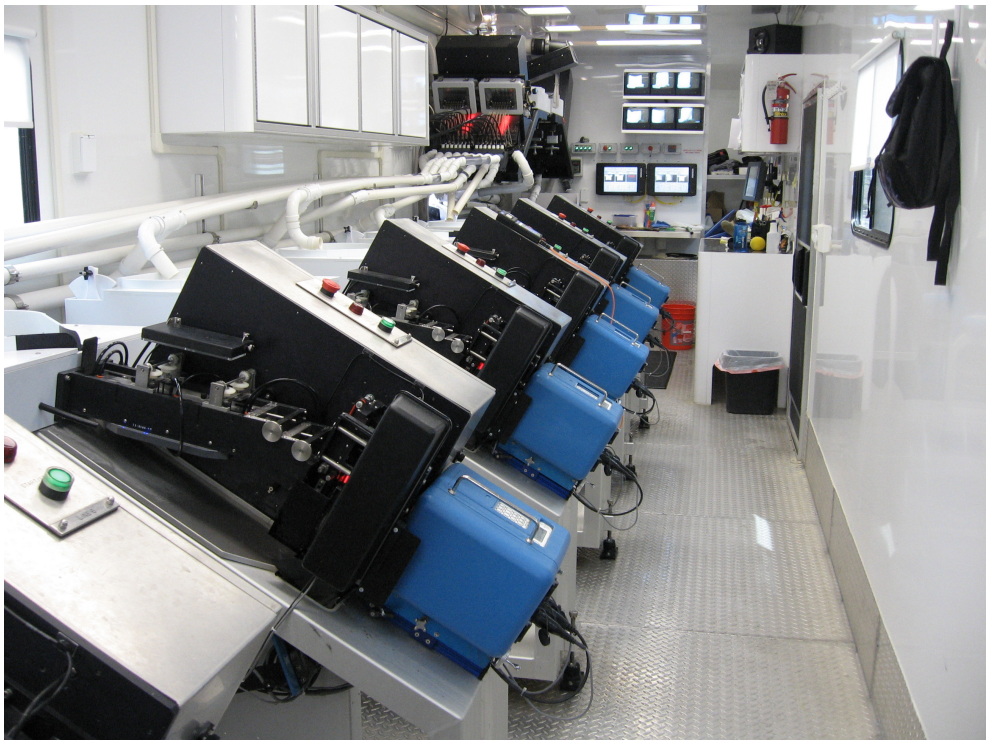
Constant Fractional Marking/Tagging Program For Central Valley Fall-run Chinook Salmon

2009 Marking Season



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Abstract

The Central Valley Constant Fractional Marking/Tagging Program (CFM) was initiated in the spring of 2007. 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 production releases of fall-run Chinook salmon from the Central Valley hatcheries in 2007, 2008, and 2009. The program was conducted at Coleman National Fish Hatchery, Feather River Hatchery, Feather River Hatchery Annex, Nimbus Hatchery, and Mokelumne River Hatchery in these years.

This report covers the third year of marking/tagging activities at the Central Valley hatcheries in the spring of 2009 (Brood Year 2008 fall-run Chinook). The program successfully processed 100% of the production releases of fall-run Chinook salmon through automated marking trailers, a total of 26,326,779 fish. Of this total, approximately 27% were coded-wire tagged and adipose fin-clipped (a total of 7,174,719 fish). Tag retention studies were performed to determine the actual numbers of marked/tagged fish released in each tag group.

Introduction

Over 32 million fall-run Chinook salmon are produced each year at five hatcheries in California's Central Valley, including Coleman National Fish Hatchery, Feather River Hatchery, Feather River Hatchery Annex, Nimbus Hatchery, and Mokelumne River 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.

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 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 Game, 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, 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 Annex, California Department of Fish and Game; Mokelumne River Fish Hatchery, East Bay Municipal Utility District; and Nimbus Fish Hatchery, U.S. Bureau of Reclamation.

The CFM program will provide CALFED ERP and the participating agencies with specific information needed to evaluate Ecosystem Restoration Program Plan (ERPP) actions and goals related to improving conditions for Central Valley Chinook salmon.
The overall objectives of the program 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.

This report covers the third year of marking/tagging activities at the Central Valley hatcheries in the spring of 2009 (Brood Year 2008 fall-run Chinook).

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 will be recovered in ocean fisheries throughout the West Coast.

Four state-of-the-art automated tagging trailers were purchased for the 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 are 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, 2008, and 2009. Coded-wire tags for the 2009 season were ordered from Northwest Marine Technology in November 2008. Tags used in the program were all 1.1 mm. standard size tags; no half tags were used.

The program was conducted at Coleman National Fish Hatchery, Feather River Hatchery, Feather River Hatchery Annex, Nimbus Hatchery, and Mokelumne River 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 program, as all the fall-run Chinook at this hatchery are raised for experimental purposes, and were marked and coded-wire tagged using manual techniques in 2009.

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 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 marking season began the second week of February at the Feather River Annex in Thermalito and ended at Nimbus Fish Hatchery the third week of May. Marking of hatchery-produced salmon in 2009 therefore spanned a 15-week period.

Throughout the season, tag retention studies were conducted to determine actual marking/tagging rates for each coded-wire tag code. Approximately 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. For Coleman National Fish Hatchery, approximately 400 fish were held for retention purposes for each tag code. The fewer number of fish held per tag code for this facility was determined with the assistance of USFWS personnel since 30 different tag codes were used. Study fish were sampled from throughout the tagging period for each tag code. Fish were electronically tested for tag retention at end of the study period. 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), operated by the Pacific States Marine Fisheries Commission. 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

The program successfully processed 100% of the 2009 production releases of fall-run Chinook salmon from the Central Valley hatcheries. The technology allowed an accurate count of all production fish, and the marking/tagging of an exact percentage of those fish. The 25% target rate for marking/tagging was achieved for brood year 2008.

