

SAWTOOTH FISH HATCHERY 2007 STEELHEAD RUN REPORT

Prepared for
SAWTOOTH FISH HATCHERY

By

Jocelyn Brown
Fisheries Technician

Erin Madson
Research Data Technician

2007 ADULT STEELHEAD RUN

Sawtooth Fish Hatchery

The Sawtooth Fish Hatchery weir on the Main Salmon River was installed on March 15 in 2007, with the adult steelhead (*Oncorhynchus mykiss*) trap operating from March 26 through May 1. A total of 4,049 adult "A-run" steelhead were trapped during the 2007 season; 4,028 (2,131 males / 1,897 females) of which were marked fish (hatchery produced) and 21 (4 males / 17 females) were unmarked fish of natural origin (Table 1.)

Distribution of the 4,028 marked adults ranged from spawn-related activities to charitable giveaways. The 1,052 steelhead used for spawning were either given to the public on a first come, first served basis on spawn days or distributed to charitable organizations. A total of 2,250 adult steelhead were donated to the following tribes and/or organizations in the following numbers:

Idaho City Food Bank (SMRIST Essentials Food Bank)	400
Shoshone-Bannock Tribe	300
Shoshone-Paiute Tribe	550
Idaho Food Bank	1000

The remaining 726 fish were kept frozen on station and will be processed and used in a stream nutrient enhancement program. Fish disposition data is provided in Table 2.

A genetic sample was taken from all returning unmarked adults (21), which were then released upstream of the hatchery weir to spawn naturally; also sampled and released upstream were 10 marked males to supplement natural spawning (Table 2.) Additional genetic samples were taken randomly from 100 pair of marked adult steelhead that were included in the broodstock.

Age class, gender, and length frequency for returning Sawtooth steelhead (marked and unmarked) is provided in Tables 5 through 7, and Figures 1 through 9.

Sawtooth Hatchery Spawning

Sawtooth Fish Hatchery spawning operations occurred from March 29 through May 3 in 2007. A total of 526 females were crossed with 526 males over 12 spawning days to produce 2,472,200 green eggs with a mean fecundity of 4,810 eggs per female. Total green egg take yielded 2,104,531 eyed eggs for a percent survival to the eyed-stage of development average of 83.20 percent (Table 3).

Eyed egg transfers to Magic Valley Steelhead Hatchery and Hagerman National Fish Hatchery totaled 428,050 and 1,179,101-eyed eggs, respectively. The Sawtooth-stock eyed-egg transfer totaled 2,104,531 (Table 4).

Eggs were made available to biologists from the Shoshone-Bannock Tribe (SBT) to support two programs that are currently underway. A total of 257,575 eyed-eggs were provided for the SBT DNA Parentage Exclusion Analysis Program, an experimental study on supplementation using genotyped steelhead released as smolts into the Yankee Fork; these eggs are to be reared to smolts at Hagerman National Fish Hatchery. A total of 572,380 eyed-eggs [from Sawtooth and Pahsimeroi stocks (Table 4)] were provided for the SBT Egg Box Program, in which eggs are placed in streamside incubators

(upwellers) on river water to mimic natural hatch timing in five systems: Yankee Fork, Basin Creek, Morgan Creek, Indian Creek, and Panther Creek. All supplementation fish produced from these two programs are genotyped so that they can be differentiated as F1 juveniles and F1 adults from all other fish produced naturally in these systems (AOP for Fish Production Programs in the Salmon River Basin, 2007).

Table 1. Total steelhead trapped at Sawtooth in 2007.

Total Fish Trapped:	4049	
2131 Hatchery Males	4 Natural Males	2135 Total Males
1897 Hatchery Females	17 Natural Females	1914 Total Females
4028 Hatchery Fish	21 Natural Fish	4049 Total Fish

Table 2. Disposition of steelhead trapped at Sawtooth in 2007.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned	526	526
Killed Not Used	121	33
Released Above Weir	14**	17
Other*	1484	1338
Total	2135	1914

*These fish were not used in spawning, but were killed and either distributed to the Shoshone-Bannock and Shoshone-Paiute Tribes, food banks, or kept frozen on station for processing to be used in a stream nutrient enhancement program.**Ten of these males were marked males, released to supplement natural spawning.

Table 3. Spawn summary of steelhead spawned at Sawtooth in 2007.

Males spawned	Females spawned	Eggs per female	Number of green eggs	Number of eyed eggs	Percent eye-up
526	526	4810	2,472,200	2,104,531	83.20%

Table 4: Steelhead eyed-egg shipments from Sawtooth Fish Hatchery in 2007

HATCHERY or OFF-SITE LOCATION	NUMBER SHIPPED	STOCK
Shoshone-Bannock Egg Boxes	497,380	Sawtooth
Shoshone-Bannock Egg Boxes	75,000	Pahsimeroi
Hagerman National FH/SBT YFK smolts	257,575	Sawtooth
Hagerman National Fish Hatchery	850,226	Sawtooth
Hagerman National Fish Hatchery	71,300*	Sawtooth
Hagerman National Fish Hatchery	220,000	Pahsimeroi
Hagerman State Fish Hatchery	200,000	Pahsimeroi
Magic Valley Fish Hatchery	428,050	Sawtooth
Magic Valley Fish Hatchery	192,777 / 80,939	East Fork/Squaw Creek
Total Eggs Shipped	2,104,531	Sawtooth
Total Eggs Shipped	192,777	East Fork
Total Eggs Shipped	80,939	Squaw Creek
Total Eggs Shipped	495,000	Pahsimeroi
Total Eggs Shipped	2,873,247	All Stocks

*This shipment of 71,300 eggs was culled at HNFH as a result of hatching during shipment.

Table 5. Age class length criteria for steelhead trapped at Sawtooth in 2007.

