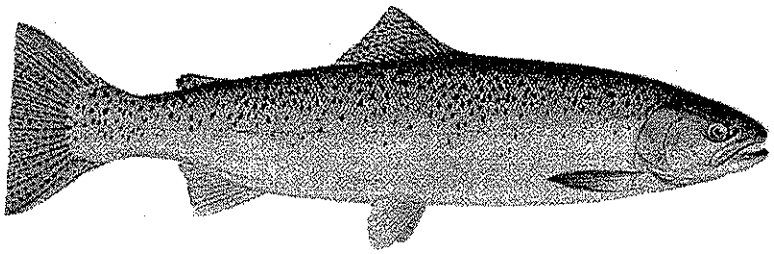
Summary Report

The 1997 Siuslaw Winter Steelhead Broodstock Project



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Introduction

The Oregon Department of Fish and Wildlife(ODFW) has maintained a hatchery program to supplement the winter steelhead fishery in the Siuslaw River system since 1964. Until recently the stock of winter steelhead for the Siuslaw hatchery program was the Alsea stock raised at Alsea Hatchery. In recent years several concerns have surfaced regarding the appropriateness of using Alsea stock steelhead in the Siuslaw basin. It was observed that large numbers of hatchery fish were spawning with wild fish. The concern was that hatchery steelhead were poorly adapted to the wild environment. It was also learned that large numbers of hatchery steelhead released in the Siuslaw basin strayed to other smaller coastal tributaries such as the Yachats River, Tenmile Creek and Cape Creek. Both these issues caused the Siuslaw winter steelhead hatchery program to be out of compliance with the ODFW Wild Fish Management Policy(WFMP). The WFMP sets guidelines for hatchery programs to protect the genetic integrity of wild fish populations.

The Siuslaw district has implemented several changes in the winter steelhead hatchery program to move toward compliance with the WFMP. These include:

1. Begin a broodstock program to provide Siuslaw stock steelhead for the hatchery program.
2. Change the rearing site for Siuslaw smolts to a non-coastal hatchery.
3. Begin to release hatchery smolts into tributaries where returning adults can be recaptured and removed from the spawning population.
4. Reduce the smolt allocation from 170,000 to 100,000.

All of these changes have been implemented. This report is on the broodstock collection activities for the 1997 brood year.

From 1990 to 1996 ODFW research crews operated and maintained up to 13 adult steelhead traps located in various tributaries of the Siuslaw basin as part of a steelhead research project. The goal of the research project was to provide recommendations to managers to decrease the risk of detrimental effects of hatchery programs on the genetic characteristics of wild steelhead(Lindsay et al. 1988). This was accomplished in the Siuslaw basin by developing a Siuslaw broodstock of steelhead and by experimenting with various release strategies to minimize conflicts with the WFMP. During the 1996 spawning season research crews operated and maintained 12 trapping sites. The Siuslaw district used these traps to collect wild and Siuslaw stock hatchery steelhead to develop the broodstock for the Siuslaw basin hatchery program. During the 1997 spawning season the district undertook all trapping operations and trapped 4 tributary streams (Greenleaf Creek, West Fork Indian Creek, Nelson Creek, and Whittaker Creek). Only 4 tributaries were trapped due to workload constraints and because all Siuslaw stock hatchery smolts were released into Whittaker Creek. Greenleaf, Nelson and West Fork Indian Creeks were trapped primarily for wild fish to increase genetic diversity of the broodstock.

Methods

Greenleaf, Nelson and West Fork Indian Creek traps were vertical picket weirs with "gorilla cage" capture boxes. The Whittaker Creek trap was a horizontal picket weir with a trap box of steel panels and concrete base. Both types of traps were described in detail by Schroeder(1996).

Siuslaw district and "Hire the Fisher" (HTF) personnel, with some help from volunteers, trapped and processed the returning adult steelhead at each site. Alsea stock hatchery steelhead were opercle punched and released downstream of the weirs. They were released because the district did not have the resources to haul Alsea stock steelhead downstream to recycle them through the fishery. Also results from research trapping has shown recycling fish adds limited benefits to the fishery. One in four wild steelhead and all Siuslaw stock hatchery steelhead caught in the traps were held for broodstock. District personnel collected and hauled these steelhead to our holding facility in Munsel Creek in Florence. As the steelhead ripened they were spawned on site with assistance of the Florence STEP Group.