Tag retention studies indicated very high rates of tag/mark retention. Retention rates ranged as follows:

- Coleman National Fish Hatchery: 99.736 – 100% with an average of 99.93%
- Feather River Hatchery Annex: 98.24 – 99.89% with an average of 98.91%
- Feather River Hatchery: 98.69 – 99.64% with an average of 98.98%
- Mokelumne River Hatchery: 99.56 – 99.89% with an average of 99.67%
- Nimbus Hatchery: 99.13 – 100% with an average of 99.66%

Daily tagging rates, tag codes, and results of retention studies are shown in Appendix Tables 1 – 5 for each of the hatcheries.

The program successfully processed 100% of the production releases of fall-run Chinook salmon through the automated marking trailers, a total of 26,326,779 fish. Of this total, approximately 27% were coded-wire tagged and adipose fin-clipped (a total of 7,174,719 fish).

During the 2009 season, a greater percentage of the fall-run production was marked relative to the 2007 and 2008 seasons. In 2009, the Mokelumne River Hatchery had many fewer fish; therefore, 100% of their production was coded-wire tagged and adipose fin-clipped. The Feather River Annex and Nimbus Fish Hatchery also chose to perform 100% clip/tag on some of their production fish.

Discussion

No significant problems were encountered in the 2009 marking season. One fairly consistent issue at most of the Central Valley Hatcheries is ensuring that the hatchery personnel take the proper raceway of fish off of feed at the correct time. Part of this is lack of communication between hatchery personnel and sometimes hatchery personnel forgetting what raceways to hold off of feed and when. We will continue to work on this communication and see if we can make progress on this minor issue.

The CFM Program started the marking season the second week of February, 2009 and completed trailer operations the third week of May for a total of 15 weeks. The program had five Trailer Operators, one of which left three weeks before the 5 Central Valley Hatcheries was completed. The other four Trailer Operators worked on the CFM Program for the necessary 15 weeks. Five to six Trailer Assistants were also employed throughout the 15 week season. The Tagging Coordinator spent all but three of the 15 weeks working on the CFM Program in the Central Valley.

Acknowledgements

The Constant Fractional Marking Program would not have existed or successfully completed the first three 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:

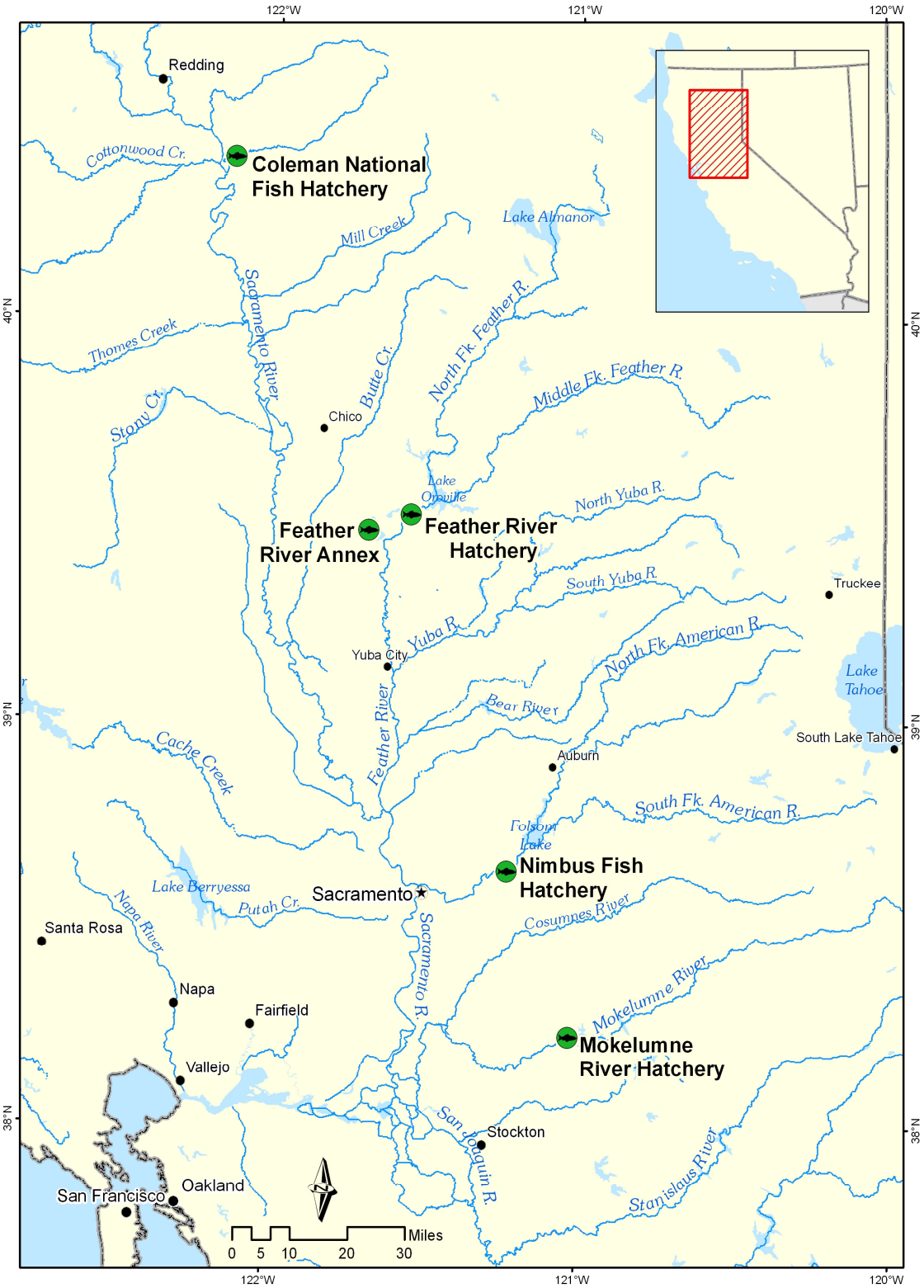
The IEP Central Valley Salmonid Project Work Team provided guidance over the years in the development of the project. Members included Jim Smith (USFWS), Russell Bellmer (CDFG), Kenneth Lentz (USBR retired), John Hannon (USBR), Rich Dixon (CDFG retired), Alice Low (CDFG), Brad Cavallo (formerly DWR),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