Males	<=68 cm - 2-year old	1-Ocean
	>68 cm - 3 or 4 year old	2-Ocean
Females	<=65 cm - 2-year old	1-Ocean
	>65 cm - 3 or 4 year old	2-Ocean

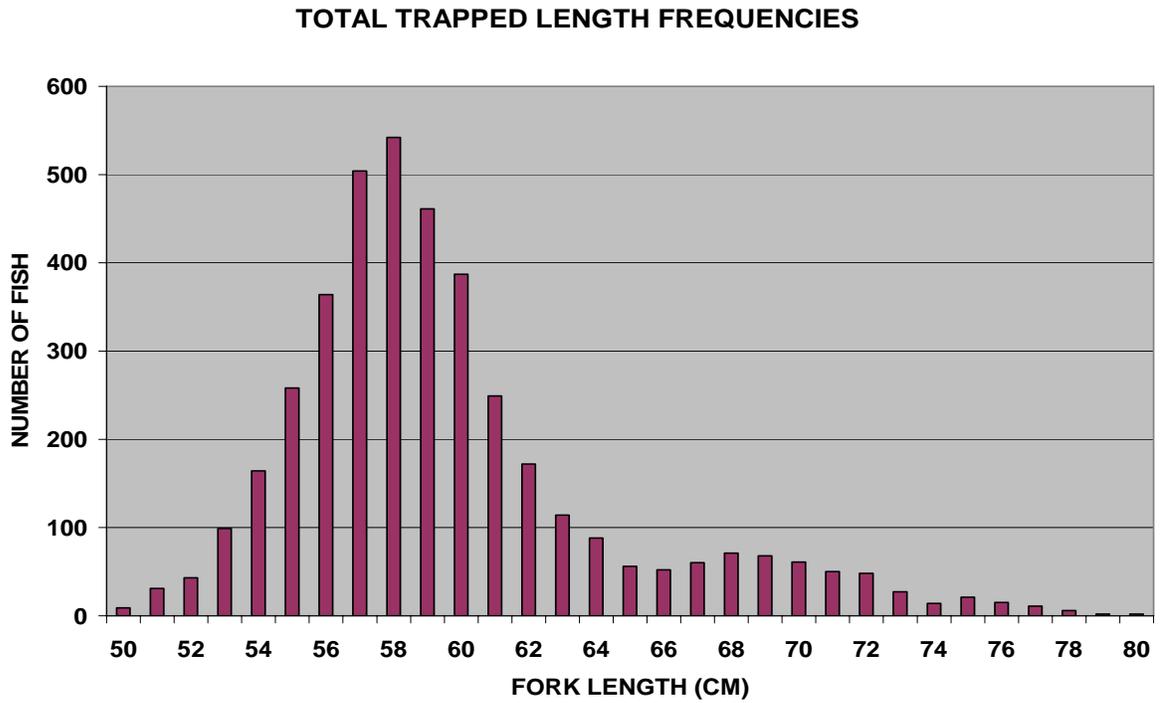
Table 6. Age class breakdown for steelhead trapped at Sawtooth in 2007.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
Hatchery 1-Ocean	1995	93.62	1531	80.71	3526	87.54
Hatchery 2-Ocean	136	6.38	366	19.29	502	12.46
Natural 1-Ocean	3	0.10	10	0.52	13	0.32
Natural 2-Ocean	1	0.05	7	0.37	8	0.20
Total 1-Ocean	1998	93.58	1541	80.51	3539	87.4
Total 2-Ocean	137	6.42	373	19.049	510	12.60

Table 7. Length breakdown for steelhead trapped at Sawtooth for 2007.

F.L. (cm)	HATCHERY		NATURAL		TOTAL TRAPPED			F.L. (in.)
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	TOTAL	
50	6	3	0	0	6	3	9	19.7
51	18	13	0	0	18	13	31	20.1
52	15	27	0	1	15	28	43	20.5
53	39	60	0	0	39	60	99	20.9
54	69	95	0	0	69	95	164	21.3
55	115	143	0	0	115	143	258	21.7
56	167	195	2	0	169	195	364	22.0
57	256	245	0	3	256	248	504	22.4
58	310	231	0	1	310	232	542	22.8
59	265	196	0	0	265	196	461	23.2
60	255	132	0	0	255	132	387	23.6
61	180	67	0	2	180	69	249	24.0
62	116	54	1	1	117	55	172	24.4
63	80	34	0	0	80	34	114	24.8
64	50	36	0	2	50	38	88	25.2
65	24	32	0	0	24	32	56	25.6
66	16	36	0	0	16	36	52	26.0
67	14	46	0	0	14	46	60	26.4
68	18	51	0	2	18	53	71	26.8
69	21	46	0	1	21	47	68	27.2
70	17	44	0	0	17	44	61	27.6
71	13	35	0	2	13	37	50	28.0
72	14	33	0	1	14	34	48	28.3
73	9	18	0	0	9	18	27	28.7
74	6	8	0	0	6	8	14	29.1
75	13	8	0	0	13	8	21	29.5
76	10	5	0	0	10	5	15	29.9
77	7	4	0	0	7	4	11	30.3
78	5	0	0	1	5	1	6	30.7
79	1	0	1	0	2	0	2	31.1
80	2	0	0	0	2	0	2	31.5
Totals	2131	1897	4	17	2135	1914	4049	

**Figure 1. Length frequency histogram for total steelhead trapped at Sawtooth for 2007.
N=4049**



**Figure 2. Length frequency histogram for female steelhead trapped at Sawtooth for 2007.
N=1914**

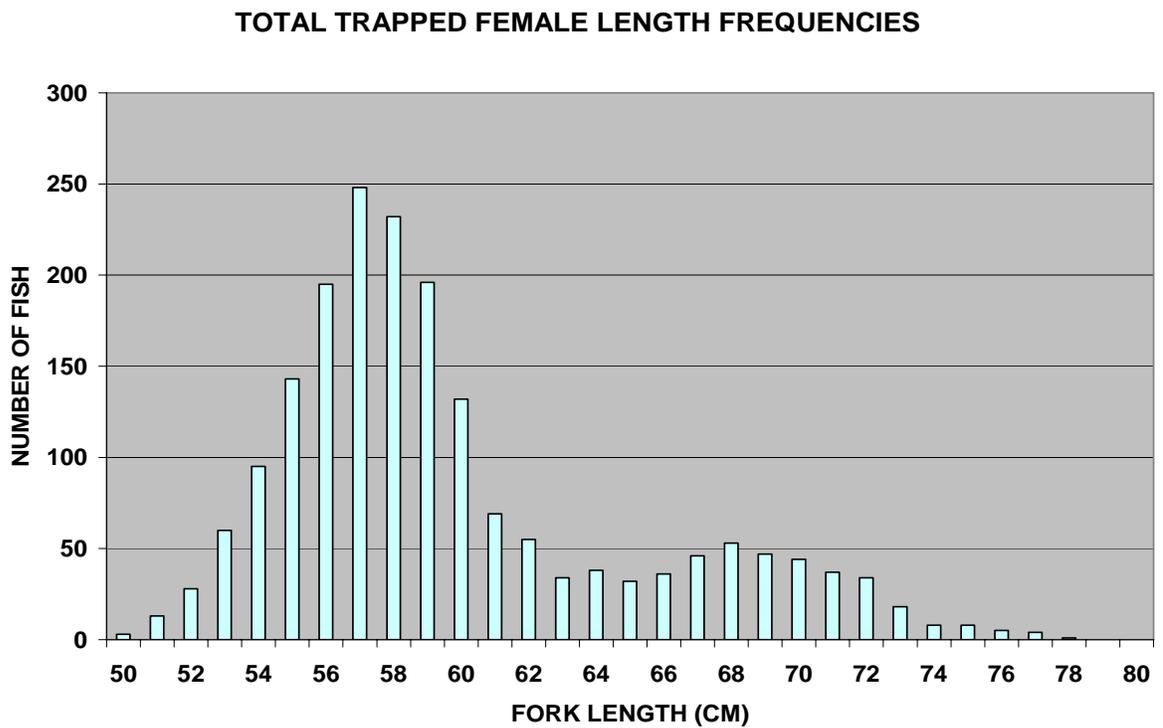


Figure 3. Length frequency histogram for male steelhead trapped at Sawtooth for 2007. N=2135

