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FISH HATCHERY EVALUATIONS - IDAHO

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by

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ABSTRACT

For the reporting period of July 1, 1987 to September 30, 1988, the Lower Snake River Compensation Plan (LSRCP) hatchery program released 3.71 million A-run steelhead trout smolts of which 206,000 were marked with coded wire tags. 8-run steelhead trout releases totalled 251,800 smolts with none marked with coded wire tags. In addition to the smolts, 1.18 million steelhead trout fry were released in the upper Salmon River drainage. Steelhead trout eggs taken at various LSRCP adult trapping sites totalled 3.61 million for A-run and 797,000 for B-run steelhead trout. LSRCP reared spring chinook salmon smolt releases totalled 3.96 million, with 542,536 coded wire tagged in spring 1988. Fall 1987 released spring chinook yearlings were 333,600, with 46,100 coded wire tagged. Age '0' releases were 480,726, with 187,700 coded wire tagged. Total spring chinook eggs taken at LSRCP adult traps were 9.18 million. Summer chinook smolt releases totalled 1.06 million, with 309,000 marked with coded wire tags. A total of 2.83 million summer chinook eggs were taken in 1988.

Summer chinook salmon of the 1983 brood year returned to the South Fork Salmon River trap at a rate of 0.46%, which is similar to the previous two brood years. The Red River adult spring chinook salmon fall versus spring release groups (1982 brood year) returned at similar rates, which were not different statistically. Sawtooth Hatchery spring chinook of 1983 brood year returned at a rate of 0.02%, the lowest of any brood year returning to the facility.

Chinook salmon redd counts in index streams continued to show an upward trend since the early 1980s.

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INTRODUCTION

In 1976, the United States Congress authorized the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP) to mitigate for fish and wildlife losses as a result of lower Snake River dams. The LSRCP requires that anadromous fish runs be returned to pre-project numbers, primarily with the aid of fish hatcheries. To date, five LSRCP hatcheries are in operation in Idaho: McCall Hatchery, Sawtooth Hatchery, Magic Valley Hatchery, Dworshak Hatchery, and Hagerman Hatchery. Clearwater Hatchery is the only hatchery facility authorized, but as yet not constructed. In addition to the hatcheries, five satellite facilities are authorized with only three in operation; Red River, South Fork Salmon River, and East Fork Salmon River.

Proposed rearing capabilities and release strategies for the LSRCP program in Idaho are given in Table 1.

The LSRCP hatchery evaluation program provides documentation of the hatchery programs, including rearing and release strategies and evaluation of those strategies for the period of July 1, 1987 to September 30, 1988.

OBJECTIVES

1. Provide a documentation of the LSRCP funded fish rearing activities in Idaho and the resulting adult returns.

2. Develop and provide an on-going evaluation of major operational guidelines of LSRCP hatchery activities in Idaho.

3. Identify suitable sites for outplants in relation to available habitat and potential harvest goals.

4. Document augmentation of natural runs that may occur due to outplants.

METHODS

Hatchery Documentation

Data for documentation of hatchery operations are collected by hatchery personnel at the different facilities. Records are compiled and summarized of fish numbers produced at each facility, categorized by strain, size, and weight, and reported by planting location. Tagged or otherwise marked experimental fish groups are also documented. Records of adult returns are maintained for each rearing program categorized by strain and brood year. Returns of steelhead trout documented in the sport harvest are presented in the harvest monitoring report.

Table 1. Proposed production and distribution summary of Idaho Lower Snake River Compensation Plan anadromous fish hatcheries.

Hatchery	Species	Proposed release site	No. of Smolts	No. of Fry and fingerling
McCall	SuCk	S.F. Salmon River	1,000,000	---
		S.F. Salmon River	---	200,000
		Johnson Creek	---	200,000
		E.F. S.F. Salmon River	---	100,000
Sawtooth	SpCk	Upper Salmon River	1,700,000	---
		E.F. Salmon River	700,000	200,000
		Upper Salmon River tributa	---	600,000
		Yankee Fork Salmon River	---	200,000
		Slate Creek	---	100,000
Dworshak	SpCk	N.F. Clearwater River	1,000,000	---
		Lolo Creek	200,000	200,000
		Newsome Creek	200,000	---
		American River	200,000	---
		S.F. Clearwater River tributaries	---	300,000
Clearwater	SpCk	Lochsa River and tributaries	---	500,000
		S.F. Clearwater River tributaries	---	500,000
	Sth-B	Lochsa River	1,000,000	---
		Crooked River	500,000	---
		Slate Creek	500,000	---
		Clearwater River tributaries	700,000	1,000,000
Magic Valley	Sth-A	Little Salmon River	800,000	---
		Salmon River tributaries	1,000,000	---
		Panther Creek	300,000	---
Hagerman	Sth-A	E.F. Salmon River	1,300,000	---
		Upper Salmon River	300,000	---

TABLET1

Evaluation of Major Operational Guidelines

Technical oversight of hatchery operations is provided to ensure: 1) consistency of operation with interagency agreements on principles, procedures, and goals for LSRCP operations; 2) maintenance of stock integrity; 3) adherence to fish distribution plans; 4) adherence to general operational criteria (i.e., size and time of release, brood stock selection, etc.); and 5) identification of hatchery problems, and development of plans to address the problems.

Attaining the optimum smolt size at the best time for release is critical to the success of the LSRCP. Existing size, time of release, and return data are reviewed and analyzed to develop criteria for each program. Coded wire tag groups are released as needed to test and compare new and old programs.

Selection of brood stock is accomplished in conformance with program objectives for genetics management. Usual objectives are to maintain the original size, run timing, and age composition of adult runs.

Special or experimental hatchery practices require mark-release-return groups to facilitate evaluation. A number of experimental groups are coded wire tagged or fin clipped to evaluate offsite releases, fishery contributions, and migrational timing. Monitoring of adult return is accomplished by enumerating fish returning to collection facilities and recording and analyzing marks or tags, either at collection sites or in the harvest. Pacific coastal state, federal, and Canadian agencies cooperate in returning tags and catch data to this agency. Project personnel compile and estimate contribution information for each rearing program that may have fish tagged for fishery contribution purposes. This information is presented in the LSRCP Coded Wire Tag Recovery report (Cochnauer and Norton, 1989).

Outplant Site Selection

Tributaries of the Clearwater and Salmon rivers are assessed to determine suitability of habitat for acceptable survival of salmon and steelhead juvenile outplants. Using these data, a distribution plan will be developed to provide stock-by-stock and stream-by-stream planting guidelines.

Augmentation of Natural Runs

Documentation of survival, from juveniles to returning adults, is determined by coded wire tag returns. Increases in juvenile salmon and steelhead densities, as a result of hatchery reared adults returning from juvenile plants or natural spawning, are determined by Idaho Fish and Game Department (IDFG) standardized snorkeling techniques in streams identified in Objective 2.

EVAL88

Chinook salmon redd counts are conducted on selected spawning grounds for evaluation of outplant success in comparison with wild or natural populations.

RESULTS

Hatchery Documentation

Magic Valley Hatchery

The year 1988 marked the first releases of A-run steelhead trout smolts from Magic Valley Hatchery. A total of 2,063,000 smolts were released at several sites in the Salmon River drainage (Table 2). A single coded wire tag group of 52,300 smolts was released into the Little Salmon River drainage as an offsite evaluation. This group of fish will begin returning in 1989 (Table 3).

The facility received 2.05 million A-run steelhead trout eggs from adults trapped at Pahsimeroi Hatchery, and 357,500 B-run steelhead trout eggs from adults trapped at East Fork Salmon River trap.

McCall Hatchery

Summer chinook salmon juveniles reared at the McCall facility and released into South Fork Salmon River, totaled 1,060,400 in 1988 (Table 4). Of these, 309,000 were coded wire tagged under the US/Canada Fishery Treaty to monitor contribution to ocean fisheries.

This year 2,393 adult chinook salmon returned to the South Fork Salmon River trap, and 850 were released above the weir to spawn naturally (Table 5). A total of 2,834,364 eggs were taken at the trap site, and all will be reared at the McCall Hatchery.

Preliminary scale analysis of•adults collected at the site suggests that less than 10% of the run was of natural origin. An in-depth scale analysis to determine composition of run will be initiated in 1989.

Based on coded wire tag returns, the 1983 brood year returned at a rate of 0.46%, similar to the previous two brood year returns (Table 6).

Red River Facility

This year was the first that a permanent weir was in place at the Red River facility. Returning spring chinook adults numbered 394, with 158 released above

Table 2. Release data for Magic Valley Hatchery steelhead trout, 1988.

Release site	Brood near	Release date	Stock	Number	Size (number/ pound	Mark & purpose
French Creek	1987	04/11-14/88	Upper Salmon A-run	100,000	4.56	
Hazard Creek	1987	04/12-23/88	Upper Salmon A-run	52,300	4.61	10/40/49 Offsite
Hazard Creek	1987	04/12-23/88	Upper Salmon A-run	649,000	4.61	
N.F. Salmon River	1987	04/05-10/88	Upper Salmon A-run	253,100	4.74	
Panther Creek	1987	04/11/88	Upper Salmon A-run	162,800	4.62	
Salmon River @Hammer Creek	1987	04/23-25/88	Upper Salmon A-run	87,200	4.71	
Salmon River @Sawtooth	1987	04/06-09/88	Upper Salmon A-run	57,500	4.68	
Salmon River @Shoup Bridge	1987	03/23-24/88	Upper Salmon A-run	147,000	4.73	
Slate Creek River	1987	04/18-25/88	Upper Salmon A-run	346,100	4.30	
Yankee Fork	1987	04/04-07/88	Upper Salmon A-run	208,000	4.69	

Table 3. Coded wire tag returns from steelhead trout (A-run) marked groups reared at Magic Valley Hatchery.