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 Game (CDFG); 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 we conduct the Constant Fractional Marking. Without your help, cooperation and support this program would not be possible. Bob Anderson (CDFG - Mokelumne River Fish Hatchery), William Smith (CDFG - Mokelumne River Fish Hatchery), Kurtis Brown (USFWS - Coleman National Fish Hatchery), Anna Kastner (CDFG - Feather River Fish Hatchery), Allen Dill (CDFG – Feather River Fish Hatchery), Paula Hoover (CDFG - Nimbus Fish Hatchery), Bob Burks (CDFG - Nimbus 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 Michael Mercer (PSMFC) for his work on the data entry and the rest of the professional and hard working CFM Tagging crew that made this third year such a success. They each spent many long days away from home to accomplish the goals of this very demanding program. Trailer Operators included Charles Hanley (PSMFC), Travis House (PSMFC), Michael Mercer (PSMFC), Dale Morrison (PSMFC), and Ryan Revnak (PSMFC). Tagging Trailer Assistants included seasonal PSMFC staff members Elizabeth Ferris, Cheryl Fullerton, Tracy Haller, Camille Jacoby, Terra Perkins, and Amber Smith.

Figure 1. Hatchery Locations: Central Valley Constant Fractional Marking Program (2009)



Coleman National Fish Hatchery

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

Coleman National Fish Hatchery							
Tag Code: 05 48 74			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/11/2009	29	2	22,971	–	69,006	–	91,977
3/12/2009	29,3	2	33,483	56,454	100,512	169,518	225,972
3/13/2009	3	2	33,459	89,913	100,443	269,961	359,874
3/16/2009	3	2	28,293	118,206	84,954	354,915	473,121
Tag CodeTotals:			**–**	**118,206**	**–**	**354,915**	**473,121**

Coleman National Fish Hatchery							
Tag Code: 05 48 77			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/17/2009	3	3	44,766	–	134,451	–	179,217
3/18/2009	3	3	42,219	86,985	126,702	261,153	348,138
3/19/2009	3	3	21,439	108,424	64,566	325,719	434,143
Tag CodeTotals:			**–**	**108,424**	**–**	**325,719**	**434,143**

Coleman National Fish Hatchery							
Tag Code: 05 48 80			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/19/2009	1	1	17,317	–	51,951	–	69,268
3/20/2009	1	1	39,220	56,537	117,693	169,644	226,181
3/23/2009	1	1	45,601	102,138	136,890	306,534	408,672
3/24/2009	1	1	17,470	119,608	52,443	358,977	478,585
Tag CodeTotals:			**–**	**119,608**	**–**	**358,977**	**478,585**

Coleman National Fish Hatchery							
Tag Code: 05 48 70			size:115K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/24/2009	30	29	8,793	–	26,418	–	35,211
3/25/2009	30/31	29	10,078	18,871	30,273	56,691	**75,562**
3/25/2009	31/32	30	18,949	–	56,847	–	**75,796**
3/25/2009	32	31	7,017	–	21,051	–	28,068
3/26/2009	32/33	31	11,678	18,695	35,073	56,124	**74,819**
3/26/2009	33/34	32	18,767	–	56,325	–	**75,092**
3/26/2009	34	33	6,043	–	18,129	–	24,172
3/27/2009	34/35	33	12,714	18,757	38,250	56,379	**75,136**
3/27/2009	35/36	34	16,645	–	50,007	–	66,652
3/30/2009	36	34	2,101	18,746	6,378	56,385	**75,131**
3/30/2009	36/37	35	17,486	–	52,458	–	**69,944**
Tag CodeTotals:			–	**130,271**	–	**391,209**	**521,480**

Coleman National Fish Hatchery							
Tag Code: 05 48 71			size:115K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/30/2009	37/38	36	18,856	–	56,631	–	**75,487**
3/30/2009	38/39	37	18,058	–	54,177	–	72,235
3/31/2009	39	37	700	18,758	2,109	56,286	**75,044**
3/31/2009	39/40	38	18,801	–	56,436	–	**75,237**
3/31/2009	40/41	39	18,741	–	56,250	–	**74,991**
3/31/2009	41/42	40	18,747	–	56,277	–	**75,024**
3/31/2009	42	41	10,324	–	30,975	–	41,299
4/1/2009	42	41	8,411	18,735	25,242	56,217	**74,952**
4/1/2009	42/43	42*	19,910	–	59,733	–	**79,643**
Tag CodeTotals:			–	**132,548**	–	**397,830**	**530,378**