Whenever possible the spawning process maximized genetic combinations. Ripe males and females were kill spawned and bled out in a spawning rack. Females were bled to avoid blood contacting the eggs. All spawning gear was disinfected with Argentine solution, rinsed with freshwater and dried. The males and females were spawned into separate plastic bags and mixed together using a 3 X 3 matrix cross. The bags of fertilized eggs were transported to the Florence STEP Group hatch house and put into Heath incubation trays which have been power rinsed, disinfected with 100 PPM Argentine solution and air dried. The water source was pumped from Munsel Creek at 4 GPM. Formalin was dripped through the eggs once every two days to control the *Saprolegnia* fungus. Tissue samples were taken from the spleen, kidney and gill filaments of each steelhead spawned. Ovarian fluid samples were taken from each female spawned. Tissue and ovarian samples were sent to ODFW pathology lab in Corvallis.

When eyed the eggs were picked by the Florence STEP Group. The eyed eggs were transported to Willamette Hatchery and inventoried. They will be reared until the spring of 1998 and released into Siuslaw basin tributaries where they will be recaptured.

Results

We trapped 1,812 first run steelhead at our four trapping sites (Table 1). The finmarks and their origins are shown in Table 2. This was the last year for 2-salt returns of Alsea stock hatchery steelhead. There were 31,000 Alsea stock steelhead released into Whittaker Creek and 786 returning adults were trapped for a return rate to the trap of 2.5%. There were 12,000 Alsea stock steelhead released into Greenleaf Creek and only 19 were trapped for a return rate of 0.16%. The low return is due to an inefficient trap and because the smolts were stocked at the confluence with Greenleaf and Lake Creeks and therefore were not homing to Greenleaf Creek specifically. We trapped 358 Siuslaw stock ADRM's at Whittaker, from a release of 7,923 for a return rate of 4.5%. The ADRM group was raised by the Emerald Empire Chapter of the Association of NW Steelheaders at Letz Creek.

Table 1. Numbers of Steelhead and mark groups caught in Siuslaw tributary traps during the 1997 trapping season.

WINTER STEELHEAD TRAP DATA - 1997 BROOD					
STREAM	Whittaker Creek Trap	W. Fork Indian Creek Trap	Greenleaf Creek Trap	Nelson Creek Trap	TOTAL
NO MARK	147	73	21	1	242
AD (only)	786	18	19	1	824
LPLM	11	0	0	2	13
LPRM	64	0	0	0	64
RPLM	129	0	0	0	129
RPRM	121	0	0	0	121
ADRV	1	0	0	0	1
ADLV	6	0	0	0	6
ADLM	2	2	0	1	5
ADRM	358	5	1	0	364
ADLP	18	0	1	0	19
ADRP	23	0	1	0	24
TOTAL	1666	98	43	5	1812

Table 2. Origin of finmarks, numbers released and release location of marks caught during the 1997 trapping season.

1994 Release - 3 Salt returns in 1997			
Fin Mark	Hatchery / Stock	# Released	Release Location
ADRP	Alsea / Alsea	80 K	N. Fork Alsea
AD	Alsea / Alsea	40 K	Fall Creek
RPLM	Alsea / Alsea	30 K	Whittaker Creek
RPRM	Alsea / Alsea	30 K	Whittaker Creek
LPLM	Alsea / Alsea	41 K	Various locations in the mainstem Siuslaw River
ADRM	Alsea / Siuslaw	33 K	Lake Creek
ADLM	Alsea / Alsea	36 K	Lake Creek
LPRM	Alsea / Alsea	28 K	Whittaker Creek
AD	Alsea / Alsea	20 K	Various locations in the N. F. Siuslaw and in the Siuslaw basin.
1995 Release - 2 Salt returns in 1997			
ADLP	Alsea / Alsea	83 K	N. Fork Alsea
AD	Alsea / Alsea	45 K	Fall Creek
ADRM	Letz Creek / Siuslaw	8 K	Whittaker Creek
AD	Alsea / Alsea	12K	Greenleaf Creek
AD	Alsea / Alsea	18K	Various location in the mainstem Siuslaw River
AD	Alsea / Alsea	38K	Various location in the mainstem Lake Creek
AD	Alsea / Alsea	31 K	Whittaker Creek
1996 Release - 1 Salt returns in 1997			
ADLV	Letz Creek / Siuslaw	13 K	Whittaker Creek
ADRV	Willamette / Siuslaw	18 K	Whittaker Creek
ADRV	Willamette / Siuslaw	39 K	Greenleaf Creek

The total run trapped at all traps was comprised of 13% wild fish, 64% Alsea stock fish, 21% Siuslaw stock fish and 2% stray Alsea fish (Table 3).