Tag code	Brood year	Year released	Number tagged releas	Number per pound	Release site	Purpose	Year returned 1989		1991	1992	1993	Total returns	Percen
10/40/49	1987	1988	52,300	4.61	Little Salmon	Offsite	-	-	-	-	-	-	-

TABLET2

Table 4. Release data for McCall Hatchery summer chinook salmon, 1988.

Release site	Brood year	Release date	Stock	Number	Size (number/ pound	Mark & purpose
Cabin Creek	1987	05/10/88	S. F. Salmon	101,900	518.1	
E.F. S.F. Salmon River	1987	05/16/88	S. F. Salmon	201,000	430.9	
Johnson Creek	1987	05/09/88	S. F. Salmon	107,600	439.2	
Johnson Creek	1987	05/31/88	S. F. Salmon	259,200	414.7	
Sand Creek	1987	05/09/88	S. F. Salmon	87,800	439.0	
S.F. Salmon River	1986	03/21-24/88	S. F. Salmon	247,800	18.7	10/30/32 US-Can
S.F. Salmon River	1986	03/23-24/88	S. F. Salmon	61,900	18.7	10/30/33 US-Can w/RD T-2
S.F. Salmon River	1986	03/21-24/88	S. F. Salmon	750,700	18.7	

TABLET1

Table 5. Results of summer chinook salmon trapping at S.F. Salmon River Facility.

Year	Trap operated	Trap removed	Males 1- ocean	Males 2- & 3- ocean	Females	Total	Released upstream Males	Released upstream Females	Green eggs taken
1980	Jul 19	Sep 10	186	148	46	380	209	21	92,116
1981	Jul 8	Sep 14	124	201	194	519	167	60	482,941
1982	Jul 20	Sep 7	48	306	196	550	112	45	648,520
1983	Jul 12	Sep 4	505	192	240	937	161	55	750,634
1984	Jul 9	Sep 5	595	431	503	1,529	213	124	1,526,832
1985	Jun 19	Sep 10	828	514	895	2,237	373	400	2,073,546
1986	Jun 27	Sep 9	1,222	757	711	2,690	257	212	2,148,722
1987	Jun 7	Sep 8	386	1,200	1,121	2,707	574	323	3,110,200
1988	Jun 20	Sep 9	50	940	1,403	2,393	399	451	2,834,364

TABLET1

Table 6. Coded wire tag returns for marked groups of summer chinook s#lmon to the South Fork Salmon River, 1988.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Purpose	Returns 1984	1985	1986	1987	1988	Total returns	Percent
10/01/01	1974	1976	78,725	38.4	Hat. Eval.	-	-	-	-	-	-	-
10/02/05	1975	1977	79,000	35.0	Hat. Eval.	-	-	-	-	-	-	-
10/03/23	1976	1978	72,200	40.0	Hat. Eval.	-	-	-	-	-	-	-
10/03/25	1977	1979	116,200	13.8	Hat. Eval.	-	-	-	-	-	-	-
10/21/17	1979	1981	40,450	17.5	Id. ctrl.	10	-	-	-	-	10	0.02
10/21/18	1979	1981	40,850	17.5	Id. ctrl.	21	-	-	-	-	21	0.05
10/21/28	1979	1981	47,625	17.5	Id. ctrl.	15	-	-	-	-	15	0.03
10/24/12	1980	1982	40,775	20.0	Vib. vac.	219	35	-	-	-	254	0.62
10/24/13	1980	1982	40,500	20.0	Ctrl Vib. vac	190	35	-	-	-	225	0.56
10/24/58	1981	1983	62,100	20.3	Hat. Eval.	187	294	16	-	-	497	0.80
10/27/38	1982	1984	50,000	15.8	Hat. Eval.	-	117	90	12	-	219	0.44
10/25/18	1983	1985	38,100	19.1	Hat.	-	-	28	66	83	177	0.46
10/26/33	1983	1985	40,100	19.1	Hat. Eval.	-	-	34	77	76	187	0.47
10/28/04	1984	1986	8,800	21.3	Production	-	-	-	1	9	10	0.11
10/28/12	1984	1986	39,800	21.3	Production	-	-	-	7	26	33	0.08
10/30/10	1984	1986	105,375	21.3	US - Canada	-	-	-	16	69	85	0.08
10/30/11	1984	1986	104,675	21.3	US - Canada	-	-		16	45	61	0.06
10/30/12	1984	1986	105,325	21.3	US - Canada	-	-	-	18	68	86	0.08
10/30/19	1985	1987	103,850	20.2	US - Canada	-	-	-	-	-	-	-
10/30/20	1985	1987	104,525	20.2	US - Canada	-	-	-	-	-	-	-
10/30/21	1985	1987	103,450	20.2	US - Canada	-	-	-		2	2	0.00
10/30/32	1986	1988	247,800	18.7	US - Canada	-	-	-	-	-	-	-
10/30/33	1986	1988	61,900	19.2	US - Canada	-	-	-	-	-	-	-

TABLET2

the weir (Table 7). Eggs taken were 361,000, and all were transferred to the Dworshak National Hatchery for incubation and juvenile rearing.

A total of 291,200 spring chinook fry were planted into the Red River rearing pond in June for rearing until release in late October (Table 8). Of these, 56,050 were coded wire tagged. A spring smolt release of 50,100 coded wire tagged fish was also made in Red River above the weir.

Evaluation of the the 1982 brood year spring versus fall release test (Table 9) showed that there was no significant difference between the two time-of-release groups (X^2=56.39, a=0.000).

Sawtooth Hatchery

A total of 100,600 spring chinook salmon juveniles (brood year 1986) were released into the Salmon River at the hatchery site in the fall of 1987. All of these fish were marked with a left ventral fin clip (LV) to be used in evaluating the fall release strategy. An additional 1,604,900 smolts of the same brood year were released in the spring of 1988 (Table 10), and 308,675 of these were marked with coded wire tags for contribution evaluation under the US/Canada Fishery Treaty program.

In 1988, 1,485 spring chinook salmon returned to the Sawtooth Hatchery weir, and of these, 552 were released above the weir (Table 11). Preliminary analysis of scales for origin indicated that approximately 25% were of natural origin. An in-depth scale analysis for origin will be initiated in 1989.

One 3-year-old chinook with an LV clip was recovered at the weir site in 1988. This compares with one recovered coded wire tagged fish from the same brood year, but released in the spring. It is too early in the return cycle to make any valid statement regarding the relative success of a fall release strategy.

The 1983 brood year chinook returned to Sawtooth Hatchery at an overall rate of 0.02% (Table 12), the lowest return rate of any fish group released at the facility. Comparative return rates for the 1981 and 1982 brood years were 0.16 and 0.77, respectively. A chi-square analysis between the 1981 and the 1983 brood years shows that there is a significant difference between the two years (X^2=349.05, a<.001).

Seven groups of steelhead trout fry reared at Sawtooth Hatchery were outplanted in various locations in the upper Salmon River drainage in 1988 (Table 13).

A total of 990 adult steelhead trout returned to the hatchery in 1988, with 365 being released above the weir (Table 14). Green eggs taken totalled 1.56 million.

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Table 7. Results of spring chinook salmon trapping at Red River facility, upper South Fork Clearwater River.

Year	Trap operated	Trap removed	Males 1- ocean	Males 2- & 3- ocean	Females	Total	Released upstream Males	Released upstream Females	Green eggs taken
1983*	Jul 12	Sep 12	-	65	73	138	ND	ND	ND
1984*	Jul 7	Sep 13	2	44	65	111	ND	ND	ND
1985*	Jun 21	Sep 11	2	67	56	125	ND	ND	ND
1986	Not installed		-	-	-	-	-	-	-
1987	May 14	Sep 14	35	264	220	519	116	82	4,527,100
1988	Jun 9	Sep 13	3	182	209	394	83	75	361,700

* Temporary weir

TABLET1

Table 8. Spring chinook salmon releases at the Red River facility.

Brood near	Release date	Stock	Number	Size (number/ Pound	Mark & Purpose
	1970	Clearwater River	298,511	ND	
1971	04/02-03/73	Rapid River	120,160	ND	
	1973	Rapid River	23,400	19.5	
1974	04/13-14/76	Rapid River	66,600	20.0	
	1975	Rapid River	43,500	ND	
	1976	Rapid River	350,000	ND	
	1977	Rapid River	37,200	ND	10/03/28 Pond eval
	1977	Rapid River	162,800	ND	
	1976	Rapid River	33,600	ND	
	1978	Rapid River	43,800	27.0	10/21/12 Pond eval
	1978	Rapid River	181,200	27.0	
	1979	Rapid River	51,000	25.0	10/21/27 Contributio
	1979	Rapid River	214,000	25.0	n
	1980	Carson	268,000	17.0	
	1982	Rapid River	60,900	21.0	10/24/59 Fall rel.
	1982	Rapid River	199,100	21.0	
	1982	Rapid River	40,725	ND	10/24/63 Spring rel.
	1983	Red River	80,000	22.0	
	1984	Red River	136,800	30.0	
	1985	Rapid River	96,400	ND	
	1985	Rapid River	30,100	32.0	10/29/57 Spring rel.
	1985	Rapid River	19,200	32.0	10/29/62 Spring rel.
	1985	Rapid River	98,800	ND	
	1986	Rapid River	46,100	41.0	10/40/01 Fall rel.
	1986	Rapid River	186,900	41.0	
	1986	Clearwater River	50,100	ND	
	1987	Clearwater River	56,050	25.0	10/40/02 Fall Rel.
	1987 10/12/8	Clearwater River	235,150	25.0	

TABLET1

Table 9. Coded wire tag returns of spring chinook salmon to the Red River facility.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Purpose	Year returned 1984	1985	1986	1987	1988	Total returns	Percent
10/03/28	1977	1978	37,200	ND	Pond eval.	-	-	-	-	-		_
10/21/12	1978	1979	43,800	27.0	Pond eval.	-	-	-	-	-	_	_
10/21/27	1979	1980	51,000	25.0	Contribution	-	-	-	_	_	_	_
10/24/59	1982	1983	60,900	21.0	Fall Rel.	-	-	-	12		12	0.02
10/24/63	1982	1984	40,725	21.0	Spring Rel.	-	-	-	8	-	8	0.02
10/29/57	1985	1987	30,100	32.0	Spring Rel.	-	-	-		_	_	_
10/29/62	1985	1987	19,200	32.0	Spring Rel.	-	-	-	-	-	_	_
10/40/01	1986	1987	46,100	-	Fall Rel.	-	-		-	-	-	_
10/40/02	1987	1988	54,375	25.4	Fall Rel.	-	-	-	-	-	-	_

Table 10. Release data for Sawtooth Hatchery spring chinook salmon, 1988.