* 76 tags from tag code **05 48 79** were used to finish Rwy 42

Coleman National Fish Hatchery							
Tag Code: 05 48 86			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/1/2009	15	15	12,386	–	37,227	–	49,613
4/2/2009	15	15	79,831	92,217	239,613	276,840	369,057
4/3/2009	15	15	17,382	109,599	52,185	329,025	438,624
Tag CodeTotals:			–	**109,599**	–	**329,025**	**438,624**

Coleman National Fish Hatchery							
Tag Code: 05 48 88			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/3/2009	16	16	49,720	–	149,220	–	198,940
4/6/2009	16	16	75,296	125,016	226,056	375,276	500,292
Tag CodeTotals:			–	**125,016**	–	**375,276**	**500,292**

Coleman National Fish Hatchery							
Tag Code: 05 48 89			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/7/2009	17	17	67,102	–	201,387	–	268,489
4/8/2009	17	17	46,279	113,381	138,993	340,380	453,761
Tag CodeTotals:			**–**	**113,381**	**–**	**340,380**	**453,761**

Coleman National Fish Hatchery							
Tag Code: 05 48 91			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/8/2009	18	18	15,884	–	47,700	–	63,584
4/9/2009	18	18	75,552	91,436	226,779	274,479	365,915
4/10/2009	18	18	26,002	117,438	78,087	352,566	470,004
Tag CodeTotals:			**–**	**117,438**	**–**	**352,566**	**470,004**

Coleman National Fish Hatchery							
Tag Code: 05 48 93			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/10/2009	19	19	24,324	–	73,080	–	97,404
4/13/2009	19	19	73,823	98,147	221,640	294,720	392,867
4/14/2009	19	19	20,800	118,947	62,442	357,162	476,109
Tag CodeTotals:			**–**	**118,947**	**–**	**357,162**	**476,109**

Coleman National Fish Hatchery							
Tag Code: 05 48 95			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/14/2009	21	21	43,759	–	131,349	–	175,108
4/15/2009	21	21	80,598	124,357	241,920	373,269	497,626
Tag CodeTotals:			**–**	**124,357**	**–**	**373,269**	**497,626**

Coleman National Fish Hatchery							
Tag Code: 05 48 97			size:110K			Trailer #	CA3
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/16/2009	22	22	83,936	–	251,940	–	335,876
4/17/2009	22	22	41,823	125,759	125,526	377,466	503,225
Tag CodeTotals:			**–**	**125,759**	**–**	**377,466**	**503,225**

Coleman National Fish Hatchery							
Tag Code: 05 48 75			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/9/2009	5	5	11,100	–	33,414	–	44,514
3/10/2009	5	5	33,435	44,535	100,392	133,806	178,341
3/11/2009	5	5	39,491	84,026	118,545	252,351	336,377
3/12/2009	5	5	29,095	113,121	87,375	339,726	452,847
Tag CodeTotals:			**–**	**113,121**	**–**	**339,726**	**452,847**

Coleman National Fish Hatchery							
Tag Code: 05 48 76			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/13/2009	4	4	33,688	–	101,133	–	134,821
3/16/2009	4	4	70,632	104,320	212,151	313,284	417,604
3/17/2009	4	4	1,541	105,861	4,671	317,955	423,816
Tag CodeTotals:			**–**	**105,861**	**–**	**317,955**	**423,816**

Coleman National Fish Hatchery							
Tag Code: 05 48 78			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/17/2009	6	6	59,838	–	179,613	–	239,451
3/18/2009	6	6	58,836	118,674	176,610	356,223	474,897
Tag CodeTotals:			**–**	**118,674**	**–**	**356,223**	**474,897**

Coleman National Fish Hatchery							
Tag Code: 05 48 79			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/19/2009	6,7	7	79,566	–	239,100	–	318,666
3/20/2009	7	7	29,359	108,925	88,200	327,300	**436,225**
4/1/2009*	42/43	42	76	109,001	–	–	–
Tag CodeTotals:			**–**	**109,001**	**–**	**327,300**	**436,225**

* 76 tags from tag code **05 48 79** were used to finish Rwy 42 (Tag Code **05 48 71**).

Coleman National Fish Hatchery							
Tag Code: 05 48 81			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/20/2009	8	8	32,067	–	96,387	–	128,454
3/23/2009	8	8	74,603	106,670	223,938	320,325	426,995
Tag CodeTotals:			**–**	**106,670**	**–**	**320,325**	**426,995**

Coleman National Fish Hatchery							
Tag Code: 05 48 82			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/24/2009	9	9	58,626	–	175,947	–	234,573
3/25/2009	9	9	60,530	119,156	181,638	357,585	476,741
Tag CodeTotals:			**–**	**119,156**	**–**	**357,585**	**476,741**

Coleman National Fish Hatchery							
Tag Code: 05 48 83			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/26/2009	10	10	93,062	–	279,330	–	372,392
3/27/2009	10	10	15,896	108,958	47,775	327,105	436,063
Tag CodeTotals:			**–**	**108,958**	**–**	**327,105**	**436,063**

Coleman National Fish Hatchery							
Tag Code: 05 48 84			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/27/2009	11	11	45,038	–	135,183	–	180,221
3/30/2009	11	11	71,129	116,167	213,609	348,792	464,959
Tag CodeTotals:			**–**	**116,167**	**–**	**348,792**	**464,959**

