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THE RESOURCE AGENCY
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
MERCED RIVER HATCHERY
2002-2003

BY

MICHAEL D. COZART
SAN JOAQUIN VALLEY and SOUTHERN SIERRA REGION

LANDS AND FACILITIES BRANCH
ADMINISTRATIVE REPORT NO. _____

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ABSTRACT

This report summarizes the operation of the Merced River Hatchery (MRH) from July 1, 2002 through June 30, 2003. The hatchery was constructed to rehabilitate the fall run Chinook salmon (*Oncorhynchus tshawytscha*) in the Merced River.

A total of 1,399,178 Chinook salmon smolts (2002 brood year) were produced.

In the fall of 2002, 1,838 Chinook salmon (1,030 males, 808 females) entered the hatchery. The 797 females artificially spawned produced 4,316,418 eggs in 16 spawnings.

INTRODUCTION

The Merced River Hatchery, formerly Merced River Fish Faculty, is located immediately downstream from the Crocker-Huffman Dam on the Merced River, a tributary to the San Joaquin River, about 15 miles northeast of Merced. It is the terminal point for the salmon spawning on the Merced River.

The facility was built by the Merced Irrigation District (MID) with Davis-Grunsky Act funds. Operation began in the fall of 1970.

In 1991 Merced River Hatchery underwent modernization funded by the Department of Water Resources (DWR). Modernization included 1000 linear feet of concrete raceways consisting of ten 100 foot ponds. A bird enclosure was constructed to eliminate fish eating birds. Ultraviolet units were placed at the water inlet of each raceway and into the water supply line to the hatchery building. A new water line from Crocker-Huffman Dam supplies more consistent volume to the raceways and an increased volume to the hatchery building. A permanent hatchery building houses 14 double stacks of Heath type incubator trays and hatch jars capable of incubating and hatching approximately three million Chinook salmon eggs. Twelve nursery tanks, two with the capability to start feeding of approximately 100,000 swim-up size salmon each, and 10 that will hold 90,000 fingerlings each are located adjacent to the hatchery building. The adult salmon trapping facility, located in the fish ladder of the spawning channel, consists of a fyke trap entrance, holding pen and a hydraulic basket hoist. The adjoining spawning building houses an anesthetic tank with hydraulic basket hoist, a sorting table and spawning table. The spawning building was constructed in 1995 by funds from the Salmon Stamp Account. The hatchery is also comprised of one effluent settling basin and a 4,372 ft long spawning channel (the Reuben E. Schmidt Spawning Channel), which is no longer in operation. The installation is operated by the California Department of Fish and Game with partial funding assistance for operational costs by DWR.

PRODUCTION SUMMARY

The Merced River Hatchery trap was in operation on October 14, 2002. The first Chinook salmon entered the trap on October 29, 2002. Trapping was terminated for the season on December 24, 2002. The combined production of Chinook salmon for M.R.H. 2002-2003 is summarized in Table 1. Chinook salmon smolts planted from M.R.H in 2003, (Table 2). Smolts provided for net efficiency and vulnerability tests totaled 180,711 (Table 3). A total of 1,838 adult fish entered the trap and are recorded in Appendix Table 1. The number of returning Chinook salmon since 1970 are shown in Appendix Table 2. Fork length of marked salmon trapped at Merced River Hatchery (Appendix Table 3). Chinook Salmon Code Wire Tag recoveries at Merced River Hatchery (Appendix Table 4). Appendix Figure 1 provides water temperatures for the

production year.

Table 1. Production Summary, Merced River Fish Facility, 2002-2003

SPECIES	NUMBER TRAPPED	NUMBER FEMALE SPAWNED	NUMBER EGGS INTO PRODUCTION	NUMBER FINGERLING PLANTED **	YEARLINGS PLANTED	POUNDS PLANTED **	ON HAND JUNE 30, 2003
CHINOOK 2002 BY							
MRFF	1,838	797	2,059,305	1,399,178	-00-	20,693	0
TOTAL	1,838	797	2,059,305	1,399,178	-00-	20,693	0

** 180,711 BY 02, 2,612 pounds were used for net efficiency and vulnerability tests for the South Delta Study.

Table 2. 2003 BY Merced River strain Chinook salmon smolts planted from Merced River Hatchery, 2003.

RELEASED DATE	CODED WIRE TAG CODE	NUMBER TAGGED	NUMBER UNTAGGED	SIZE NUMBER/LB	RELEASE SITE
03-22-03			17,400	118.0	HATCHERY OUTLET MERCED R.
03-26-03			20,500	133.0	GALLO RANCH DFG MERCED R.
04-03-03			20,800	112.0	HATCHERY OUTLET MERCED R.
04-04-03			19,800	112.0	HATCHERY OUTLET MERCED R.
04-05-03			17,500	85.0	HATCHERY OUTLET MERCED R.
04-05-03			21,375	85.0	SHAFFER BR MERCED R.

