

SAWTOOTH FISH HATCHERY 2009 SPRING CHINOOK RUN REPORT

Prepared for
SAWTOOTH FISH HATCHERY

By:

Danielle Dorsch
Fish Culturist
Jocelyn Hatch
Fishery Technician

Table of Contents

	<u>Page</u>
2009 Sawtooth Spring Chinook Abstract	3
Trapping and Release Protocols	3
Pre-Spawning Mortality	4
Hatchery Spawning	4
East Fork Salmon River Trapping	5

LIST OF TABLES

Table 1.	Chinook Salmon Trapping Summary for Sawtooth Weir in 2009.	5
Table 2.	Fish Disposition Summary for SFH in 2009.	5
Table 3.	Age Class Breakdown of Hatchery Chinook in 2009	6
Table 4.	Spawn Summary of Spring Chinook Spawmed at SFH in 2009.	6
Table 5.	Summary of Incidental Catch SFH 2009	6
Table 6.	Summary of All Fish Trapped at East Fork Salmon River 2009.	7

LIST OF FIGURES

Figure 1.	Length Frequency Histogram—Total Spring Chinook Trapped	7
Figure 2.	Length Frequency Histogram—Total Marked Spring Chinook	8
Figure 3.	Length Frequency Histogram—Marked Males	8
Figure 4.	Length Frequency Histogram—Marked Females	9
Figure 5.	Length Frequency Histogram—Total Unmarked Chinook Trapped	9
Figure 6.	Length Frequency Histogram—Unmarked Males	10
Figure 7.	Length Frequency Histogram—Unmarked Females	10
Figure 8.	Sawtooth Fish Hatchery 2009 Spring Chinook Run Timing.	11

2009 SAWTOOTH SPRING CHINOOK RUN

Abstract

The Spring Chinook Salmon, *Oncorhynchus tshawytscha*, weir at Sawtooth Fish Hatchery (SFH) on the Main Salmon River was installed on June 24, 2009 and remained in operation until October 16, 2009. During its operation, the weir diverted all upstream migration of fish through the trap at the facility, trapping a total of 4,003 adult Chinook salmon. Of the 4,003 adult Chinook trapped, 3,556 were hatchery-produced marked fish (380 jacks, 1,348 adult males, 1,828 females) and 447 were unmarked (77 jacks, 208 adult males, 162 females.) A trapping summary is provided in Table 1. Hatchery-origin marked fish are defined as fish with either an adipose fin-clip only (AD), adipose clip/Coded Wire Tag (AD/CWT), or CWT only. Unmarked fish are defined as fish with no external markings or CWT. All unmarked Chinook were released above the hatchery weir for volitional spawning. Marked Chinook ponding included 1,067 brood stock (50 jacks, 495 males, 522 females) with the remainder identified as excess to brood stock needs. There were 5 trap mortalities of marked fish (1 male, 4 females); there were 57 mortalities (31 females and 26 males) prior to spawning activities. Of the excess fish, a total of 709 Chinook were identified with a hole punch in the left opercle then recycled through the fishery down river to Torrey's Hole and Watt's Bridge. There were 149 recapture recycled fish from this group. Additionally, 1,517 excess Chinook (750 males, 767 females) were transferred to the Yankee Fork of the Salmon River for a supplementation program managed by the Shoshone-Bannock Tribes Fisheries Department (SBT). Transferred fish were either taken directly from the trap or from a holding pond. Fish provided from the holding ponds were either excess fish, recycled-recaptured fish or males that were used once for spawning and then provided to SBT. Fish were transferred by IDFG and SBT personnel to the Yankee Fork. Excess fish were also provided to food banks and charitable organizations as follows:

Shoshone-Bannock Tribes Food Bank	15adults
Middleton Food Bank	100 jacks
<u>Lowman/Idaho City Food Bank</u>	<u>198 jacks</u>
Total Distributed To Food Banks	298 jacks, 15 adults

The remaining 160 excess fish were frozen and shipped to a rendering facility. Fish disposition data is summarized in Table 2.

A total of 1,067 spring Chinook salmon were ponded as brood stock. Brood stock pre-spawning mortality of 0.01 percent included 2 females and 9 males. An additional 2 females and 13 males were killed but not used at spawn time (KNU). The remaining 1,041 brood stock spawned included 518 females and 523 males (Table 2). Due to egg culling, 490 enumerated females spawn crosses resulted in 2,429,273 green eggs being collected with an eye up rate of 94 percent producing 2,282,484 eyed eggs. Average fecundity was 4,958 eggs per female (Table 4.) All fish carcasses used for spawning, pre-spawn mortalities, KNU, or excess that were not distributed elsewhere, were shipped to a rendering facility.

