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THE RESOURCE AGENCY
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
MERCED RIVER HATCHERY
2001-2002

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, 2001 through June 30, 2002. The hatchery was constructed to rehabilitate the fall run Chinook salmon (*Oncorhynchus tshawytscha*) in the Merced River.

A total of 1,541,967 Chinook salmon smolts (2001 brood year) were produced.

In the fall of 2001, 1,663 Chinook salmon (1,185 males, 778 females) entered the hatchery. The 703 females artificially spawned produced 4,066,652 eggs in 13 spawnings.

1/ Inland Fisheries Administrative Report No. _____

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 1, 2001. The first Chinook salmon entered the trap on October 4, 2001. Trapping was terminated for the season on December 24, 2001. The combined production of Chinook salmon for M.R.H. 2001-2002 is summarized in Table 1. Chinook salmon smolts planted from M.R.H in 2002, (Table 2). Smolts provided for net efficiency and vulnerability tests totaled 167,311 (Table 3). A total of 1,663 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, 2001-2002

SPECIES	NUMBER TRAPPED	NUMBER FEMALE SPAWNED	NUMBER EGGS INTO PRODUCTION	NUMBER FINGERLING PLANTED **	YEARLINGS PLANTED	POUNDS PLANTED **	ON HAND JUNE 30, 2002
CHINOOK 2001 BY							
MRFF	1,663	703	4,066,652	1,541,967	-00-	17,815	0
TOTAL	1,663	703	4,066,652	1,541,967	-00-	17,815	0

** 198,409 BY 01, 1,280 pounds were used for net efficiency and vulnerability tests for the South Delta Study.

Table 2. 2001 BY Merced River strain Chinook salmon smolts planted from Merced River Hatchery, 2002.

RELEASED DATE	CODED WIRE TAG CODE	NUMBER TAGGED	NUMBER UNTAGGED	SIZE NUMBER/LB	RELEASE SITE
03-31-02	06-44-63 06-44-64 06-44-65 06-44-66	102,466	0	84.0	HATCHERY OUTLET MERCED R.
04-03-02	06-44-51 06-44-52 06-45-48	50,000	0	82.0	HATFIELD ST PARK MERCED R.
04-05-02	06-44-51 06-44-52 06-45-48	26,650	0	82.0	HATFIELD ST PARK MERCED R.

04-18-02	06-44-71 06-44-72 06-44-73 06-44-74	102,934	0	73.6	DURHAM FERRY SAN JOAQUIN R.
04-19-02	06-44-58	26,183	0	71.3	MOSSDALE SAN JOAQUIN R.
04-19-02	06-44-57	25,787	0	71.5	MOSSDALE SAN JOAQUIN R.
04-21-02	06-44-82 06-44-83 06-44-84 06-44-85	100,489	0	94.5	HATCHERY OUTLET MERCED R.
04-22-02	06-44-59	25,707	0	69.8	JERSEY POINT SAN JOAQUIN R.
04-22-02	06-44-60	25,251	0	67.5	JERSEY POINT SAN JOAQUIN R.
04-24-02	06-44-67 06-44-68 06-44-06	25,000	0	64.0	OLD LA GRANGE BR TUOLUMNE R.
04-24-02	06-44-67 06-44-68 06-44-06	25,000	0	64.0	OLD LA GRANGE BR TUOLUMNE R.
04-25-02	06-44-70 06-44-75 06-44-76 06-44-77	103,455	0	83.0	DURHAM FERRY SAN JOAQUIN R.
04-25-02	06-44-67 06-44-68 06-44-06	27,037	0	64.0	OLD LA GRANGE BR TUOLUMNE R.
04-26-02	06-44-86 06-44-87 06-44-88	23,530	0	90.5	HATFIELD ST PARK MERCED R.
04-26-02	06-44-79	25,887	0	76.1	MOSSDALE SAN JOAQUIN R.
04-26-02	06-44-78	26,261	0	76.1	MOSSDALE SAN JOAQUIN R.
04-26-02	06-44-61	26,040	0	65.8	OLD FISHERMAN CLUB SAN JOAQUIN R.
04-29-02	06-44-86 06-44-87 06-44-88	28,470	0	87.6	HATFIELD ST PARK MERCED R.