Release site	Brood year	Release date	Stock	Number	Size (number/pound	Mark & purpose
E.F. Salmon River	1986	3/15-16/88	E.F. Salmon River	46,575	19.5	10/29/37 Offsite
E.F. Salmon River	1986	3/15-16/88	E.F. Salmon River	202,625	19.5	
Pole Creek		09/06/88	Salmon R.	32	.04	Adults
Salmon River @Sawtooth	1986	10/15/87	Salmon R.	100,600	23.0	Fall Eval LV clip
Salmon River @Sawtooth	1986	3/15/88	Salmon R.	246,575	20.5	10/30/30 US/Can
Salmon River @Sawtooth	1986	3/15/88	Salmon R.	62,100	20.5	10/30/31 US/Can
Salmon River @Sawtooth	1986	3/15/88	Salmon R.	1,296,225	20.5	
Pole Creek	1987	06/14/88	Salmon R.	24,000	80.0	

TABLET1

Table 11. Results of spring chinook salmon trapping at Sawtooth Hatchery upper Salmon River.

Year	Trap operated	Trap removed	Males 1- ocean	Males 2- & 3- ocean	Females	Total	Released upstream Males	Released upstream Females	Green eggs taken
1981	Jun 25	Sep 9	23	257	449	729	0	255	647,555
1982	Jun 29	Sep 26	16	135	111	262	0	12	451,902
1983	Jul 19	Sep 6	17	170	179	366	78	19	650,196
1984	Jul 7	Sep 6	76	142	187	405	140	65	601,671
1985	Jun 14	Sep 25	296	786	557	1,639	445	180	1,418,920
1986	Jun 20	Sep 9	51	992	726	1,769	628	248	1,856,298
1987	May 13	Sep 8	17	627	700	1,344	254	252	2,721,400
1988	May 23	Sep 6	80	552	853	1,485	247	305	3,120,668

TABLET1

Table 12. Coded wire tag returns of spring chinook salmon to Sawtooth Hatchery.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Release site	Purpose	Year returned 1984	1985	1986	1987	1988	Total returns	Percent
10/24/08	1981	1983	35,075	28.7	Salmon R. Above Sawtooth	Hatchery evaluation	3	51	15	-	-	69	0.20
10/25/35	1981	1983	51,450	28.7	Salmon R. Above Sawtooth	Hatchery evaluation	2	69	9	-	-	80	0.16
10/27/08	1982	1984	51,025	17.0	Salmon R. Above Sawtooth	Hatchery evaluation	-	83	218	77	-	378	0.70
10/27/09	1982	1984	50,600	17.0	Salmon R. Above Sawtooth	Hatchery evaluation	-	72	183	77	-	332	0.70
10/26/34	1983	1985	41,200	22.5	Salmon R. Above Sawtooth	Hatchery evaluation	-	-	-	2	2	4	0.00
10/26/35	1983	1985	38,150	22.5	Salmon R. Above Sawtooth	Hatchery evaluation	-	-	2	1	4	7	0.02
10/28/45	1984	1986	37,550	26.3	Sawtooth H.	Hatchery evaluation	-	-	-	1	2	3	0.00
10/28/46	1984	1986	38,300	26.3	Sawtooth H.	Hatchery evaluation	-	-	-	-	1	1	0.00
10/30/16	1985	1987	100,450	30.0	Sawtooth H.	US-Canada	-	-	-	-	1	1	0.00
10/30/17	1985	1987	101,175	30.0	Sawtooth H.	US-Canada	-	-	-	-	-	-	-
10/30/18	1985	1987	101,850	30.0	Sawtooth H.	US-Canada	-	-	-	-	-	-	-
10/30/30	1986	1988	246,600	-	Sawtooth H.	US-Canada	-	-	-	-	-	-	-
10/30/31	1986	1988	62,100	-	Sawtooth H.	US-Canada	-	-	-	-	-	-	-

Table 13. Release data for Sawtooth Hatchery. A-run steelhead fry outplants, 1988.

Release site	Release date	Stock	Number	Size (number/ Pound
Alturas Lake Creek	06/22-25/88	Salmon R.	104,800	2,758
Basin Creek	07/04/88	Salmon R.	83,600	2,533
Pole Creek	06/25-07/01/88	Salmon R.	105,700	2,689
Redfish Lake Creek	07/11/88	Salmon R.	17,500	2,500
Salmon River	06/28-07/08/88	Salmon R.	327,200	2,736
Valley Creek	06/14/88	Salmon R.	201,000	2,716
W.F. Yankee Fork	07/06/88	Salmon R.	242,000	2,701
Upper Yankee Fork	07/04/88	Salmon R.	100,300	2,229

TABLET1

Table 14. Results of A-run steelhead trout trapping at Sawtooth Hatchery, upper Salmon River.

Year	Trap operated	Trap removed	Males	Females	Total	Released upstream		Green eggs taken
						Males	Females	
1985	Mar 14	May 10	149	377	526	114	92	1,618,755
1986	Mar 16	Apr 23	1,271	941	2,212	743	322	2,765,760
1987	Mar 7	May 1	1,074	1,113	2,187	596	383	3,504,000
1988	Mar 3	May 3	546	444	990	229	136	1,568,200

TABLET1

East Fork Salmon River Trap

Spring chinook salmon returning to the East Fork Salmon River facility totaled 548, with 202 released above the weir (Table 15). Chinook salmon eggs *taken* totaled 790,000 and were transferred to Hagerman National Hatchery for incubation.

Coded wire tag marked chinook salmon should begin returning to the facility in 1988 (Table 16).

Two hundred ten B-run steelhead were trapped and 72 were released above the weir in 1988 (Table 17). Approximately 440,000 eggs were taken and transferred to Hagerman National Hatchery for incubation and rearing.

Powell Trap

Coded wire tagged spring chinook salmon released at the Powell facility (White Sands Creek) are listed in Table 18. Return estimates are not available at this point in the upper Lochsa River program.

Dworshak Hatchery

Compilation and analysis of returns and releases for LSRCP reared spring chinook salmon are reported by the U.S. Fish and Wildlife Service Fisheries Assistance Office at Dworshak Hatchery (Miller et al. 1988). Summaries of releases and adult returns are presented in Tables 19 and 20. A total of 1,132,152 spring chinook smolts (Rapid River stock) were released directly into the North Fork Clearwater River at the hatchery site in 1988. Of these, 187,325 were coded wire tagged. A release of 222,737 age `0' chinook salmon fry (BY 1987) was also made in spring 1988. In addition, 192,125 age `0' chinook salmon fry (BY 1987) were released in the early fall of 1988.

Complete returns of coded wire tagged chinook salmon released at Dworshak Hatchery will not be available until 1989 when the 1986 brood year returns are complete (Table 21).

Hagerman Hatchery

Hagerman Hatchery reared 1,969,894 A-run and B-run steelhead trout juveniles for release at several locations (Table 22). Of these, 153,700 were coded wire tagged to determine contribution from three release sites.

The hatchery received 440,000 B-run steelhead trout eggs from the East Fork Salmon River facility in 1988.

EVAL88

Table 15. Results of spring chinook salmon trapping at E.F. Salmon River facility.

Year	Trap operated	Trap removed	Males 1- ocean	Males 2- & 3- ocean	Females	Total	Released upstream Males	Released upstream Females	Green eggs taken
1984	Jun 20	Sep 7	22	60	35	117	58	7	171,308
1985	Jun 11	Sep 4	50	190	63	303	124	18	245,175
1986	May 27	Sep 9	5	110	79	194	101	25	283,419
1987	May 11	Sep 3	1	158	113	272	61	37	419,600
1988	Jun 1	Sep 1	6	272	270	548	103	99	790,512

TABLET1

Table 17. Results of B-run steelhead trout trapping at E.F. Salmon River facility.

Year	Trap operated	Trap removed	Males	Females	Total	Released upstream		Green eggs taken
						Males	Females	
1984	Mar 16	May 10	14	26	40	14	26	0
1985	Mar 15	May 22	47	30	77	0	0	129,740
1986	Mar 17	Apr 27	266	177	443	ND	160	529,776
1987	Mar 12	Apr 30	88	136	224	62	49	445,400
1988	Mar 15	May 2	90	120	210	31	41	440,200

TABLET1

Table 18. Coded wire tag returns of spring chinook salmon to the Powell facility.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Release Site	Purpose	Year returned 1987	1988	1989	1990	1991	Total returns	Percent
10/29/58	1984	1986	29,500	32.0	White Sands Cr.	Offsite	0	0	-	-	-	-	
10/29/59	1984	1986	20,925	32.0	White Sands Cr.	Offsite	0	0	_	_	_	_	
10/29/56	1985	1987	39,700	25.0	White Sands Cr.	Offsite	-	0	_	_	_	_	
10/29/61	1985	1987	9,625	25.0	White Sands Cr.	Offsite	-	0	_	_	_	_	

Table 19. Release data for Dworshak Hatchery reared spring chinook, 1988.