Trapping and Release Protocols

Trapping and release protocols in 2009 were such that all unmarked Chinook were released for volitional spawning and all marked hatchery fish (AD, AD/CWT or CWT-only), were held at the hatchery. Upon being removed from the trap, all brood stock and unmarked fish were measured for fork length (cm), checked for external tags and scanned for PIT and CWT tags, gender determination was made, and genetic tissue was sampled (unmarked fish only). A total of 662 fish held for brood stock were injected with erythromycin. After July 3, when daily trapping numbers peaked, injections of erythromycin were given only to brood stock females to

reduce fish handling time. Injections continued until August 19, 2009, after which the injections were no longer considered beneficial. Due to higher than expected return in jack numbers, only 50 jacks possessing a CWT were held for hatchery brood stock. After initial handling the fish were placed into the appropriate adult holding pond or in the adult transfer tank to recover prior to release.

Age-length criteria applied in previous years to determine age class was utilized for the 2009 Chinook season at SFH. All brood year 2004 (five year old) hatchery fish returning in 2009 were marked with either an AD or AD/CWT and measured greater than 82 centimeters (N=548 for 2009). All brood year 2005 (four year old) hatchery fish returning in 2009 were marked with either an AD or AD/CWT and measure 64 to 82 centimeters (N= 2628 for 2009). All brood year 2006 (three year old) hatchery fish returning in 2009 were marked with a CWT only and measured less than or equal to 64 centimeters (N= 380 for 2009) (Table 3).

Pre-Spawning Mortality of Poned Groups

Of the 1,067 brood stock Chinook held at SFH, 11 fish (2 females, 9 males) died prior to spawning activities, resulting in 0.010 percent pre-spawn mortality. Additionally, there were 46 trap or holding pond mortalities (29 females and 17 males). No mortality was categorized to a specific fish health pathogen. Formalin treatments began July 2, 2009, when the first fish was ponded for brood stock. One hour flow-through treatments of 170 ppm formalin were initiated three days a week, then increasing to five days a week when river temperatures and conditions were such that an epidemic of an infectious disease was likely. When river temperatures subsided and turbidity decreased, treatments returned to three days a week. All pre-spawning mortalities were marked fish.

Hatchery Spawning

In 2009, hatchery spawning began August 13 and concluded on September 16, with a total of 518 females spawned on eight separate spawn days (lots). Hatchery spawning protocols were identical to recent years and follow industry-accepted practices and standards. Spawn matrices are developed and spawn crosses made to maximize both the number and genetic diversity of parents contributing to future offspring. Spawn crosses were made by 1:1 (f/m) split-random cross mating. A total of 518 females were spawned with 523 males. Each female's eggs were fertilized individually with one male, and then combined after 15 seconds with eggs from another female and milt from a second male. All adult males were used once; 105 broodstock males were spawned once and then provided to the SBT for supplementation to the Yankee Fork of the Salmon River. An additional two males were spawned with one female on days where an odd number of females were spawned. There were 2 KNU females, and 13 KNU males that were not used for spawning. After fertilization, all eggs were rinsed with well water then water-hardened for 30 minutes in a 50 parts per million (ppm) solution of Ovadine (Povidone Iodine), and then drained. Once drained, the eggs were then immersed in a solution of 100 (ppm) Ovadine (Povidone Iodine) for ten minutes. Eggs were incubated at two females per egg tray in vertical-stack incubators. Eagle Fish Health Laboratory analyzed all females spawned and detected elevated Bacterial Kidney Disease (BKD) levels [Enzyme-Linked Immunosorbent Assay (ELISA) optical density values ≥ 0.25] in 14 fish health samples in 2009, resulting in 28 females' eggs being culled (70,402 eggs total). The green egg take from the remaining 490 females was 2,429,273 eggs, yielding 2,282,484 eyed eggs for a percent survival to the eyed-stage of development average of 94 percent and a mean fecundity of 4,958 eggs per female (Table 4.). An additional 481,717 excess eyed eggs were provided to the SBT to be placed in egg boxes in the Yankee Fork of the Salmon River for supplementation