Table 3. Total catch of runs of steelhead at the various traps in the Siuslaw basin.

Origin	Whittaker	W. Fk. Indian	Greenleaf	Nelson	Total
Wild Stock	147	73	21	1	242
Alsea Stock	1,113	20	19	4	1156
Siuslaw Stock	365	5	1	0	371
Stray Alsea Stock	41	0	2	0	43
Total	1,666	98	43	5	1,812

Trapping concluded in Nelson Creek on March 14. West Fork Indian and Greenleaf Creeks were trapped until April 28th and Whittaker Creek was trapped until May 15. The Whittaker Creek Trap fished 95% of the total possible days during the trapping season while West Fork Indian, Greenleaf, and Nelson Creek traps fished 85%, 86%, and 83% of the total possible days respectively (Table 4).

Table 4. Summary of days fished by trap

Trap	Date Installed	Date Removed	Total Days Fished	Days Not Operable*	% of Days Fishing
West Fork Indian	Dec. 19	Apr. 28	110	20	85%
Greenleaf	Dec. 19	Apr. 28	112	18	86%
Nelson	Dec. 18	Mar. 14	71	15	83%
Whittaker	Dec. 18	Apr. 30	141	7	95%

* Due to high water or debris

Egg Takes

We did our first egg take on January 9 and concluded our egg takes for the 1997 spawning season on April 21, 1997. We collected 91 males and 130 females for broodstock, and spawned 81 males and 117 females. Of the 198 winter steelhead spawned 4% were Siuslaw stock hatchery fish collected at Alsea Hatchery, 68% were Siuslaw stock hatchery fish collected at the traps and 28% were wild fish collected at the traps (Table 5).

Table 5. Origin of Steelhead collected and spawned in the 1997 Siuslaw Steelhead Broodstock program.

	Fish Collected			Fish Spawned		
	M	F	% Collected	M	F	% Collected
Siuslaw Stock (Traps)	59	90	67%	53	82	68%
Wild Siuslaw Stock(Traps)	32	32	29%	28	27	28%
Siuslaw Stock (Alsea Hatchery)	0	8	4%	0	8	4%
Totals	91	130		81	117	

We took 355,902 eggs in 12 separate groups between January 9 and April 21 (Table 6). Egg loss was 64,083 and averaged 18%. The first two egg takes of 25,875 eggs were taken on January 9 and January 21 respectively. Loss was 4,472 or 17%. A total of 21,403 eyed eggs and fry were shipped to the Letz Creek STEP facility operated by the Emerald Empire chapter, Association of Northwest Steelheaders. Egg and fry losses since then have been reported as negligible, they have purposefully not handled them after learning of the high losses experienced by Willamette Hatchery. They will be weighed and inventoried sometime in June. We shipped 231,812 eyed eggs and fry to Willamette Hatchery. At their request we shipped the last two groups to the hatchery as unfed fry to help them catch up to the earlier groups taken. Our water temperatures were 10-15 degrees warmer than those at the hatchery. Willamette hatchery has ponded approximately 162,000 fry. They have experienced significant egg and fry loss. We will outplant fry in excess of those needed to meet the production goal to help seed underutilized habitat in the Siuslaw basin.

Table 6. Egg data summary for all spawning groups taken during the 1997 spawning season.

Egg Takes 1997 Brood													
	VO 019	VO 020	VO 021	VO 022	VO 023	VO 024	VO 025	VO 026	VO 027	V0 028	VO 029	VO 030	TOTAL
Take Date:	9-Jan	21-Jan	31-Jan	19-Feb	26-Feb	5-Mar	12-Mar	19-Mar	4-Apr	9-Apr	15-Apr	21-Apr	
No. Females:	2	4	4	13	9	4	10	28	7	11	19	6	117
Green Eggs:	8,320	17,555	10,500	45,500	30,000	12,000	30,000	77,000	19,000	35,427	52,600	18,000	355,902
Egg loss:	2,682	1,550	2,016	4,670	2,698	1,690	3,770	12,300	6,536	8,603	14,387	3,181	64,083
Fry Loss:	240								2,634	3,182	1,513	2,035	9,604
% Egg Loss:	32	9	19	10	9	14	13	16	34	24	27	18	18
Estimated No.Transferred	5398	16005	8484	35830	27302	8310	26230	64700	9830	21642	16700	12784	253215
Location:	Letz Cr.	Letz Cr.	Will.	Will.	Will.	Will.	Will.	Will.	Will.	Will.	Will.	Will.	
Est. Reduction				5000		2000							29000
Thompson Cr.										2,000			
Hatch Boxes											20000		

Fecundity

The fecundities were similar 3,080 for Siuslaw stock hatchery fish and 3,128 for wild fish, while Siuslaw stock steelhead collected at Alsea Hatchery had a higher fecundity 4,160 (Table 7). This was expected because the Alsea hatchery fish were 3-salts. The overall fecundity for the 1997 spawning season was 13% lower than the fecundity during the 1996 spawning season.