Coleman National Fish Hatchery							
Tag Code: 05 48 72			size:115K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/31/2009	12	12	71,317	–	214,119	–	285,436
4/1/2009	12	12	48,119	119,436	144,528	358,647	478,083
Tag CodeTotals:			**–**	**119,436**	**–**	**358,647**	**478,083**

Coleman National Fish Hatchery							
Tag Code: 05 48 85			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/1/2009	13	13	16,671	–	50,034	–	66,705
4/2/2009	13	13	79,301	95,972	238,053	288,087	384,059
4/3/2009	13	13	18,783	114,755	56,460	344,547	459,302
Tag CodeTotals:			**–**	**114,755**	**–**	**344,547**	**459,302**

Coleman National Fish Hatchery							
Tag Code: 05 48 87			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/3/2009	14	14	38,211	–	114,858	–	153,069
4/6/2009	14	14	77,777	115,988	233,436	348,294	464,282
Tag CodeTotals:			**–**	**115,988**	**–**	**348,294**	**464,282**

Coleman National Fish Hatchery							
Tag Code: 05 48 90			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/7/2009	20	20	63,909	–	191,787	–	255,696
4/8/2009	20	20	45,383	109,292	136,269	328,056	437,348
Tag CodeTotals:			**–**	**109,292**	**–**	**328,056**	**437,348**

Coleman National Fish Hatchery							
Tag Code: 05 48 73			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/8/2009	24	24	25,344	–	76,116	–	101,460
4/8/2009	24	24	88,571	113,915	265,848	341,964	455,879
4/9/2009	24	24	16,005	129,920	48,066	390,030	519,950
Tag CodeTotals:			**–**	**129,920**	**–**	**390,030**	**519,950**

Coleman National Fish Hatchery							
Tag Code: 05 48 92			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/10/2009	23	23	44,635	–	133,986	–	178,621
4/13/2009	23	23	76,661	121,296	230,055	364,041	485,337
Tag CodeTotals:			**–**	**121,296**	**–**	**364,041**	**485,337**

Coleman National Fish Hatchery							
Tag Code: 05 48 94			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/14/2009	25	25	82,518	–	247,617	–	330,135
4/15/2009	25	25	32,587	115,105	97,812	345,429	460,534
Tag CodeTotals:			**–**	**115,105**	**–**	**345,429**	**460,534**

Coleman National Fish Hatchery							
Tag Code: 05 48 96			size:110K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/15/2009	27	27	34,678	–	104,076	–	138,754
4/16/2009	27	27	78,223	112,901	234,756	338,832	451,733
Tag CodeTotals:			**–**	**112,901**	**–**	**338,832**	**451,733**

Coleman National Fish Hatchery							
Tag Code: 05 48 98			size:135K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/17/2009	28	28	60,686	–	182,118	–	242,804
4/20/2009	28	28	51,927	112,613	155,844	337,962	450,575
Tag CodeTotals:			**–**	**112,613**	**–**	**337,962**	**450,575**

Coleman National Fish Hatchery							
Tag Code: 05 48 99			size:135K			Trailer #	CA1
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/21/2009	26	26	74,266	–	222,897	–	297,163
4/22/2009	26	26	38,279	112,545	114,867	337,764	450,309
Tag CodeTotals:			**–**	**112,545**	**–**	**337,764**	**450,309**

Table 1b. Summary of hatchery tag codes and tag retention studies

Coleman National Fish Hatchery										
Tag Code Size and Location			Tag Code Totals			Retention				
Tag Code	Tag Code Size	Raceway	Number Tagged	Number Untagged	Total Processed	# of Fish Held	Days Held	% Retention	# Retaining tag	Calculated Untagged
05/48/70	115K	29,30,31,32 33,34,35	130,271	391,209	521,480	408	30	100.00%	130,271	391,209
05/48/71	115K	36,37,38,39 40,41,42	132,548	397,830	530,378	425	30	99.76%	132,230	398,148
05/48/72	115K	12	119,436	358,647	478,083	389	21	100.00%	119,436	358,647
05/48/73	115K	24	129,920	390,030	519,950	376	31	100.00%	129,920	390,030
05/48/74	110K	2	118,206	354,915	473,121	404	23	100.00%	118,206	354,915
05/48/75	110K	5	113,121	339,726	452,847	397	27	100.00%	113,121	339,726
05/48/76	110K	4	105,861	317,955	423,816	393	27	100.00%	105,861	317,955
05/48/77	110K	3	108,424	325,719	434,143	402	20	100.00%	108,424	325,719
05/48/78	110K	6	118,674	356,223	474,897	397	21	100.00%	118,674	356,223
05/48/79	110K	7,42	109,001	327,300	436,301	404	40	99.75%	108,728	327,573
05/48/80	110K	1	119,608	358,977	478,585	381	16	100.00%	119,608	358,977
05/48/81	110K	8	106,670	320,325	426,995	408	16	100.00%	106,670	320,325
05/48/82	110K	9	119,156	357,585	476,741	389	18	99.74%	118,846	357,895
05/48/83	110K	10	108,958	327,105	436,063	376	19	100.00%	108,958	327,105
05/48/84	110K	11	116,167	348,792	464,959	405	23	99.75%	115,877	349,082
05/48/85	110K	13	114,755	344,547	459,302	401	26	100.00%	114,755	344,547
05/48/86	110K	15	109,599	329,025	438,624	404	26	99.75%	109,325	329,299
05/48/87	110K	14	115,988	348,294	464,282	428	23	100.00%	115,988	348,294
05/48/88	110K	16	125,016	375,276	500,292	401	23	100.00%	125,016	375,276
05/48/89	110K	17	113,381	340,380	453,761	412	21	100.00%	113,381	340,380
05/48/90	110K	20	109,292	328,056	437,348	412	21	100.00%	109,292	328,056
05/48/91	110K	18	117,438	352,566	470,004	415	31	100.00%	117,438	352,566
05/48/92	110K	23	121,296	364,041	485,337	385	27	99.74%	120,981	364,356
05/48/93	110K	19	118,947	357,162	476,109	409	27	100.00%	118,947	357,162
05/48/94	110K	25	115,105	345,429	460,534	404	26	100.00%	115,105	345,429
05/48/95	110K	21	124,357	373,269	497,626	413	26	100.00%	124,357	373,269
05/48/96	110K	27	112,901	338,832	451,733	383	24	99.74%	112,607	339,126
05/48/97	110K	22	125,759	377,466	503,225	407	24	100.00%	125,759	377,466
05/48/98	135K	28	112,613	337,962	450,575	392	21	99.75%	112,331	338,244
05/48/99	135K	26	112,545	337,764	450,309	379	19	99.74%	112,252	338,057
Grand Total =			**3,505,013**	**10,522,407**	**14,027,420**	**Avg % Retention =**		99.93%	**3,502,364**	**10,525,056**