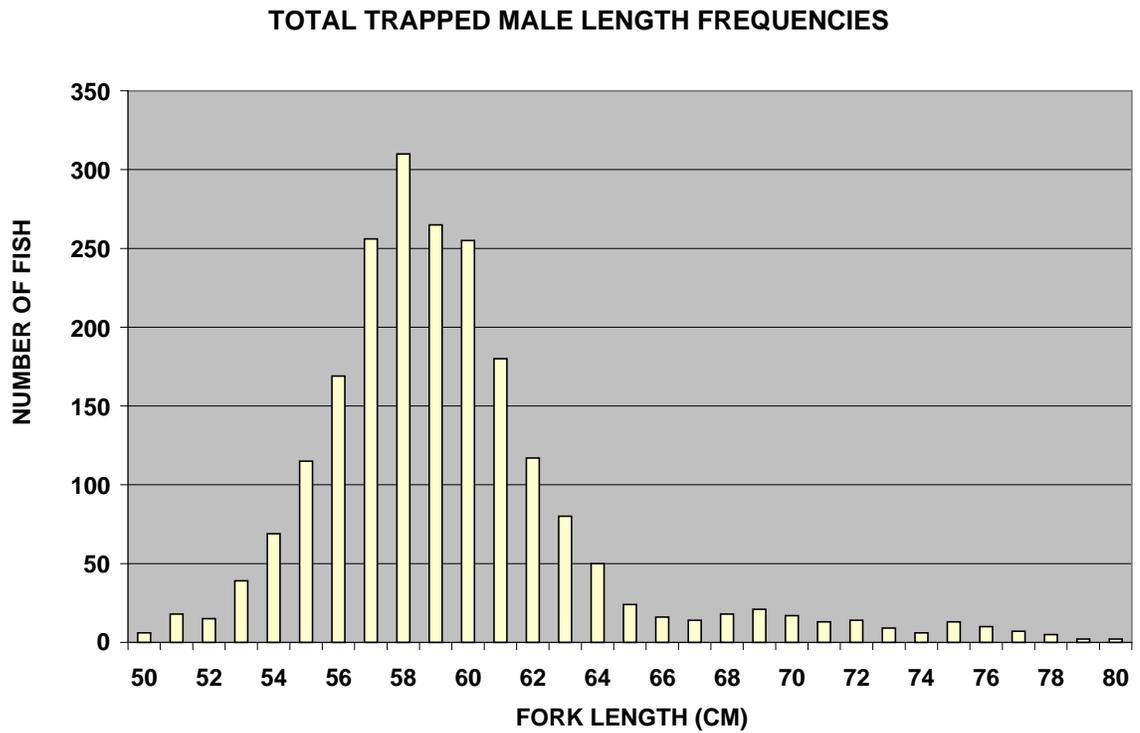


Figure 4. Length frequency histogram for total marked steelhead trapped at Sawtooth for 2007. N=4028

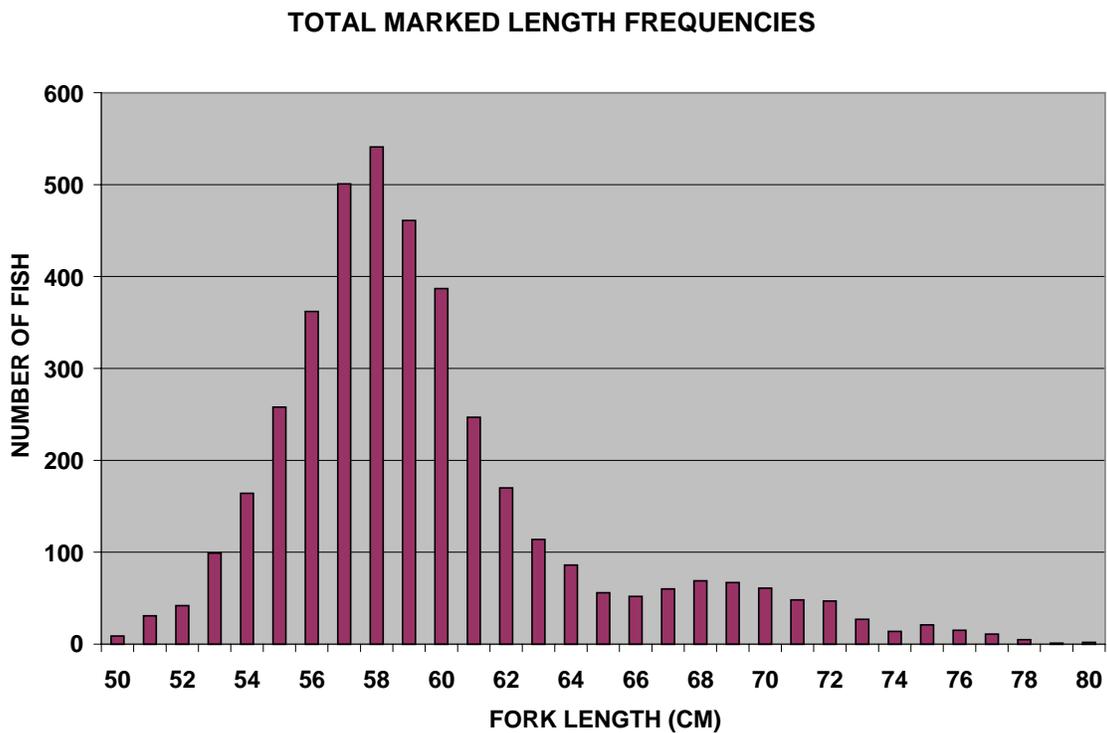


Figure 5. Length frequency histogram for marked females trapped at Sawtooth for 2007.
N=1897