04-29-02	06-44-86 06-44-87 06-44-88	24,285	0	87.6	HATFIELD ST PARK MERCED R.
04-29-02	06-44-69	25,607	0	63.7	OLD FISHERMAN CLUB SAN JOAQUIN R.
04-30-02	06-44-81	25,399	0	71.1	JERSEY POINT SAN JOAQUIN R.
04-30-02	06-44-80	25,246	0	70.1	JERSEY POINT SAN JOAQUIN R.
05-01-02	06-44-47	25,474	0	65.0	KNIGHTS FERRY STANISLAUS R.
05-01-02	06-44-46	26,785	0	67.0	KNIGHTS FERRY STANISLAUS R.
05-01-02		0	183,140	170.0	HATCHERY OUTLET MERCED R.
05-01-02		0	178,001	136.0	HATCHERY OUTLET MERCED R.
05-04-02	06-44-48	25,474	0	63.5	2 RIVERS PARK SAN JOAQUIN R.
06-13-02		0	8,000	46.1	CASWELL ST PARK STANISLAUS R.
TOTAL		974,417	369,141		

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 2002.

- Merced River Salmon Habitat Enhancement Project Smolt Survival Studies-

RELEASE DATE	PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
02-07-02	BLUE UPPER CAUDAL	20	390.0	HAGAMAN PARK

02-13-02	RED UPPER CAUDAL	1,859	270.0	HAGAMAN PARK
02-27-02	RED DORSAL	2,224	193.0	HAGAMAN PARK
03-06-02	RED LOWER CAUDAL	2,015	153.0	HAGAMAN PARK
03-13-02	RED ANAL	2,075	194.0	HAGAMAN PARK
03-20-02	RED UPPER CAUDAL	2,018	149.0	HAGAMAN PARK
03-27-02	RED DORSAL	2,068	120.0	HAGAMAN PARK
03-30-02	PINK LOWER CAUDAL	893	125.0	HAGAMAN PARK
03-30-02	PINK ANAL	1,130	125.0	HAGAMAN PARK
04-03-02	RED LOWER CAUDAL	2,042	120.0	HAGAMAN PARK
04-10-02	RED UPPER CAUDAL	2,024	91.0	HAGAMAN PARK
04-17-02	RED DORSAL	2,022	100.0	HAGAMAN PARK
05-02-02	RED UPPER CAUDAL	2,025	70.0	HAGAMAN PARK
05-08-02	RED LOWER CAUDAL	2,116	70.0	HAGAMAN PARK
05-14-02	RED ANAL	2,014	65.0	HAGAMAN PARK
05-22-02	RED DORSAL	2,077	62.0	HAGAMAN PARK
05-29-02	RED UPPER CAUDAL	2,048	55.0	HAGAMAN PARK
TOTAL		30,670		
MERCED RIVER HATCHERY				
04-02-02	BISMARCK BROWN	5,928	120.0	HATCHERY OUTLET
04-16-02	BISMARCK BROWN	7,100	100.0	HATCHERY OUTLET
05-01-02	BISMARCK BROWN	7,019	70.0	HATCHERY OUTLET
05-15-02	BISMARCK BROWN	7,149	65.0	HATCHERY OUTLET