Release site	Brood year	Release date	Stock	Number	Size (number/ pound	Mark & purpose
American River	1987	05/24/88	Clearwater	81,501	152	
Lolo Creek	1987	05/25/88	Clearwater	43,722	160	
Newsome Creek	1987	05/24/88	Clearwater	84,766	157	
North Fork Clearwater	1987	03/30/88	Clearwater	62,700	85.6	10/40/52 Age 0 20,623 w\LA H-1
North Fork Clearwater	1987	03/30/88	Clearwater	62,175	85.6	10/40/53 Age 0 21,106 w\LA H-1
North Fork Clearwater	1987	03/30/88	Clearwater	62,825	85.6	10/40/54 Age 0 20,771 w\LA H-1
North Fork Clearwater	1986	03/30/88	Clearwater	35,037	85.6	
North Fork Clearwater	1986	03/30/88	Rapid river	62,337	20.61	10/40/55 20,587 w\LA T-2
North Fork Clearwater	1986	03/30/88	Rapid river	60,934	20.61	10/40/56 21,252 w\LA T-2
North Fork Clearwater	1986	03/30/88	Rapid river	64,015	20.61	10/40/57 20,506 w\LA T-2
North Fork Clearwater	1986	03/30/88	Rapid river	944,866	20.61	
North Fork Clearwater	1987	09/28/88	Clearwater	63,775	33.12	5/40/10 21,741 w\RD R-1
North Fork Clearwater	1987	09/28/88	Clearwater	63,975	33.12	5/40/11 20,995 w\RD R-2
North Fork Clearwater	1987	09/28/88	Clearwater	64,375	33.12	5/40/12 20,926 w\RD R-3
White Sands Creek	1986	03/17/88	Rapid river	200,105	22.42	

TABLET1

Table 20. Results of spring chinook salmon trapping at Dworshak National Fish Hatchery, Clearwater River.

Year	Trap operated	Trap removed	Males 1- 2- & 3-ocean	Males ocean	Females	Total	Released upstream Males	Released upstream Females	Green eggs taken
1984	Jun 1	Sep 10	14	ND	ND	82	0	0	*600,600
1985	Jun 1	Sep 10	13	150	171	334	0	0	1,587,600
1986	Jun 1	Sep 12	80	ND	ND	492	0	0	1,241,176
1987	May 22	Sep 8	25	ND	ND	2,017	0	0	3,487,500
1988	May 17	Sep 6	163	ND	ND	1,972	0	0	4,910,842

* Dworshak and Kooskia Hatcheries combined.

TABLET1

Table 21. Coded wire tag returns of spring chinook salmon reared at Dworshak Hatchery.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Release site	Purpose	Year returned 1984	1985	1986	1987	1988	Total returns	Percent
5/05/30	1980	1982	54,225	20.1	Clear Cr.	Ident. Hatchery eval. Size at release	1	-	-	-	-	1	0.00
5/06/59	1980	1982	46,950	9.4	Clear Cr.	Ident. Hatchery eval. Size at release	0	-	-	-	-	-	-
10/25/20	1984	1986	41,075	19.8	North Fork Clearwater	Ident.	-	-	-	0	21	21	0.05
10/28/43	1984	1986	41,850	19.8	North Fork Clearwater	Ident. Diet feed trials	-	-	-	2	22	24	0.06
10/29/36	1985	1987	49,750	24.0	North Fork Clearwater	Production	-	-	-	-	2	2	0.00
5/17/51	1986	1987	53,850	39.6	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
10/28/13	1986	1987	30,125	39.6	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
10/29/30	1986	1987	9,800	39.6	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
10/29/34	1986	1987	53,850	39.6	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
10/40/52	1986	1988	62,700	85.6	North Fork Clearwater	Age 0	-	-	-	-	-	-	-
10/40/53	1986	1988	62,175	85.6	North Fork Clearwater	Age 0	-	-	-	-	-	-	-
10/40/54	1986	1988	62,825	85.6	North Fork Clearwater	Age 0	-	-	-	-	-	-	-
10/40/55	1986	1988	62,350	20.6	North Fork Clearwater	Spring release	-	-	-	-	-	-	-
10/40/56	1986	1988	60,950	20.6	North Fork Clearwater	Spring release	-	-	-	-	-	-	-
10/40/57	1986	1988	64,025	20.6	North Fork Clearwater	Spring release	-	-	-	-	-	-	-
5/40/10	1987	1988	63,775	33.1	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
5/40/11	1987	1988	63,975	33.1	North Fork Clearwater	Fall release	-	-	-	-	-	-	-
5/40/12	1987	1988	64,375	33.1	North Fork Clearwater	Fall release	-	-	-	-	-	-	-

TABLET2

Table 22. 'Release data for Hagerman Hatchery summer steelhead, 1988.

Release site	Brood year	Release date	Stock	Number	Size (number/ pound)	Mark & purpose
Snake River @Hells Canyon	1987	11/05/87	A Run	344,049	26.48	
E.F. Salmon River	1987	04/04-11/88	A Run	51,725	4.82	10/29/38 Offsite
E.F. Salmon River	1987	04/04-11/88	B Run	251,839	4.82	
Salmon River @Sawtooth	1987	04/13-25/88	A Run	51,925	4.62	10/29/39 Offsite
Salmon River @Sawtooth	1987	04/13-25/88	A Run	1,143,820	4.62	
Slate Creek	1987	04/25/88	A Run	50,050	4.81	10/40/50 Offsite
Slate Creek	1987	04/25/88	A Run	672	4.81	

TABLET1

Hagerman Hatchery reared fish returning to release sites during this reporting period included the 1984 brood year A-run steelhead trout to Sawtooth Hatchery and Hazard Creek, B-run steelhead (Table 23) to East Fork Salmon River and Hazard Creek, and other releases (Table 24). A full age complement of adult steelhead for the 1984 brood year will not be available until 1989.

The 1983 brood year (1984 release) was used to determine return rates of small (8.4/lb) versus large (5.0/lb) steelhead trout smolts. These returns were complete in 1988 (Table 23). The large smolts returned at a significantly higher rate (X^2=43.54. a<.001). The results are similar to the 1982 brood year test group of small (5.3/lb) and large (2.1/lb) steelhead smolts (Rohrer 1988). Both large smolt groups returned at a rate greater than three times the small size smolts.

The hatchery received 790,000 spring chinook salmon eggs from the East Fork Salmon River facility.

Spring and fall chinook salmon programs at Hagerman have been terminated with minimal recoveries of coded wire tagged fish (Tables 25 and 26)at trapping sites, but did show substantial returns to downstream Columbia River fisheries.

Outplant Site Selection

The criteria for selecting streams for outplanting different life history phases and species included whether or not either steelhead trout or chinook salmon were present in the stream historically, and whether or not the stream had a history of receiving hatchery plants. The selected streams are listed in Table 27.

Augmentation of Natural Runs

This is the first year that many of the designated streams were monitored by snorkeling for summer juvenile salmon and steelhead densities (Tables 28 and 29). Resident fish species densities were also documented (Appendices A and B).

Chinook salmon redd counts (Figures 1, 2, and 3; Tables 30 through 35) have shown an upward but stabilizing trend since the early 1980s, when some of the lowest counts on record were observed. The influence of hatchery outplants programs is best seen in the Red River numbers (Table 32), even though two-thirds of the runs are retained and spawned at the Red River trapping facility.

Table 23. Coded wire tag returns of A-run steelhead trout reared at Hagerman National Fish Hatchery.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Purpose	Site released	Returns 1981	1982	1983	1984	1985	1986	1987	1988	Total returns	percent
5/4/22	1978	1979	60,000	5.5	Ident. Cold cond.	Pahsimeroi R.	4	163	8	-	-	-	-	-	175	0.29
5/04/23	1978	1979	56,300	3.5	Ident. ctrl. Size at release	Pahsimeroi R.	2	112	4	-	-	-	-	-	118	0.20
5/04/24	1978	1979	41,430	9.2	Ident. ctrl. Size at release		1	57	3	-	-	-	-	-	61	0.15
5/06/35	1979	1980	36,775	5.4	Id. Cold Cond. Size at release	Pahsimeroi R.	-	4	91	3	-	-	-	-	98	0.26
5/06/36	1979	1980	39,825	5.2	Id. Cold Cond. Size at release	Pahsimeroi R.	-	11	105	6	-	-	-	-	122	0.31
5/06/37	1979	1980	34,300	3.7	Id. Cold Cond. Size at release	Pahsimeroi R.	-	24	180	12	-	-	-	-	216	0.63
10/22/39	1980	1981	49,550	3.7	Id. stock eval.	Pahsimeroi R.	-	-	94	9	0	-	-	-	103	0.21
10/22/40	1980	1981	38,425	7.1	Id. stock eval. Dworshak B	Pahsimeroi R.	-	-	6	35	1	-	-	-	42	0.11
5/10/20	1981	1982	58,950	2.5	Id. stock eval. Pahsimeroi A	Pahsimeroi R.	-	-	-	269	97	0	-	-	366	0.62
5/13/33	1982	1983	38,825	2.1	Hatchery eval. Size at release large	Decker Flat	-	-	-	-	21	2	1	-	24	0.06
5/13/34	1982	1983	39,125	5.3	Hatchery eval. Size at release small	Decker Flat	-	-	-	-	3	1	0	-	4	0.01
5/10/28	1983	1984	38,775	8.4	Hatchery eval. Size at release small	Decker Flat	-	-	-	-	-	11	1	0	12	0.03
5/10/29	1983	1984	36,800	5.0	Hatchery eval. Size at release large	Decker Flat	-	-	-	-	-	33	3	3	39	0.11
5/13/36	1983	1984	90,925	6.0	Hatchery eval. stock Pahs. A	Hazard Cr.	-	-	-	-	-	0	0	0	0	-
10/26/30	1984	1985	40,475	4.5	Id. Hat. eval. Migration	Sawtooth Hat.	-	-	-	-	-	-	51	12	63	0.16
10/26/32	1984	1985	39,175	4.2	Id. Hat. eval.	Hazard Cr.	-	-	-	-	-	-	0	0	0	-
10/28/01	1985	1986	9,450	4.75	Ident.	Sawtooth Hat.	-	-	-	-	-	-	-	6	6	0.06
10/28/05	1985	1986	8,650	4.26	Ident.	Hazard Cr.	-	-	-	-	-	-	-	0	0	-
10/28/42	1985	1986	35,475	4.41	Ident.	Hazard Cr.	-	-	-	-	-	-	-	0	0	-
10/28/44	1985	1986	39,125	4.41	Ident.	Sawtooth Hat.	-	-	-	-	-	-	-	30	30	0.07
10/29/25	1986	1987	50,250	4.50	Offsite	Hazard Cr.	-	-	-	-	-	-	-	-	-	-
10/29/48	1986	1987	24,950	4.50	Offsite	Sawtooth Hat.	-	-	-	-	-	-	-	-	-	-
10/29/39	1987	1988	51,925	4.89	Offsite	Sawtooth Hat.	-	-	-	-	-	-	-	-	-	-
10/40/50	1987	1988	50,050	4.81	Ident.	Slate Cr.	-	-	-	-	-	-	-	-	-	-