Eggs were larger in the wild fish at 364 eggs per 100 ml versus 532 eggs per 100 ml for the Siuslaw stock hatchery fish(Table 7).

In comparison to the 1996 spawning season the fecundity for Siuslaw stock hatchery steelhead was 14% lower while egg size was 27% larger and the fecundity for wild steelhead was 19% lower and the egg size was 44% larger in the 1997 spawning season.

Table 7. Comparison of the number of eggs per female steelhead in 1996 and 1997.

Origin	1997			1996		
	# Females	Eggs per 100 ml.	Eggs per Female	# Females	Eggs per 100 ml.	Eggs per Female
Alsea Hatchery (ADRM)	2	-	4,160	25	736	3,182
Siuslaw Traps (ADRM)	50	532	3,080	21	728	3,572
Siuslaw Traps (Wild)	7	364	3,128	8	649	3,856

Run Timing

There were significant differences in the return dates of the different stocks of steelhead caught. The Alsea stock steelhead peaked in late January, the wild steelhead peaked in mid March and the Siuslaw stock(Siuslaw offspring released at Letz Creek) peaked in late April. (Fig. 1)

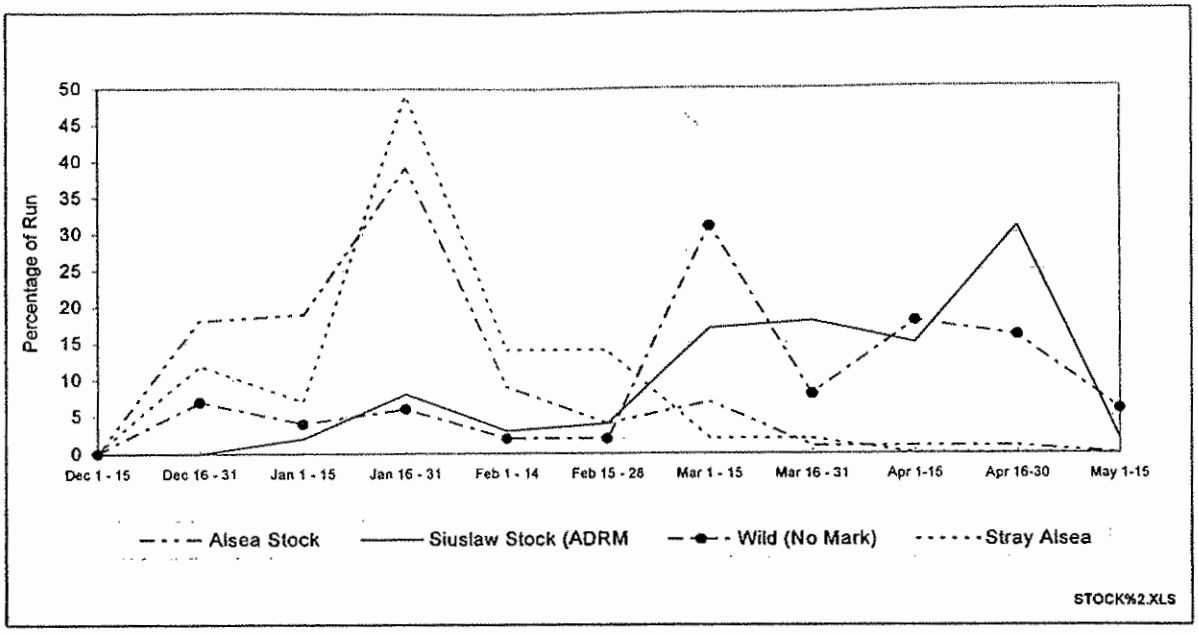

Figure 1. Timing of catch of steelhead stocks in the Siuslaw River 1996-97.

Through February 90% of the Alsea stock hatchery steelhead and 94% of the stray Alsea steelhead had returned to the traps while 17% of the Siuslaw stock hatchery steelhead and 21% of the wild steelhead had returned to the traps (Table 8).

