

Central Valley Salmon and Steelhead Marking/Coded-wire Tagging Program

**Fall-run Chinook Salmon
Spring-run Chinook Salmon
Steelhead**

2013 Marking Season



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Abstract

The Central Valley Constant Fractional Marking/Tagging Program (CFM) was initiated in the spring of 2007 following the purchase of four automated fish tagging trailers (AutoFish Systems). Planning studies indicated that the optimal marking/tagging rate for the Central Valley CFM program was 25% of the fall-run Chinook production releases. For each production release (fish released at the same time and location), the program therefore targeted marking with an adipose fin-clip and coded-wire tagging a representative 25% of each release of fall-run Chinook salmon from the Central Valley hatcheries in 2007 through 2013. The program was conducted at Coleman National Fish Hatchery, Feather River Fish Hatchery, Feather River Fish Hatchery Annex, Nimbus Fish Hatchery, and Mokelumne River Fish Hatchery in these years.

The AutoFish Trailers were also used in the 2011, 2012, and 2013 seasons to adipose fin-clip and coded-wire tag 100% of the spring-run Chinook salmon reared at the Feather River Fish Hatchery, and adipose fin-clip 100% of the steelhead reared at Coleman National Fish Hatchery, Feather River Fish Hatchery, and Nimbus Fish Hatchery. At Mokelumne River Fish Hatchery, the steelhead were manually clipped due to the wide range of sizes. At Nimbus Fish Hatchery, 100% of the steelhead were adipose fin-clipped with the AutoFish Trailer for the first time in the 2013 season.

This report includes the marking/tagging activities conducted with the AutoFish Systems at the five Central Valley hatcheries in 2013 (Brood Year 2012 fall-run Chinook salmon, spring-run Chinook salmon, and steelhead). The program successfully processed 100% of the production releases of fall-run Chinook salmon through the automated marking trailers, a total of 28,050,995 fish. Of the fall-run Chinook total, approximately 28.85% were coded-wire tagged and adipose fin-clipped (a total of 8,092,268 fish). In addition, the program marked and coded-wire tagged 100% of the spring-run Chinook salmon produced at the Feather River Fish Hatchery, a total of 2,162,607 fish, and adipose fin-clipped 100% of the steelhead produced at Coleman National Fish Hatchery, Feather River Fish Hatchery, and Nimbus Fish Hatchery, a total of 1,442,140 fish. The steelhead at Mokelumne River Hatchery were manually clipped by hatchery personnel and are not included in this number.

Introduction

In most years, 28-32 million fall-run Chinook salmon are produced at five hatcheries in California's Central Valley, including Coleman National Fish Hatchery, Feather River Fish Hatchery, Feather River Fish Hatchery Annex, Nimbus Fish Hatchery, and Mokelumne River Fish Hatchery (Figure 1). Production from these hatcheries contributes to major sport and commercial fisheries in ocean and inland areas. Until 2007, only experimental releases of fall-run Chinook were externally marked and coded-wire tagged on a regular basis.

In 2004, the CALFED Ecosystem Restoration Program (ERP) funded a study to design a constant fractional marking/coded-wire tagging program for production releases of fall-run Chinook salmon from Central Valley hatcheries, with the goal of estimating in a statistically valid manner the relative contribution of hatchery production. The study recommended the implementation of a system-wide marking/tagging program for production releases.

In 2006, the ERP Program provided funding to begin implementation of the Central Valley Constant Fractional Marking (CFM) program. The initial contract provided funding to Pacific States Marine Fisheries Commission for the purchase of four automated tagging systems (AutoFish Systems) and the first two years of operating costs for marking/tagging production releases of fall-run Chinook salmon at the five major Central Valley hatcheries (in 2007 and 2008). This program is a cooperative effort of the California Department of Fish and Wildlife, California Department of Water Resources, U.S. Fish and Wildlife Service, Pacific States Marine Fisheries Commission, U.S. Bureau of Reclamation, and East Bay Municipal Utility District. In 2009 through 2013 funding to conduct tagging operations at each hatchery was provided by the following entities: Coleman National Fish Hatchery, U.S. Bureau of Reclamation; Feather River Fish Hatchery, California Department of Water Resources; Feather River Fish Hatchery Annex, California Department of Fish and Wildlife; Mokelumne River Fish Hatchery, East Bay Municipal Utility District; and Nimbus Fish Hatchery, U.S. Bureau of Reclamation.

From 2002 to 2010, 100% of the spring-run Chinook salmon reared at Feather River Hatchery were marked and coded-wire tagged using manual techniques. In 2011, 2012, and 2013 the AutoFish Trailers were used for the spring-run Chinook marking/tagging. Funding was provided by the California Department of Water Resources.

The overall objectives of the fall and spring-run Chinook salmon tagging programs are:

1. To evaluate the contribution rates of hatchery fish to Central Valley Chinook salmon populations,
2. To evaluate the Central Valley propagation program's genetic and ecological effects on natural Chinook populations,
3. To estimate exploitation rates of hatchery and natural Central Valley Chinook salmon in ocean and inland fisheries,
4. To evaluate the success of restoration actions designed to increase natural production of Central Valley Chinook salmon,
5. To evaluate the relative impacts of water project operations on hatchery and naturally-produced Chinook salmon,
6. To evaluate the recovery of listed stocks of Chinook salmon.

The majority of the steelhead reared at Central Valley hatcheries were also marked using the AutoFish Trailers in 2013. Marking allows selective harvest of hatchery-reared steelhead in sport fisheries.

This report covers the seventh year of the CFM program's marking/tagging activities at the five major Central Valley hatcheries in the spring/summer of 2013 (Brood Year 2012 fall-run Chinook). The report also includes the marking/tagging of Brood Year 2012 spring-run Chinook salmon reared at the Feather River Fish Hatchery, and marking of steelhead reared at Coleman National Fish Hatchery, Feather River Fish Hatchery, and Nimbus Fish Hatchery.

Methods

The coded-wire tag/adipose fin clip is the method agreed to by the Pacific Salmon Treaty (1999) to monitor Chinook salmon in ocean fisheries along the Pacific Coast. It is a cost-effective method to apply a long-term mark that gives data on hatchery origin and release group, and provides for external identification of tagged fish. The coded-wire tag/adipose fin-clip marking method has been used throughout the West Coast of North America since the 1970's. Currently, over 50 million Chinook and coho salmon are coded-wire tagged each year. This Central Valley program is an integral part of this Coast-wide tagging program; tagged fish are recovered in ocean fisheries throughout the West Coast.

Four state-of-the-art automated tagging trailers were purchased for the Central Valley program in late 2006 and early 2007 from Northwest Marine Technology. The trailers incorporated the latest advanced technology for marking and coded-wire tagging fish. The AutoFish System™ has the capacity to mark and implant coded-wire tags very rapidly without any use of anesthetic or human contact. These systems have been in use for many years in the Pacific Northwest, but the Central Valley trailers were the first to be purchased for use in California.

Planning studies indicated that the optimal marking/tagging rate for the Central Valley CFM program was 25% of the fall-run Chinook production releases. For each production release (fish released at the same time and location), the program therefore targeted marking/tagging a representative 25% in 2007 through 2013. Coded-wire tags for the 2013 season were ordered from Northwest Marine Technology in November 2012. Tags used in the program were all 1.1 mm standard length tags.

The program was conducted at Coleman National Fish Hatchery, Feather River Fish Hatchery, Feather River Fish Hatchery Annex, Nimbus Fish Hatchery, and Mokelumne River Fish Hatchery (Figure 1). Fall-run Chinook coded-wire tagged and released for experimental purposes were not included in the program. The Merced River Hatchery therefore was not included in the Constant Fractional Marking Program, as the fall-run Chinook at this hatchery are raised for experimental purposes and were marked and coded-wire tagged using manual techniques in 2013.