TABLET2

Table 24. Coded wire tag returns of B-run steelhead trout reared at Hagerman National Fish Hatchery.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Purpose	Site released	Returns 1982	1983	1984	1985	1986	1987	1988	Total returns	percent
5/10/21	1981	1982	56,525	4.2	Id. stock eval.	Pahsimeroi R.	-	37	252	3	-	-	-	292	0.52
10/24/60	1982	1983	37,600	3.6	Pahsimeroi B Hatchery eval. stock evaluation	East Fork Salmon R.	-	-	0	3	8	-	-	11	0.03
10/28/06	1983	1984	54,625	7.3	Pahsimeroi B Hatchery eval. stock evaluation	Hazard Cr.	-	-	-	-	0	0	0	0	-
10/28/07	1983	1984	37,175	7.3	Pahsimeroi B Hatchery eval. stock evaluation	Hazard Cr.	-	-	-	-	0	0	0	0	-
10/26/31	1984	1985	39,375	4.6	Pahsimeroi B Hatchery eval.	E.F. Salmon R.	-	-	-	-	-	10	3	13	0.03
10/26/36	1984	1985	35,225	4.8	Hatchery eval.	E.F. Salmon R.	-	-	-	-	-	5	10	15	0.04
10/28/02	1984	1985	8,100	4.4	Time release Middle	E.F. Salmon R.	-	-	-	-	-	0	7	7	0.09
10/28/03	1984	1985	16,950	4.8	Time release Middle	E.F. Salmon R.	-	-	-	-	-	0	11	11	0.06
10/28/54	1984	1985	25,525	4.3	Time release Late	E.F. Salmon R.	-	-	-	-	-	3	8	11	0.04
10/28/55	1984	1985	17,425	5.0	Time release Early	E.F. Salmon R.	-	-	-	-	-	0	6	6	0.03
10/28/20	1985	1986	25,325	4.62	Ident.	E.F. Salmon R.	-	-	-	-	-	-	0	0	-
10/29/26	1986	1987	48,050	4.50	Offsite	Slate Cr.	-	-	-	-	-	-	-	-	-
10/29/49	1986	1987	24,150	4.50	Offsite	E.F. Salmon R.	-	-	-	-	-		-	-	-
10/29/38	1987	1988	51,725	4.98	Offsite	E.F. Salmon R.	-	-	-	-	-	-	-	-	-

Table 25. Coded wire tag recoveries of spring chinook salmon reared at Hagerman Hatchery.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Release site	Purpose	Year returned 1984	1985	1986	1987	1988	Total returns	Percent
10/25/15	1982	1983	34,800	24.7	Clear Cr.	Age of release Disease Kidney	-	0	0	1	-	1	0.00
10/26/06	1983	1984	33,600	54.4	Clearwater R.	Hatchery eval. K.D. control	-	0	5	0	-	5	0.01
10/26/07	1983	1984	33,650	54.4	Clearwater R.	Hatchery eval. K.D. control	-	0	0	1	-	1	0.00
10/26/08	1983	1984	32,100	54.4	Clearwater R.	Hatchery eval. Kidney Erythromycin		0	0	0	1	1	0.00
10/26/09	1983	1984	30,200	54.4	Clearwater R.	Hatchery eval. Kidney Erythromycin	-	0	0	0	1	1	0.00

TABLET2

Table 26. Coded wire tag recoveries of Hagerman National Fish Hatchery reared fall chinook salmon.

Tag code	Brood year	Year released	Number tagged released	Number per pound	Purpose	Site released	Returns 1982	1983	1984	1985	1986	1987	Total returns	percent
5/04/20	1978	1979	51,000	84.0	Ident. Migration	Lower Granite Dam	1	-	-	-	-	-	1	0.00
5/04/21	1978	1979	44,000	92.2	Transportation Ident. Migration	Asotin WA.	0	-	-	-	-	-	0	0.00
5/05/27	1979	1980	58,100	57.9	Size at release Ident. Control	Asotin WA.	0	0	1	-	-	-	1	0.00
5/05/28	1979	1980	56,000	59.2	Release location	Below Bonneville	0	0	-	-	-	-	0	0.00
10/22/10	1980	1981	55,400	34.1	Release location Transportation	Lower Granite Dam	0	0	28	-	-	-	28	0.05
10/22/11	1980	1981	55,700	51.4	Transportation stock evaluation Ident. Transportation	Below Bonneville	0	0	22	-	-	-	22	0.04
5/10/22	1981	1982	78,300	37.4	Migration Ident. Transportation	Asotin WA.	-	0	139	214	-	-	353	0.45
5/10/23	1981	1982	80,425	37.6	Migration Release loc.	Lower Granite Dam	-	0	134	178	-	-	312	0.39
5/13/54	1983	1984	59,300	71.0	Transportation Ident. Hatchery eval.	Snake R.	-	-	-	19	123	97	239	0.40
5/13/53	1984	1985	54,425	52.2	Ident. Hatchery eval.	Snake R.	-	-	-	-	21	170	189	380	0.70

TABLET2

Table 27. Proposed streams for outplant scheduling under Lower Snake River Compensation Plan program.

Species	Hatchery	Release site	Drainage	Life stage	Number
Summer Chinook	McCall	Johnson Cr.	S.F. Salmon R.	Pre-smolt	200,000
		E.F. S.F. Salmon R.	S.F. Salmon R.	Pre-smolt	100,000
Spring Chinook	Sawtooth	E.F. Salmon R.	Salmon R.	Smolt	700,000
		Valley Cr.	Salmon R.	Smolt	100,000
		Yankee Fork	Salmon R.	Smolt	200,000
		Upper Salmon tribs.	Salmon R.	Pre-smolt	200,000
		Yankee Fork	Salmon R.	Pre-smolt	200,000
		E.F. Salmon R.	Salmon R.	Pre-smolt	200,000
		Slate Cr.	Salmon R.	Pre-smolt	100,000
Spring Chinook	Dworshak	Lolo Cr.	Clearwater R.	Smolt	200,000
		Newsome Cr.	S.F. Clearwater R.	Smolt	200,000
		American R.	S.F. Clearwater R.	Smolt	100,000
		Lolo Cr.	Clearwater R.	Pre-smolt	200,000
		S.F. Clearwater R.	Clearwater R.	Pre-smolt	300,000
Spring Chinook	Clearwater	Lochsa tribs.	Clearwater R.	Pre-smolt	500,000
		S.F. Clearwater R.	Clearwater R.	Pre-smolt	500,000
Steelhead A-Run	Magic Valley	Little Salmon R.	Salmon R.	Smolt	300,000
		Lower Salmon R. @ Rice Cr.	Salmon R.	Smolt	400,000
		Panther Cr.	Salmon R.	Smolt	300,000
Steelhead A-Run	Hagerman N.F.H.	Upper Salmon R. tribs.	Salmon R.	Smolt	700,000
Steelhead B-Run		E.F. Salmon R.	Salmon R.	Smolt	1,000,000
Steelhead B-Run	Clearwater	Crooked R.	S.F. Clearwater R.	Smolt	500,000
		Lochsa R.	Clearwater R.	Smolt	1,000,000
		Captain John Cr.	Snake R.	Smolt	300,000
		Slate Cr.	Salmon R.	Smolt	500,000
		Clearwater tribs.	Clearwater R.	Fry	1,000,000

Table 28. Chinook salmon and steelhead trout mid-summer densities(fish/100 m2) determined by IDFG standard snorkeling techniques in Salmon River drainage, 1988.