04-05-03			29,900	113.0	HATCHERY OUTLET MERCED R.
04-06-03			26,250	113.0	SHAFFER BR MERCED R.
04-13-03			11,625	76.0	HATCHERY OUTLET MERCED R.
04-13-03	06-44-89 06-44-90 06-44-91 06-44-92	103,637	0	60.0	HATCHERY OUTLET MERCED R.
04-16-03	06-44-93 06-44-94 06-44-95	76,723	0	57.0	HATFIELD ST PARK MERCED R.
04-21-03	06-44-82 06-44-83 06-27-42	78,732	0	65.0	DURHAM FERRY SAN JOAQUIN R.
04-22-03	06-27-43	26,922	0	64.6	MOSSDALE SAN JOAQUIN R.
04-22-03	06-27-48	26,409	0	64.3	MOSSDALE SAN JOAQUIN R.
04-25-03	06-45-67 06-45-68 06-45-69	55,440	0	63.0	KNIGHTS FERRY STANISLAUS R.
04-25-03	06-27-44	26,505	0	60.1	JERSEY POINT SAN JOAQUIN R.
04-25-03	06-44-96 06-44-97 06-44-98 06-44-99	101,891	0	63.0	HATCHERY OUTLET MERCED R.
04-25-03	06-45-67 06-45-68 06-45-69	23,370	0	63.0	KNIGHTS FERRY STANISLAUS R.
04-27-03	06-45-70	26,635	0	60.0	2 RIVERS SAN JOAQUIN R.
04-28-03	06-27-45 06-27-46 06-27-47	78,836	0	64.3	DURHAM FERRY SAN JOAQUIN R.
04-28-03	06-45-71	26,900	0	58.5	2 RIVERS SAN JOAQUIN R.

04-29-03	06-27-49	26,031	0	61.5	MOSSDALE SAN JOAQUIN R.
04-29-03	06-27-50	26,064	0	61.1	MOSSDALE SAN JOAQUIN R.
04-29-03	06-45-64 06-45-65 06-45-66	76,456	0	58.3	HATFIELD ST PARK MERCED R.
04-30-03			1,807	66.0	HATCHERY OUTLET MERCED R.
05-02-03	06-27-51	26,618		58.5	JERSET POINT SAN JOAQUIN R.
05-04-03	06-27-77 06-27-78 06-44-49 06-44-50	102,939		64.6	HATCHERY OUTLET MERCED R.
05-07-03	06-45-46 06-45-47 06-45-72	76,802	0	63.5	HATFIELD ST PARK MERCED R.
05-12-03		0	7,550	58.0	HATCHERY OUTLET MERCED R.
05-12-03			35,550	96.0	HATCHERY OUTLET MERCED R.
TOTAL		986,910	230,057		

Table 3. Chinook salmon smolts provided by Merced River Hatchery for net efficiency and vulnerability test in the Merced, Stanislaus, Tuolumne and San Joaquin Rivers in 2003.

- Merced River Salmon Habitat Enhancement Project Smolt Survival Studies-

RELEASE DATE	PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
04-02-03	GREEN UPPER CAUDAL	100	92.6	HAGAMAN PARK

04-08-03	GREEN UPPER CAUDAL	2,000	85.0	HAGAMAN PARK
04-08-03	GREEN LOWER CAUDAL	101	85.0	HAGAMAN PARK
04-15-03	GREEN LOWER CAUDAL	2,000	85.0	HAGAMAN PARK
04-22-03	GREEN ANAL	2,040	85.0	HAGAMAN PARK
04-29-03	GREEN DORSAL	2,016	84.6	HAGAMAN PARK
05-06-03	GREEN UPPER CAUDAL	2,015	70.0	HAGAMAN PARK
05-13-03	GREEN LOWER CAUDAL	2,009	70.0	HAGAMAN PARK
05-20-03	GREEN ANAL	2,021	68.0	HAGAMAN PARK
TOTAL		14,302		
MERCED RIVER HATCHERY				
04-01-03	BISMARK BROWN	9,387	76.0	HATCHERY OUTLET
04-14-03	BISMARK BROWN	10,000	62.0	HATCHERY OUTLET
04-23-03	BISMARK BROWN	10,209	84.6	HATCHERY OUTLET
05-05-03	BISMARK BROWN	9,979	78.3	HATCHERY OUTLET
TOTAL		39,575		
ROBINSON RANCH				
04-03-03	BLUE UPPER CAUDAL	3,000	76.0	ROBINSON RANCH
04-16-03	BLUE LOWER CAUDAL	3,000	62.0	ROBINSON RANCH

04-25-03	BLUE DORSAL	3,000	84.6	ROBINSON RANCH
05-07-03	BLUE UPPER CAUDAL	3,000	70.0	ROBIBSON RANCH
TOTAL		12,000		
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HENDERSON PARK				
04-02-03	ORANGE UPPER CAUDAL	5,000	76.0	HENDERSON PARK
04-15-03	ORANGE LOWER CAUDAL	5,000	76.0	HENDERSON PARK
04-24-03	ORANGE ANAL	5,000	84.6	HENDERSON PARK
05-06-03	ORANGE UPPER CAUDAL	5,017	78.3	HENDERSON PARK
TOTAL		20,017		
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RATZLAFF				
04-03-03	PURPLE LOWER CAUDAL	3,035	76.0	RATZLAFF
04-16-03	RED UPPER CAUDAL	3,010	62.0	RATZLAFF
04-25-03	BLUE ANAL	3,000	84.6	RATZLAFF
05-07-03	PURPLE LOWER CAUDAL	3,000	70.0	RATZLAFF
TOTAL		12,045		
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GALLO RANCH DFG				
04-03-03	RED LOWER CAUDAL	2,000	76.0	GALLO RANCH