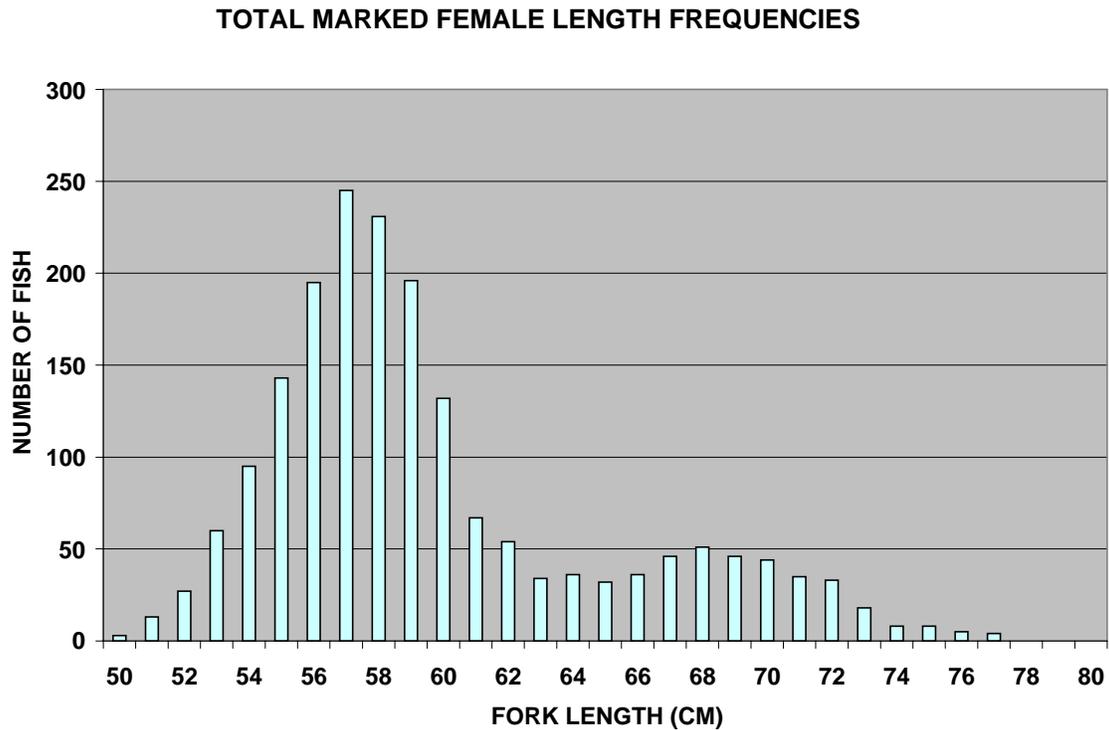


Figure 6. Length frequency histogram for marked males trapped at Sawtooth for 2007.
N=2131

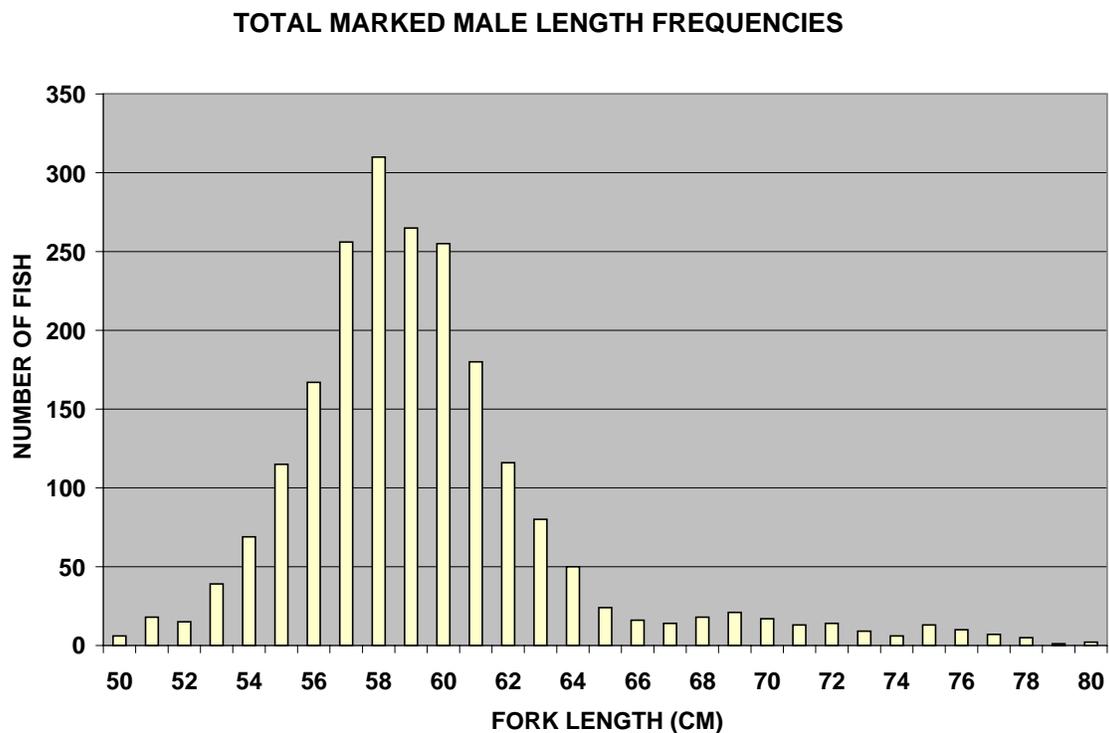


Figure 7. Length frequency histogram for total unmarked steelhead trapped at Sawtooth in 2007. N=21