Stream:	Rainbow-steel head Age 0	Age I	Age II	Resident	Hatchery	Totals	Chinook Age 0	Age I	Totals
SALMON RIVER DRAINAGE									
Salmon River									
Mainstem	0.00	0.67	0.30	0.00	0.00	0.97	9.27	0.00	9.27
Slate Creek	7.42	10.68	6.79	0.49	2.11	27.49	0.26	0.36	0.62
Whitebird Creek	53.25	28.24	14.31	2.18	0.00	97.98	0.28	0.00	0.28
Yankee Fork	2.04	4.07	0.00	0.00	0.00	6.11	10.42	0.00	10.42
West Fork									
Yankee Fork	3.03	5.21	0.00	0.00	0.00	8.24	21.21	0.00	21.21
Valley Creek	0.00	0.57	0.08	0.00	0.00	0.65	16.45	0.00	16.45
SOUTH FORK SALMON RIVER									
Johnson Creek	1.89	1.09	1.45	0.00	0.56	4.99	6.05	0.04	6.09

TABLET2

Table 29. Chinook salmon and steelhead trout densities (per 100 m2) by IDFG standard snorkeling techniques in Clearwater River Drainage, 1988.

	Rainbow-steel						Chinook		
Stream:	Age 0	Age I	Age II	Resident	Hatchery	Totals	Age 0	Age I	Totals
CLEARWATER RIVER DRAINAGE									
Lolo Creek	25.66	1.84	0.36	0.00	0.00	27.86	45.82	0.08	45.90
Eldorado Creek	2.30	3.10	1.20	0.00	0.10	6.70	5.97	0.04	6.01
SOUTH FORK CLEARWATER RIVER DRAINAGE									
Newsome Creek	0.21	9.55	6.99	0.14	0.00	16.89	9.91	47.94	57.85
Johns Creek	5.10	4.05	2.35	0.00	0.00	11.50	0.49	0.00	0.49
Red River	0.00	0.65	0.41	0.00	0.00	1.06	25.57	0.00	25.57
Crooked River	0.00	10.44	0.82	0.00	0.00	11.26	31.46	0.00	31.46
Meadow Creek	0.00	6.59	0.39	0.00	0.00	6.98	31.27	0.00	31.27
LOCHSA RIVER DRAINAGE									
Lochsa River	0.81	0.19	0.03	0.31	0.00	1.34	0.02	0.00	0.02
Old Man Creek	19.56	41.69	3.31	0.00	0.00	64.56	0.00	0.00	0.00
Fish Creek	11.87	9.86	3.65	0.16	0.00	25.54	0.03	0.00	0.03
Post Office Creek	19.58	0.86	0.00	0.00	0.00	20.44	0.00	0.00	0.00
Warm Springs Creek	11.44	2.58	1.81	0.75	0.00	16.58	0.00	0.00	0.00
Brushy Fork Creek	5.83	2.92	1.29	2.10	0.00	12.14	16.71	0.00	16.71
Crooked Fork Creek	20.48	3.65	5.24	2.21	0.00	31.58	32.30	13.00	45.30
Boulder Creek	0.00	6.60	3.10	0.00	0.00	9.70	9.02	0.00	9.02
White Sands Creek	0.00	0.91	0.27	0.00	0.00	1.18	38.89	0.00	38.89
SELWAY RIVER DRAINAGE									
Mainstem	0.90	0.21	0.21	0.00	0.00	1.32	0.47	0.00	0.47
Running Creek	4.97	3.44	0.23	0.00	0.00	8.64	0.00	0.00	0.00
Moose Creek	3.57	1.77	1.12	0.15	0.00	6.61	0.47	0.00	0.47
Bear Creek	1.71	2.28	1.24	0.60	0.11	5.94	1.39	0.12	1.51
Three Links Creek	6.44	12.13	8.72	2.03	0.00	29.32	0.00	0.00	0.00
Meadow Creek	0.00	0.00	0.03	0.00	0.00	0.03	0.84	0.00	0.84
Otter Creek	10.11	5.05	0.00	11.79	0.00	26.95	0.00	0.00	0.00

TABLET2

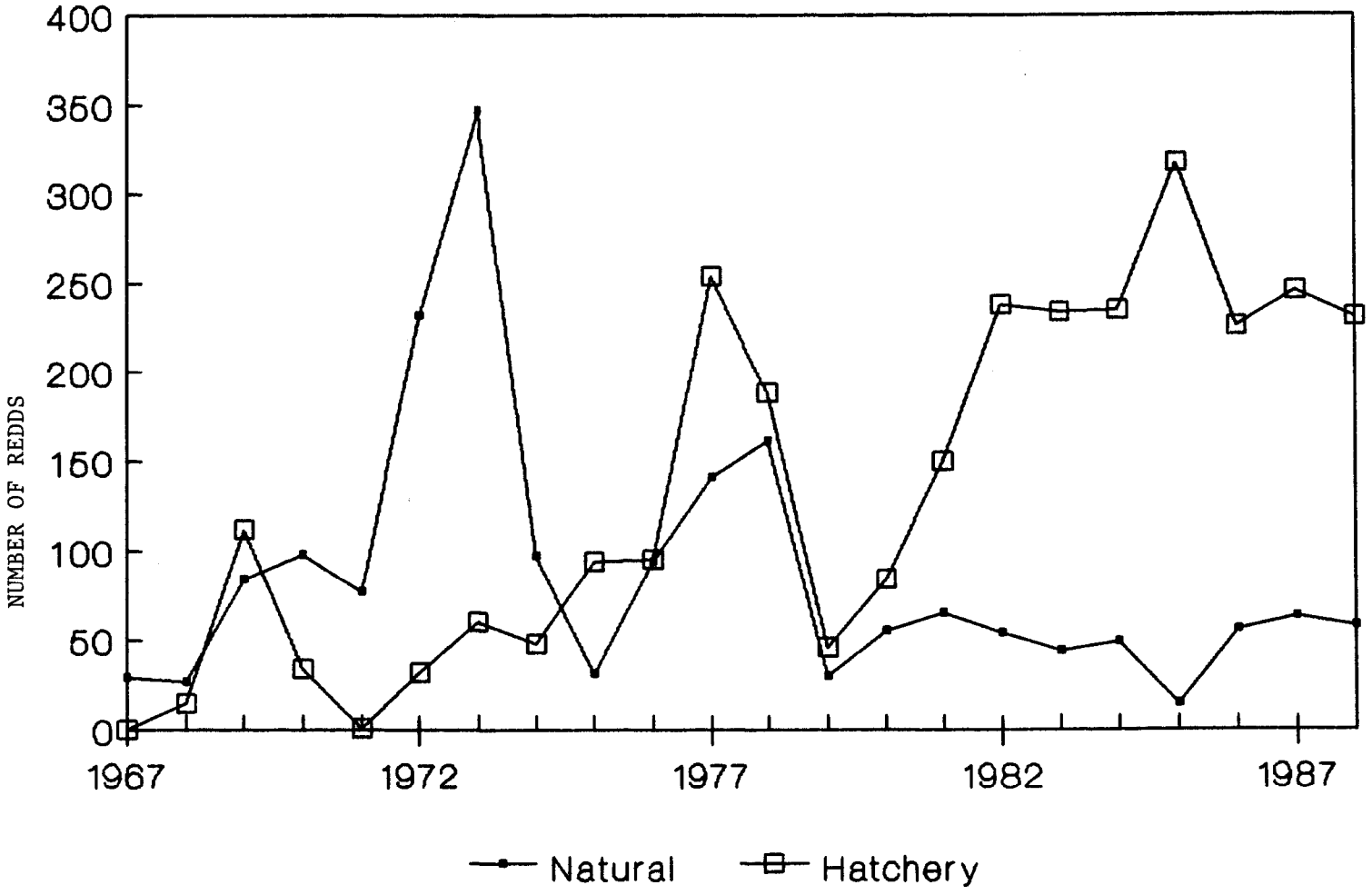

Figure 1. Historic spring chinook salmon redd counts for LSRCP evaluations streams in the Clearwater River drainage, Idaho.