The automated marking trailers have the ability to process fish that are a minimum length of 57 mm and a maximum length of 142 mm. With this in mind, timing of AutoFish Trailer operations at each facility was critical to maximize efficiency and productivity while meeting hatchery release deadlines. Double shifts were often used to maximize efficiency and output of the AutoFish Trailers. Trailers were moved as needed when fish at each hatchery reached the appropriate marking size. The fall-run Chinook marking/tagging season began the second week of February at the Feather River Fish Hatchery and ended at Nimbus Fish Hatchery the first week of May. Marking/tagging of hatchery-produced fall-run Chinook in 2013 therefore spanned a 12-week period. The spring-run Chinook marking/tagging season began the second week of February at the Feather River Fish Hatchery and was completed the third week of March for a total of 5 weeks. The Central Valley steelhead marking was conducted intermittently based on the number of fish that were the appropriate size to process through the AutoFish Trailers, from the third week of May through the fourth week of June.

Throughout the season, fin-clipping rate and tag retention studies were conducted for fall and spring-run Chinook salmon to determine actual marking/tagging rates for each coded-wire tag

code. Except as otherwise noted below, approximately 800-900 marked/tagged fish per tag code were retained and held separately for a period of approximately 21 days following the completion of each tag code. At Coleman National Fish Hatchery and Mokelumne River Fish Hatchery, approximately 400 fish were held for retention purposes for each tag code. A lower number of fish was used in studies at these facilities due to the large number of tag codes used. Study fish were sampled from throughout the tagging period for each tag code. Fish were electronically tested for tag retentions and visually inspected for fin-clip quality at the end of the study period. For the quality checks, for a fish to be counted as successfully retaining a tag, 60% or more of the adipose fin must be removed and a coded-wire tag must be present. A partial fin-clip has approximately 10-40% of the adipose fin still present and is counted in the successful clipping rate. If more than 40% of the adipose fin is still intact, fish are classified as unclipped and therefore count against the successful tagging rate (i.e. it likely would not be checked for a CWT since the adipose fin is intact or mostly intact). In some instances fish were held for less than the standard 21-day time period due to specific hatchery release strategies. For some smaller tag codes, tag retention studies were not feasible; for these tag groups, retention rates were extrapolated from larger groups tagged at the same hatchery during similar time periods.

Following the tagging season, coded-wire tag data were summarized for submission to [the Regional Mark Processing Center \(RMPC\)](http://www.rmipc.org), operated by the Pacific States Marine Fisheries Commission (<http://www.rmipc.org>). The RMPC provides regional coordination of salmon tagging and fin marking programs, and maintenance of coastwide databases for coded-wire tag releases, recoveries, and associated catch/sample information, in the Regional Mark Information System (RMIS).

Figure 2 summarizes the annual project work flow.

Results

Daily tagging rates, tag codes, and results of retention studies for the 2013 tagging season are shown in Appendix Tables 1 – 5 for each of the hatcheries. The technology allowed an accurate count of all production fish, and the marking/tagging of an exact percentage of those fish.

The program successfully processed 100% of the 2013 production releases of fall-run Chinook salmon from the Central Valley hatcheries (totaling 28,050,995 fish). The 25% target rate for marking/tagging was achieved for Brood Year 2012 (approximately 28.85% were CWT/ad-clipped, a total of 8,092,268 fish). The AutoFish Trailers also marked and tagged 100% of the Brood Year 2012 spring-run Chinook salmon reared at the Feather River Fish Hatchery, a total of 2,162,607 fish.

The AutoFish Trailers marked 100% of the steelhead reared at Coleman National Fish Hatchery, Feather River Fish Hatchery, and Nimbus Fish Hatchery. At Mokelumne River Fish Hatchery, only approximately 125,000 steelhead were produced, resulting from egg takes that spanned a ten-week period. Due to the low numbers and wide size range, these fish were all manually clipped by hatchery personnel. At Nimbus Fish Hatchery, this was the first year that the AutoFish Trailer was used for all of the steelhead marking. In previous years at Nimbus Fish Hatchery, the first and last few egg takes were manually fin-clipped due to logistical reasons. A total of 1,442,140 steelhead were adipose fin-clipped at these three facilities, not including the fish that were manually clipped at Mokelumne River Fish Hatchery.

Tag retention studies for the fall-run Chinook indicated very high rates of tag/mark retention. Retention rates ranged as follows:

- Coleman National Fish Hatchery: 99.20 - 100% with an average of 99.64%
- Feather River Hatchery Annex: 98.45-99.13% with an average of 98.79%
- Feather River Hatchery: 97.42% - 99.67% with an average of 98.82%
- Mokelumne River Hatchery: 98.79% - 100% with average of 99.59%
- Nimbus Hatchery: 99.33% - 99.67% with an average of 99.56%

Tag retention studies for the spring-run Chinook also indicated high rates of tag/mark retention. Retention rates ranged as follows:

- Feather River Hatchery: 98.22% – 99.11% with an average of 98.53%

The steelhead from each facility are generally released during the winter months and clip quality will be checked just prior to release.

The numbers of fish included in this report were those processed and returned to the raceways during the tagging process. The actual numbers of fish released may differ. Please refer to the RMIS website, <http://www.rmmpc.org>, for the number of fish that were successfully clipped and tagged and then released.

Discussion

Similar to past tagging seasons, finding and retaining qualified technical personnel for program operations continued to be a challenge during the 2013 tagging season. The program started with seven Trailer Operators and ended with six Trailer Operators. One experienced Trailer Operator from Idaho spent one week assisting with trailer operations at Coleman National Fish Hatchery. Six to eight Trailer Assistants were also employed throughout the 20-week season.

This report includes all of the anadromous marking/tagging activities in the Central Valley with the exception of the Coleman National Fish Hatchery late fall-run Chinook and steelhead, Merced River fall-run Chinook, and Livingston Stone National Fish Hatchery winter-run Chinook. These groups of fish are included in separate annual reports.

At Feather River Fish Hatchery in the 2013 season, no coho were reared for release into Lake Oroville. In the 2013 season, a specific group of fall-run Chinook were clipped and tagged with a unique tag code and kept separate for release into Lake Oroville.

Acknowledgements

The Constant Fractional Marking Program would not have existed or successfully completed the first seven years of tagging without significant contributions from a number of people and agencies. I would like to thank the following individuals for their support, dedication and cooperation in this program:

The IEP Central Valley Salmonid Project Work Team provided guidance over the years in the development of the project. Members included Jim Smith (USFWS), Russell Bellmer (CDFW), Kenneth Lentz (USBR retired), John Hannon (USBR), Rich Dixon (CDFW retired), Alice Low (CDFW), Brad Cavallo (formerly DWR), Pete Adams (NOAA Fisheries retired), Stan Allen (PSMFC) and Joseph Miyamoto (EBMUD retired).

Management, administration, problem solving, and the existence of this program would not have been possible without Alice Low, Tom Schroyer, and Dave Zezulak, California Department of Fish and Wildlife (CDFW); Stan Allen and Amy Roberts, Pacific States Marine Fisheries Commission (PSMFC); and Kevin Niemela, U.S. Fish and Wildlife Service (USFWS).

In particular, I want to thank the managers and staff working at the hatcheries where we conduct the marking/tagging program. Without your help, cooperation and support, this program would not be possible. Your willingness to work with us in adjusting the agendas and scheduling is critical in meeting the goals of all of the facilities. Kurtis Brown (USFWS - Coleman National Fish Hatchery), Anna Kastner (CDFW - Feather River Fish Hatchery), Allen Dill (CDFW - Feather River Fish Hatchery), Paula Hoover (CDFW - Nimbus Fish Hatchery), Gary Novak (CDFW - Nimbus Fish Hatchery), William Smith (CDFW - Mokelumne River Fish Hatchery), and their very professional hatchery staff did a significant amount of work to accommodate the trailers at their hatcheries, and made us feel welcome while we were on-site. I look forward to continuing to work with you all.