TOTAL		27,196		
ROBINSON RANCH				
04-04-02	BLUE UPPER CAUDAL	3,050	120.0	ROBINSON RANCH
04-18-02	BLUE LOWER CAUDAL	3,006	100.0	ROBINSON RANCH
05-03-02	BLUE DORSAL	3,088	70.0	ROBINSON RANCH
05-17-02	BLUE ANAL	3,025	65.0	ROBIBSON RANCH
TOTAL		12,169		
HENDERSON PARK				
04-03-02	ORANGE UPPER CAUDAL	5,053	120.0	HENDERSON PARK
04-17-02	ORANGE LOWER CAUDAL	5,092	91.0	HENDERSON PARK
05-02-02	ORANGE DORSAL	5,036	70.0	HENDERSON PARK
05-16-02	ORANGE UPPER CAUDAL	5,027	65.0	HENDERSON PARK
TOTAL		20,208		
GALLO RANCH				
04-04-02	MAGENTIA LOWER CAUDAL	2,067	120.0	GALLO RANCH
04-18-02	MAGENTIA UPPER CAUDAL	2,044	100.0	GALLO RANCH

05-03-02	MAGENTIA ANAL	2,028	70.0	GALLO RANCH
05-17-02	MAGENTIA ANAL	2,008	65.0	GALLO RANCH
TOTAL		8,147		
MID-NATURAL RESOURCE SCIENCE GALLO RANCH				
02-20-02	PINK LOWER/UPPER CAUDAL	687	1200.0	GALLO RANCH
02-23-02	GREEN UPPER/LOWER CAUDAL	1,268	600.0	GALLO RANCH
03-06-02	PINK LOWER/UPPER CAUDAL GREEN ANAL	764	296.0	GALLO RANCH
03-19-02	GREEN UPPER/LOWER CAUDAL	1,881	137.0	GALLO RANCH
04-12-02	GREEN LOWER/UPPER PINK LOWER/UPPER CAUDAL	2,596	118.0	GALLO RANCH
04-21-02	GREEN UPPER/LOWER PINK UPPER CAUDAL PINK ANAL	2,500	100.0	GALLO RANCH
05-03-02	GREEN UPPER CAUDAL GREEN ANAL	1,086	70.0	GALLO RANCH
05-04-02	PINK UPPER GREEN UPPER CAUDAL GREEN ANAL	1,246	70.0	GALLO RANCH

05-20-02	GREEN UPPER/LOWER PINK UPPER/LOWER CAUDAL	2,400	70.0	GALLO RANCH
TOTAL		15,510		
GRAND TOTAL		113,900		

-Tuolumne River Rotary Screw Trap vulnerability tests-

DFG STUDY

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
02-07-02	BLUE UPPER CAUDAL	39	390.0	GRAYSON
02-19-02	RED LOWER CAUDAL	2,102	250.0	GRAYSON
03-05-02	RED ANAL	2,336	158.0	GRAYSON
03-12-02	RED UPPER CAUDAL	2,045	194.0	GRAYSON
03-19-02	RED DORSAL	2,119	149.0	GRAYSON
03-26-02	RED LOWER CAUDAL	2,133	120.0	GRAYSON
04-02-02	06-44-62 RED ANAL	2,021	86.0	GRAYSON
04-08-02	06-44-62 RED UPPER CAUDAL	2,024	87.0	GRAYSON
04-16-02	06-44-62 RED DORSAL	2,054	72.0	GRAYSON
04-25-02	06-44-62 RED LOWER CAUDAL	2,002	72.0	GRAYSON

04-30-02	06-44-62 RED ANAL	2,035	50.0	GRAYSON
05-07-02	06-44-62 RED DORSAL	2,024	50.0	GRAYSON
05-14-02	06-44-62 RED UPPER CAUDAL	2,050	50.0	GRAYSON
05-22-02	06-44-62 RED LOWER CAUDAL	2,047	40.2	GRAYSON
05-29-02	06-44-62 RED ANAL	4,067	110.0	GRAYSON
TOTAL		31,098		

- Stanislaus River Rotary Screw Trap vulnerability tests-

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASED	SIZE NUMBER/LB	RELEASE LOCATION
05-03-02	MARKED ON SITE	650	70.0	OAKDALE
TOTAL		650		