Table 8. Numbers of the different stocks of steelhead caught at Siuslaw traps by time period 1996-97.

Time Period	Alsea Stock		Siuslaw Stock		Wild		Stray Alsea	
	#	%	#	% (ADRM)	#	%	#	%
Dec 1 - 15	0	0	0	0	0	0	0	0
Dec 16 - 31	208	18	1	0	16	7	5	12
Jan 1 - 15	215	19	7	2	9	4	3	7
Jan 16 - 31	456	39	31	8	14	6	21	49
Feb 1 - 14	106	9	10	3	6	2	6	14
Feb 15 - 28	52	4	14	4	6	2	6	14
Mar 1 - 15	86	7	64	17	74	31	1	2
Mar 16 - 31	14	1	67	18	19	8	1	2
Apr 1-15	7	1	56	15	44	18	0	0
Apr 16-30	12	1	114	31	38	16		0
May 1-15	0	0	7	2	15	6	0	0
TOTAL	1156		371		241		43	

Disposition of Excess Broodstock

Due to the high returns of Siuslaw stock steelhead an excess 127 Siuslaw stock steelhead were outplanted to help seed underutilized habitat in Nelson and upper Lake Creeks(Table 9).

Table 9. Outplanting location and number released.

Date	Location	No. Fish
3-18-97	Congdon Cr	21
3-24-97	Lake Cr. above Hult Res.	26
3-26-97	Lake Cr. above Hult Re.	15
3-28-97	Congdon Cr.	11
4-16-97	Lake Cr. above Hult Res.	20
4-18-97	Nelson Cr.	20
4-23-97	Nelson Cr.	14

Disposition of Alsea Stock Steelhead

Alsea stock hatchery steelhead caught in the traps were opercle punched and released downstream of the weirs. If recaught the fish were opercle punched again and released. This was done because the Siuslaw district did not have trucks or manpower available to recycle the steelhead through the fishery or relocate them to non-outlet coastal lakes, and so the fish were not sampled again.

The recapture data reported in Table 10 is biased because we relocated 63 of these fish to Carter Lake and also because some opercle punched fish escaped upstream during high water events. One persistent fish was caught six times in the Whittaker Creek trap.

Table 10. Recaptured Alsea stock fish in all traps.

	Whittaker	West Fk. Indian	Greenleaf	Nelson	Total	Recapt. %
Alsea stock	1161	20	21	4	1206	-
Recapt. x 1	569	5	0	0	574	48
Recapt. x 2	183	1	0	0	184	32
Recapt. x 3	82	0	0	0	82	45
Recapt. x 4	24	0	0	0	24	29
Recapt. x 5	2	0	0	0	2	8
Recapt. x 6	1	0	0	0	1	50

Life History

Scales were taken from 52 wild steelhead used for broodstock. The most common life history types shown by males and females were 2/2 and 3/2(Fresh water age/Salt water age). Repeat spawners made up 21% of the males collected for broodstock while 17% of the females collected for broodstock were repeat spawners (Table 11). This data is contrary to research showing repeat spawners are mostly females. Males reportedly arrive first on the spawning grounds, stay longer, and as a result are in poorer shape to return to saltwater than females.(Emmett et al. 1991) Our results could be due to a normal annual variation or due to the small sample size.

Table 11. Summary of Life History types of wild adult steelhead used for broodstock in Siuslaw basin traps, 1996-97.

Sex	Freshwater Age	Salt Age	Number	% of Total
Male	Regenerated*	2	3	
	2	2	11	44
	2	2s.3	4	16
	3	2	8	32
	3	2s.3	2	8
			28	
Female	Regenerated	2	2	
	2	2	12	60
	2	2s.3	1	5
	2	2s.3s.4s.5	2	5
	2	3	1	5
	Regenerated	3	1	
	3	2	4	20
	3	2s.3	1	5
			24	

Male repeat spawners - 6 of 28 - 21%
Female repeat spawners - 4 of 24 - 17%
*Freshwater regenerated scale data was used when figuring percent of repeat spawners.

Tag Recoveries

We recovered eight tagged steelhead. All eight were originally tagged by the research crews during the 1996 trapping season. Seven of the eight tags recovered were at Whittaker Creek and one at Nelson Creek. All eight were originally tagged at Whittaker Creek and six had been transported downstream to Linslaw Park to rerun them through the fishery. Seven of the eight fish were captured an average of 15 days earlier than when tagged in 1996. The eighth fish returned 15 days later than it did in 1996.