I also want to thank Scott Merlette and Patrick Jarrett (PSMFC) for their work on the data entry and Chad Dale (PSMFC) for all of his maintenance work on the AutoFish Trailers to ensure that everything was operational. I want to thank the rest of the professional and hard working CFM crew that made this seventh season a great success. They each spent many long days away from home to accomplish the goals of this very demanding program. Trailer Operators included Tom Clifford (PSMFC), Chad Collier (PSMFC-Idaho), Jarrod Connelly (PSMFC), Chad Dale (PSMFC), Julie Day (PSMFC), Patrick Jarrett (PSMFC), Mike Memeo (PSMFC), and Scott Merlette. Tagging Trailer Assistants included seasonal PSMFC staff members Nichole Clemente, Elizabeth Ferris, Cheryl Fullerton, Tracy Foreman, Nathan Lederman, Devin Pike, Spencer Reno, and Matt Stillwagon.

Figure 1. Hatchery Locations: Central Valley Constant Fractional Marking Program (2011)

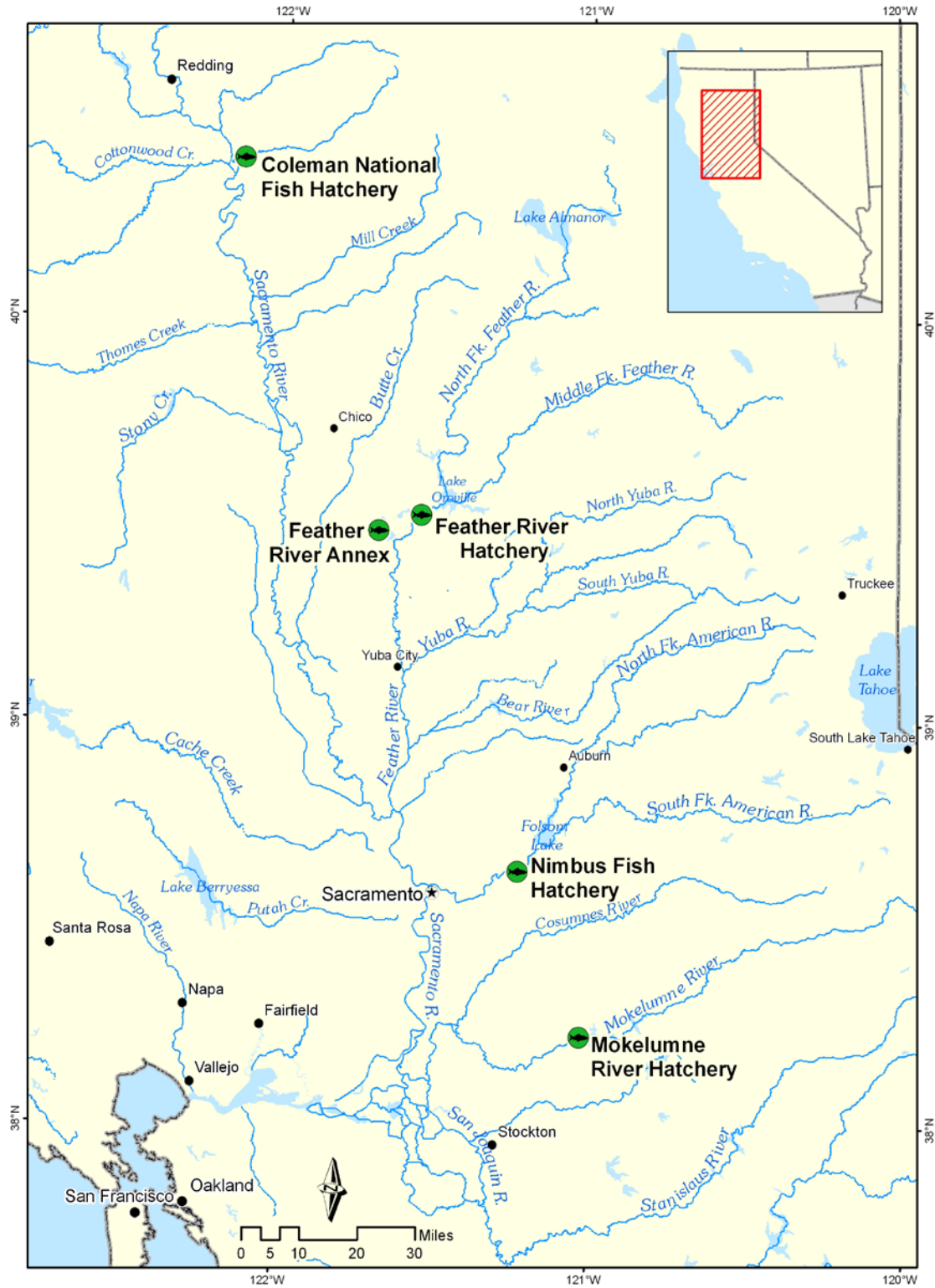
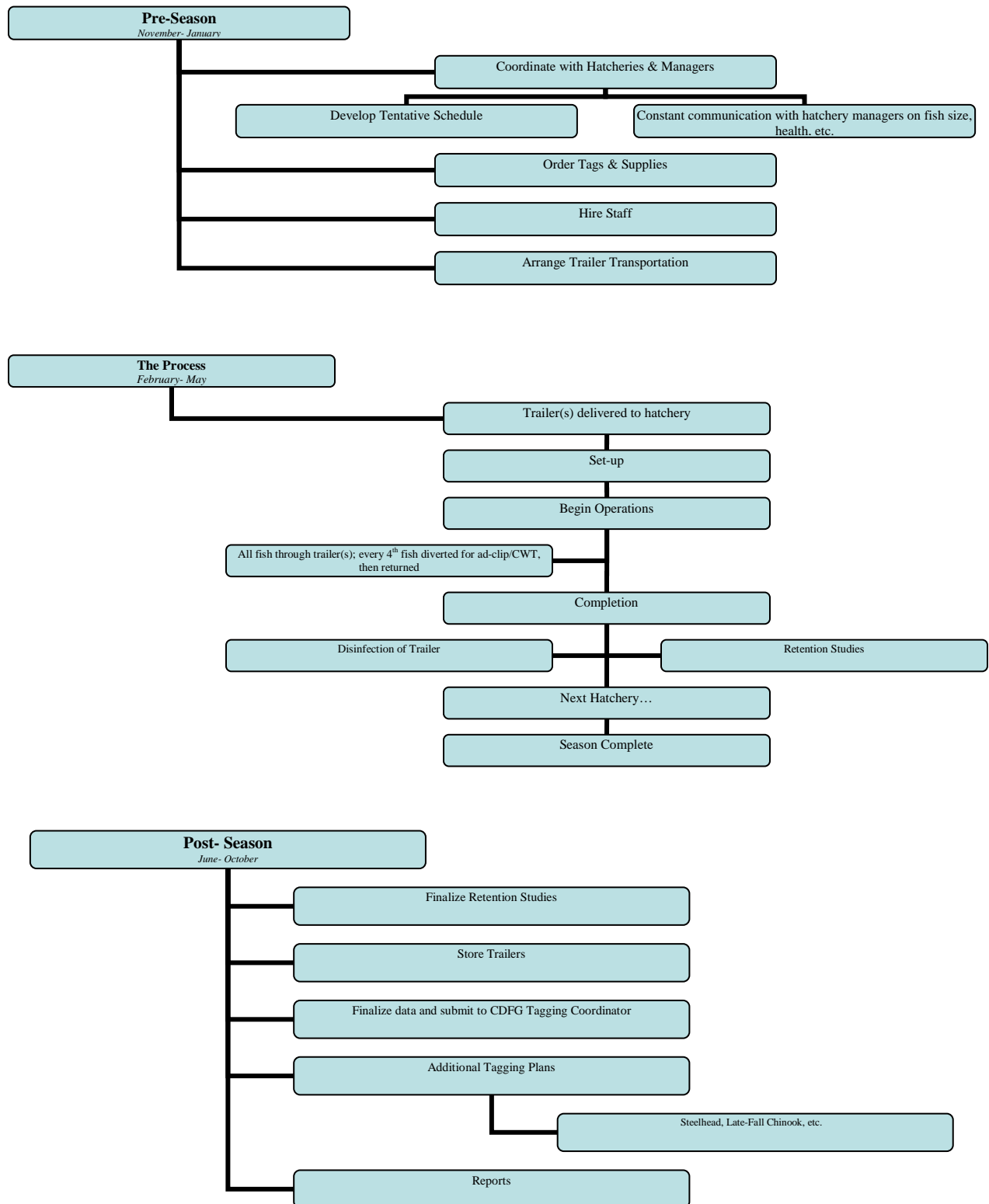