East Fork Salmon River Trapping

The adult trap was operated by IDFG Captive Chinook Program staff from June 12 through September 26. During 2009, 191 natural/wild origin Chinook salmon were trapped. Of these 191 fish, 81 were adult males (42.4%), 50 were jacks (26.2%) and 60 were females (31.4%). This is the second highest recorded return to the EFSR since 1988. Also trapped were 11 adipose-clipped hatchery Chinook, which were subsequently transported and released into the main Salmon River upstream of the mouth of the EFSR. Of these 11 hatchery fish, five were left opercle punched, which was the mark given to hatchery Chinook at SFH that were subsequently released back into the Salmon River downstream of Stanley at several sites in an effort to recycle excess Chinook through the fishery.

Run timing during 2009 was very similar to 2008. The first Chinook trapped was on June 29th and the last trapped was on September 14th this year. It is also worth noting the recovery of one natural male carcass above the weir that did not have a jaw tag, nor was its left ventral fin clipped. Thus, this fish was never captured in the trap and was evidently able to pass the trap through the spillway, somehow able to jump the barrier, or passed prior to installation of the trap on June 12th.

TABLES

Table 1. Chinook Salmon Trapping Summary for Sawtooth Weir in 2009.

Total Fish Trapped: 4003					
380	Marked Jacks	77	Unmarked Jacks	457	Total Jacks
1348	Marked Males	208	Unmarked Males	1556	Total Males
1828	Marked Females	162	Unmarked Females	1990	Total Females
3556	Marked Fish	447	Unmarked Fish	4003	Total Fish

Table 2. Fish Disposition Summary for SFH in 2009. N = 4003

Fish Disposition	Jacks	Jills	Males	Females	Total
Pre-Spawning Mortality	0	0	9	2	11
Pond Mortality	0	0	17***	29***	46
Spawned	50	0	473	518	1041
Recycled	0	0	304	405	709
Killed: Not Used*	0	0	13*	2*	15
Released Above Weir	77	0	208	162	447
Trap Mortalities	0	0	1	4	5
Excess to Food Banks	298	0	15	0	313
Excess to Yankee Fork**	0	0	750***	767***	1517
Excess to Rendering Plant	0	0	62***	98***	160
Recaptured Recycled***	0	0	113***	36***	-149
1 st Use Males***	0	0	105***	0	-105

*Fish held for brood stock that were killed and not used for spawning.

**Fish transferred for Shoshone-Bannock Tribes Yankee Fork Supplementation Program.

*** AD Recaptured Recycled fish and first-use males provided to SBT; these fish have already been counted in trapping totals.

Table 3. Age Class Breakdown of hatchery Chinook in 2009

Age Class	MALES	FEMALES	TOTAL
Hatchery Jacks	380	0	380
Hatchery 2-Oceans	1202	1426	2628
Hatchery 3-Oceans	146	402	548

Table 4. Spawn Summary of Spring Chinook Spawned at SFH in 2009.

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
523(45)*	490**	4,958	2,429,273**	2,282,484	94%

*Total Males (Jacks) ** 518 females were spawned, 28 females' eggs were culled due to high ELISA scores and are not included in summary.

Table 5. Summary of all incidental species at SFH Trap.

Species	Trapped	Released	Genetics taken
Bull trout	24	23	23
West slope cutthroat trout	6	6	NA
Rainbow trout	4	4	NA
Mountain Whitefish	6	6	NA
Mountain Sucker	170	170	NA
Northern Pike Minnow	1	1	NA
Sockeye Salmon	250	0	250
Steelhead	1	1	NA
Cutthroat X Rainbow	2	2	NA

Table 6. Summary of all fish species captured at East Fork Salmon River adult trap, June 12 - September 9, 2009.

Species	Trapped	Recaptured	Genetics taken
Chinook ^a	191	22	191
Bull trout	200	36	122
Westslope cutthroat trout	6	2	5
Rainbow trout ^b	1	0	1
Mountain whitefish	98	1	45
Catostomous spp	0	0	0
Steelhead (adult)	0	0	0
Sockeye salmon	0	0	0

^a Does not include 11 adipose-clipped hatchery Chinook

^b Includes cutthroat-rainbow hybrids

FIGURES

Figure 1. Length Frequency Histogram—Total Spring Chinook Trapped in 2009. N=4,003.