Predator Marks

All fish caught in the traps were sampled for predator scars. Twenty-eight percent, 507 of 1,812 had a visible scar showing teeth marks by marine mammals, sharks or other predators. The percentage of scarred fish appears to be consistent throughout the length of the run. Five steelhead were observed with net marks. The marks consisted of the classic "web" marks around the body anterior to the dorsal fin.

Time to Spawn

The time from the date of capture to the spawn date averaged 18.3 days for wild fish and 12.4 days for Siuslaw stock hatchery fish. Males from each population were similar at 16.4 days for wild fish and 16.9 days for Siuslaw stock fish while females were significantly different at 9.5 days for Siuslaw stock and 20.1 days for wild females (Table 12). As expected the average time to spawn decreases through the spawning season(Fig. 2). The April data is slightly biased because we were selecting the riper fish to conclude our broodstock collection for the season.

Table 12. Average days to spawn by month for steelhead used for broodstock.

	WILD		ADRM	
	M	F	M	F
December	23.2	34.3	0	0
January	40.0	43.0	29.0	21.3
February	0.0[1]	13.0[1]	17.9	18.1
March	14.4	8.4	8.7	8.8
April	1.4	4.7	1.7	3.2
Average	16.4	20.1	16.9	9.5

[1] only spawned 1 male and 1 female

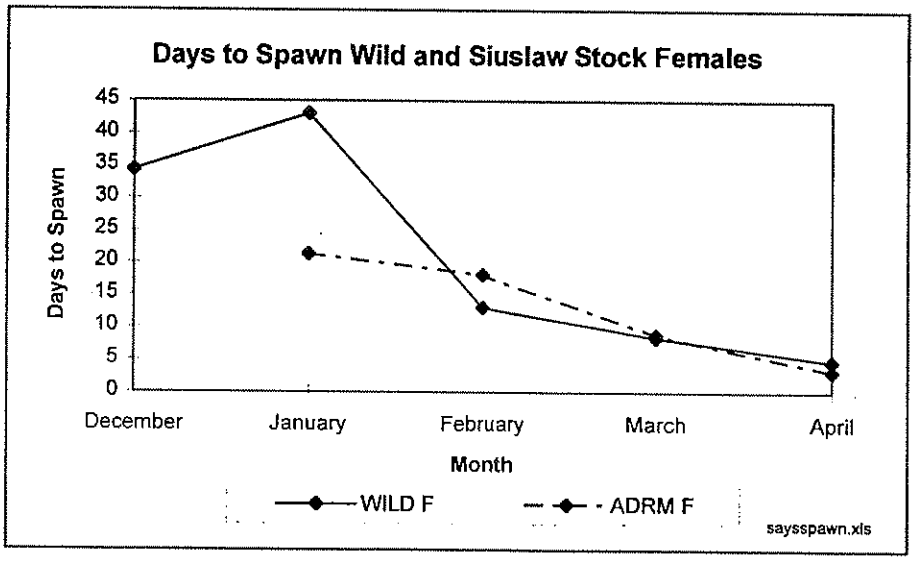

Figure 2. Average days to spawn female broodstock.

Discussion

The original egg take goal was to collect 140,000 eggs with a production goal of 100,000 smolts in the spring of 1998. We exceeded the goal substantially by collecting 355,902 eggs. The primary reason for the excess egg take was to ensure that all portions of the run were represented in the broodstock. Secondly, we wanted to ensure that we took enough eggs since we experienced high egg mortality during the season. Early indications from Willamette Hatchery from the first groups of eggs, was that there might be excessive egg and fry loss again this year.

Egg mortality for the year averaged 18% compared to 28% last year. Although an improvement, this rate of egg loss is still considered unacceptably high. We are not sure what factors caused this high rate of loss. We suspect some of the broodstock may have been in poor condition due to handling during the capture, transportation and holding process prior to spawning. Some of the earliest broodstock captured were held in tubes up to 60 days before spawning. Frequent examination for ripeness, and occasionally excessive amounts of sand being washed into the holding facility may also have added to poor spawner quality. We also believe that some females were spawned either before they were completely ripe or were over ripe.

Additionally, there was a shortage of males in some groups and we attempted to spawn some males twice. We had little choice in some spawn groups but to use males that were in poor condition. This may have contributed to poor fertilization and loss of eggs. During the last two years the sex ratio of fish collected for broodstock has been 41% males and 59% females.