Figure 2. Constant Fractional Marking Program Annual Work Flow Summary



Appendix

Coleman National Fish Hatchery



Table 1a. Daily Tagging Rates at Coleman National Fish Hatchery

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/93			Size: 105K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/4/2013	1	1	3,448	-	10,488	-	13,936
3/5/2013	1	1	38,787	42,235	116,466	126,954	169,189
3/5/2013	1	1	36,624	78,859	109,983	236,937	315,796
3/6/2013	1	1	22,540	101,399	67,698	304,635	406,034
Tag Code Totals:			-	101,399	-	304,635	406,034

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/97			Size: 210K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/6/2013	2	2	44,570	-	133,812	-	178,382
3/7/2013	2	2	39,450	84,020	118,452	252,264	336,284
3/7/2013	2	2	24,388	108,408	73,206	325,470	433,878
3/7/2013	3	3	3,100	-	9,369	-	12,469
3/8/2013	3	3	38,196	41,296	114,684	124,053	165,349
3/8/2013	3	3	35,853	77,149	107,700	231,753	308,902
3/11/2013	3	3	17,575	94,724	52,806	284,559	379,283
Tag Code Totals:			-	203,132	-	610,029	813,161

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/96			Size: 210K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/11/2013	4	4	32,298	-	96,996	-	129,294
3/12/2013	4	4	38,664	70,962	116,058	213,054	284,016
3/12/2013	4	4	24,592	95,554	73,857	286,911	382,465
3/13/2013	5	5	39,141	-	117,534	-	156,675
3/13/2013	5	5	35,884	75,025	107,712	225,246	300,271
3/14/2013	5	5	35,588	110,613	106,836	332,082	442,695
Tag Code Totals:			-	206,167	-	618,993	825,160

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/98			Size: 210K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/14/2013	6	6	11,551	-	34,770	-	46,321
3/15/2013	6	6	39,169	50,720	117,573	152,343	203,063
3/15/2013	6	6	32,058	82,778	96,291	248,634	331,412
3/18/2013	6	6	25,940	108,718	77,919	326,553	435,271
3/18/2013	7	7	31,793	-	95,424	-	127,217
3/19/2013	7	7	36,397	68,190	109,245	204,669	272,859
3/19/2013	7	7	30,510	98,700	91,572	296,241	394,941
3/20/2013	7	7	2,146	100,846	6,459	302,700	403,546
Tag Code Totals:			-	209,564	-	629,253	838,817

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/99			Size: 210K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/20/2013	8	8	43,351	-	130,113	-	173,464
3/21/2013	8	8	42,276	85,627	126,933	257,046	342,673
3/21/2013	8	8	20,420	106,047	61,296	318,342	424,389
3/21/2013	9	9	4,238	-	12,732	-	16,970
3/22/2013	9	9	39,870	44,108	119,754	132,486	176,594
3/22/2013	9	9	27,976	72,084	83,967	216,453	288,537
3/25/2013	9	9	23,360	95,444	70,164	286,617	382,061
Tag Code Totals:			-	201,491	-	604,959	806,450

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/08			Size: 310K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/18/2013	12	12	29,444	-	88,536	-	117,980
3/19/2013	12	12	36,315	65,759	109,014	197,550	263,309
3/19/2013	12	12	25,477	91,236	76,569	274,119	365,355
3/20/2013	11	11	21,231	-	63,735	-	84,966
3/20/2013	11	11	40,372	61,603	121,221	184,956	246,559
3/21/2013	11	11	42,494	104,097	127,530	312,486	416,583
3/21/2013	11	11	4,672	108,769	14,025	326,511	435,280
3/21/2013	10	10	19,315	-	57,996	-	77,311
3/22/2013	10	10	40,363	59,678	121,158	179,154	238,832
3/22/2013	10	10	24,033	83,711	72,228	251,382	335,093
3/25/2013	10	10	23,427	107,138	70,347	321,729	428,867
Tag Code Totals:			-	307,143	-	922,359	1,229,502

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/09			Size: 310K			Trailer # CA3 (CA1=rwy15)	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/25/2013	13	13	17,103	-	51,396	-	68,499
3/26/2013	13	13	40,281	57,384	120,948	172,344	229,728
3/26/2013	13	13	31,267	88,651	93,933	266,277	354,928
3/27/2013	13	13	22,028	110,679	66,141	332,418	443,097
3/27/2013	14	14	26,985	-	81,048	-	108,033
3/28/2013	14	14	33,888	60,873	101,739	182,787	243,660
3/28/2013	14	14	35,207	96,080	105,810	288,597	384,677
3/29/2013	14	14	15,797	111,877	47,415	336,012	447,889
3/26/2014	15	15	12,898	-	38,766	-	51,664
3/27/2013	15	15	36,837	49,735	110,601	149,367	199,102
3/28/2013	15	15	35,352	85,087	106,158	255,525	340,612
3/29/2013	15	15	20,925	106,012	62,823	318,348	424,360
Tag Code Totals:			-	328,568	-	986,778	1,315,346

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/04			Size: 210K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/29/2013	16	16	22,701	-	68,211	-	90,912
4/1/2013	16	16	27,381	50,082	82,251	150,462	200,544
4/1/2013	16	16	32,437	82,519	97,350	247,812	330,331
4/2/2013	16	16	27,977	110,496	84,018	331,830	442,326
4/2/2013	17	17	20,400	-	61,242	-	81,642
4/3/2013	17	17	71,866	92,266	215,730	276,972	369,238
4/4/2013	17	17	7,661	99,927	23,019	299,991	399,918
Tag Code Totals:			-	210,423	-	631,821	842,244

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/10			Size: 310K			Trailer # CA1 (CA3=rwy20)	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/1/2013	20	20	63,872	-	191,898	-	255,770
4/2/2013	20	20	48,343	112,215	145,137	337,035	449,250
4/4/2013	18	18	13,106	-	39,351	-	52,457
4/4/2013	18	18	41,078	54,184	123,285	162,636	216,820
4/5/2013	18	18	42,204	96,388	126,762	289,398	385,786
4/8/2013	19	19	65,723	-	197,289	-	263,012
4/9/2013	19	19	49,270	114,993	147,894	345,183	460,176
Tag Code Totals:			-	323,596	-	971,616	1,295,212

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/05			Size: 210K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/3/2013	21	21	26,707	-	80,184	-	106,891
4/4/2013	21	21	37,509	64,216	112,617	192,801	257,017
4/5/2013	21	21	47,732	111,948	143,265	336,066	448,014
4/8/2013	22	22	24,299	-	72,969	-	97,268
4/8/2013	22	22	40,711	65,010	122,238	195,207	260,217
4/9/2013	22	22	32,123	97,133	96,453	291,660	388,793
Tag Code Totals:			-	209,081	-	627,726	836,807