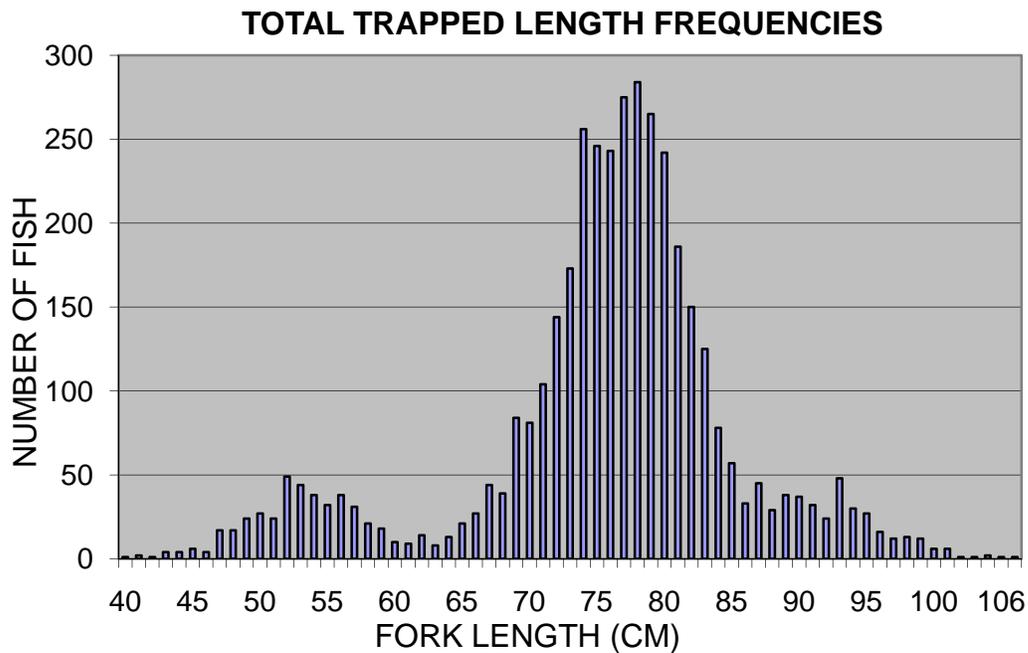


Figure 2. Length Frequency Histogram-Total Marked Spring Chinook Trapped in 2009. N=3,556.