It is possible our spawning techniques are a factor contributing to the high rate of egg mortality, although we tried to use the best spawning and handling techniques. Our spawning techniques were reviewed on site by Alsea Hatchery personnel at the beginning of the season and because of their recommendations, some slight modifications were made. This may explain the lower egg mortality during the 1997 spawning season compared to the 1996 season.

The quality of the water in Munsel Creek may be a possible factor contributing to the high egg mortality although there is no direct evidence to support or refute this hypothesis. The water in Munsel Creek comes from Munsel Lake and the North Florence Dunal Aquifer which also supplies the City of Florence with drinking water. The water is high in iron content and sometimes has a distinct odor. Frequently an orange precipitate forms on objects in the water. These are naturally occurring compounds in the water and are not believed to be harmful to fish. It would be comforting, however to have some tests done to rule this out.

Saprolegnia fungus at the hatch house is an on-going problem and is especially bad during the warmer water temperatures that occur in the spring. The fungus was treated by dripping Formalin through the eggs every day or two with limited success. Egg mortality was higher than average during the April spawn groups, presumably due to warm water temperatures.

It should also be reported that Willamette Hatchery experienced high egg and fry mortality on the Siuslaw stock steelhead from eyed egg to smolt stage at their facility. There may be some unknown factor inherent in the culture of Siuslaw stock that makes it difficult to culture. In light of the difficulties we have experienced in the last two years, we recommend that there be

an on-site meeting with all available and appropriate steelhead culture experts at the beginning of the spawning season next year for a comprehensive review of our facilities and techniques.

Adult mortalities occurred at all our trapping facilities during the 1997 trapping season. The Whittaker Creek trap had only two mortalities even though it caught 2,527 fish. Greenleaf, West Fork Indian, and Nelson Creek traps had 36 mortalities and caught 188 fish combined. This rate of trapping mortality is unacceptably high. Most of the mortalities occurred during high water events when the force of the water through the live boxes was too turbulent, exhausting the fish and ultimately killing them. We attempted to minimize the mortalities by putting plywood against the front of the boxes creating a calm area for the fish and also closing off the trap boxes when high water events were expected. The vertical picket weirs with "gorilla cage" live boxes at West Fork Indian, Greenleaf and Nelson Creeks killed fish under moderate to high flows while the Whittaker Creek trap had few mortalities under all conditions. The Whittaker trap was successful in minimizing mortalities due to the large size of the trap box with a recessed hole in the bottom offering fish a refuge place and also because during moderate to high flows the horizontal weir allowed more water to flow over it subsequently lowering water velocities through the livebox. It is a high priority to have a more efficient trap in Greenleaf Creek before next trapping season. The 2-salt returns from a 1996 release of 38,500 Siuslaw stock steelhead smolts will return to Greenleaf Creek in 1998. The inefficient vertical picket weir and "gorilla cage" live box traps will not be able to handle this number of fish and will increase trapping mortality. The inherent inefficiently of the current trap design would also cause Greenleaf Creek to be out of compliance with WFMP. It is imperative to build a permanent, more efficient trap in Greenleaf Creek before next trapping season. We also recommend building several other permanent traps to secure future wild fish for broodstock and to monitor compliance with the WFMP. The present picket weirs and gorilla cage traps are inefficient, difficult, and dangerous to operate and cause unacceptable rates of mortality on wild steelhead.

Wild Fish Management Policy Compliance

This year we spawned 198 steelhead for broodstock purposes, 28% wild fish and 72% Siuslaw stock fish. "Type I" broodstock as defined by the Wild Fish Management Policy requires that on average 30% of the broodstock be wild fish. We consider the 28% level of wild fish to acceptably close to the WFMP guideline.

The best indicator of what the hatchery/wild ratio in the Siuslaw basin is the data from the West Fork Indian Creek trap. Of 98 steelhead caught at that trap, 74% were wild and 26% were hatchery fish. While only one sample, this ratio of hatchery to wild fish is well within the 50% guideline for a Type I broodstock.

Scale Reading Lag Time - Siuslaw district personnel did not have the expertise or equipment necessary to verify unmarked steelhead as wild fish during the 1997 trapping season. We mailed scales from unmarked steelhead to Lisa Borgerson, ODFW Research Section in Corvallis, who read the scales and called us back with the information. This worked well early in the season when the fish were held for long periods of time before spawning. However during the latter part of the season we had to spawn many fish that were not verified wild. This could have been a problem since we did not have enough incubator space to keep the eggs from each female separate. Fortunately, only one scale sample was verified as an unmarked hatchery fish and it

was released before spawning. We recommend that before next spawning season we have somebody trained in reading scales and have the necessary equipment on hand to do this task.