04-16-03	RED ANAL	2,000	62.0	GALLO RANCH
04-25-03	RED DORSAL	2,000	84.6	GALLO RANCH
05-07-03	RED LOWER CAUDAL	2,185	70.0	GALLO RANCH
TOTAL		8,185		
MID-NATURAL RESOURCE SCIENCE GALLO RANCH				
02-22-03	PINK UPPER CAUDAL	800	800.0	GALLO RANCH
02-22-03	GREEN LOWER CAUDAL	800	800.0	GALLO RANCH
03-12-03	MARKED ON SITE	1,652	413.0	GALLO RANCH
TOTAL		3,252		
GRAND TOTAL		109,376		

-Tuolumne River Rotary Screw Trap vulnerability tests-

DFG STUDY

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
04-02-03	GREEN UPPER CAUDAL	100	92.6	GRAYSON
04-02-03	GREEN UPPER CAUDAL	100	92.6	GRAYSON
04-09-03	GREEN UPPER CAUDAL	2,000	85.0	GRAYSON

04-08-03	GREEN LOWER CAUDAL	100	85.0	GRAYSON
04-09-03	GREEN LOWER CAUDAL	103	85.0	GRAYSON
04-16-03	GREEN LOWER CAUDAL	2,000	85.0	GRAYSON
04-23-03	GREEN ANAL	2,000	85.0	GRAYSON
04-30-03	GREEN DORSAL	2,051	80.0	GRAYSON
05-07-03	GREEN UPPER CAUDAL	2,125	68.5	GRAYSON
05-14-03	GREEN LOWER CAUDAL	2,016	70.0	GRAYSON
05-20-03	GREEN ANAL	2,009	68.0	GRAYSON
05-27-03	GREEN UPPER CAUDAL	2,000	65.5	GRAYSON
TOTAL		16,604		

- Stanislaus River Rotary Screw Trap vulnerability tests-

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
02-18-03	MAJENTIA UPPER CAUDAL	1,069	522.0.0	OAKDALE REC
02-18-03	BLUE UPPER CAUDAL	250	522.0	OAKDALE REC
02-18-03	GREEN CAUDAL	125	522.0	OAKDALE REC
02-19-03	GREEN CAUDAL	127	522.0	OAKDALE REC
02-19-03	BLUE UPPER CAUDAL	251	522.0	OAKDALE REC
02-20-03	GREEN CAUDAL	125	522.0	OAKDALE REC
02-20-03	BLUE UPPER CAUDAL	250	522.0	OAKDALE REC
02-21-03	GREEN CAUDAL	122	522.0	OAKDALE REC
02-21-03	BLUE UPPER CAUDAL	250	522.0	OAKDALE REC
TOTAL		2,569		

-San Joaquin River-

Mossdale Kodiak Trawl vulnerability tests

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASE	SIZE NUMBER/LB	RELEASE LOCATION
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04-04-03	PEACH UPPER CAUDAL	2,000	94.5	MOSSDALE
04-10-03	PEACH LOWER CAUDAL	5,044	85.0	MOSSDALE
04-18-03	PEACH ANAL	2,000	66.7	MOSSDALE
04-24-03	PEACH DORSAL	5,000	66.7	MOSSDALE
05-02-03	PEACH UPPER CAUDAL	2,000	66.7	MOSSDALE
05-09-03	PINK ANAL	5,060	72.3	MOSSDALE
05-16-03	PINK DORSAL	2,000	70.0	MOSSDALE
05-23-03	PINK ANAL	5,000	68.5	MOSSDALE
TOTAL		28,104		

Head of Old River Barrier vulnerability tests

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASE	SIZE NUMBER/LB	RELEASE LOCATION
04-22-03	YELLOW UPPER CAUDAL	3,000	66.0	OLD RIVER BARRIER
04-22-03	PURPLE UPPER CAUDAL	3,015	66.0	OLD RIVER BARRIER
04-22-03	PURPLE DORSAL	3,000	66.0	OLD RIVER BARRIER
04-22-03	YELLOW DORSAL	3,000	66.0	OLD RIVER BARRIER
04-29-03	PURPLE ANAL	3,002	66.0	OLD RIVER BARRIER
04-29-03	PURPLE LOWER CAUDAL	3,000	66.0	OLD RIVER BARRIER
04-29-03	YELLOW LOWER CAUDAL	3,017	66.7	OLD RIVER BARRIER

04-29-03	YELLOW ANAL	3,024	66.7	OLD RIVER BARRIER
TOTAL		24,058		

HATCHERY OPERATION

Brood Year 2002 fish, lot 1 through lot 6, were reared on a diet of Bio Diet starter and grower. A total of 16,080 lbs of food produced 15,387 lbs of fish, yielding a conversion rate of 1.04.

Brood Year 2002 fish, lot 7 through lot 16, were reared on a diet of EWOS starter and grower. A total of 4,224 lbs of food produced 5,305 lbs of fish, yielding a conversion rate of 0.8.

The facility had 2,562 visitors in fiscal year 2002-2003.