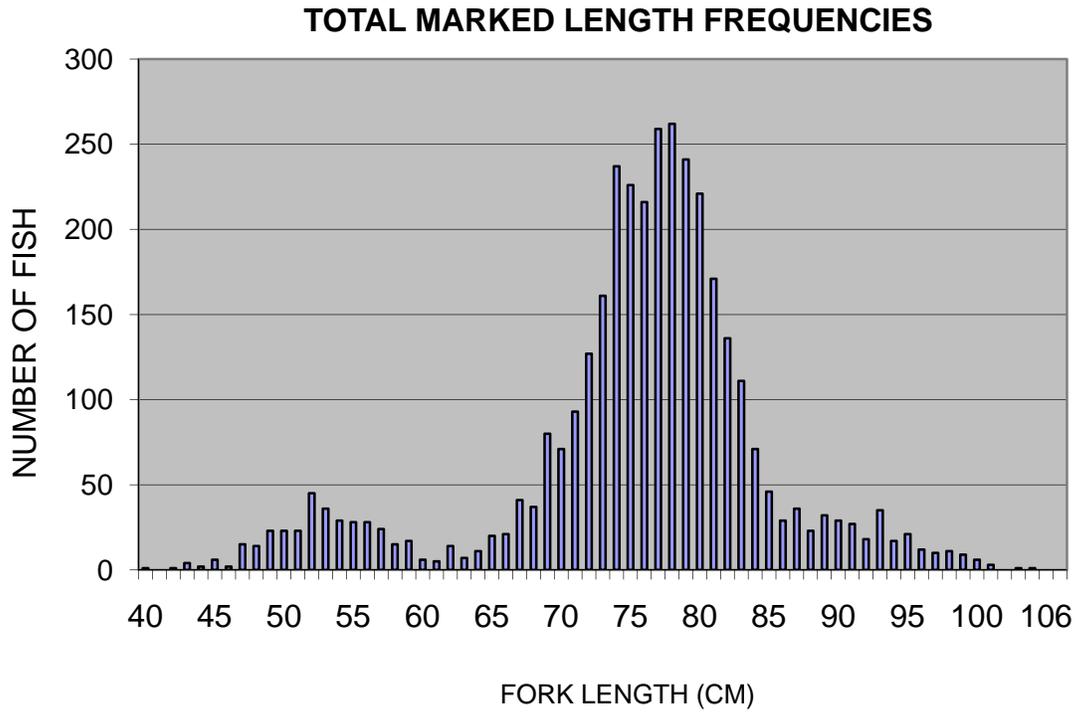


Figure 3. Length Frequency Histogram-Total Marked Males Trapped in 2009. N=1,728

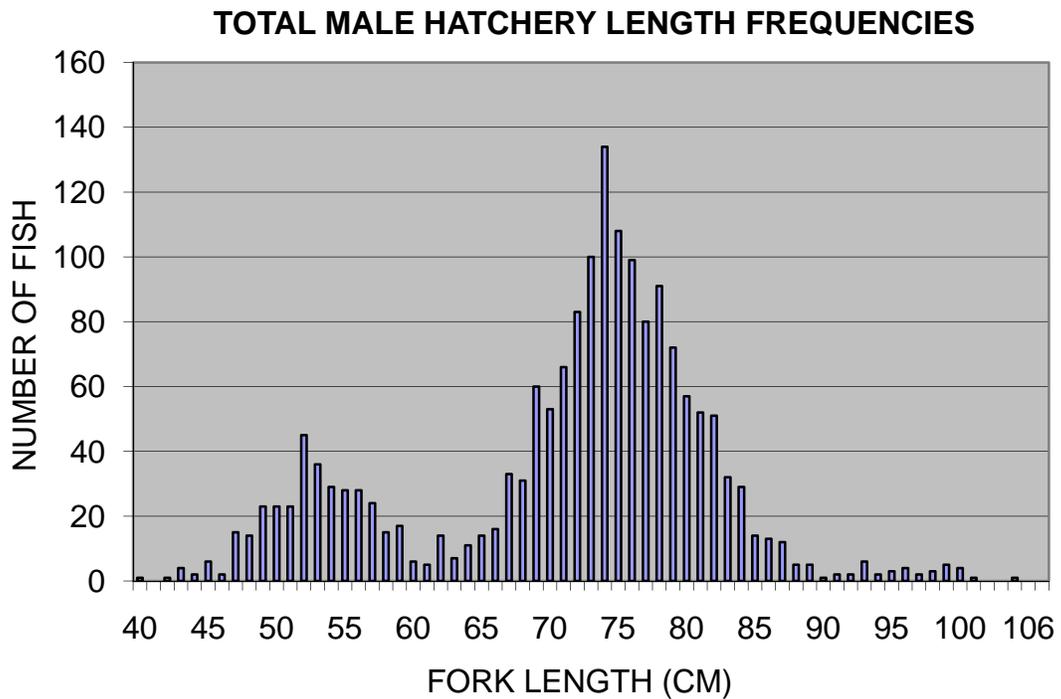


Figure 4. Length Frequency Histogram—Total Marked Females Trapped in 2009. N=1,828.