-San Joaquin River-

Mossdale Kodiak Trawl vulnerability tests

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASE	SIZE NUMBER/LB	RELEASE LOCATION
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04-05-02	PEACH UPPER CAUDAL	2,017	130.0	MOSSDALE
04-11-02	PEACH LOWER CAUDAL	5,091	91.0	MOSSDALE
04-17-02	PEACH ANAL	2,043	91.0	MOSSDALE
04-26-02	PEACH UPPER CAUDAL	5,064	75.0	MOSSDALE
05-03-02	PEACH DORSAL	2,005	50.0	MOSSDALE
05-09-02	PEACH LOWER CAUDAL	5,010	54.0	MOSSDALE
05-14-02	PEACH UPPER CAUDAL	2,014	50.0	MOSSDALE
05-23-02	PEACH DORSAL	5,057	57.2	MOSSDALE
TOTAL		28,301		

RELEASE DATE	CWT/PANJET MARK	NUMBER RELEASE	SIZE NUMBER/LB	RELEASE LOCATION
04-19-02	YELLOW LOWER CAUDAL	3,033	75.0	OLD RIVER BARRIER
04-19-02	YELLOW UPPER CAUDAL	3,011	75.0	OLD RIVER BARRIER
04-19-02	PURPLE LOWER CAUDAL	3,282	75.0	OLD RIVER BARRIER
04-19-02	PURPLE UPPER CAUDAL	3,008	75.0	OLD RIVER BARRIER
04-24-02	YELLOW DORSAL	3,034	75.0	OLD RIVER BARRIER
04-24-02	PURPLE ANAL	3,053	75.0	OLD RIVER BARRIER
04-24-02	YELLOW ANAL	3,039	75.0	OLD RIVER BARRIER

04-24-02	PURPLE ANAL	3,000	75.0	OLD RIVER BARRIER
TOTAL		24,460		

HATCHERY OPERATION

All BY 2001 fish were reared on a diet of Bio Diet starter and grower. A total of 23,882 lbs of food produced 17,815 lbs of fish, yielding a conversion rate of 1.34.

The facility had 1,858 visitors in fiscal year 2001-2002.

Approximately 2,580 eyed MRH Chinook salmon eggs were supplied to 48 teachers, representing 41 different elementary and high schools that participated in the 2002 "Salmonids-In-The-Classroom" program for the San Joaquin River Basin area. Approximately 12,264 eggs were supplied to Stillwater Science Consultants for riffle studies in the Tuolumne River.

CHINOOK SALMON MAINTENANCE PROGRAM

History of the 2001 Run

The first Chinook salmon entered the MRH trap on October 4, 2001. Of the 1,663 salmon trapped, 473 were adult males, 657 adult females and 533 Grilse (412 males and 121 females). A total of 4,066,652 eggs were taken from 703 females during 13 spawnings, for an average fecundity of 5,785 eggs. The average fertility of eggs was 61.1 percent. Spawning was terminated December 13, 2001. 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 2001 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 623,982 eggs taken in the 13 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 BY01 VAMP pre and post release fish groups. *Tetracapsula bryosalmonae* (the cause of Proliferative Kidney Disease) was clinically identified during fish production period. 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 2001-2002