Trap Vandalism - Two of our four traps were vandalized during the trapping season. The lock was cut off at Greenleaf Creek and we are unsure if any fish were taken. Whittaker Creek was broken into twice. The first time the plywood top of the trap was pried off and at least six fish we were holding for broodstock were removed. The second time the lock was cut off and we do not know how many fish were taken. Another problem at Whittaker Creek is a 10 inch gap between the top of the trap box and the back wall of the trap. This gap enabled "fishermen" to snag fish out of the trap. We do not know if any fish were taken this way but it was tried, as evidenced by the amount of Steelies and Buzz Bombs found snagged to the trap. Because of the "snagging" problem we should extend the top of the trap box to the back trap wall to stop this from occurring. The trap box lids should be built of aluminum or steel grating rather than plywood then the trap box lids could not be pried off.

There were concerns from STEP volunteers, Steelheaders and various individuals about kill spawning wild steelhead. We recommend live spawning the wild steelhead used for broodstock if there is a way to meet pathology concerns. So far there have not been any positive disease results in the Siuslaw steelhead during the seven seasons of Siuslaw broodstock development. If we could make the assumption that Siuslaw wild steelhead are disease free we could live spawn the wild fish and release them back into the system. This would be a good public relations move as it would let the various interest groups know that ODFW listens to their concerns.

This year 46% of the Siuslaw stock steelhead returned to the traps in April after the fishing season closed. Due to the late run timing of the Siuslaw stock steelhead we should extend the fishery through April to increase the harvest of these fish. We will need to harvest some of these fish or we will have the problem of what to do with the excess Siuslaw stock steelhead not needed for broodstock. This problem was apparent this year from a release of only 8,000 smolts. During the 1998 trapping season we are expecting Siuslaw stock 2-salt returns from a release of 70,000 smolts. We need to have a plan in place to deal with the excess steelhead. This past year we opercle punched Alsea stock hatchery fish and released them downstream of the weirs which created a large fishery in the Siuslaw River in the vicinity of Whittaker Creek, as predicted. This is the simplest and least costly alternative but it may result in neighboring streams being out of compliance with the WFMP. We would need to trap several adjacent streams to determine actual stray rates from released fish. Other alternatives would be to remove these fish to local coastal lakes with no outlet, recycle them through the fishery, kill them and donate to rendering plant or kill them and place bodies in coho production streams for nutrient input. Permits would be needed for this last activity but it would offer a chance to experiment with placing carcasses in streams to increase coho productivity.

Labor available to operate the traps is an issue that needs to be addressed for next trapping season. The "Hire the Fisher" personnel which helped extensively this year will likely not be available next year unless federal funds are continued. Volunteers from the Florence STEP Group assisted in spawning and incubation of the eggs. They did a great deal of caring for and picking the eggs and their assistance will continue to be needed. We will need more assistance from them if the "Hire the Fisher" are unavailable next trapping season. The STEP volunteers could assist us with installing the traps at the beginning of the 1998 trapping season. We could

use two seasonal employees to check and maintain the traps. The Emerald Empire Chapter of the Association of NW Steelheaders assisted us with the checking of the Whittaker Creek trap on the weekends. We will need to cultivate a relationship with volunteer groups so the volunteers will be willing to take an even greater role in the 1998 broodstock collection activities.

Summary of Management Recommendations

1. Conduct an intensive peer review of the entire broodstock collection, spawning, and incubation program using all appropriate fish culture experts available, focusing on ways to reduce egg to fry mortality.

2. Build more efficient traps to reduce trapping mortalities. Greenleaf Creek is the highest priority.

3. Have the expertise and equipment available to read steelhead scales in Newport or Florence.

4. Modify the Whittaker Creek trap box lid to make it more vandal-proof.

5. Investigate the possibility of live spawning wild steelhead to return them alive to the system.

6. Open the Siuslaw River and Lake Creek to steelhead fishing in April, to harvest the surplus late returning fish.

7. Develop an explicit plan to deal with surplus Siuslaw hatchery broodstock and Alsea stock steelhead prior to the onset of the spawning season in 1997-98.

8. Address manpower needs to install and operate traps and carry out the program.

9. Foster and recruit volunteer help for the program. Develop volunteer work plans and job descriptions.

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