Approximately 2,550 eyed MRH Chinook salmon eggs were supplied to 48 teachers, representing 44 different elementary and high schools that participated in the 2003 "Salmonids-In-The-Classroom" program for the San Joaquin River Basin area. Approximately XXXXXX chinook salmon fingerlings were supplied for various laboratory studies through out the state.

CHINOOK SALMON MAINTENANCE PROGRAM

History of the 2002 Run

The first Chinook salmon entered the MRH trap on October 29, 2002. Of the 1,838 salmon trapped, 598 were adult males, 652 adult females and 588 Grilse (432 males and 156 females). A total of 4,316,418 eggs were taken from 797 females during 16 spawnings, for an average fecundity of 5,416 eggs. The average fertility of eggs was 61.5 percent. Spawning was terminated December 24, 2002. Production

Goals for Merced River Hatchery are set at 2 million eggs and 1.4 million smolts. Based on previous 10 year egg production records, a percentage from each egg lot are selected for production. Spawning procedures for 2002 were as follows: Single adult female eggs were divided into three or four pans, depending on egg volume, and each pan was fertilized with a different 3 year or older male. Grilse females were spawned in the same procedure using 3 year or older males for fertilization. When a shortage of adult 3 year or older males occurs, grilse males are used with 3 year old or older females. Genetic concerns regarding out-of-basin Chinook salmon smolt releases in the past years for the South Delta Study were addressed this year. Spawned coded wire tagged Chinook salmon were issued a number to identify all spawning combinations. CWT codes were identified within 24 hours as to their place of origin. All out-of-basin spawn combinations were disposed of. A total of 425,750 eggs taken in the 16 spawnings constituted out-of-basin contribution. Biological data collection: CWT heads, scales, otoliths, length frequency, ovarian fluids and DNA samples.

-Disease-

Enteric redmouth, *Yersinia ruckeri*, was not diagnosed in 2002. All fish were immersed vaccinated with Ermogen (Enteric Redmouth/Yersiniosis), Bacterins, Aqua Health USA, Buhl, Idaho, as a preventive treatment. A fish health assessment by personnel from Ca-NV Fish Health Center, Coleman Fish Hatchery, was performed on the BY02 VAMP post release fish groups. *Tetracapsula bryosalmonae* (the cause of Proliferative Kidney Disease) was clinically identified in VAMP post released groups therefore in our production fish also. No bacterial or viral pathogens were detected during production period. "Fish Health Assessment of VAMP Release Groups - 2002", CA-NV Fish Health Center, 24411 Coleman Fish Hatchery Rd, Anderson, California 96007.

Appendix Table 1. Weekly adult Chinook salmon trapping data for Merced River Hatchery 2002-2003

Week of	Adults	Grilse	Total
OCT 10-02	7	6	13
OCT 21-02	87	30	117
OCT 28-02	185	112	297
Nov 04-02	231	128	359
Nov 11-02	308	136	444
NOV 18-02	151	43	194
NOV 25-02	111	49	160
DEC 02-02	38	21	59
DEC 09-02	12	8	20
DEC 25-02		TRAP CLOSED	
TOTAL	1,130	533	1,663

Appendix Table 2. Summary of Chinook salmon run to Merced River Hatchery.
^{1/} ^{2/}

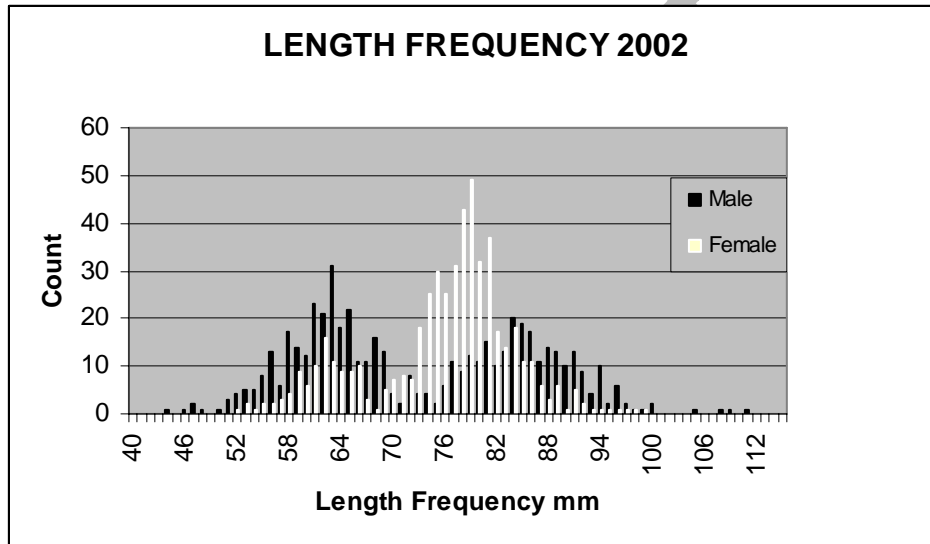
FISCAL YEAR	MALES	FEMALES	GRILSE ^{2/}	TOTAL
1970-71	59	40	^{1/}	99
1971-72	54	94	^{1/}	148
1972-73	14	51	^{1/}	65
1973-74	13	150	^{1/}	163
1974-75	24	400	^{1/}	424
1975-76	99	300	^{1/}	399
1976-77	86	260	^{1/}	346
1977-78	44	200	^{1/}	244