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/}

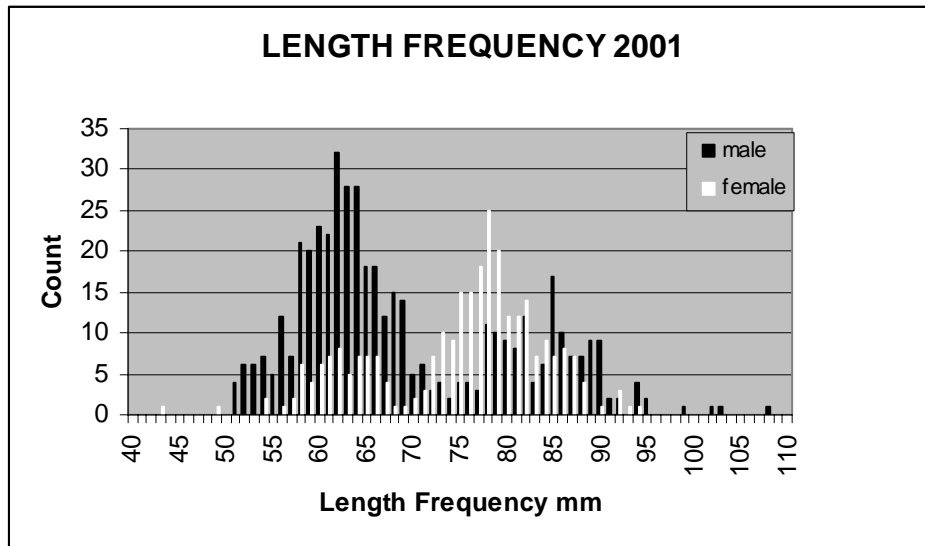
FISCAL YEAR	MALES	FEMALES	GRILSE ^{2/}	TOTAL
1970-71	59	40	^{1/}	99
1971-72	54	94	^{1/}	148
1972-73	14	51	^{1/}	65
1973-74	13	150	^{1/}	163
1974-75	24	400	^{1/}	424
1975-76	99	300	^{1/}	399
1976-77	86	260	^{1/}	346
1977-78	44	200	^{1/}	244
1978-79	14	45	^{1/}	61
1979-80	143	86	120	349
1980-81	43	106	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

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, 2001.



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), 2001.

CWT CODE	NUMBER RECOVERED	BROOD YEAR	HATCHERY OF ORIGIN	RELEASE SITE	RELEASE DATE
06-01-06-09-15	1	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-28-00
06-01-06-10-01	6	99	MRFF	JERSEY POINT SAN JOAQUIN R.	5-01-00
06-01-06-10-02	1	99	MRFF	JERSEY POINT SAN JOAQUIN R.	5-01-00
06-01-11-05-02	2	97	MRFF	HATFIELD ST PARK MERCED R.	5-05-98
06-01-11-08-08	1	97	MRFF	DOS REIS SAN JOAQUIN R.	4-17-98
06-01-11-08-13	1	97	MRFF	JERSEY POINT SAN JOAQUIN R.	4-20-98
06-01-11-08-15	2	98	MRFF	JERSEY POINT SAN JOAQUIN R.	4-21-99
06-01-11-08-04	1	00	MRFF	KNIGHTS FERRY STANISLAUS R.	5-22-01
06-44-01	12	99	MRFF	MOSSDALE SAN JOAQUIN R.	4-18-00
06-44-02	11	99	MRFF	MOSSDALE SAN JOAQUIN R.	4-18-00
06-44-03	29	99	MRFF	JERSEY POINT SAN JOAQUIN R.	4-20-00
06-44-04	36	99	MRFF	JERSEY POINT SAN JOAQUIN R.	4-20-00
06-44-05	13	99	MRFF	MOSSDALE SAN JOAQUIN R.	5-03-00
06-45-24	2	97	MRFF	HATCHERY OUTLET MERCED R.	4-12-98
06-45-28	12	98	MRFF	HATCHERY OUTLET MERCED R.	4-14-99
06-45-29	14	98	MRFF	HATCHERY OUTLET MERCED R.	4-14-99
06-45-30	16	98	MRFF	HATCHERY OUTLET MERCED R.	4-14-99
06-45-31	20	98	MRFF	HATFIELD ST PARK MERCED R.	4-16-99
06-45-32	18	98	MRFF	HATFIELD ST PARK MERCED R.	4-16-99