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/06			Size: 210K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/9/2013	23	23	38,112	-	114,438	-	152,550
4/10/2013	23	23	42,162	80,274	126,561	240,999	321,273
4/10/2013	23	23	31,886	112,160	95,763	336,762	448,922
4/11/2013	24	15	41,212	-	123,663	-	164,875
4/11/2013	24	15	36,186	77,398	108,669	232,332	309,730
4/12/2013	24	15	29,712	107,110	89,190	321,522	428,632
Tag Code Totals:			-	219,270	-	658,284	877,554

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/56/07			Size: 210K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/12/2013	25	24	45,046	-	135,252	-	180,298
4/15/2013	25	24	61,853	106,899	185,652	320,904	427,803
4/15/2013	26	25	38,038	-	114,237	-	152,275
4/16/2013	26	25	41,959	79,997	125,967	240,204	320,201
4/17/2013	26	25	37,731	117,728	113,265	353,469	471,197
Tag Code Totals:			-	224,627	-	674,373	899,000

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/94			Size: 105K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/17/2013	27	26	34,414	-	103,344	-	137,758
4/18/2013	27	26	39,147	73,561	117,486	220,830	294,391
4/18/2013	27	26	35,240	108,801	105,807	326,637	435,438
4/19/2013	27	26	2,991	111,792	9,015	335,652	447,444
Tag Code Totals:			-	111,792	-	335,652	447,444

Coleman National Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 05/55/95			Size: 105K			Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/19/2013	28	27	49,144	-	147,498	-	196,642
4/22/2013	28	27	35,563	84,707	106,758	254,256	338,963
4/22/2013	28	27	28,609	113,316	85,884	340,140	453,456
Tag Code Totals:			-	113,316	-	340,140	453,456

Hatchery Totals:		2,969,569		8,916,618	11,886,187
Retention Average:	99.64%				

Table 1b. Summary of Hatchery Tag Codes and Tag Retention Study

Coleman National Fish Hatchery- Fall Run Chinook										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
05/55/93	105K	1	101,399	304,635	406,034	209	34	100.00%	101,399	304,635
05/55/97	210K	2/3	203,132	610,029	813,161	405	29	100.00%	203,132	610,029
05/55/96	210K	4/5	206,167	618,993	825,160	390	27	100.00%	206,167	618,993
05/55/98	210K	6/7	209,564	629,253	838,817	391	20	99.50%	208,516	630,301
05/55/99	210K	8/9	201,491	604,959	806,450	379	17	99.70%	200,887	605,563
05/56/08	310K	10/11/12	307,143	922,359	1,229,502	393	21	99.50%	305,607	923,895
05/56/09	310K	13/14/15	328,568	986,778	1,315,346	398	47	99.30%	326,268	989,078
05/56/04	210K	16/17	210,423	631,821	842,244	365	18	99.70%	209,792	632,452
05/56/10	310K	18/19/20	323,596	971,616	1,295,212	413	36	100.00%	323,596	971,616
05/56/05	210K	21/22	209,081	627,726	836,807	138	36	100.00%	209,081	627,726
05/56/06	210K	23/15	219,270	658,284	877,554	405	33	99.50%	218,174	659,380
05/56/07	210K	24/25	224,627	674,373	899,000	394	28	99.20%	222,830	676,170
05/55/94	105K	26	111,792	335,652	447,444	393	26	99.20%	110,898	336,546
05/55/95	105K	27	113,316	340,140	453,456	404	23	99.30%	112,523	340,933
Hatchery Totals			2,969,569	8,916,618	11,886,187	Average		99.64%	2,958,869	8,927,318

Feather River Fish Hatchery



Table 2a. Daily Tagging Rates at Feather River Hatchery

Feather River Fish Hatchery- Fall Run Chinook				
Inland - Lake Oroville - 100% Mark/Tag				
Tag Code: 06/04/70		Size:110K	Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
2/11/2013	Y1	Y2	72,400	72,400
2/12/2013	Y1	Y2	19,569	91,969
Tag Code Totals:			-	91,969

Feather River Fish Hatchery- Fall Run Chinook				
100% Mark/Tag				
Tag Code: 06/04/71		Size: 90K	Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
3/5/2013	F1	F1B	13,459	13,459
3/6/2013	F1	F1B	86,029	99,488
Tag Code Totals:			-	99,488

Feather River Fish Hatchery- Fall Run Chinook				
100% Mark/Tag				
Tag Code: 06/04/72		Size: 90K	Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
3/6/2013	F1	F1C	12,214	12,214
3/7/2013	F1	F1C	87,592	99,806
Tag Code Totals:			-	99,806

Feather River Fish Hatchery- Fall Run Chinook				
100% Mark/Tag				
Tag Code: 06/04/73		Size: 90K	Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
3/7/2013	F1	F1A	10,175	10,175
3/8/2013	F1/F3	F1A	84,907	95,082
3/11/2013	F3	F1A	5,546	100,628
Tag Code Totals:			-	100,628

Feather River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/64			Size: 460K			Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/11/2013	F3	Channel	18,252	-	54,756	-	73,008
3/11/2013	F3	Channel	27,468	45,720	82,437	137,193	182,913
3/12/2013	F3	Channel	32,301	78,021	96,942	234,135	312,156
3/12/2013	F3	Channel	33,305	111,326	99,993	334,128	445,454
3/13/2013	F3	Channel	39,443	150,769	118,371	452,499	603,268
3/13/2013	F3/E2	Channel	34,430	185,199	103,353	555,852	741,051
3/14/2013	E2	Channel	38,154	223,353	114,516	670,368	893,721
3/14/2013	E2	Channel	40,506	263,859	121,560	791,928	1,055,787
3/15/2013	E2/3	Channel	26,899	290,758	80,739	872,667	1,163,425
3/15/2013	E3	Channel	25,215	315,973	75,699	948,366	1,264,339
3/18/2013	E3	Channel	34,324	350,297	103,026	1,051,392	1,401,689
3/18/2013	E3	Channel	34,751	385,048	104,298	1,155,690	1,540,738
3/19/2013	E3	Channel	42,429	427,477	127,326	1,283,016	1,710,493
3/19/2013	E3	Channel	35,491	462,968	106,512	1,389,528	1,852,496
3/20/2013	E3/D2	Channel	37,841	500,809	113,556	1,503,084	2,003,893
3/20/2013	D2	Channel	30,499	531,308	91,593	1,594,677	2,125,985
Tag Code Totals:			-	531,308	-	1,594,677	2,125,985

Feather River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/67			Size: 230K			Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/20/2013	D2	F6	1,790	-	5,382	-	7,172
3/21/2013	D2	F6	49,399	51,189	148,239	153,621	204,810
3/21/2013	D2/D3	E6	22,584	-	67,812	-	90,396
3/22/2013	D3	E6	28,809	51,393	86,454	154,266	205,659
3/22/2013	D3	F4	25,989	-	78,033	-	104,022
3/25/2013	D3	F4	54,984	80,973	165,039	243,072	324,045
3/25/2013	D3	E4	12,938	-	38,841	-	51,779
3/26/2013	D3/C2	E4	68,481	81,419	205,494	244,335	325,754
Tag Code Totals:			-	264,974	-	795,294	1,060,268

Feather River Fish Hatchery- Fall Run Chinook				
100% Mark/Tag				
Tag Code: 06/04/47		Size: 15K	Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
3/26/2013	C2	F1D	10,103	10,103
Tag Code Totals:			-	10,103

