LV/AD	104336	21,775	4.5	Size at release	1	55	13	83	0.38		
				*LV/AD		131		Regular size group		2				12	3
				*AD		304,738									
Sawtooth Weir 4/13/91	76- 78	305,400	SAW A	CWT/LV/AD	104337	20,318	4.5	Size at release	1	49	15	96	0.47		
				*LV/AD		143		Regular size group		2				31	1
				*AD		284,939									
Sawtooth Weir 4/16/91	78- 80	290,660	SAW A	CWT/LV/AD	104338	19,338	4.4	Size at release	1	52	19	104	0.54		
				*LV/AD		156		Regular size group		2				29	4
				*AD		271,166									
Sawtooth Weir 4/13-16/91	71- 80	985	SAW A	*AD/PIT	ND	985	ND	Size at release (Lg)	1	2	1	4	0.41		
						(489)		Size at release (Reg)		2				1	0
						(496)									

Sawtooth Weir 865,124 SAW A NON-CWT 865,124 2.9 Production 1 2,173 682 4,000 0.46
 Includes all release dates that (Includes all *)
 have Mark Type indicated by *
 Appendix B. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Sawtooth Weir 10/5-17/90	ND	ND	SAW A	*AD		304,907	39.6	Fall release	1 2	0 0	0 0	0	0.00
			TOTAL CWT RELEASE			114,676							
			TOTAL NON-CWT RELEASE			1,170,031							
			TOTAL SITE RELEASE			1,284,707		TOTAL RETURN:		3,654	945	4,599	0.36
Little Salmon R. at Hazard Cr. 4/22/91	19- 21	154,937	DWOR B	CWT/LV/AD *LV/AD *AD	104332	19,831 384 134,722	4.4	Contribution	1 2 3	6 15 ND	6 15 ND	42	0.21
Little Salmon R. at Hazard Cr. 4/19/91	51	154,379	DWOR B	CWT/LV/AD *LV/AD *AD	104339	19,813 241 134,325	4.4	Contribution	1 2 3	4 5 ND	4 5 ND	18	0.09
Little Salmon R. at Hazard Cr. 4/17/91	38	147,794	DWOR B	CWT/LV/AD *LV/AD *AD	104340	18,877 554 128,363	4.5	Contribution	1 2 3	3 10 ND	3 10 ND	26	0.14
Little Salmon R. at Hazard Cr. 4/24/91	44 45	424	DWOR B	AD/PIT		424	4.5	Contribution	1 2 3	0 0 ND	0 0 ND	0	ND
Little Salmon R. at Hazard Cr.	ND		DWOR B	AD		120,323	22.5	Excess Fingerling Plant	1 2 3	27 0 ND	27 0 ND	54	0.04
Little Salmon R. at Hazard Cr. Includes all release dates that have Mark Type indicated by *			DWOR B	NON-CWT (Includes all *)		398,589	4-4.5	Production (Includes all *)	1 2 3	88 204 ND	88 204 ND	584	0.15
			TOTAL CWT RELEASE			58,521							
			TOTAL NON-CWT RELEASE			518,912							
			TOTAL SITE RELEASE			577,433		TOTAL RETURN:		362	362	724	0.13
E. Fk Salmon R. (above trap)	ND		UNK. B	AD		540,733	32.8	Excess Fingerling Plant	1 2	29 0	4 0	33	0.01