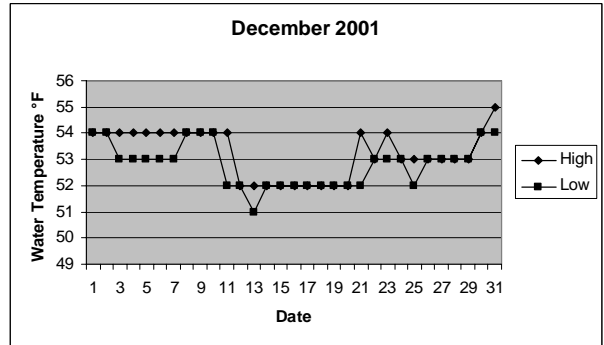
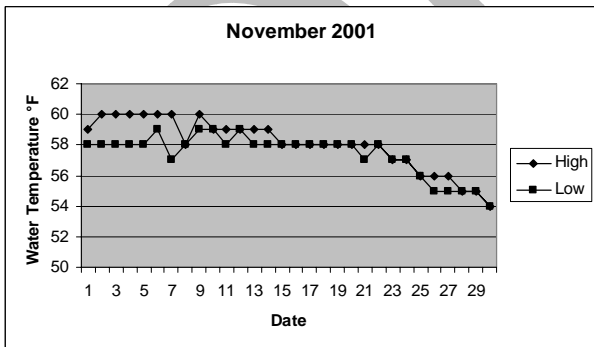
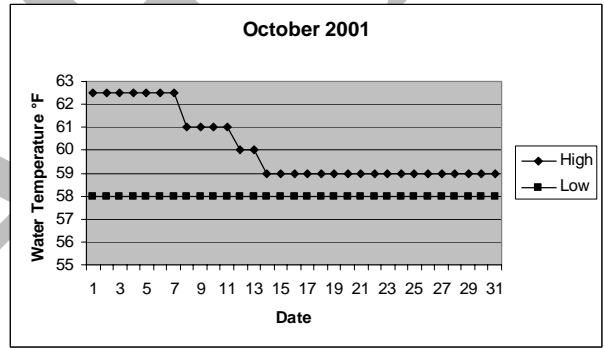
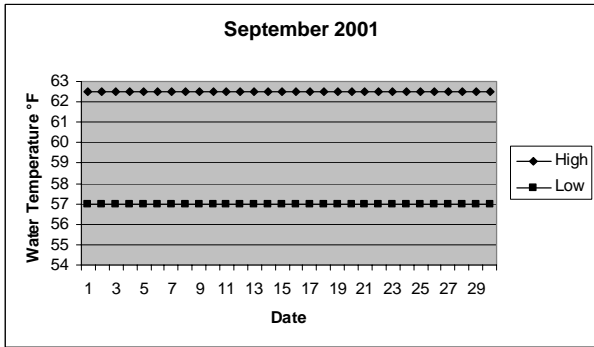
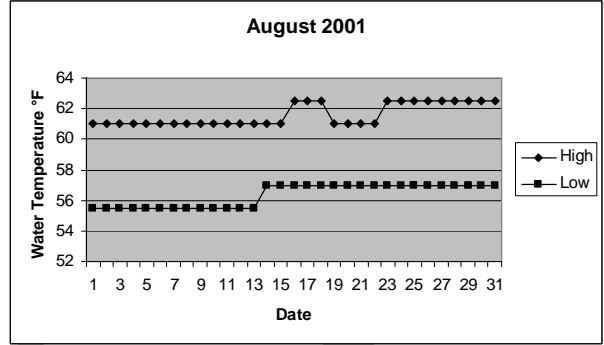
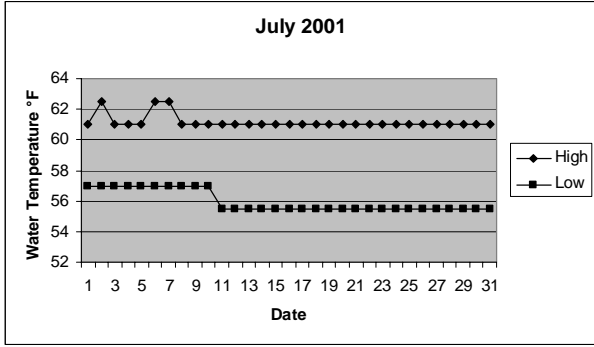
06-45-33	1	98	MRFF	SHILOH TUOLUMNE R.	4-16-99
06-45-34	16	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-35	6	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-36	11	98	MRFF	HATFIELD ST PARK MERCED R.	5-07-99
06-45-39	6	99	MRFF	HATCHERY OUTLET MERCED R.	4-12-99
06-45-40	8	99	MRFF	HATCHERY OUTLET MERCED R.	4-12-99
06-45-41	7	99	MRFF	HATCHERY OUTLET MERCED R.	4-13-99
06-45-42	3	99	MRFF	HATCHERY OUTLET MERCED R.	4-13-99
06-45-43	10	99	MRFF	HATFIELD ST PARK MERCED R.	4-13-99
06-45-44	9	99	MRFF	HATFIELD ST PARK MERCED R.	4-13-99
06-45-45	8	99	MRFF	HATFIELD ST PARK MERCED R.	4-14-99
06-45-49	1	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-50	5	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-51	9	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-52	6	99	MRFF	HATCHERY OUTLET MERCED R.	4-24-00
06-45-53	16	99	MRFF	HATFIELD ST PARK MERCED R.	4-27-00
06-45-54	17	99	MRFF	HATFIELD ST PARK MERCED R.	4-27-00
06-45-55	8	99	MRFF	HATFIELD ST PARK MERCED R.	4-28-00
06-45-59	9	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
06-45-61	1	99	MRFF	OLD LA GRANGE BR TUOLUMNE R.	4-16-00