Feather River Fish Hatchery

Table 2a. Daily Tagging Rates at Feather River Hatchery.

Feather River Hatchery							
Tag Code: 06 86 06			size:350K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/23/2009	F2	Channel 2	43,561	–	130,857	–	174,418
2/24/2009	F2	Channel 2	56,936	100,497	171,000	301,857	402,354
2/25/2009	F2/F4	Channel 2	62,120	162,617	186,615	488,472	651,089
2/26/2009	F4	Channel 2	62,592	225,209	188,118	676,590	901,799
2/27/2009	F4/F6	Channel 2	52,209	277,418	157,014	833,604	1,111,022
3/2/2009	F6	Channel 2	58,886	336,304	177,264	1,010,868	1,347,172
3/3/2009	F6/E2	Channel 2	60,471	396,775	181,833	1,192,701	1,589,476
Tag CodeTotals:			–	**396,775**	–	**1,192,701**	**1,589,476**

Feather River Hatchery							
Tag Code: 06 86 34			size:350K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/4/2009	E2	Channel 1	65,957	–	198,204	–	264,161
3/5/2009	E2	Channel 1	71,993	137,950	216,285	414,489	552,439
3/6/2009	E4	Channel 1	56,359	194,309	169,320	583,809	778,118
3/9/2009	E4/E6	Channel 1	108,096	302,405	324,639	908,448	1,210,853
3/10/2009	E6/D2	Channel 1	100,760	403,165	302,514	1,210,962	1,614,127
Tag CodeTotals:			**–**	**403,165**	**–**	**1,210,962**	**1,614,127**

Feather River Hatchery							
Tag Code: 06 86 35			size:350K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/11/2009	D2	F6	31,487	–	94,605	–	126,092
3/11/2009	D2/D4	F6	37,701	69,188	113,142	207,747	**276,935**
3/12/2009	D4	E6	42,172	–	126,666	–	168,838
3/12/2009	D4	E6	32,990	75,162	99,048	225,714	**300,876**
3/13/2009	D4/D6	F4	88,682	–	266,220	–	**354,902**
3/13/2009	D6	E4	34,651	–	103,974	–	138,625
3/16/2009	D6	E4	40,687	75,338	122,139	226,113	**301,451**
3/16/2009	D6/C2	F2	13,501	–	40,533	–	54,034
3/17/2009	C2	F2	68,071	81,572	204,357	244,890	326,462
3/18/2009	C2	F2	13,782	95,354	41,394	286,284	**381,638**
Tag CodeTotals:			–	**403,724**	–	**1,212,078**	**1,615,802**

Feather River Hatchery							
Tag Code: 06 86 36			size:350K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/18/2009	C2	D6	51,920	–	155,820	–	207,740
3/19/2009	C2/C4	D6	4,408	56,328	13,260	169,080	**225,408**
3/19/2009	C4	D4	57,152	–	171,564	–	228,716
3/20/2009	C4	D4	11,724	68,876	35,205	206,769	**275,645**
3/20/2009	C4/C6	C6	38,575	–	115,767	–	154,342
3/23/2009	C4/C6	C6	32,669	71,244	98,070	213,837	**285,081**
3/23/2009	C4/C6	C2	26,592	–	79,797	–	106,389
3/24/2009	C4/C6	C2	48,884	75,476	146,709	226,506	**301,982**
3/24/2009	C4/C6	C4	18,794	–	56,397	–	75,191
3/25/2009	C4/C6/A4	C4	50,359	69,153	151,137	207,534	**276,687**
3/25/2009	A4	D2	12,205	–	36,627	–	48,832
3/26/2009	A4	D2	50,682	62,887	152,121	188,748	**251,635**
Tag CodeTotals:			–	**403,964**	–	**1,212,474**	**1,616,438**

Feather River Hatchery							
Tag Code: 06 86 50			size:130K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
3/26/2009	A4	A4	13,522	–	40,587	–	54,109
3/27/2009	B4	A4	51,744	65,266	155,307	195,894	261,160
3/30/2009	B4	A4	9,648	74,914	28,992	224,886	**299,800**
3/30/2009	B4	B4	25,747	–	77,259	–	103,006
3/31/2009	B4	B4	46,096	71,843	138,372	215,631	**287,474**
Tag CodeTotals:			–	**146,757**	–	**440,517**	**587,274**