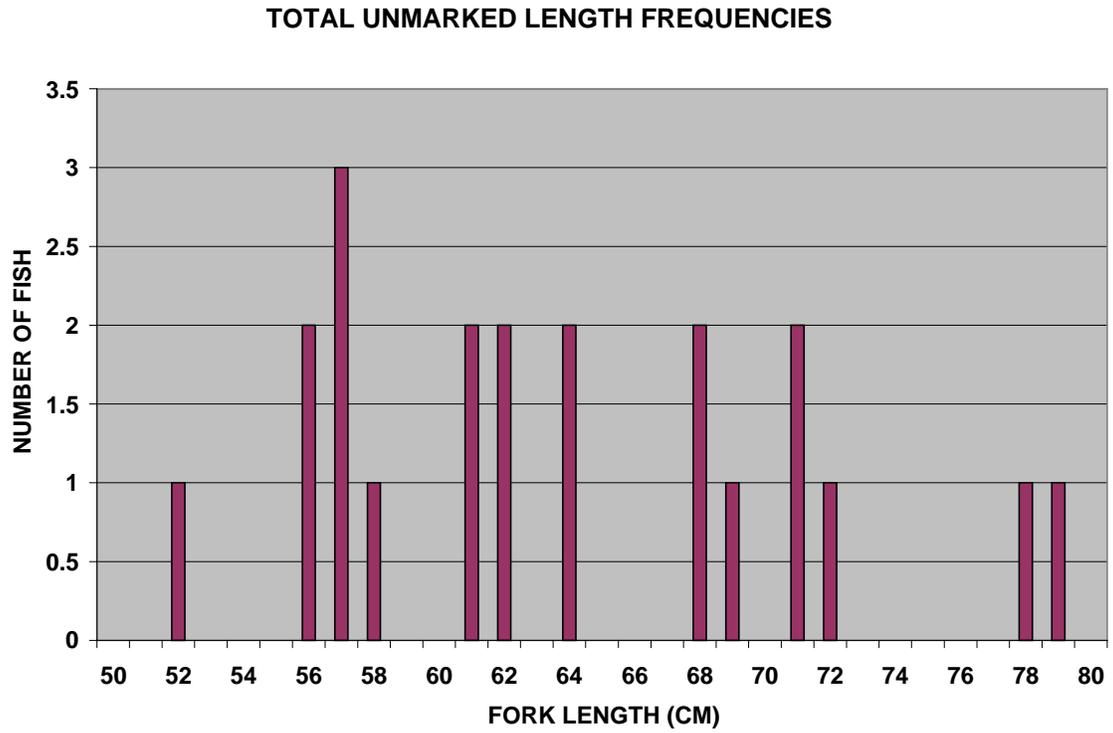


Figure 8. Length frequency histogram for unmarked females trapped at Sawtooth in 2007. N=17

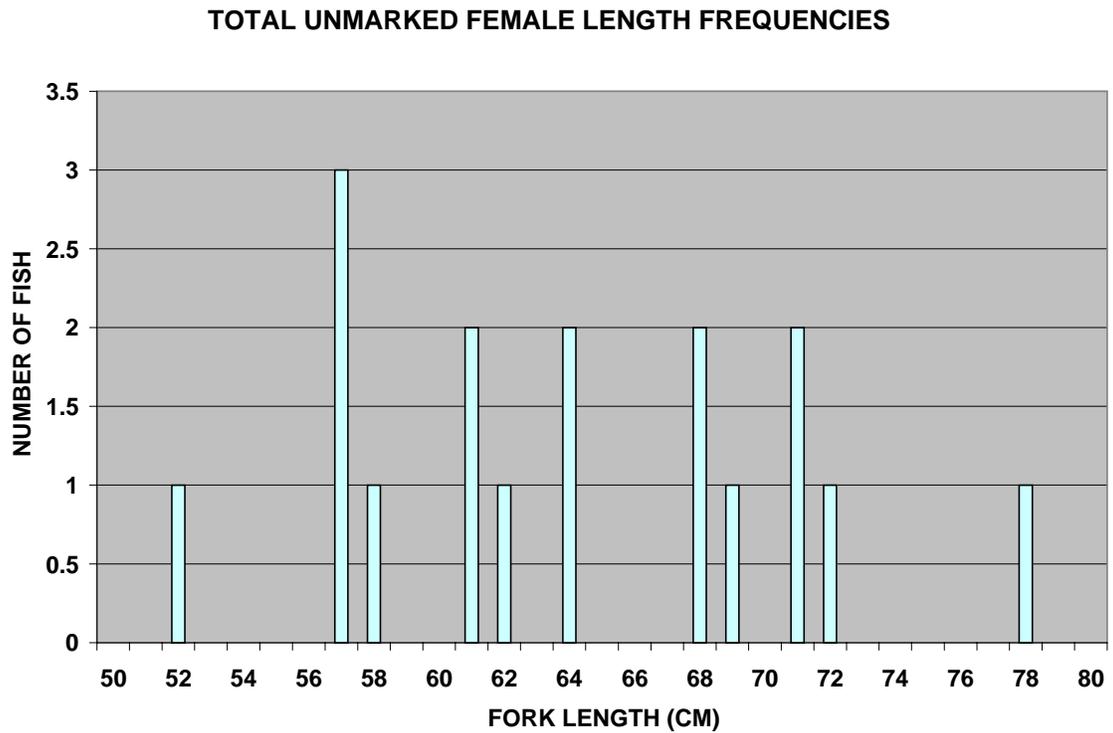
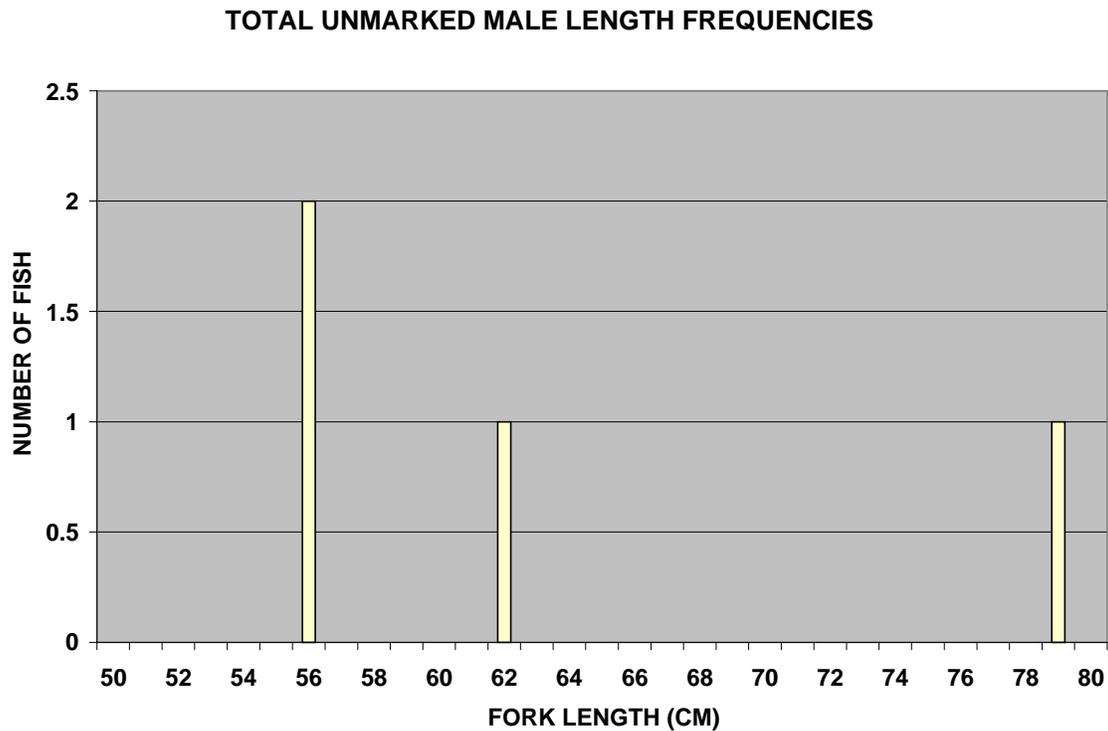


Figure 9. Length frequency histogram for unmarked males trapped at Sawtooth for 2007. N=4



Pahsimeroi Stock Egg Incubation

As in past years, Sawtooth Fish Hatchery incubated a portion of the Pahsimeroi Fish Hatchery egg take for LSRCP Steelhead Programs. All egg shipments are transferred as “green” eggs in insulated coolers.