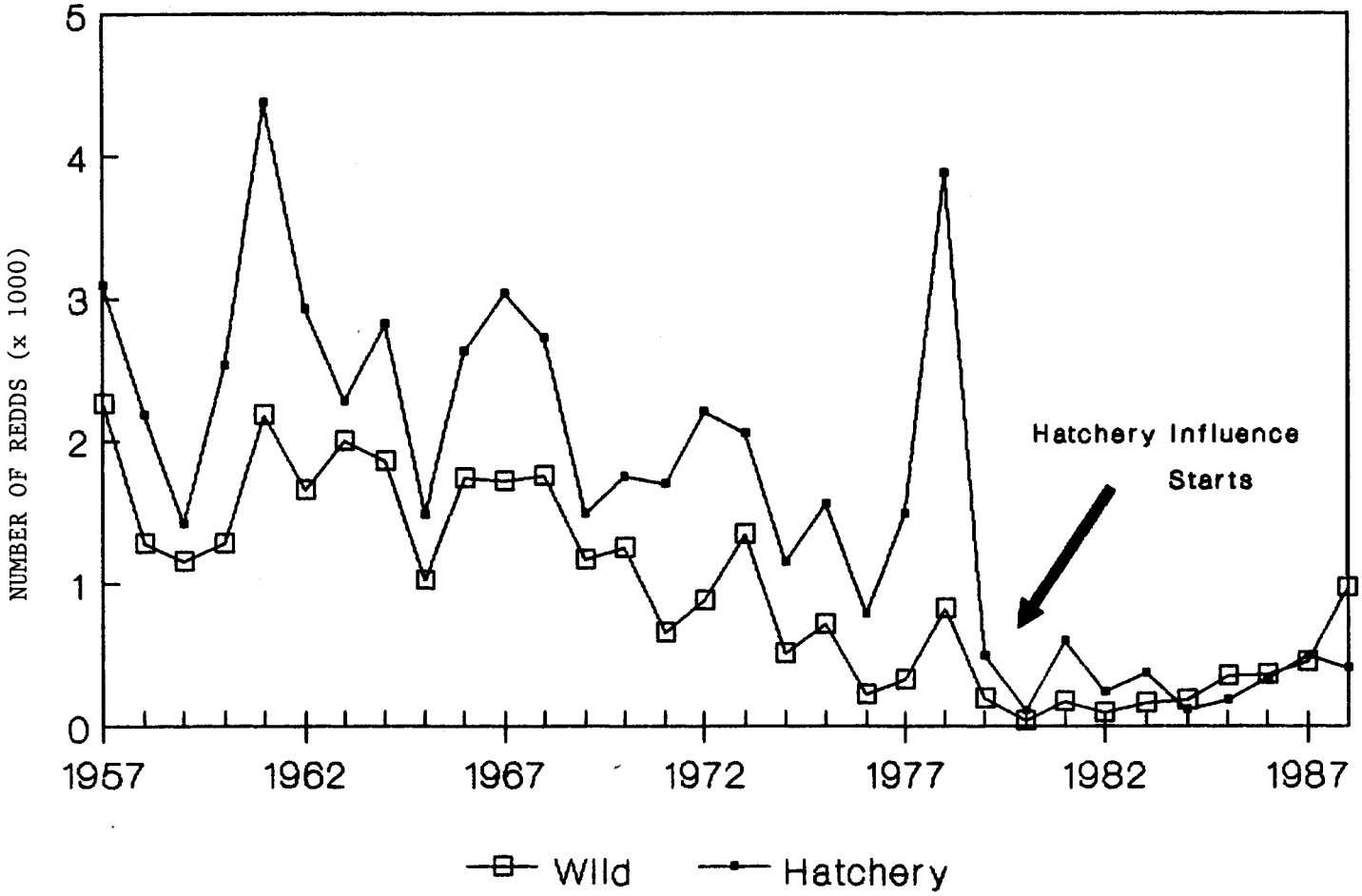

Figure 2. Historic spring chinook salmon redd counts for LSRCP evaluations streams in the Salmon River drainage, Idaho.

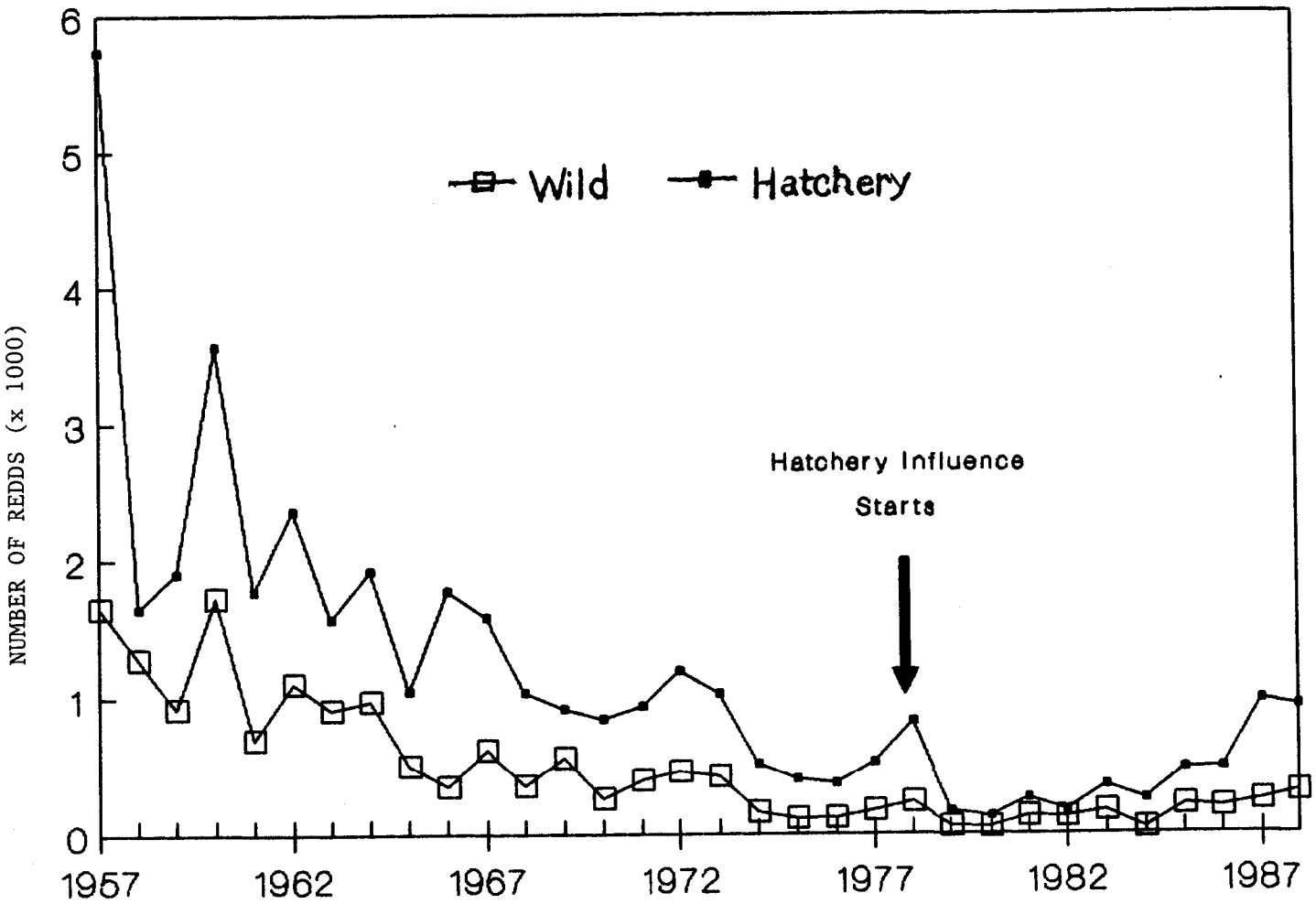

Figure 3. Historic summer chinook salmon redd counts for LSRCP evaluations streams in the Salmon River drainage, Idaho.

Table 30. Salmon River drainage hatchery-influenced spring chinook salmon redd counts, 1957-1988.

Year	Upper East Fork**	Upper Salmon River*	Upper Valley Creek	Upper Yankee Fork	TOTALS	Five year average
1988	27	191	12	1	231	
1987	59	237	31	0	327	
1986	NC	134	13	15	162	176
1985	NC	76	1	5	82	
1984	NC	71	6	NC	77	
1983	121	161	8	0	290	
1982	28	42	1	0	71	
1981	76	363	2	16	457	236
1980	6	47	6	0	59	
1979***	57	205	25	18	305	
1978	841	1,707	141	33	2,722	
1977	168	698	18	6	890	
1976	75	378	NC	40	493	1,215
1975	348	509	189	60	1,106	
1974	346	338	127	54	865	
1973	665	414	125	104	1,308	
1972	448	748	182	115	1,493	
1971	370	619	89	57	1,135	1,199
1970	468	432	202	67	1,169	
1969	174	313	350	53	890	
1968	622	637	330	234	1,823	
1967	614	943	253	250	2,060	
1966	511	699	219	112	1,541	1,554
1965	138	472	204	77	891	
1964	405	706	199	146	1,456	
1963	646	638	141	128	1,553	
1962	334	638	157	60	1,189	
1961	818	813	227	192	2,050	1,304
1960	122	720	83	43	968	
1959	223	502	24	10	759	
1958	427	535	75	38	1,075	
1957	572	1,118	225	47	1,962	

* Reduced by trapping at Sawtooth Hatchery site, 1981-19-1988
** Reduced by trapping at East Fork Weir, 1984, 4-1988.
** Hatchery influence began.

Table 31. Salmon River drainage wild and natural spring chinook salmon redd counts, 1957-1988.

Year	Bear Valley Creek	Elk Creek	Marsh Creek drainage	Upper Sulphur Creek	Big Creek	Total	Five year average
1988	283	330	217	41	101	972	
1987	102	149	150	11	36	448	
1986	74	55	101	65	67	362	463
1985	134	28	108	10	70	350	
1984	55	27	60	0	42	184	
1983	56	38	33	8	27	162	
1982	39	9	40	3	7	98	
1981	60	23	63	7	22	175	
1980	15	8	9	2	4	38	134
1979	69	49	47	15	15	195	
1978	184	208	270	64	95	821	
1977	129	86	98	5	9	327	
1976	76	61	48	14	22	221	
1975	215	169	201	50	77	712	517
1974	130	108	210	30	28	506	
1973	287	369	518	78	96	1,348	
1972	221	212	312	71	60	876	
1971	108	173	281	58	32	652	
1970	334	302	456	93	68	1,253	1,059
1969	356	349	235	138	90	1,168	
1968	574	483	466	142	90	1,755	
1967	445	420	650	134	67	1,716	
1966	534	525	406	142	127	1,734	
1965	301	203	404	43	75	1,026	1,618
1964	576	425	709	97	51	1,858	
1963	460	654	372	332	181	1,999	
1962	484	426	345	169	231	1,655	
1961	629	384	546	239	382	2,180	
1960	386	346	316	79	159	1,286	1,656
1959	381	516	95	100	69	1,161	
1958	341	410	262	131	140	1,284	
1957	791	398	458	381	233	2,261	

TABLET1

Table 32. Clearwater River hatchery-influenced chinook salmon redd counts, 1974-1988.

Year	Newsome Creek	Crooked River	Red River*	American River	Total	Drainage Five yr. average
198	20	27	111	12	170	
1987	20	17	140	31	208	
1986	7	9	155	14	185	204
1985	2	10	222	23	257	
1984	1	22	175	NC	198	
1983	7	12	193	9	221	
1982	5	2	159	21	187	
1981	3	3	80	12	98	118
1980	5	8	38	7	58	
1979	6	2	20	-	28	
1978	22	40	64	-	126	
1977	26	71	62	-	159	
1976	5	13	15	-	33	79
1975	6	33	20	-	59	
1974	3	5	12	-	20	

* Reduced by adult trapping at Red River adult trap, 1984-1988.