Feather River Hatchery							
Tag Code: 06 86 21			size:50K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
4/1/2009	B5	B6	29,501	–	88,584	–	118,085
4/2/2009	B5	B6	15,684	45,185	47,106	135,690	**180,875**
Tag CodeTotals:			–	**45,185**	–	**135,690**	**180,875**

Table 2b. Summary of hatchery tag codes and tag retention studies

Feather River Hatchery Summary										
Tag Code Size and Location			**Tag Code Totals**			**Retention**				
Tag Code	**Size**	**Raceway**	**Number Tagged**	**Number Untagged**	**Total Processed**	**# of Fish**	**Days Held**	**% Retention**	**# Retaining Tag**	**Calculated Untagged**
06/86/06	350K	Channel 2	396,775	1,192,701	1,589,476	558	21	99.46%	394,640	1,194,836
06/86/34	350K	Channel 1	403,165	1,210,962	1,614,127	897	21	98.87%	398,620	1,215,507
06/86/35	350K	E4,E6,F2,F4,F6	403,724	1,212,078	1,615,802	992	23	98.69%	398,433	1,217,369
06/86/36	350K	D2,D4,D6,C2,C4,C6	403,964	1,212,474	1,616,438	*	–	98.937%*	399,672	1,216,766
06/86/50	130K	A4,B4	146,757	440,517	587,274	*	–	98.937%*	145,198	442,076
06/86/21	50K	B6	45,185	135,690	180,875	**	–	98.937%**	44,705	136,170
Grand Total =			**1,799,570**	**5,404,422**	**7,203,992**	**Avg % Retention =**		**98.94%**	**1,781,268**	**5,422,724**

* = Net pens blew over in wind storm, retention fish lost. Numbers are an average of the previous three groups.

** = No retention fish. Numbers are an average of first three groups.

Feather River Hatchery Annex

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

Feather River Annex							
Tag Code: 06 86 49			size:150K (100% Mark & Tag)			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/9/2009	C4	C2	45,194	45,194	–	–	45,194
2/10/2009	C4	C2	87,331	132,525	–	–	132,525
2/11/2009	C4	C2	39,482	172,007	–	–	172,007
Tag Code Totals:			–	**172,007**	–	–	**172,007**

Feather River Annex							
Tag Code: 06 86 29			size:10K (100% Mark & Tag)			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/11/2009	C4	C2	9,578	–	–	–	181,585
Tag Code Totals:			–	**9,578**	–	–	**181,585**

Feather River Annex							
Tag Code: 06 86 30			size:10K (100% Mark & Tag)			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/11/2009	C4	C2	9,531	–	–	–	191,116
Tag Code Totals:			–	**9,531**	–	–	**191,116**

Feather River Annex							
Tag Code: 06 70 29			size:10K (100% Mark & Tag)			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/11/2009	C4	C2	5,156	–	–	–	196,272
Tag Code Totals:			–	**5,156**	–	–	**196,272**

Feather River Annex							
Tag Code: 06 86 31			size:70k (100% Mark & Tag)			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/11/2009	D4	D2/Top	3,650	–	–	–	3,650
2/12/2009	D4	D2/Top	74,884	78,534	–	–	78,534
Tag Code Totals:			–	**78,534**	–	–	**78,534**

Feather River Annex							
Tag Code: 06 86 52			size: 100K			Trailer #CA1	
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
2/13/2009	D4	D2/Low	32,135	–	96,453	–	128,588
2/17/2009	D4/Low	D4/Top	39,591	71,726	118,845	215,298	287,024
2/18/2009	D4/Low	D4/Top	21,900	93,626	65,754	281,052	374,678
Tag Code Totals:			–	**93,626**	–	**281,052**	**374,678**

Table 3b. Summary of hatchery tag codes and tag retention studies

Feather River Annex Summary										
Tag Code Size and Location			**Tag Code Totals**			**Retention**				
Tag Code	**Size**	**Raceway**	**Number Tagged**	**Number Untagged**	**Total Processed**	**# of Fish**	**Days Held**	**% Retention**	**# Retaining Tag**	**Calculated Untagged**
06/86/49*	150K		172,007	–	172,007					
06/86/29*	10K		9,578	–	9,578					
06/86/30*	10K		9,531	–	9,531					
06/70/29*	10K	C2	5,156	–	5,156	907	22	98.13%	192,593	3,679
06/86/31*	70K	D2	78,534	–	78,534	920	21	98.37%	77,254	1,280
06/86/52	100K	D2,D4	93,626	281,052	374,678	930	21	99.89%	93,525	281,153
Grand Total =			**368,432**	**281,052**	**649,484**	**Avg % Retention =**		**98.91%**	**363,372**	**286,112**

*= 100% Mark and Tag

Mokelumne River Hatchery

Table 4a. Daily Tagging Rates at Mokelumne River Hatchery.