In 2007, an estimated 538,115 green eggs were transferred to Sawtooth from a total of 104 females (4,735 mean fecundity). Total egg transfers yielded 495,000 eyed-eggs, for a percent survival to the eyed stage of development average of 92.0 percent (Table 8). Eyed egg transfers to Hagerman State Fish Hatchery (HSFH) and Hagerman National Fish Hatchery (HNFH) totaled 200,000 and 220,000-eyed eggs, respectively. All females spawned for HNFH were viral tested. A total of 75,000 Pahsimeroi eggs were made available to the SBT Egg Box Program described above (Table 4). Due to lack of demand, an estimated 558,730 eggs were culled before enumeration (59 females from Lot 3 and 59 females from Lot 4 at a mean fecundity of 4,735 eggs).

Table 8. Spawn summary of Pahsimeroi steelhead eggs incubated and enumerated at Sawtooth.

Males spawned	Females spawned	Eggs per female	Number of green eggs	Number of eyed eggs	Percent eye-up
104	104	4735	538,115	495,000	92.0%

East Fork Salmon River Trap

In 2007, the velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation from March 27 through May 7. Continuing with the Natural Steelhead Program that began in 2001, the plan for trapping and spawning returning steelhead in 2007 was to retain enough eggs taken from Hatchery-Origin steelhead (designated as H-O by presence of a Coded Wire Tag or frayed fins from hatchery rearing) enhanced with a component of steelhead eggs taken from Natural-Origin steelhead (designated as N-O by lack of tag present and unmarked or undamaged fins) to produce 50,000 smolts for the East Fork Weir Release Group (EFWRG) of non-adipose fin-clipped smolts. Anticipating a lower egg-to-smolt survival conversion of natural steelhead reared in a hatchery than that of hatchery steelhead, the target egg take was increased to 70,000 steelhead eggs to achieve the target of 50,000 smolts. In order to incorporate natural steelhead genetics into the hatchery broodstock, one of every three N-O females trapped at the EFSR weir in 2007 was to be crossed with a HO male. A total of 166 adult steelhead were trapped for the Natural Steelhead Program: 150 H-O steelhead (72 males/78 females) and 16 N-O steelhead (3 males/13 females; Table 1a.) Six adipose fin-clipped steelhead were trapped (4 males/2 females) One of these males was inadvertently used for spawning and then killed, and the remaining 3 males and 2 females were killed and not used for spawning. Age class, gender, and length frequency for returning EFSR adults is provided in Tables 4a. through 6a., and Figures 1a. through 3a.

East Fork Spawning

A total of 57 East Fork H-O males and 46 East Fork females, including 1 N-O female and 45 H-O females, were retained for natural-production spawn crosses in 2007 (Table 2a.) Five females were killed and not used for spawning (two were ad-clipped, two females were partially spawned, and one female was green). Spawning operations occurred from April 3 through April 20 (6 spawn dates). The egg take from those 6 spawn dates exceeded available rearing space and spawning operations ended at the EFSR weir on April 20. Spawning activities from the 46 East Fork female steelhead yielded a total of 251,181 green eggs for a mean fecundity of 5,460 eggs per female. A total of 192,777 eyed eggs were obtained from natural-production crosses, for a percent survival to the eyed-stage of development average of 76.7 percent (Table 3a). All 192,777-eyed eggs produced from EFSR natural crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 4).

Table 1a. East Fork Steelhead trapped for 2007.

Total Fish Trapped	160		
*72 H-O Males		3 N-O Males	75 Total Males
*78 H-O Females		<u>13 N-O Females</u>	<u>91 Total Females</u>
150 H-O Fish		16 N-O Fish	166 Total Fish

*includes 4 adipose fin-clipped males and 1 adipose fin-clipped female.

Table 2a. Disposition of Steelhead trapped at the East Fork for 2007.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned	57	46
Killed Not Used	3	5
Released Above Weir	38	40
Total	75*	91

*Of these 75 males, 23 males were used for spawning and then released, 15 males were not used for spawning and were released, for a total of 38 males released above the weir. Twenty-two males were spawned twice, with 14 of these 22 males being released above the weir, and 8 of these males being killed after spawning. Five males were spawned three times and released above the weir.

Table 3a. Spawn class breakdown for Steelhead trapped at the East Fork for 2007.

Males spawned	Females spawned	Number of green eggs	Number of eyed eggs	Percent eye-up
57	46	251,181	192,777	76.70%

Table 4a. Age class length criteria for Steelhead trapped at the East Fork for 2007

Males	<=68 cm - 2-year old	1-Ocean
	>68 cm - 3 or 4-year old	2-Ocean
Females	<=65 cm - 2-year old	1-Ocean
	>65 cm - 3 or 4-year old	2-Ocean

Table 5a. Age breakdown for Steelhead trapped at the East Fork for 2007. H-O designates hatchery-origin fish; N-O designates natural-origin fish.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
H-O 1-Ocean	31	41.33%	9	9.90%	40	24.10%
H-O 2-Ocean	41	54.67%	69	75.82%	110	66.27%
N-O 1-Ocean	2	2.67%	3	3.30%	5	3.01%
N-O 2-Ocean	1	1.33%	10	10.99%	11	6.63%
Total 1-Ocean	33	44.00%	12	13.19%	45	27.11%
Total 2-Ocean	42	56.00%	79	86.81%	121	72.89%

Table 6a. Length breakdown of Steelhead trapped at the East Fork in 2007.

F.L. (cm)	HATCHERY-ORIGIN		NATURAL-ORIGIN		TOTAL TRAPPED			F.L. (in.)
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	TOTAL	
51	1	0	0	0	1	0	1	20.1
52	0	0	0	0	0	0	0	20.5
53	0	1	0	0	0	1	1	20.9
54	1	0	0	0	1	0	1	21.3
55	2	0	0	0	2	0	2	21.7
56	1	0	0	1	1	1	2	22.0
57	4	0	0	1	4	1	5	22.4
58	4	1	0	0	4	1	5	22.8
59	4	5	0	1	4	6	10	23.2
60	2	0	0	0	2	0	2	23.6
61	2	1	0	0	2	1	3	24.0
62	2	0	1	0	3	0	3	24.4
63	4	0	0	0	4	0	4	24.8
64	2	1	0	0	2	1	3	25.2
65	1	3	0	0	1	3	4	25.6
66	1	0	0	0	1	0	1	26.0
67	0	7	1	1	1	8	9	26.4
68	3	4	0	1	3	5	8	26.8
69	0	9	0	0	0	9	9	27.2
70	3	11	0	1	3	12	15	27.6
71	3	8	1	1	4	9	13	28.0
72	6	5	0	0	6	5	11	28.3
73	3	5	0	0	3	5	8	28.7
74	8	6	0	1	8	7	15	29.1
75	2	4	0	1	2	5	7	29.5
76	3	1	0	0	3	1	4	29.9
77	3	4	0	1	3	5	8	30.3
78	2	1	0	0	2	1	3	30.7
79	3	1	0	0	3	1	4	31.1
80	0	0	0	1	0	1	1	31.5
81	0	0	0	1	0	1	1	31.9
82	2	0	0	0	2	0	2	32.3
83	0	0	0	0	0	0	0	32.7
84	0	0	0	1	0	1	1	33.1
Totals	72	78	3	13	75	91	166	