1978-79	14	45	^{1/}	61
1979-80	143	86	120	349
1980-81	43	106	8	157
1981-82	326	278	319	923
1982-83	90	67	32	189
1983-84	30	178	1587	1795
1984-85	713	858	167	1738
1985-86	514	610	87	1211
1986-87	271	217	162	650
1987-88	401	90	467	958
1988-89	165	250	42	457
1989-90	33	33	16	82
1990-91	17	11	18	46
1991-92	24	8	9	41
1992-93	97	24	245	368
1993-94	114	120	175	409
1994-95	359	240	344	943
1995-96	204	107	291	602
1996-97	464	275	402	1141
1997-98	451	365	86	946
1998-99	239	186	374	799
1999-00	396	234	1,007	1,637
2000-01	683	932	331	1,946
2001-02	473	657	533	1,663
2002-03	598	652	588	1,838

^{1/}. From 1970-71 through 1978-79, the annual run of adult female Chinook salmon was estimated by using redd counts and carcass recoveries in the spawning channel. The number of male salmon shown are actual counts of recovered carcasses. Beginning in fiscal year 1979-80, an adult trap has been operated at the facility throughout each spawning season and actual counts are made. There are no records of number of grilse prior to 1978.

^{2/}. The criteria for grilse was changed from 21 inches F.L. and less to 22 inches F.L. and less in 1983-84, to 23 inches F.L. and less in 1984-85, and to 24 inches F.L. and less in 1985-86.

Appendix Table 3. Length Frequency Distribution (to nearest whole centimeter) of Coded Wire Tagged Chinook salmon trapped at Merced River Hatchery 2002.



Based on Code Wire Tag carcass recoveries in the San Joaquin River basin the cut off length for 2 year old fish since 1997 has been 67cm (26.5 in) for males and 64cm (25 in) for females.

Appendix Table 4. Chinook salmon coded wire tag (CWT) recoveries, Merced River Hatchery (MRH), 2002.

CWT CODE	NUMBER RECOVERED	BROOD YEAR	HATCHERY OF ORIGIN	RELEASE SITE	RELEASE DATE
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06-01-06-07-14	2	98	MRFF	HATCHERY OUTLET MERCED R.	5-05-99
06-01-06-09-14	5	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-28-00
06-01-06-09-15	8	99	MRFF	DURHAM FERRY JOAQUIN R.	4-28-00
06-01-06-10-01	28	99	MRFF	JERSEY POINT SAN JOAQUIN R.	5-01-00
06-01-06-10-02	14	99	MRFF	JERSEY POINT SAN JOAQUIN R.	5-01-00
06-01-11-08-14	3	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-28-00
06-01-11-08-15	1	98	MRFF	JERSEY POINT SAN JOAQUIN R.	4-21-99
06-04-01	12	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-04-02	24	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-26-42	3	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-19-99
06-26-43	1	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-19-99
06-26-45	4	98	MRFF	DOS REIS SAN JOAQUIN R.	4-19-99
06-26-46	3	98	MRFF	DOS REIS SAN JOAQUIN R.	4-19-99
06-26-47	3	98	MRFF	JERSEY POINT SAN JOAQUIN R.	4-21-99
06-44-01	30	99	MRFF	MOSSDALE SAN JOAQUIN R.	4-18-00
06-44-02	35	99	MRFF	MOSSDALE SAN JOAQUIN R.	4-18-00
06-44-03	48	99	MRFF	JERSEY POINT SAN JOAQUIN R.	4-20-00
06-44-04	53	99	MRFF	JERSEY POINT SAN JOAQUIN R.	4-20-00
06-44-05	23	99	MRFF	MOSSDALE SAN JOAQUIN R.	4-19-00
06-44-10	1	99	MRFF	2 RIVERS STANISLAUS R.	5-20-00
06-44-11	1	99	MRFF	2 RIVERS STANISLAUS R.	5-20-00

06-44-15	3	00	MRFF	HATCHERY OUTLET MERCED R.	4-21-01
06-44-16	9	00	MRFF	HATCHERY OUTLET MERCED R.	4-21-01
06-44-17	7	00	MRFF	HATCHERY OUTLET MERCED R.	4-21-01
06-44-18	7	00	MRFF	HATCHERY OUTLET MERCED R.	4-21-01
06-44-19	6	00	MRFF	HATFIELD ST PARK MERCED R.	4-24-01
06-44-20	6	00	MRFF	HATFIELD ST PARK MERCED R.	4-24-01
06-44-21	14	00	MRFF	HATFIELD ST PARK MERCED R.	4-26-01
06-44-24	1	00	MRFF	HATCHERY OUTLET MERCED R.	5-08-01
06-44-29	10	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-30-01
06-44-30	11	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-30-01
06-44-31	13	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-30-01
06-44-32	12	00	MRFF	MOSSDALE SAN JOAQUIN R.	5-01-01
06-44-33	15	00	MRFF	MOSSDALE SAN JOAQUIN R.	5-01-01
06-44-34	42	00	MRFF	JERSEY POINT SAN JOAQUIN R.	5-04-01
06-44-35	47	00	MRFF	JERSEY POINT SAN JOAQUIN R.	5-04-01
06-44-36	2	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	5-07-01
06-44-37	2	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	5-07-01
06-44-38	2	00	MRFF	DURHAM FERRY SAN JOAQUIN R.	5-07-01
06-44-39	2	00	MRFF	MOSSDALE SAN JOAQUIN R.	5-08-01
06-44-40	1	00	MRFF	MOSSDALE SAN JOAQUIN R.	5-08-01
06-44-41	19	00	MRFF	JERSEY POINT SAN JOAQUIN R.	5-11-01