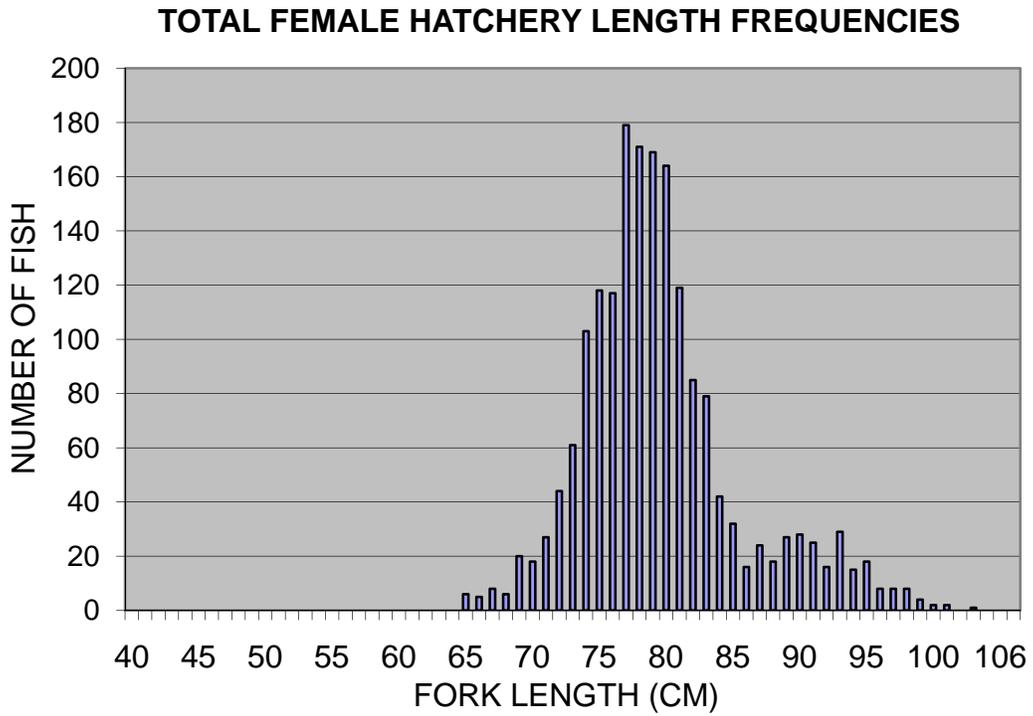


Figure 5. Length Frequency Histogram—Total Unmarked Chinook Trapped in 2009. N=447.

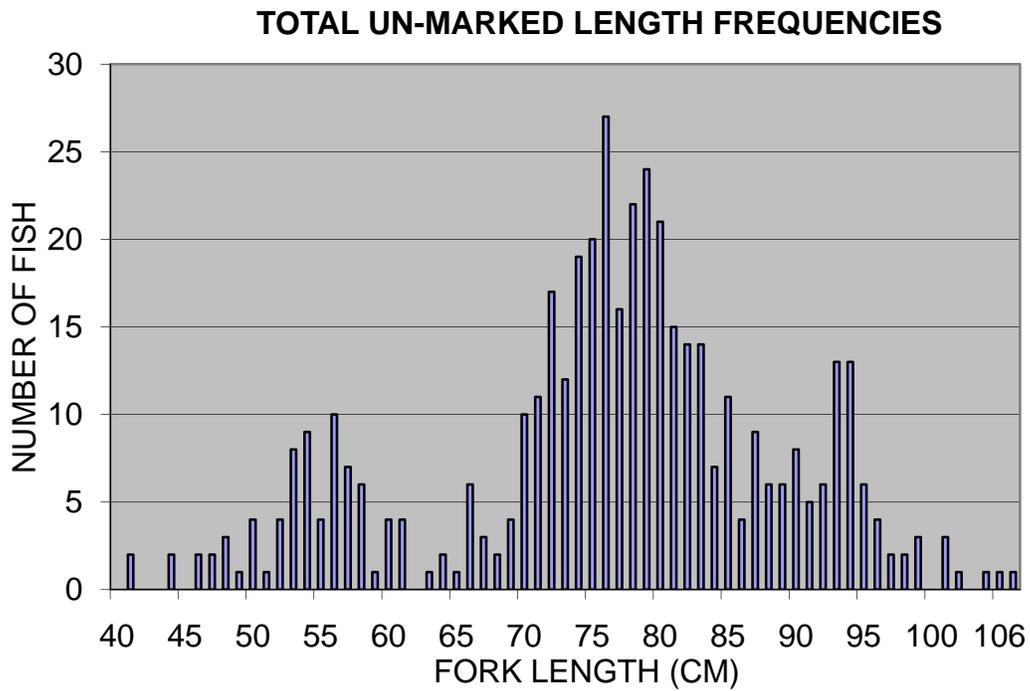


Figure 6. Length Frequency Histogram-Total Unmarked Males Trapped in 2009. N=285.