Feather River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/65			Size: 345K			Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/27/2013	C2	D6	51,243	-	153,960	-	205,203
3/27/2013	C2	D4	21,917	-	65,769	-	87,686
3/28/2013	C2/3	D4	43,129	65,046	129,420	195,189	260,235
3/28/2013	C3	D2	33,382	-	100,173	-	133,555
3/29/2013	C3	D2	47,963	81,345	143,955	244,128	325,473
3/29/2013	C3	C6	9,719	-	29,175	-	38,894
4/1/2013	C3/B2	C6	35,793	45,512	107,463	136,638	182,150
4/2/2013	B2	C6	5,709	51,221	17,169	153,807	205,028
4/2/2013	B2	C4	25,366	-	76,122	-	101,488
4/3/2013	B2	C4	35,856	61,222	107,613	183,735	244,957
4/4/2013	B2	C4	3,513	64,735	10,581	194,316	259,051
4/4/2013	B2	C2	33,412	-	100,260	-	133,672
4/5/2013	B2/B3	C2	20,709	54,121	62,178	162,438	216,559
4/8/2013	B3	C2	27,226	81,347	81,726	244,164	325,511
Tag Code Totals:			-	394,937	-	1,185,564	1,580,501

Feather River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/66			Size: 345K			Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/8/2013	B3	B2	6,571	-	19,734	-	26,305
4/9/2013	B3	B2	40,695	47,266	122,136	141,870	189,136
4/10/2013	B3/B4	B2	35,216	82,482	105,687	247,557	330,039
4/11/2013	B4	B2	4,784	87,266	14,397	261,954	349,220
4/11/2013	B4	B6	25,033	-	75,123	-	100,156
4/12/2013	B4	B6	28,909	53,942	86,757	161,880	215,822
4/15/2013	B4/A2	B6	8,439	62,381	25,326	187,206	249,587
4/16/2013	A2	B6	12,584	74,965	37,809	225,015	299,980
4/16/2013	A2	B4	17,718	-	53,154	-	70,872
4/17/2013	A2	B4	36,883	54,601	110,754	163,908	218,509
4/18/2013	A2/A3	B4	20,365	74,966	61,158	225,066	300,032
4/18/2013	A3	A2	10,482	-	31,446	-	41,928
4/19/2013	A3	A2	24,140	34,622	72,453	103,899	138,521
Tag Code Totals:			-	271,819	-	815,934	1,087,753
Hatchery Totals:		1,865,032				4,391,469	6,256,501
Retention Average:		98.82%					

Table 2b. Summary of Hatchery Fall-run Tag Codes and Tag Retention Study

Feather River Fish Hatchery - Fall Run Chinook Salmon										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
06/04/47	15K	F2	10,103	-	10,103	913	22	98.90%	9,992	111
06/04/64	460K	Channel	531,308	1,594,677	2,125,985	859	20	99.30%	527,589	1,598,396
06/04/65	345K	C/D	394,937	1,185,564	1,580,501	900	23	99.56%	393,199	1,187,302
06/04/67	230K	E/F	264,974	795,294	1,060,268	848	22	99.65%	264,047	796,221
06/04/71	90K	F1B	99,488	-	99,488	891	22	97.42%	96,921	2,567
06/04/72	90K	F1C	99,806	-	99,806	992	21	98.29%	98,099	1,707
06/04/73	90K	F1A	100,628	-	100,628	900	21	98.67%	99,290	1,338
06/04/70	110K	Y2	91,969	-	91,969	911	21	98.79%	90,856	1,113
06/04/66	345K	A/B	271,819	815,934	1,087,753	900	21	99.67%	270,922	816,831
Hatchery Totals			1,865,032	4,391,469	6,256,501	Average		98.82%	1,850,915	4,405,586

Feather River Fish Hatchery - Spring Run Chinook Salmon 100% Mark/Tag				
Tag Code: 06/04/62		Size: 900K	Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
2/12/2013	H2	H6	56,459	56,459
2/13/2013	H2	H6	61,038	117,497
2/13/2013	H2	H6	60,972	178,469
2/14/2013	H2	H6	62,702	241,171
2/14/2013	H2	H6	63,492	304,663
2/15/2013	H2	H6	20,350	325,013
2/15/2013	H2	H1	80,367	80,367
2/19/2013	H2	H1	47,822	128,189
2/19/2013	H2	H1	66,166	194,355
2/20/2013	H2/3	H1/2	60,163	254,518
2/20/2013	H3	H2	59,838	314,356
2/21/2013	H3	H2	58,670	373,026
2/21/2013	H3	H2	37,334	410,360
2/21/2013	H3	H4	22,902	22,902
2/22/2013	H3	H4	50,581	73,483
2/22/2013	H3	H4	53,324	126,807
2/25/2013	H3	H4	47,565	174,372
2/25/2013	H3	H4	54,983	229,355
2/26/2013	H3	H4	58,239	287,594
2/26/2013	H3	H4	12,409	300,003
Tag Code Totals:			-	1,035,376

Feather River Fish Hatchery - Spring Run Chinook Salmon 100% Mark/Tag				
Tag Code: 06/04/63		Size: 900K	Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
2/26/2013	H3	G6	36,038	36,038
2/27/2013	G2	G6	53,467	89,505
2/27/2013	G2	G6	60,594	150,099
2/28/2013	G2	G6	62,799	212,898
2/28/2013	G2	G6	58,324	271,222
3/1/2013	G2	G6	53,646	324,868
3/1/2013	G2	G1	48,577	48,577
3/4/2013	G2	G1	49,955	98,532
3/4/2013	G2	G1	56,836	155,368
3/5/2013	G2	G1	20,984	176,352
3/5/2013	G2	G1	72,943	249,295
3/6/2013	G2/3	G1/2	57,190	306,485
3/6/2013	G3	G2	43,903	350,388
3/7/2013	G3	G2	50,504	400,892
3/7/2013	G3	G2	9,021	409,913
3/7/2013	G3	G4	27,570	27570
3/8/2013	G3	G4	51,398	78,968
3/8/2013	G3	G4	40,863	119,831
3/11/2013	G3	G4	45,268	165,099
3/11/2013	G3	G4	50,992	216,091
3/12/2013	G3	G4	52,969	269,060
3/12/2013	G3	G4	30,974	300,034
Tag Code Totals:			-	1,034,815

Feather River Fish Hatchery - Spring Run Chinook Salmon 100% Mark/Tag				
Tag Code: 06/04/37		Size: 90K	Trailer # CA3	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged/ Raceway Total
3/12/2013	G4	H1	19,065	19,065
3/13/2013	G4	H1	73,351	92,416
Tag Code Totals:			-	92,416

Hatchery Totals:	2,162,607
Retention Average:	98.53%

Table 2c. Summary of Hatchery Spring-Run Tag Codes and Retention Study

Feather River Fish Hatchery - Spring Run Chinook Salmon - 100% Mark/Tag										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
06/04/37	90K	H1	92,416	-	92,416	900	21	99.11%	91,593	823
06/04/62	900K	H	1,035,376	-	1,035,376	926	21	98.27%	1,017,464	17,912
06/04/63	900K	G	1,034,815	-	1,034,815	900	21	98.22%	1,016,395	18,420
Hatchery Totals			2,162,607	-	2,162,607	Average		98.53%	2,125,453	37,154

Feather River Fish Hatchery - Winter Run Steelhead - 100% Mark Only						
Trailer # CA 2						
Marking Date	Raceway Prior to Marking	Raceway Following Marking	Daily Clip Total Auto	Daily Clip Total Manual	Cumulative Total	Raceway Total
6/12/2013	E	F	6,149	2,082	8,231	8,231
6/13/2013	E	F	42,388	11,107	53,495	61,726
6/14/2013	E	F	34,178	6,860	41,038	102,764
6/17/2013	E	F	6,896	750	7,646	110,410
6/18/2013	E	F	19,164	2,787	21,951	132,361
6/19/2013	E	F	13,284	1,267	14,551	146,912
6/19/2013	E	F	27,482	3,860	31,342	178,254
6/20/2013	E	F	37,457	7,208	44,665	222,919
6/21/2013	E	F	35,939	5,367	41,306	264,225
6/24/2013	E	F	37,505	4,636	42,141	306,366
6/25/2013	E	F	48,930	5,688	54,618	360,984
6/26/2013	E	F	15,033	2,475	17,508	378,492
Hatchery Totals:			324,405	54,087	378,492	378,492