Appendix B. Table 3. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1991. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1991												
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery			
E. Fk. Salmon R. at trap 4/6-9/92	ND	ND	DWOR B	*AD		302,335	ND	Production	1	292	14	306	0.10	
									2	ND	ND			
						0			3	ND	ND			
						302,335								
						302,335		TOTAL RETURN:		292	14	306	0.10	
Little Salmon R. at Warm Springs Bridge 4/16,20/92	ND	ND	DWOR B	CWT/LV/AD	104407	18,386	ND	Contribution	1	0	0	0	0.00	
				*LV/AD		316			2	ND	ND			
				*AD		81,230			3	ND	ND			
Little Salmon R. at Warm Springs Bridge 4/14/92	ND	ND	DWOR B	CWT/LV/AD	104408	19,450	ND	Contribution	1	0	0	0	0.00	
				*LV/AD		546			2	ND	ND			
				*AD		85,930			3	ND	ND			
Little Salmon R. at Warm Springs Bridge 4/16/92	ND	ND	DWOR B	CWT/LV/AD	104409	17,390	ND	Contribution	1	0	0	0	0.00	
				*LV/AD		457			2	ND	ND			
				*AD		76,829			3	ND	ND			
Little Salmon R. at Warm Springs Bridge 4/14,16,20,22/92	ND	ND	DWOR B	NON-CWT (Includes all *)		245,308	ND	Production	1	0	0	0	0.00	
									2	ND	ND			
									3	ND	ND			
						55,226								
						245,308								

		TOTAL SITE RELEASE		300,534	TOTAL RETURN:		0	0	0	0.00	
Pahsimeroi ponds 3/25-27/92	61-70	223,406	PAH A *AD	223,406	ND	Production	1 2	270 ND	125 ND	395	0.18
		TOTAL CWT RELEASE		0							
		TOTAL NON-CWT RELEASE		223,406							
		TOTAL SITE RELEASE		223,406	TOTAL RETURN:		270	125	395	0.18	

Appendix B. Table 3. Continued

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Sawtooth Weir 3/13-21/92	71,84		PAH A	CWT/LV/AD	104421	17,955	4.8	Acclimation	1	26	1	27	0.15
				*LV/AD		152		Experimental Group	2	ND	ND		
				*AD		149,183		Trucked to SAWT on 3/17/92					
Sawtooth Weir 3/13-21/92	72,85		PAH A	CWT/LV/AD	104422	18,336	5	Acclimation	1	0	2	2	0.01
				*LV/AD		515		Experimental Group	2	ND	ND		
				*AD		152,349		Trucked to SAWT on 3/18/92					
Sawtooth Weir 3/13-21/92	81,85		PAH A	CWT/LV/AD	104423	19,341	5.1	Acclimation	1	4	2	6	0.03
				*LV/AD		810		Experimental Group	2	ND	ND		
				*AD		160,699		Trucked to SAWT on 3/19/92					
Sawtooth Weir 4/10-13/92	78-80	47,895	PAH A	CWT/LV/AD	104007	45,646	4.5	Size Exp. - Regular and Acc. Control	1	5	4	9	0.02
				*LV/AD		1,850		group	2	ND	ND		
				*AD		399		Trucked to & released at SAWT on 4/10/92					
Sawtooth Weir 4/10-13/92	73-77	54,645	PAH A	CWT/LV/AD	101530	53,463	2.8	Size Exp. - Large	1	265	2	267	0.50
				*LV/AD		573		Trucked to & released	2	ND	ND		
				*AD		609		at SAWT on 4/10/92					
Sawtooth Weir 4/10-13/92			PAH A	NON-CWT (Includes all *)		467,139			1	162	91	253	0.05
				2	ND				ND				
Sawtooth Weir 4/10-21/92			PAH A	**PIT		1,479		Includes all PIT tags for acc. and size exp's. See study design for	1 2	1 ND	0 ND	1	0.07

complete details.