06-44-42	16	00	MRFF	JERSEY POINT SAN JOAQUIN R.	5-11-01
06-44-43	4	00	MRFF	OLD FISHERMAN CLUB TUOLUMNE R.	4-28-01
06-44-44	10	00	MRFF	OLD FISHERMAN CLUB TUOLUMNE R.	4-26-01
06-45-34	3	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-35	3	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-36	5	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-39	13	99	MRFF	HATCHERY OUTLET MERCED R.	4-12-00
06-45-40	9	99	MRFF	HATCHERY OUTLET MERCED R.	4-12-00
06-45-41	8	99	MRFF	HATCHERY OUTLET MERCED R.	4-12-00
06-45-42	16	99	MRFF	HATCHERY OUTLET MERCED R.	4-13-00
06-45-43	14	99	MRFF	HATFIELD ST PARK MERCED R.	4-13-00
06-45-44	18	99	MRFF	HATFIELD ST PARK MERCED R.	4-14-00
06-45-45	20	99	MRFF	HATFIELD ST PARK MERCED R.	4-14-00
06-45-49	11	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-50	11	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-51	10	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-52	19	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-53	10	99	MRFF	HATFIELD ST PARK MERCED R.	4-27-00
06-45-54	31	99	MRFF	HATFIELD ST PARK MERCED R.	4-27-00
06-45-55	21	99	MRFF	HATFIELD ST PARK MERCED R.	4-28-00
06-45-56	3	99	MRFF	LA GRANGE TUOLUMNE R.	4-13-00

06-45-58	2	99	MRFF	LA GRANGE TUOLUMNE R.	4-15-00
06-45-59	13	99	MRFF	OLD FISHERMAN CLUB SAN JOAQUIN R.	4-16-00
06-45-60	9	99	MRFF	OLD FISHERMAN CLUB SAN JOAQUIN R.	4-14-00
06-45-62	1	99	MRFF	LA GRANGE TUOLUMNE R.	4-13-00
06-45-63	15	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-46-05	2	98	MRFF	OLD FISHERMAN CLUB SAN JOAQUIN R.	4-19-00
06-46-06	1	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-20-00
06-46-08	1	98	MRFF	LA GRANGE, GRAYSON TUOLUMNE R.	4-16-00
05-07-68	1	01	COLEMAN NFH	PORT CHICAGO	2002
05-07-76	1	01	COLEMAN NFH	GEORGIANA SLOUGH	2002
05-51-32	1	99	COLEMAN NFH	RYDE KOKET	2002
05-51-35	1	01	COLEMAN NFH	GEORGIANA SLOUGH	2002
06-02-47	6	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-02-48	4	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-02-50	1	99	MOKELUMNE	WICKLAND OIL NET PENS	2000
06-02-51	1	99	MOKELUMNE	WICKLAND OIL NET PENS	2000
06-02-53	15	99	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	2000
06-02-54	11	99	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	2000
06-02-57	3	99	MOKELUMNE	NEW HOPE LANDING	2000
06-02-58	2	99	MOKELUMNE	NEW HOPE LANDING	2000
06-02-64	1	00	MOKELUMNE	NEW HOPE LANDING	2001
06-02-66	1	00	MOKELUMNE	S.F. MOKELUMNE R.	2001
06-02-67	1	00	MOKELUMNE	S.F. MOKELUMNE R.	2001