Figure 1a. Length frequency histogram for total Steelhead trapped at the East Fork in 2007. N=166

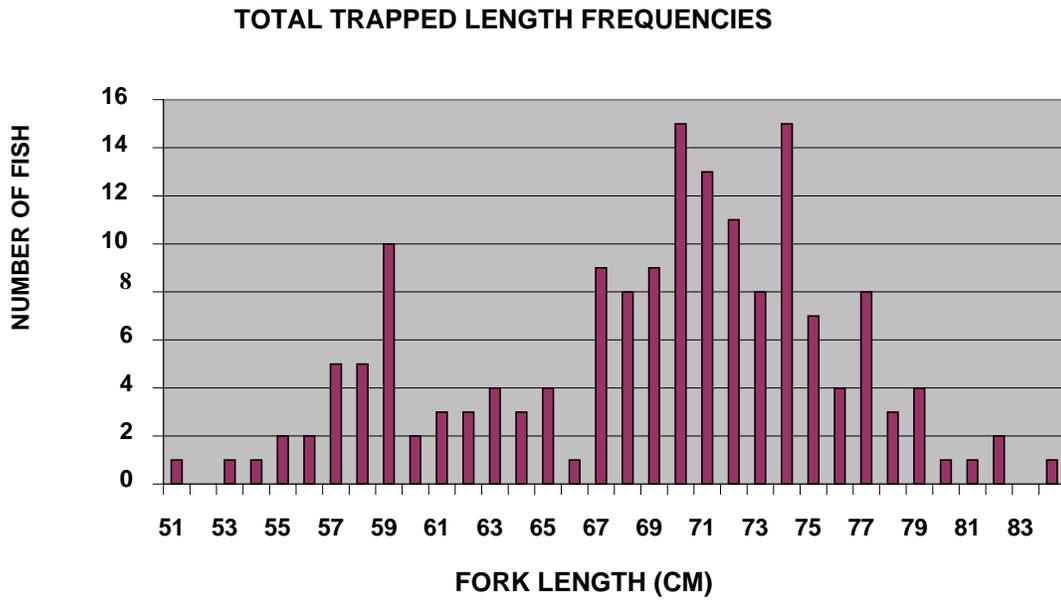


Figure 2a. Length frequency histogram for female Steelhead trapped at the East Fork in 2007. N=91

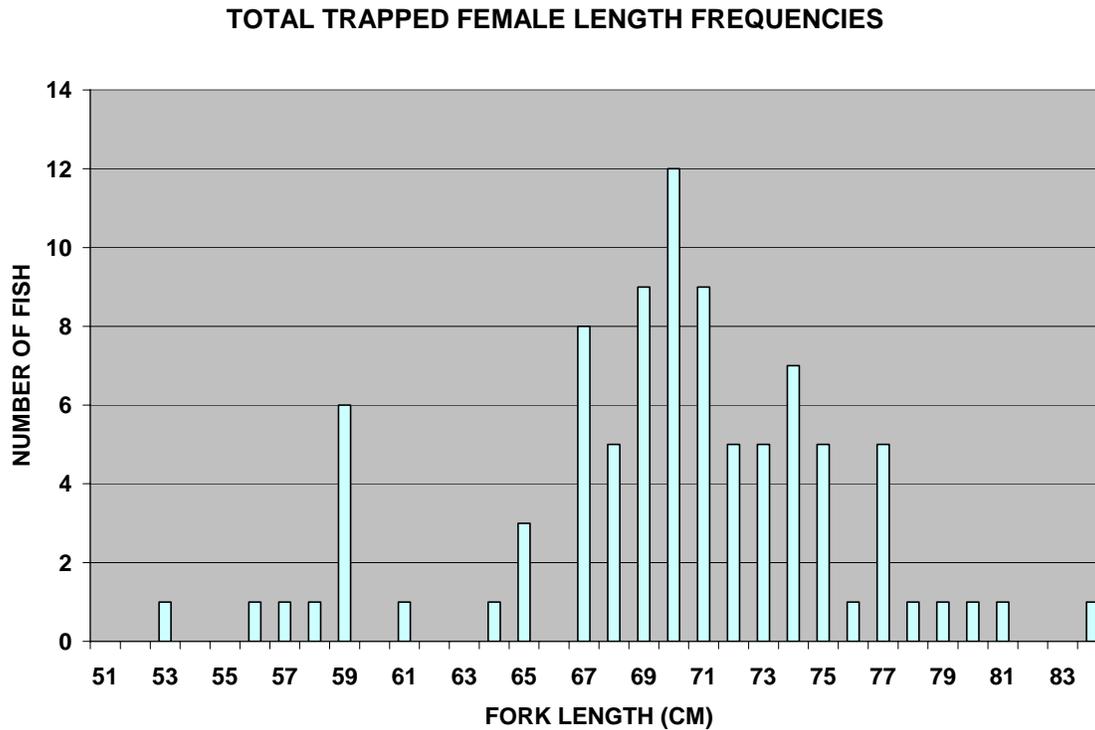
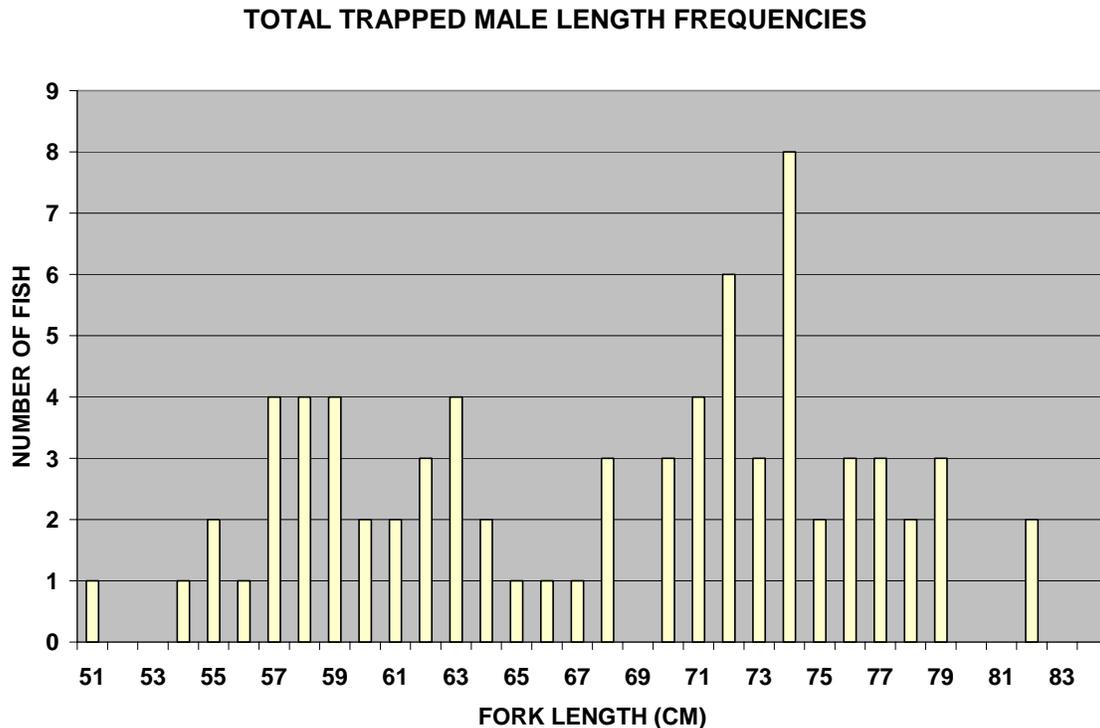