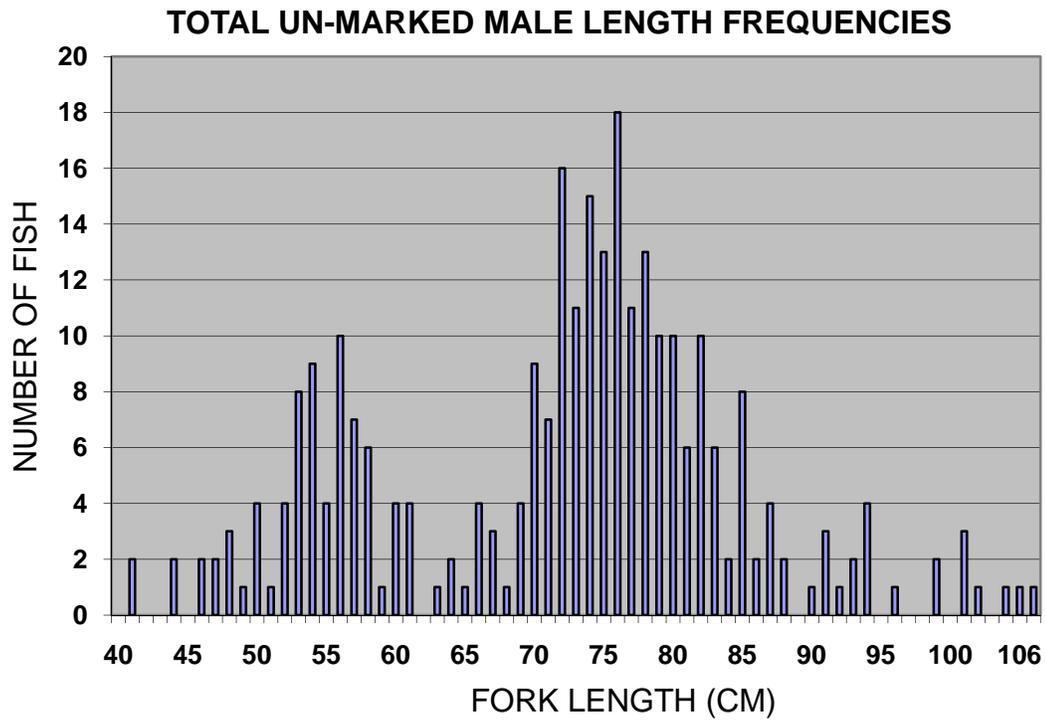


Figure 7. Length Frequency Histogram-Total Unmarked Females Trapped in 2009. N=162.

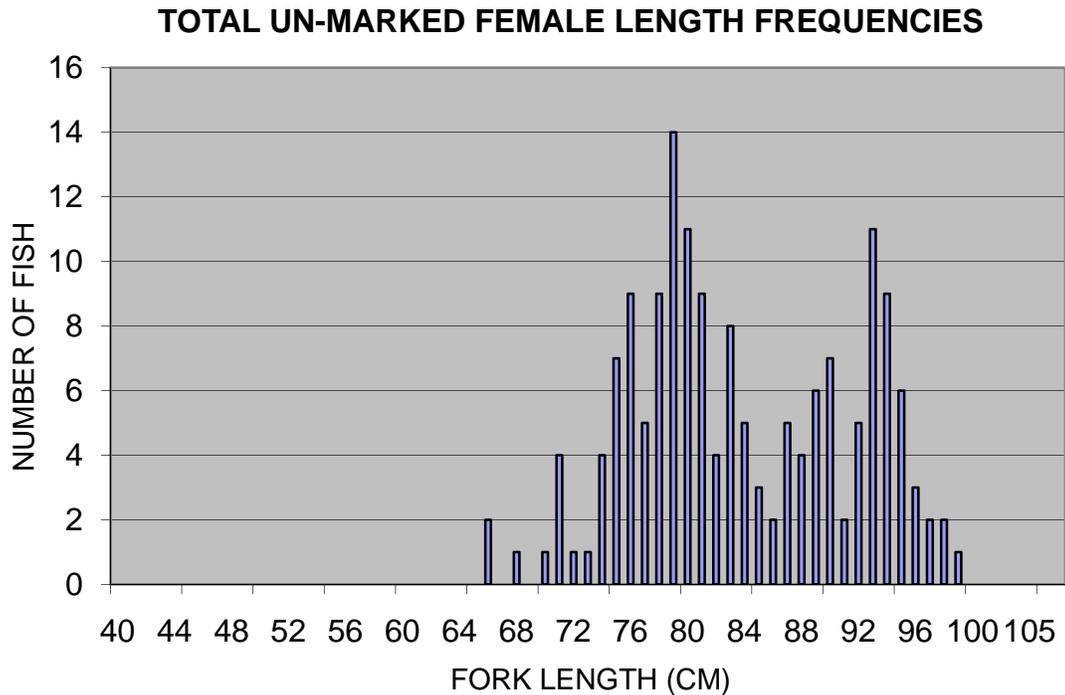


Figure 8. Sawtooth Fish Hatchery 2009 Spring Chinook Run Timing. N= 4,003.