TABLET1

Table 33. Clearwater River natural chinook salmon redd counts, 1965-1988.

	Lochsa River drainage				Selway River drainage			
Year	Crooked Fork	Brushy Fork	Total	Five yr. average	Selway River	Bear Creek	Total	Five yr. average
1988	42	19	61		34	10	44	
1987	28	10	38		36	9	45	
1986	30	11	41	48	31	10	41	36
1985	47	14	61		15	NC	15	
1984	28	9	37		30	6	36	
1983	7	6	13		26	8	34	
1982	34	17	51		38	8	46	
1981	27	25	52	32	47	8	55	41
1980	16	10	26		40	7	47	
1979	6	12	18		21	3	24	
1978	37	25	62		125	13	138	
1977	80	15	95		97	18	115	
1976	49	13	62	56	58	14	72	85
1975	31	4	35		21	5	26	
1974	22	6	28		66	10	76	_
1973	60	-	60		261	26	287	
1972	32	-	32		175	25	200	
1971	1	-	1	48	55	14	69	141
1970	34	-	34		65	19	84	
1969	112	-	112		57	6	63	
1968	15		15		16	7	23	
1967	0	-	0		22	7	29	
1966	-				36	8	44	

TABLET1

Table 34. S.F. Salmon River drainage wild and natural summer chinook redd counts,1957-1988.

Year	Secesh River Lake Cr.	Five year averaqe
1988	155	
1987	121	
1986	115	103
1985	105	
1984	21	
1983	98	
1982	65	
1981	53	51
1980	20	
1979	20	
1978	91	
1977	27	
1976	17	33
1975	10	
1974	21	
1973	74	
1972	87	
1971	80	82
1970	63	
1969	104	
1968	58	
1967	140	
1966	140	131
1965	134	
1964	181	
1963	163	
1962	292	
1961	198	292
1960	524	
1959	285	
1958	478	
1957	344	

TABLET1

Table 35. Salmon River drainage hatchery-influenced summer chinook redd counts, 1957-1988.

Year	Johnson Creek	S. Fork Salmon River	Total	Five year average
1988	137	717	854	
1987	72	752	824	
1986	53	289	342	520
1985	75	323	398	
1984	17	165	182	
1983	63	185	248	
1982	37	111	148	
1981	45	126	171	172
1980	24	116	140	
1979 *	36	115	151	
1978	113	251	364	
1977	81	226	307	
1976	68	241	309	322
1975	69	238	307	
1974	107	218	325	
1973	271	586	857	
1972	220	577	797	
1971	183	421	604	765
1970	130	527	657	
1969	273	636	909	
1968	127	515	642	
1967	286	902	1,188	
1966	110	980	1,090	1,025
1965	116	656	772	
1964	310	1,124	1,434	
1963	266	1,057	1,323	
1962	295	1,589	1,884	
1961	207	1,058	1,265	1,779
1960	517	2,306	2,823	
1959	294	1,305	1,599	
1958	269	1,236	1,505	
1957	349	2,812	3,161	

* Hatchery influence began.

TABLET1

DISCUSSION

Preliminary comparative analysis of pond reared fall release and hatchery reared spring smolt release of spring chinook salmon at the Red River facility suggests that pond rearing and subsequent release in fall months is a viable strategy. Future spring releases are probably not necessary unless increases in the adult returns are needed to meet egg-take goals within the Clearwater River drainage.

Two experimental brood years of large versus small steelhead smolts have shown that the larger the smolt the better returns as adults. This is also substantiated in the creel harvest reported by Ball (1989). Sport harvest of adults resulting from large smolts was two to three times greater than adults from smaller smolts. The validity of these tests is in question because the larger fish were not fish programmed to be of the larger size, but rather the results of grading the fastest growing individuals during normal production operations. However, the adverse impacts of larger smolts on smaller chinook salmon smolts expressed by Rohrer (1988) may still be valid. Larger smolts initially cause increased stress during transportation of juvenile chinook salmon past lower Snake River and Columbia River dams, but there is some evidence that this stress is temporary and is not prevalent throughout the entire transporting period. Additionally, there is a program underway to construct sorters to prevent larger steelhead smolts from being transported with the smaller juvenile chinook salmon (S. Pettit, Idaho Department of Fish and Game, personal communications).

Standard operating procedure at Hagerman National Fish Hatchery is to produce 1.53 million smolts at 4-5/lb, and to achieve this goal, feed is reduced during part of the rearing period. If feed is not fed at a reduced rate, the facility could raise 1.23 million smolts (3.25/lb) instead of the 1.53 million (4.5/lb) presently produced. If the return rate of larger fish is in fact twice that of smaller fish, as observed in the two studies, then we would expect 1.6 times more adults (from large smolts) returning to hatchery racks even with the reduced numbers of fish released.

A potential problem in selection of brood stock at trapping facilities may be present with the policy of randomly releasing one-third of the run above the weir to spawn naturally. To maintain the desired degree of genetic integrity in those natural adult spawning runs that are being trapped, a more defined hatchery/natural composition of the run must be addressed. Preliminary analysis of origin at each of the LSRCP trapping facilities has raised concerns at Sawtooth Hatchery and South Fork Salmon River trap where the natural components are 25% and 10%, respectively. Other facilities throughout the state have natural spawning run components of around 50%. Without definite goals for the natural components, 50% may be an interim goal. A graduate study in cooperation with the Idaho Fisheries Research Cooperative Unit at the University of Idaho will be initiated in the fall 1989 to address these concerns.

EVAL88

Undoubtably downstream passage conditions influence the survival of smolts during their migrations. The difference in adult survival rates between the brood years 1981 and 1982-1983 of chinook salmon reared and released from Sawtooth Hatchery is a good example. Flow conditions during the 1983 brood year chinook outmigration (1985) were not as favorable as those for the previous two years (Table 36). Substantiation of this concept will be more evident as the returns of the 1987 and 1988 outmigration smolts return as adults.

RECOMMENDATIONS

1. Increase smolt size to 3.25/lb at Hagerman National fish and Magic Valley fish hatcheries on at least 50% of the production to elevate returns of larger smolts on a large scale. Evaluate age of return changes.

2. Develop guidelines for hatchery/wild composition of chinook salmon and steelhead trout released above trapping facilities.

3. Determine carrying capacity of Red River fingerling rearing pond for feasibility of increasing numbers released.

Table 36. Chinook salmon smolt conditions and flow characteristics during the smolt outmigration period, April-May. Information obtained from NOAA Technical Memoranda Fish Transportation Oversight Team Annual Reports, Fiscal Years 1981-1987.

Year	Discharge Average (1961-1980)	Peak Flow (cfs x 1000)	Smolt condition	Flow conditions
1981	64%	131	Poor	Poor Migration
1982	120%	184	Poor	Good Migration
1983	131%	198	Good	Excellent
1984	149%	247	Good	Good Migration
1985	95%	125	Excellent	Fair Migration
1986	124%	211	Good	Good Migration
1987	47%	100	Good	Poor Migration

TABLET1

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A P P E N D I C E S

Appendix A. Fish denities (per 100 m2) of non-anadromous fish observed by IDFG snorkeling techniques in the Clearwater River drainage, 1988.

Stream:	Cutthroat <12	Cutthroat >12	Cutthroat Totals	Mountain Whitefish	Rainbow Rainbow	Bull Trout	Rainbow-Cutthroat
CLEARWATER RIVER DRAINAGE							
Lolo Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eldorado Creek	3.20	0.00	3.20	0.00	0.00	0.00	0.00
SOUTH FORK CLEARWATER RIVER DRAINAGE							
Newsome Creek	0.54	0.00	0.54	1.27	0.00	0.07	0.00
Johns Creek	0.06	0.00	0.06	0.20	0.09	0.00	0.00
Red River	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crooked River	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Meadow Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOCHSA RIVER DRAINAGE							
Lochsa River	0.26	0.33	0.59	1.64	0.00	0.00	0.00
Old Man Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fish Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Office Creek	0.00	0.00	0.00	0.00	0.00	0.26	0.00
Warm Springs Creek	0.15	0.60	0.75	0.00	0.00	0.15	0.30
Brushy Fork Creek	1.93	0.00	1.93	0.00	0.00	0.00	0.00
Crooked Fork Creek	0.68	0.05	0.73	0.00	0.00	0.31	0.11
Boulder Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
White Sands Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SELWAY RIVER DRAINAGE							
Mainstem	0.09	0.00	0.09	0.56	0.00	0.00	0.00
Running Creek	0.59	0.29	0.88	0.52	0.00	0.00	0.00
Moose Creek	0.70	0.09	0.79	2.13	0.00	0.02	0.00
Bear Creek	0.63	0.00	0.63	1.54	0.00	0.00	0.00
Three Links Creek	1.52	0.00	1.52	0.00	0.00	0.00	0.00
Meadow Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Otter Creek	3.37	1.12	4.49	0.00	0.00	0.00	0.00

AA

Appendix B. Fish densities of non-anadromous fish (per 100 m2) observed by IDFG standard snorkeling techniques in the Salmon River drainage, 1988.

Stream:	Cutthroat <12	Cutthroat >12	Cutthroat Totals	Mountain Whitefish	Rainbow	Bull Trout	Rainbow-Cutthroat
SALMON RIVER DRAINAGE							
Salmon River Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slate Creek	0.00	0.00	0.00	0.12	0.00	0.00	0.00
Whitebird Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yankee Fork	0.00	0.00	0.00	2.75	0.00	0.00	0.00
West Fork Yankee Fork	0.00	0.00	0.00	1.97	0.00	0.00	0.00
Valley Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTH FORK SALMON RIVER							
Johnson Creek	0.00	0.00	0.00	1.57	0.00	0.00	0.00

AB

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