

2013 Yearend Captive Rearing Study Update

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Background:

The San Joaquin River Restoration Program (Program) is developing a conservation hatchery that is anticipated to provide much of the founding population for salmon restoration. The San Joaquin Salmon Conservation and Research Facility (Conservation Facility) is scheduled to be operational in February 2016. During facility planning and construction, a modest Interim Facility and the Fall-run Captive Rearing Study have been developed to refine techniques and protocols for rearing Chinook salmon through adulthood, and to help meet reintroduction timelines during full-scale facility development.

The Captive Rearing Study began with the collection of 550 fertilized fall-Chinook salmon eggs during the 2010 fall spawn at Merced River Fish Facility. In the fall of 2013 most of the surviving fish from the study were spawned and the resulting eggs were incubated and hatched. Ten males were spawned with 74 of a total of 77 female salmon. The small number of males available for spawning was due to mortality associated with early maturation. The early maturing salmon died in years-one and -two of the study, leaving few males available for spawning during year-three.

Spawning occurred between November 6 to December 9, 2013. The spawning hormone Ovaplant was used to increase milt production to allow all females to be spawned. Output of milt substantially increased four days post injection and appeared to slightly increase with subsequent spawning over the first two weeks. Because of the shortage of males, males were spawned multiple times. Sperm motility was tested for each male and motility appeared at or near 100% throughout the spawning period. Each male contributed to between 2 to 14 mated pairings which occurred on between 1 to 6 individual spawn dates. The injections were made intramuscular in the dorsal sinus using a RalGun. A rubber stopper was placed over the base of the needle of the RalGun to limit the depth of the injection.

Toward the end of the spawning period when few males remained, three females were injected with Ovaplant on December 3rd to accelerate maturation. Female maturation was based on ultrasonography. Females were determined ready to spawn when they exhibited soft abdomens, hydrated eggs (e.g. dark color at center of egg as observed in ultrasound image) and fish expelled eggs when gentle pressure was placed on the abdomen. The three females that were injected had moderately soft abdomens, but the eggs were not yet hydrated.

Post-implant Observations:

Assessment of implanted males of both the pre and post-spawn group showed increased milt production and the ability to spawn again.

Male Fish ID	Number of Mated Pairings Per Spawn Date									
	11/6	11/13	11/20	11/22	11/26	11/27	12/3	12/4	12/6	Total
7A56BD	-	1	5	3	-	-	3	-	4	16
46250D	1	3	5	1	-	2	-	-	-	12
460A7D	1	2	4	-	4	-	-	-	-	11
461BO5	-	2	1	-	2	-	3	2	-	10
79F368	1	1	-	3	4	-	-	-	-	9
60DAFD	-	2	4	2	-	-	-	-	-	8
654AO4	-	1	1	2	3	-	-	-	-	7
60D14C	-	2	4	-	-	-	-	-	-	6
46344C	-	2	3	-	-	-	-	-	-	5
7A2A89	-	-	2	-	-	-	-	-	-	2
Total	3	16	29	11	13	2	6	2	4	86

Preliminary egg survival data from the 2013 spawn.

Date spawned	Lot #	Total eggs fertilized	Total survival to eyed	% Survival to Eyed Stage
6-Nov	1	8,148	7,069	87%
13-Nov	2	41,241	38,554	93%
20-Nov	3	41,646	27,497	66%
22-Nov	4	28,152	25,513	91%
26-Nov	5	32,393	28,211	87%
27-Nov	6	5,172	4,331	84%
3-Dec	7	14,699	10,099	69%
4-Dec	8	3,941	3,329	84%
6-Dec	9	7,076	4,102	58%
9-Dec	10	5,117	3,156	62%
Total		187,585	151,861	81%

Fish will be reared to the juvenile stage in the coming months, coded wire tagged and released to the San Joaquin River for experimental studies. A full report will be provided when the study is complete later this year.