Feather River Hatchery Annex



Table 3a. Daily Tagging Rates at the Feather River Hatchery Annex

Feather River Annex- Fall Run Chinook Salmon- 100% Mark/Tag					
Tag Code: 06/04/68		Size: 380K		Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Raceway Total
2/25/2013	D2	D4	83,059	-	83,059
2/26/2013	D2	D4	60,504	143,563	143,563
2/26/2013	D2	D4	52,062	195,625	195,625
2/27/2013	D2	D4	4,427	200,052	200,052
2/27/2013	D2	D1	45,526	-	45,526
2/27/2013	D2/C2	D1	58,531	104,057	104,057
2/28/2013	C2	D1	56,357	160,414	160,414
2/28/2013	C2	D1	50,761	211,175	211,175
5/1/2013	C2	D1	9,008	220,183	220,183
Tag Code Totals:			-	-	420,235

Feather River Annex- Fall Run Chinook Salmon- 100% Mark/Tag					
Tag Code: 06/04/69		Size: 220K		Trailer # CA2	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Raceway Total
3/1/2013	C2	C1	72,359	-	72,359
3/4/2013	C2	C1	125,781	198,150	198,150
3/5/2013*	F1	F1A	43,740	241,890	241,890
Tag Code Totals:			-	-	241,890

* These fish were marked/tagged at Feather River Fish Hatchery and hauled to the Annex since they were short on fish at the Annex.

Annex Total:	662,125
Retention Average:	98.79%

Table 3b. Summary of Hatchery Tag Codes and Tag Retention Studies

Feather River Annex - Fall Run Chinook - 100% Mark/Tag										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
06/04/68	380K	D	420,235	-	420,235	919	20	99.13%	416,579	3,656
06/04/69	220K	C	241,890	-	241,890	904	21	98.45%	238,141	3,749
Hatchery Totals			662,125	-	662,125	Average		98.79%	654,720	7,405

Mokelumne River Hatchery



Table 4a. Daily Tagging Rates at Mokelumne River Hatchery

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/80			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/19/2013	B	A	6,185	-	18,780	-	24,965
3/20/2013	B	A	41,384	47,569	124,461	143,241	190,810
3/21/2013	B	A	40,484	88,053	121,785	265,026	353,079
3/22/2013	B/C	A	24,596	112,649	73,956	338,982	451,631
Tag Code Totals:			-	112,649	-	338,982	451,631

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/81			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/25/2013	C	B	49,265	-	148,041	-	197,306
3/26/2013	C	B	34,274	83,539	103,200	251,241	334,780
3/26/2013	C/D	B	29,011	112,550	87,087	338,328	450,878
Tag Code Totals:			-	112,550	-	338,328	450,878

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/82			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/27/2013	D	C	34,469	-	103,599	-	138,068
3/27/2013	D	C	31,667	66,136	95,187	198,786	264,922
3/28/2013	D/E	C	34,465	100,601	103,602	302,388	402,989
3/28/2013	E	C	11,417	112,018	34,350	336,738	448,756
Tag Code Totals:			-	112,018	-	336,738	448,756

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/83			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
3/28/2013	E	D	15,882	-	47,709	-	63,591
3/29/2013	E	D	38,380	54,262	115,326	163,035	217,297
4/1/2013	E	D	13,347	67,609	40,140	203,175	270,784
4/1/2013	E/F	D	30,093	97,702	90,381	293,556	391,258
4/2/2013	F	D	14,758	112,460	44,376	337,932	450,392
Tag Code Totals:			-	112,460	-	337,932	450,392

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/84			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/2/2013	F	E	14,331	-	43,038	-	57,369
4/2/2013	F	E	33,054	47,385	99,279	142,317	189,702
4/3/2013	F/G	E	34,969	82,354	105,072	247,389	329,743
4/3/2013	G	E	31,125	113,479	93,582	340,971	454,450
Tag Code Totals:			-	113,479	-	340,971	454,450

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/85			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/4/2013	G	F	35,226	-	105,729	-	140,955
4/4/2013	G	F	420	35,646	1,260	106,989	142,635
4/4/2013	G/I	F	26,771	62,417	80,460	187,449	249,866
4/5/2013	I	F	24,832	87,249	74,592	262,041	349,290
4/5/2013	I	F	17,591	104,840	52,869	314,910	419,750
4/8/2013	I	F	7,471	112,311	22,488	337,398	449,709
Tag Code Totals:			-	112,311	-	337,398	449,709

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/86			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/8/2013	I/H	G	39,013	-	117,156	-	156,169
4/9/2013	H	G	36,253	75,266	108,879	226,035	301,301
4/9/2013	H	G	38,551	113,817	115,713	341,748	455,565
Tag Code Totals:			-	113,817	-	341,748	455,565

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/87			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/10/2013	H	H	36,871	-	110,673	-	147,544
4/10/2013	H/J	H	36,781	73,652	110,421	221,094	294,746
4/11/2013	J	H	35,142	108,794	105,492	326,586	435,380
4/11/2013	J	H	4,339	113,133	13,056	339,642	452,775
Tag Code Totals:			-	113,133	-	339,642	452,775

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/88			Size: 100K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/11/2013	J	I	28,812	-	86,445	-	115,257
4/12/2013	J/K	I	21,039	49,851	63,186	149,631	199,482
4/12/2013	K	I	17,439	67,290	52,380	202,011	269,301
4/15/2013	K	I	25,622	92,912	76,995	279,006	371,918
4/16/2013	K	I	19,496	112,408	58,602	337,608	450,016
Tag Code Totals:			-	112,408	-	337,608	450,016

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/89			Size: 90K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/16/2013	K	J	14,152	-	42,519	-	56,671
4/17/2013	K/L	J	37,107	51,259	111,381	153,900	205,159
4/18/2013	L	J	24,936	76,195	74,943	228,843	305,038
4/23/2013	L	J	15,358	91,553	46,197	275,040	366,593
4/23/2013	L	J	8,407	99,960	25,251	300,291	400,251
Tag Code Totals:			-	99,960	-	300,291	400,251

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/86/33			Size: 60K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/23/2013	L	K	20,812	-	62,445	-	83,257
4/24/2013	L/M	K	28,023	48,835	84,165	146,610	195,445
4/24/2013	M	K	16,967	65,802	50,949	197,559	263,361
Tag Code Totals:			-	65,802	-	197,559	263,361

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/55			Size: 40K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/24/2013	M	K	11,026	-	33,102	-	44,128
4/25/2013	M	K	33,355	44,381	100,215	133,317	177,698
Tag Code Totals:			-	44,381	-	133,317	177,698

Mokelumne River Fish Hatchery- Fall Run Chinook - 100% Mark/Tag-Yearlings					
Tag Code: 06/04/38		Size: 90K		Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Raceway Total
4/25/2013	M	M	30,204	-	30,204
4/29/2013	M	M	60,856	91,060	91,060
4/30/2013	M	M	9,967	101,027	101,027
Tag Code Totals:			-	101,027	101,027

Mokelumne River Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/57			Size: 50K			Trailer # CA4	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/30/2013	N	L	56,067	-	168,384	-	224,451
Tag Code Totals:			-	56,067	-	168,384	224,451