TOTAL CWT RELEASE	154,741				
TOTAL NON-CWT RELEASE	467,139				
TOTAL SITE RELEASE	621,880	TOTAL RETURN:	463	102	565 0.09

Appendix B. Table 3. Continued

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks			Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number			Size (FPP)	Harvest		
TOTAL PAH A-STOCK CWT RELEASE						154,741						
TOTAL PAH A-STOCK NON-CWT RELEASE						690,545						
TOTAL PAH A-STOCK RELEASE						845,286						
TOTAL DWOR B-STOCK CWT RELEASE						55,226						
TOTAL DWOR B-STOCK NON-CWT RELEASE						547,643						
TOTAL DWOR B-STOCK RELEASE						602,869						
TOTAL HAGERMAN NFH CWT RELEASE						209,967						
TOTAL HAGERMAN NFH NON-CWT RELEASE						1,238,188						
TOTAL HAGERMAN NFH RELEASE						1,448,155						
TOTAL PIT TAGS						1,479						

RETURN IS INCOMPLETE

RETURN GRAND TOTAL: 1025 241 1266 0.09

Appendix C. Table 1. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1989. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Release Site/Date		RW NO.	RW Total	Stock ID	Identifying Marks			Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
					Mark Type	CWT Code	Release Number	Size (FPP)		Harvest	Hatchery			
Sawtooth Weir 4/12-13/90		1	1,159,080	PAH A	CWT/LV/AD/FB FB = LA-) (-1 *LV/AD *AD	104059	39,620 2,804 1,156,276	4.2 4.2	Contribution, timing 	1 2	56 53	14 0	123	0.31
Sawtooth Weir 4/12-13/90 Includes all release dates that have Mark Type indicated by *				PAH A	NON-CWT (Includes all *)		1,159,080		Production (Includes all *)	1 2	3,312 1,424	828 198	5,762	0.50
				TOTAL CWT RELEASE			39,620							
				TOTAL NON-CWT RELEASE			1,159,080		TOTAL RETURN:		4,845	1,040	5,885	0.49
				TOTAL SITE RELEASE			1,198,700							
E. F. Salmon R. 4/14/90		10	152,110	E. FK. B	CWT/LV/AD/FB FB = RA-) (-1 *LV/AD *AD	104058	40,905 837 111,205	4.1	Contribution, timing	1 2 3	11 66 8	4 15 0	104	0.25
E. F. Salmon R. 4/16/90		16	651,914	E. FK. B	CWT/LV/AD *LV/AD *AD	104236	15,474 366 42,068	4.2	Contribution	1 2 3	13 20 0	0 4 0	37	0.24
E. F. Salmon R. 4/16/90		11	115,013	E. FK. B	CWT/LV/AD *LV/AD *AD	104237	15,971 378 43,419	4.2	Contribution	1 2 3	5 21 0	1 3 0	30	0.19
E. F. Salmon R. 4/16/90		11	115,013	E. FK. B	CWT/LV/AD *LV/AD *AD	104238	14,958 354 40,665	4.2	Contribution	1 2 3	0 21 0	3 3 0	27	0.18

Appendix C. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery			
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD	104233	14,964	5	Contribution	1	0	0	2	0.01	
				*LV/AD		1,079			2	2	0			
				*AD		183,731			3	0	0			
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD	104234	15,157	5	Contribution	1	0	0	58	0.38	
				*LV/AD		1,093			2	58	0			
				*AD		186,101			3	0	0			
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD	104235	14,642	5	Contribution	1	2	0	12	0.08	
				*LV/AD		1,056			2	9	1			
				*AD		179,777			3	0	0			
E. F. Salmon R. 4/14-18/90			DWOR B	NON-CWT	552,837	792,129	4.6	Production (Includes all *)	1	112	14	773	0.10	
			E. FK. B	(Includes all *)					239,292	2	535			73
										3	39			0
						TOTAL CWT RELEASE								
						TOTAL NON-CWT RELEASE	132,071							
						TOTAL SITE RELEASE	924,200							
								TOTAL RETURN:		922	121	1,043	0.11	
Slate Cr. Upper Salmon R. 9/11/89	ND	ND	DWOR B	*AD		162,700	60.8	Excess Fingerling Plant	1	0	0	0	0	
									2	0	0			
									3	0	0			
						TOTAL CWT RELEASE	0							
						TOTAL NON-CWT RELEASE	162,700							
						TOTAL SITE RELEASE	162,700							
								TOTAL RETURN:		0	0	0	0	
TOTAL PAH A-STOCK CWT RELEASE						39,620								
TOTAL PAH A-STOCK NON-CWT RELEASE						1,159,080								
TOTAL PAH A-STOCK RELEASE						1,198,700								
												<u>RETURN IS COMPLETE</u>		
TOTAL DWOR B-STOCK CWT RELEASE						44,763								
TOTAL DWOR B-STOCK NON-CWT RELEASE						715,537								
TOTAL DWOR B-STOCK RELEASE						760,300								
							RETURN GRAND TOTAL:		5,767	1,161	6,928	0.30		