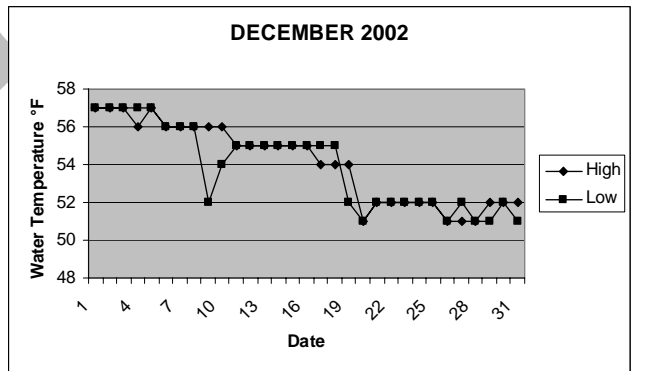
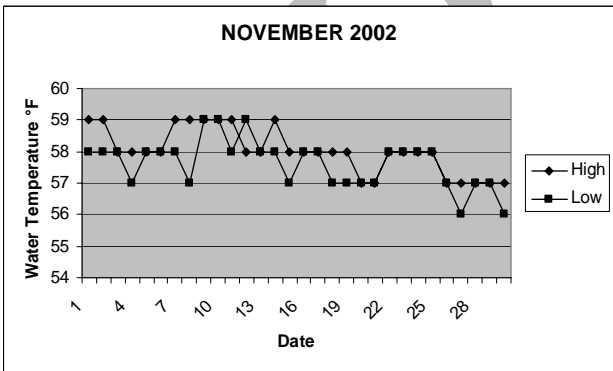
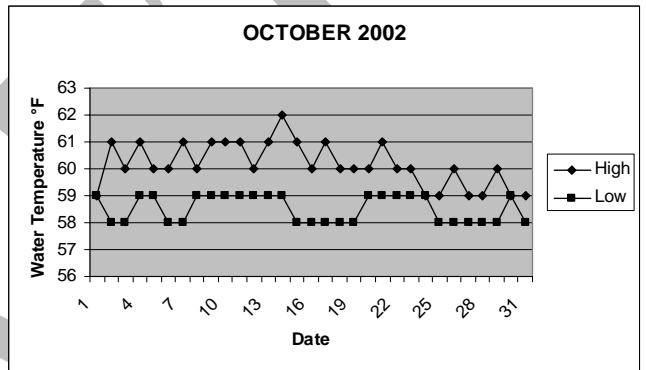
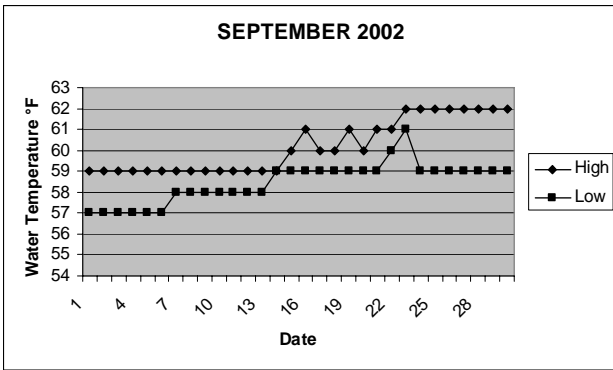
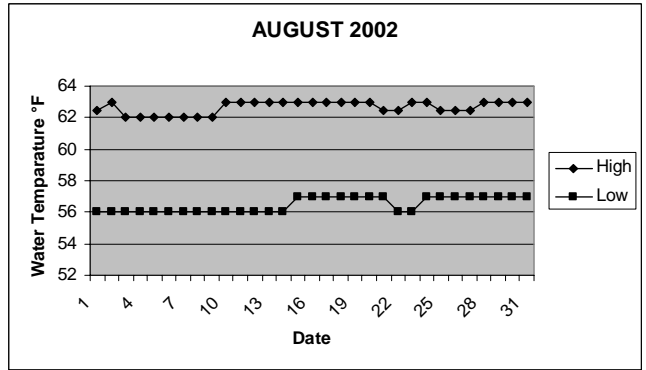
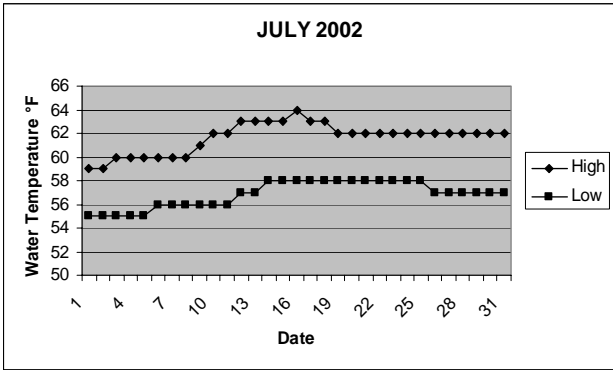
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06-02-71	9	00	MOKELUMNE	JERSEY POINT SAN JOAQUIN R.	2001
06-26-41	1	98	TRINITY R.	HATCHERY OUTLET TRINITY R.	1999
06-26-62	10	99	MOKELUMNE	MOUTH OF MOKE R. MOKELUMNE R.	2000
06-26-63	1	99	MOKELUMNE	MOUTH OF MOKE R. MOKELUMNE R.	2000
06-26-64	3	99	FEATHER	WICKLAND OIL NET PENS	2000
06-26-65	6	99	FEATHER	WICKLAND OIL NET PENS	2000
06-26-74	1	00	FEATHER	WICKLAND OIL NET PENS	2001
06-26-75	2	00	FEATHER	WICKLAND OIL NET PENS	2001
06-26-76	2	00	FEATHER	WICKLAND OIL NET PENS	2001
06-26-78	1	00	FEATHER	RODEO MINOR PORT	2001
06-27-16	4	00	MOKELUMNE	WEST SACRAMENTO	2001
06-27-17	1	00	MOKELUMNE	WEST SACRAMENTO	2001
06-49-20	2	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-49-21	2	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-49-22	3	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-54-55	3	00	NIMBUS	WICKLAND OIL NET PENS	2001
06-54-56	2	00	NIMBUS	WICKLAND OIL NET PENS	2001
06-54-57	4	00	NIMBUS	WICKLAND OIL NET PENS	2001
06-54-58	1	00	NIMBUS	WICKLAND OIL NET PENS	2001
06-54-59	2	00	NIMBUS	WICKLAND OIL NET PENS	2001
06-54-60	1	00	NIMBUS	WICKLAND OIL NET PENS	2001