Figure 3a. Length frequency histogram for male Steelhead trapped at the East Fork in 2007. N=75



Squaw Creek Trap

A weir and trap were installed on Squaw Creek, 200 meters upstream of the confluence of the Salmon River on March 27, 2007 to trap adult “B-run” steelhead. The last fish of the season was trapped on April 21, and on April 27, fifty percent of the pickets were pulled from the weir to allow downstream smolt outmigration. Trapping continued through April 30, at which time weir pickets were pulled and the trap was taken out of operation. A total of 52 marked adult “B-run” steelhead were trapped (26 males / 26 females), no unmarked fish were trapped (Table 1b.) Broodstock adults were transferred to the East Fork trapping facility for pre-spawn holding. Fish that were not to be included in the broodstock were released above the weir at Squaw Creek. Gender, length, marks and disposition data are displayed in Tables 3b and 4b.

Squaw Creek Spawning

A total of 21 marked “B-run” females and 17 marked “B-run” males were retained for hatchery-production spawn crosses in 2007, with spawning operations occurring from April 6 through April 20 (5 spawn dates). All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 21 females yielding a total of 143,521 green eggs for a mean fecundity of 6,834 eggs per female. A total of 80,939 eyed eggs were obtained from hatchery-production crosses, for a percent survival to the eyed-stage of development of 56.4 percent (Table 2b). Males used in hatchery-production crosses from Squaw Creek trap included undersized marked males that by real-time CWT reading were determined to be “B-run” origin fish. Of the 17 males used for spawning, 8 males were used twice, 1 male was used three times, and 3

males were used four times. Nine undersized males and 4 undersized females were released above the Squaw Creek trap. One undersized female was killed and not used for spawning (Table 3b.) All eyed eggs (80,939) produced from Squaw Creek “B-run” hatchery crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 4).

Table 1b. Squaw Creek Steelhead trapped for 2007.

Total Fish Trapped:			52		
26	Hatchery Males	0	Natural Males	26	Total Males
26	Hatchery Females	0	Natural Females	26	Total Females
52	Hatchery Fish	0	Natural Fish	52	Total Fish

Table 2b. Spawn class breakdown for Steelhead trapped at Squaw Creek for 2007.

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
17	21	6,834	143,521	80,939	56.4%

Table 3b. Disposition of Steelhead trapped at Squaw Creek for 2007.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned (12 used 2+ times)	17	21
Killed: Not Used (Undersized or Green)	0	1
Released Above Weir (Undersized or Green)	9	4
Other	0	0
Totals:	26	26

Table 4b. Trapping data of steelhead trapped at Squaw Creek in 2007.

Date	Sex		Fork Length (cm)	Marks				Disposition	
	M	F		AD	LV	CWT	NO	*Transferred	Released
3/30/2007		x	58	x					x
4/1/2007		x	86	x				x	
4/1/2007		x	77	x				x	
4/1/2007		x	80	x				x	
4/1/2007	x		75	x	x				x
4/2/2007		x	62	x					x
4/3/2007	x		65	x		x		x	
4/3/2007		x	77	x		x		x	
4/5/2007		x	76	x		x		x	
4/5/2007		x	80	x				x	
4/5/2007	x		66	x		x		x	
4/6/2007		x	81	x		x		x	
4/6/2007	x		84	x		x		x	
4/6/2007	x		64	x					x
4/6/2007	x		68	x		x		x	
4/6/2007		x	77	x		x		x	
4/6/2007	x		58	x					x
4/7/2007	x		60	x					x
4/7/2007		x	77	x		x		x	
4/7/2007	x		74	x		x		x	
4/7/2007	x		84	x					x
4/7/2007		x	79	x		x		x	
4/7/2007		x	79	x		x		x	
4/7/2007		x	78	x		x		x	
4/7/2007	x		82	x		x		x	
4/8/2007		x	77	x		x		x	
4/8/2007		x	80	x		x		x	
4/8/2007		x	82	x				x	
4/8/2007		x	72	x		x			
4/8/2007	x		88	x		x		x	
4/8/2007		x	80	x		x		x	
4/8/2007		x	77	x		x		x	
4/8/2007	x		58	x					x
4/8/2007	x		81	x		x		x	
4/8/2007	x		77	x					x
4/8/2007	x		75	x				x	
4/8/2007	x		61	x					x
4/8/2007		x	80	x		x		x	
4/9/2007	x		95	x		x		x	
4/9/2007	x		83	x		x		x	
4/9/2007		x	72	x					x
4/9/2007	x		76	x		x		x	
4/9/2007	x		86	x				x	
4/9/2007		x	82	x		x		x	
4/9/2007		x	77	x		x		x	
4/9/2007	x		79	x		x		x	

Date	Sex		Fork Length (cm)	Marks				Disposition	
	M	F		AD	LV	CWT	NO	*Transferred	Released
4/9/2007		x	74	x		x		x	
4/9/2007	x		73	x		x		x	
4/9/2007	x		61	x					x
4/13/2007	x		82	x		x		x	
4/14/2007	x		88	x		x		x	
4/21/2007		x	54	x					x

*Designates that fish was transferred from the Squaw Creek trap to the spawning facility at the East Fork of the Salmon River trap.