Includes all release dates that have Mark Type indicated by *

E. F. Salmon R. DWOR B NON-CWT 570,523 838,090 Production 1 337 46 1896 0.23
 Includes all release dates that E FK B (Includes all 267,567 (Includes all *) 2 1466 47
 have Mark Type indicated by * 3 ND ND
 Appendix C. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
				TOTAL CWT RELEASE				128,210					
				TOTAL NON-CWT RELEASE				839,590					
				TOTAL SITE RELEASE				967,800	TOTAL RETURN:	2212	105	2317	0.24
Hazard Cr. L. Salmon R. 4/26/91	8	102,541	PAH A	CWT/LV/AD *LV/AD *AD	104317	21,809	3.6	Contribution	1	4	4	50	0.23
						744			2	21	21		
						79,988							
Hazard Cr. L. Salmon R. 4/26/91	7 8	105,146	PAH A	CWT/LV/AD *LV/AD *AD	104318	22,704	3.6	Contribution	1	21	21	116	0.51
						774			2	37	37		
						81,668							
Hazard Cr. L. Salmon R. 4/26/91	8	101,013	PAH A	CWT/LV/AD *LV/AD *AD	104319	21,484	3.6	Contribution	1	16	16	58	0.27
						733			2	13	13		
						78,796							
Hazard Cr. L. Salmon R. 4/26/91	7 8	1,600	PAH A	AD/PIT		1,600	3.6	Migration survival and timing	1	1	1	5	0.31
									2	2	1		
Hazard Cr. L. Salmon R.			PAH A	NON-CWT (Includes all *)		242,703	3.6	Production (Includes all *)	1	151	151	824	0.34
									2	261	261		
				TOTAL CWT RELEASE				65,997					
				TOTAL NON-CWT RELEASE				244,303					
				TOTAL SITE RELEASE				310,300	TOTAL RETURN:	527	526	1053	0.34
Sawtooth Weir 4/9-19/91	ND	ND	PAH A	*AD		364,700	3.9	Production	1	916	288	1686	0.46
									2	427	55		
				TOTAL CWT RELEASE				0					
				TOTAL NON-CWT RELEASE				364,700					
				TOTAL SITE RELEASE				364,700	TOTAL RETURN:	1343	343	1686	0.46

TOTAL PIT TAGS

3,100

Appendix C. Table 3. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1991. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley Fish Hatchery Brood Year: 1991													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
E.F. Salmon R. 4/6-14/92	9	480,368	DWOR B	CWT/LV/AD *AD	104418	21,771	4.4	Contribution Rep. #1	1	0	0	0	0.00
						458,597			2	ND	ND		
									3	ND	ND		
E.F. Salmon R. 4/6-14/92	9		DWOR B	CWT/LV/AD/PIT	104418	(100)							
E.F. Salmon R. 4/6-14/92	11	476,032	DWOR B	CWT/LV/AD *LV/AD *AD	104419	21,568	4.5	Contribution Rep. #2	1	0	0	0	0.00
						143			2	ND	ND		
						454,321			3	ND	ND		
E.F. Salmon R. 4/6-14/92	11		DWOR B	CWT/LV/AD/PIT	104419	(100)							
E.F. Salmon R. 4/6-14/92	14	84,800	E FK B	CWT/LV/AD *AD	104420	20,821	6.1	Contribution Rep. #3	1	20	1	21	0.10
						63,979			2	ND	ND		
									3	ND	ND		
E.F. Salmon R. 4/6-14/92	14		E FK B	CWT/LV/AD/PIT	104420	(100)							
E.F. Salmon R. 4/6-14/92			DWOR B E FK B	NON-CWT (Includes all *)		977,040		Production (Includes all *)	1	0	0	0	0.00
									2	ND	ND		
									3	ND	ND		
Includes all release dates that have Mark Type indicated by *													
TOTAL CWT RELEASE						64,160							
TOTAL NON-CWT RELEASE						977,040							