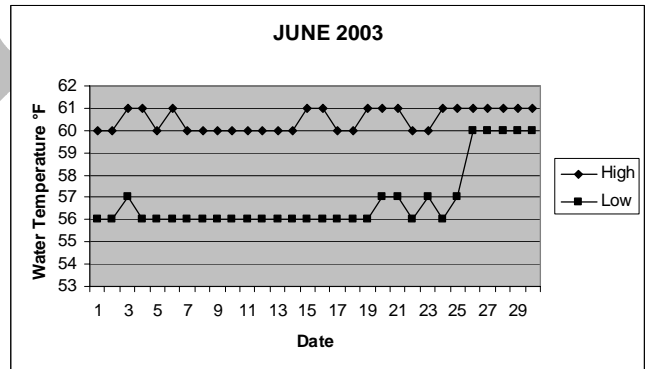
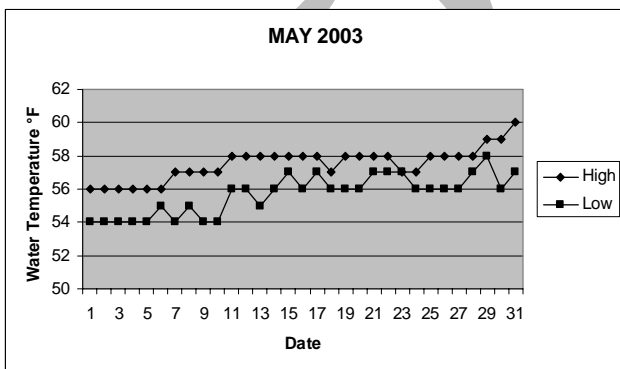
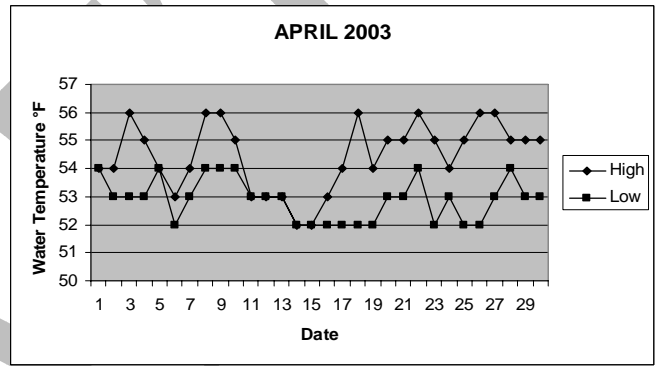
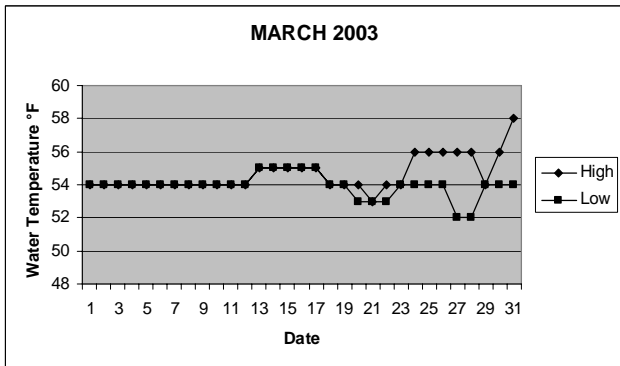
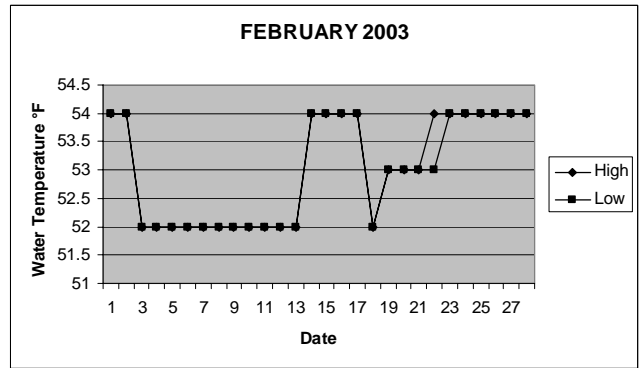
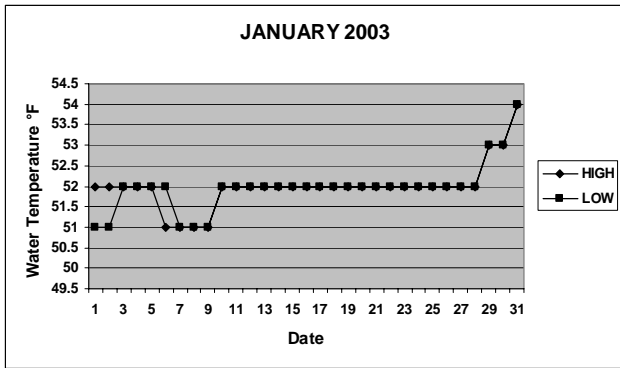
NO TAGS FOUND	93				
TOTAL	1,045				

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Appendix Figure 1. Daily water temperature for Merced River Hatchery from July 1,2002 through June 30,2003.

DAILY WATER TEMPERATURES BY MONTH





DRAFT

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GA

October