Mokelumne River Hatchery						
100 % Mark and Tag						
Tag Code: 06 86 59			size:50K		Trailer # CA2	
Date	**From Rwy**	**To Rwy**	**Machine Tagged**	**Manual Tagged**	**Tagged Total**	**Raceway Total**
4/6/2009	Top B	Mid B	1,250	74	1,324	1,324
4/7/2009	Top B	Mid B	43,978	2,379	46,357	47,681
4/8/2009	Top B	Mid B	5,534	230	5,764	53,445
Tag CodeTotals:			**50,762**	**2,683**	**53,445**	**–**

Mokelumne River Hatchery						
100 % Mark and Tag						
Tag Code: 06 86 53			size:100K		Trailer # CA2	
Date	**From Rwy**	**To Rwy**	**Machine Tagged**	**Manual Tagged**	**Tagged Total**	**Raceway Total**
4/8/2009	TopB/TopC	Mid C	46,743	1,823	48,566	48,566
4/9/2009	Top C	Mid C	49,738	2,597	52,335	100,901
Tag CodeTotals:			**96,481**	**4,420**	**100,901**	**–**

Mokelumne River Hatchery						
100 % Mark and Tag						
Tag Code: 06 86 56			size:70K		Trailer # CA2	
Date	**From Rwy**	**To Rwy**	**Machine Tagged**	**Manual Tagged**	**Tagged Total**	**Raceway Total**
4/13/2009	Top D	Mid D	20,398	534	20,932	20,932
4/14/2009	Top D	Mid D	49,046	1,670	50,716	71,648
Tag CodeTotals:			**69,444**	**2,204**	**71,648**	**–**

Mokelumne River Hatchery						
100 % Mark and Tag						
Tag Code: 06 86 27			size:30K		Trailer # CA2	
Date	**From Rwy**	**To Rwy**	**Machine Tagged**	**Manual Tagged**	**Tagged Total**	**Raceway Total**
5/4/2009	A1	E1	22,500	2,502	25,002	25,002
Tag CodeTotals:			**22,500**	**2,502**	**25,002**	**–**

Table 4b. Summary of hatchery tag codes and tag retention studies

Mokelumne River Hatchery Summary										
100 % Mark and Tag										
Tag Code Size and Location			Tag Code Totals			Retention				
Tag Code	Size	Raceway	Machine	Manual	Total	# of Fish	Days Held	% Retention	# Retaining Tag	Calculated Untagged
06/86/27	30K	E1	22,500	2,502	25,002	900*	–	99.78%*	24,946	56
06/86/53	100K	Mid C	96,481	4,420	100,901	900	26	99.56%	100,453	448
06/86/56	70K	Mid D	69,444	2,204	71,648	900	21	99.89%	71,568	78
06/86/59	50K	Mid B	50,762	2,683	53,445	900	27	99.89%	53,386	59
Grand Total =			**239,187**	**11,809**	**250,996**	**Avg % Retention =**		**99.78%**	**225,407**	**585**

* No retention fish held. Retention % is an average of previous three groups.

Nimbus Hatchery

Table 5a. Daily Tagging Rates at Nimbus Hatchery.

Nimbus Fish Hatchery							
Tag Code: 06 86 38			size:350K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
5/4/2009	C2	C1	18,713	–	56,163	–	74,876
5/5/2009	C2	C1	32,347	51,060	97,173	153,336	**204,396**
5/5/2009	D3	D1	27,765	–	83,337	–	111,102
5/6/2009	D3	D1	62,360	90,125	187,224	270,561	360,686
5/7/2009	D3	D1	68,049	158,174	204,303	474,864	633,038
5/8/2009	D3	D1	14,785	172,959	44,448	519,312	**692,271**
5/8/2009	E3	E1	19,087	–	57,342	–	76,429
5/11/2009	E3	E1	53,877	72,964	161,769	219,111	292,075
5/12/2009	E3	E1	70,939	143,903	212,901	432,012	575,915
5/13/2009	E3	E1	32,126	176,029	96,429	528,441	**704,470**
Tag CodeTotals:			**–**	**400,048**	**–**	**1,201,089**	**1,601,137**

Nimbus Fish Hatchery							
Tag Code: 06 86 51			size:125K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
5/13/2009	F3	F4	23,187	–	69,627	–	92,814
5/14/2009	F3	F4	62,137	85,324	186,510	256,137	341,461
5/15/2009	F3	F4	40,048	125,372	120,255	376,392	501,764
5/18/2009	F3	F1	17,137	142,509	51,411	427,803	570,312
Tag CodeTotals:			**–**	**142,509**	**–**	**427,803**	**570,312**

Nimbus Fish Hatchery							
Tag Code: 06 86 23			size:40K			Trailer #	CA4
Tagging Date	**Raceway prior to tagging**	**Raceway following tagging**	**Daily Tag Total**	**Cumulative Tag Total**	**Daily Untagged Total**	**Cumulative Untagged Total**	**Raceway Total**
5/18/2009	F3	F1	28,655	–	86,094	–	114,749
5/19/2009	F3	F1	6,588	35,243	19,773	105,867	141,110
Tag CodeTotals:			**–**	**35,243**	**–**	**105,867**	**141,110**

Table 5b. Summary of hatchery tag codes and tag retention studies

Nimbus Fish Hatchery Summary										
Tag Code Size and Location			Tag Code Totals			Retention calculations				
Tag Code	Size	Raceway	Number Tagged	Number Untagged	Total Processed	# of Fish	Days Held	% Retention	# Retaining tag	Calculated untagged
06/86/23	40K	F1	35,243	105,867	141,110	–	–	99.658**%	35,122	105,988
06/86/37	350K	A,B1,C	402,908	1,209,420	1,612,328	939	21	99.681%	401,623	1,210,705
06/86/38	350K	C,D,E	400,048	1,201,089	1,601,137	752	21	100.000%	400,048	1,201,089
06/86/40*	270K	B4	270,000	–	270,000	900	21	99.889%	269,700	300
06/86/51	125K	F4/F1	142,509	427,803	570,312	920	16	99.130%	141,269	429,043
Grand Total =			**1,250,708**	**2,944,179**	**4,194,887**	**Avg % Retention =**		**99.658%**	**1,247,762**	**2,947,125**

100% Mark and Tag
** No retention fish held. Retention percentage based on previous groups.