TOTAL SITE RELEASE

1,041,200

TOTAL RETURN:

20

1

21

0.00

Appendix C. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Hazard Cr. L. Salmon R. 4/17-25/92	4	284,715	OXBOW A	CWT/LV/AD *AD	104416	22,223 262,492	3.9	Contribution Rep. #2	1 2	5 ND	5 ND	10	0.04
Hazard Cr. L. Salmon R. 4/17-25/92	4		OXBOW A	CWT/LV/AD/PIT	104416	(100)							
Hazard Cr. L. Salmon R. 4/17-25/92	7	281,085	OXBOW A	CWT/LV/AD *AD	104417	21,604 259,481	4	Contribution Rep. #3	1 2	8 ND	8 ND	16	0.07
Hazard Cr. L. Salmon R. 4/17-25/92	7		OXBOW A	CWT/LV/AD/PIT	104417	(100)							
L. Salmon R. at Warm Springs Bridge 4/14-21/92	1	436100	OXBOW A	CWT/LV/AD *AD	104415	21,091 415,009	4.3	Contribution Rep. #1	1 2	5 ND	5 ND	10	0.05
L. Salmon R. at Warm Springs Bridge 4/14-21/92	1		OXBOW A	CWT/LV/AD/PIT	104415	(100)							
L. Salmon R. 4/14-25/92 Includes all release dates that have Mark Type indicated by *	1		OXBOW A	NON-CWT (Includes all *)		936,982	4.3	Production (Includes all *)	1 2	261 ND	261 ND	522	0.06
TOTAL CWT RELEASE						64,918							
TOTAL NON-CWT RELEASE						936,982							
TOTAL SITE RELEASE						1,001,900		TOTAL RETURN:		279	279	558	0.06
Sawtooth Weir Salmon R. 3/23-24/92	ND	ND	PAH A	*AD		117,300	5	Production	1 2	40 ND	23 ND	63	0.05
TOTAL CWT RELEASE						0							

TOTAL NON-CWT RELEASE	117,300				
TOTAL SITE RELEASE	117,300	TOTAL RETURN:	40	23	63 0.05

Appendix C. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks			Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number			Size (FPP)	Harvest		
TOTAL PAH A-STOCK CWT RELEASE						0						
TOTAL PAH A-STOCK NON-CWT RELEASE						117,300						
TOTAL PAH A-STOCK RELEASE						117,300						
TOTAL OXBOW A-STOCK CWT RELEASE						64,918						
TOTAL OXBOW A-STOCK NON-CWT RELEASE						936,982						
TOTAL OXBOW A-STOCK RELEASE						1,001,900						
TOTAL DWOR B-STOCK CWT RELEASE						43,339						
TOTAL DWOR B-STOCK NON-CWT RELEASE						913,061						
TOTAL DWOR B-STOCK RELEASE						956,400						
TOTAL E FK B-STOCK CWT RELEASE						20,821						
TOTAL E FK B-STOCK NON-CWT RELEASE						63,979						
TOTAL E FK B-STOCK RELEASE						84,800						
TOTAL MAGIC VALLEY FH CWT RELEASE						129,078						
TOTAL MAGIC VALLEY FH NON-CWT RELEASE						2,031,322						
TOTAL MAGIC VALLEY FH RELEASE						2,160,400						
TOTAL PIT TAGS						600						

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