Hatchery Totals:	1,382,062		3,848,898	5,230,960
Retention Average:	99.59%			

Table 4b. Summary of Hatchery Tag Codes and Tag Retention Studies

Mokelumne River Fish Hatchery- Fall Run Chinook										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
06/04/80	100K	A	112,649	338,982	451,631	408	21	99.51%	112,097	339,534
06/04/81	100K	B	112,550	338,328	450,878	396	20	100.00%	112,550	338,328
06/04/82	100K	C	112,018	336,738	448,756	164	20	100.00%	112,018	336,738
06/04/83	100K	D	112,460	337,932	450,392	401	21	99.75%	112,179	338,213
06/04/84	100K	E	113,479	340,971	454,450	400	20	99.75%	113,195	341,255
06/04/85	100K	F	112,311	337,398	449,709	408	21	99.26%	111,480	338,229
06/04/86	100K	G	113,817	341,748	455,565	401	21	100.00%	113,817	341,748
06/04/87	100K	H	113,133	339,642	452,775	391	19	99.74%	112,839	339,936
06/04/88	100K	I	112,408	337,608	450,016	409	22	99.76%	112,138	337,878
06/04/89	90K	J	99,960	300,291	400,251	411	21	98.78%	98,740	301,511
06/04/55	60K	K*	65,802	197,559	263,361	405	19	99.75%	65,637	197,724
06/86/33	40K	K*	44,381	133,317	177,698	405	19	99.75%	44,270	133,428
06/04/38	90K	M	101,027	-	101,027	400	22	99.25%	100,269	758
06/04/57	50K	L	56,067	168,384	224,451	397	22	98.99%	55,501	168,950
Hatchery Totals			1,382,062	3,848,898	5,230,960	Average		99.59%	1,376,731	3,854,229

* Both tag codes were in the same raceway so 405 fish were checked and this retention rate was applied to both tag codes.

Nimbus Hatchery



Table 5a. Daily Tagging Rates at Nimbus Hatchery

Nimbus Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/74			Size: 345K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/10/2013	A2	A1	34,138	-	102,558	-	136,696
4/11/2013	A2	A1	41,565	75,703	124,737	227,295	302,998
4/11/2013	A2	A1	41,367	117,070	124,200	351,495	468,565
4/12/2013	A2	A1	43,302	160,372	129,951	481,446	641,818
4/12/2013	B2	B1	11,936	-	35,874	-	47,810
4/15/2013	B2	B1	57,632	69,568	173,073	208,947	278,515
4/16/2013	B2	B1	43,721	113,289	131,274	340,221	453,510
4/16/2013	B2	B1	40,362	153,651	121,152	461,373	615,024
4/17/2013	B2	B1	9,223	162,874	27,726	489,099	651,973
4/17/2013	C2	C1	19,822	-	59,526	-	79,348
4/17/2013	C2	C1	32,504	52,326	97,572	157,098	209,424
Tag Code Totals:			-	375,572	-	1,127,643	1,503,215

Nimbus Fish Hatchery- Fall Run Chinook Salmon – 100% Mark/Tag							
Tag Code: 06/04/76			Size: 250K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/18/2013	C2	D6	58,592	-	-	-	58,592
4/18/2013	C2	D6	68,637	127,229	-	-	127,229
4/19/2013	C2	D6	90,061	217,290	-	-	217,290
4/22/2013	C2	D6	62,965	280,255	-	-	280,255
Tag Code Totals:			-	280,255	-	-	280,255

Nimbus Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/04/75			Size: 345K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
4/22/2013	C2	C1	14,834	-	44,526	-	59,360
4/23/2013	C2	C1	41,845	56,679	125,577	170,103	226,782
4/23/2013	C2	C1	38,968	95,647	116,949	287,052	382,699
4/24/2013	C2	C1	16,819	112,466	50,517	337,569	450,035
4/24/2013	D2	D1	26,500	-	79,548	-	106,048
4/25/2013	D2	D1	35,762	62,262	107,340	186,888	249,150
4/25/2013	D2	D1	38,163	100,425	114,558	301,446	401,871
4/26/2013	D2	D1	12,090	112,515	36,315	337,761	450,276
4/29/2013	E2	E1	17,806	-	53,559	-	71,365
4/29/2013	E2	E1	40,746	58,552	122,283	175,842	234,394
4/30/2013	E2	E1	39,811	98,363	119,523	295,365	393,728
4/30/2013	E2	E1	40,011	138,374	120,081	415,446	553,820
5/1/2013	E2	E1	10,485	148,859	31,545	446,991	595,850
Tag Code Totals:			-	373,840	-	1,122,321	1,496,161

Nimbus Fish Hatchery- Fall Run Chinook Salmon							
Tag Code: 06/03/72			Size: 175K			Trailer # CA1	
Tagging Date	Raceway Prior to Tagging	Raceway Following Tagging	Daily Tagged Total	Cumulative Tagged Total	Daily Untagged Total	Cumulative Untagged Total	Raceway Total
5/1/2013	E2/F2	F1	64,180	-	192,693	-	256,873
5/2/2013	F2	F1	41,337	105,517	124,089	316,782	422,299
5/2/2013	F2	F1	35,572	141,089	106,764	423,546	564,635
5/3/2013	F2	F1	42,724	183,813	128,232	551,778	735,591
Tag Code Totals:			-	183,813	-	551,778	735,591

Hatchery Totals:	1,213,480		2,801,742	4,015,222
Retention Average:	99.56%			

Table 5b. Summary of Hatchery Tag Codes and Tag Retention Studies

Nimbus Fish Hatchery- Fall Run Chinook										
Tag Code, Size, Location			Tag Code Totals			Retention Calculations				
Tag Code	Size	Raceway	Total Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining Tags	Calculated Untagged
06/04/74	345K	A/B/Part C	375,572	1,127,643	1,503,215	923	14	99.67%	374,333	1,128,882
06/04/76	250K	D6	280,255	-	280,255	900	14	99.67%	279,330	925
06/04/75	345K*	Part C/D/E	373,840	1,122,321	1,496,161	-	-	99.56%	372,195	1,123,966
06/03/72	175K	F1	183,813	551,778	735,591	897	19	99.33%	182,581	553,010
Hatchery Totals			1,213,480	2,801,742	4,015,222	Average		99.56%	1,208,439	2,806,783

* No retention fish were held due to release timing. The average of all other retention rates at this hatchery was applied to this tag code.

Nimbus Fish Hatchery- Steelhead- 100% Mark only						
Trailer # CA1						
Marking Date	Raceway Prior to Marking	Raceway Following Marking	Daily Marked Total Auto	Daily Marked Total Manual	Cumulative Marked Total	Raceway Total
5/13/2013	Lot 1-2	A1	15,711	3,493	19,204	19,204
5/20/2013	Lot 3	A1	23,263	4,268	27,531	46,735
5/21/2013	Lot 3-4	A1	21,897	2,573	24,470	71,205
5/21/2013	Lot 4	B1	12,591	2,080	14,671	14,671
5/22/2013	Lot 4	B1	16,042	2,112	18,154	32,825
6/6/2013	Lot 5	B1	15,910	2,861	18,771	51,596
6/7/2013	Lot 5	B1	13,491	1,765	15,256	66,852
6/3/2013	Lot 6	C1	25,371	4,946	30,317	30,317
6/4/2013	Lot 6	C1	15,907	2,239	18,146	48,463
6/7/2013	Lot 5	C1	17,480	3,387	20,867	69,330
6/4/2013	Lot 7	D1	17,852	2,880	20,732	20,732
6/5/2013	Lot 7-8	D1	38,324	7,719	46,043	66,775
6/6/2013	Lot 8	E1	18,422	2,960	21,382	21,382
6/17/2013	Lot 9	E1	25,623	4,415	30,038	51,420
6/18/2013	Lot 9	E1	9,524	1,663	11,187	62,607
6/18/2013	Lot 10-11	F1	26,095	3,328	29,423	29,423
6/19/2013	Lot 11-12	F1	24,545	3,176	27,721	57,144
Hatchery Total:		393,913				