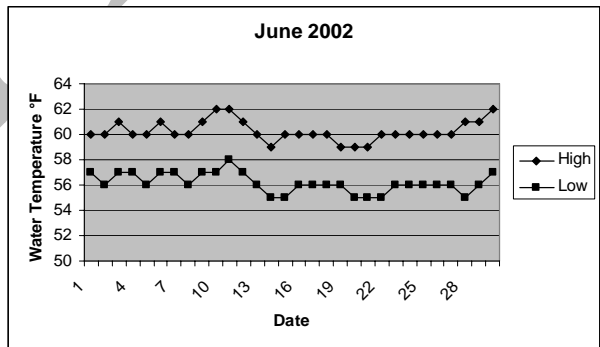
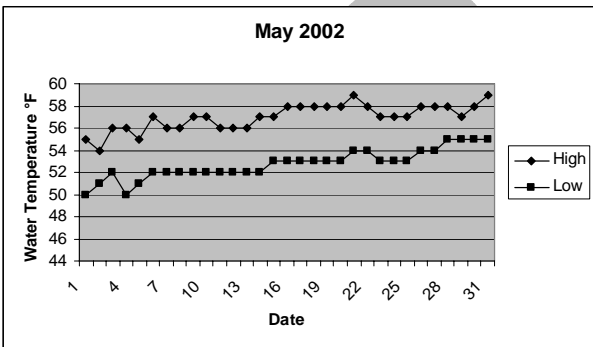
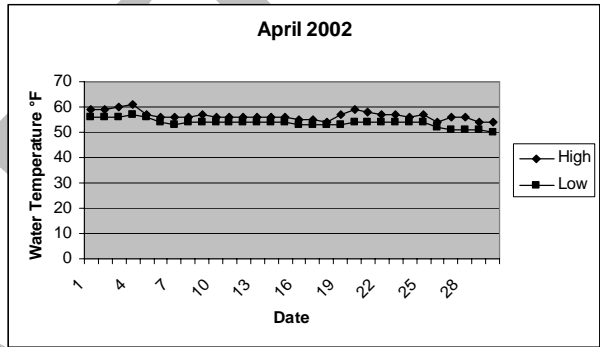
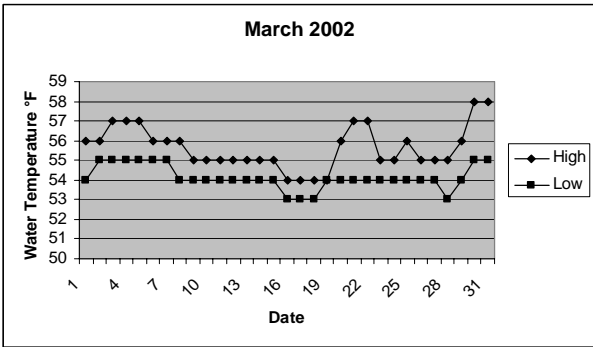
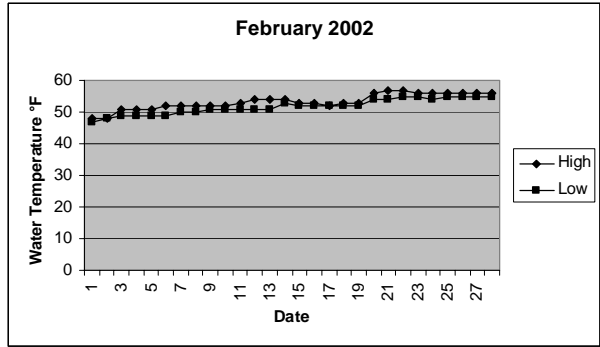
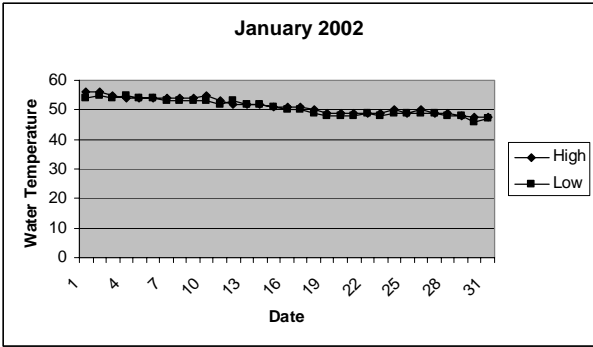
06-45-63	10	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-04-01	10	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-04-02	13	99	MRFF	DURHAM FERRY SAN JOAQUIN R.	4-17-00
06-25-20	1	97	MRFF	HATCHERY OUTLET MERCED R.	4-12-98
06-25-23	1	97	MRFF	HATFIELD ST PARK MERCED R.	4-14-98
06-26-42	15	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-19-99
06-26-43	6	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-19-99
06-26-44	21	98	MRFF	MOSSDALE San Joaquin R.	4-19-99
06-26-45	17	98	MRFF	DOS REIS PARK San Joaquin R.	4-19-99
06-26-46	13	98	MRFF	DOS REIS PARK San Joaquin R.	4-19-99
06-26-47	10	98	MRFF	JERSEY POINT SAN JOAQUIN R.	4-21-99
06-46-02	2	98	MRFF	OLD LA GRANGE BR TUOLUMNE R.	4-18-99
06-46-04	8	98	MRFF	OLD FISHERMAN CLUB SAN JOAQUIN R.	4-18-99
06-46-05	7	98	MRFF	OLD FISHERMAN CLUB SAN JOAQUIN R.	4-19-99
06-46-06	4	98	MRFF	MOSSDALE SAN JOAQUIN R.	4-20-99
05-52-07	3	99	COLEMAN NFH	HATCHERY OUTLET BATTLE CR/ SAC R.	2000
05-52-08	1	99	COLEMAN NFH	HATCHERY OUTLET BATTLE CR/ SAC R.	2000
06-02-15	14	98	MOKELUMNE	CROCKETT	1999
06-02-28	1	95	MOKELUMNE	RODEO MINOR PORT	1996
06-02-35	1	97	MOKELUMNE	JERSEY POINT SAN JOAQUIN R.	1998
06-02-47	5	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-02-48	9	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999

06-02-50	3	99	MOKELUMNE	WICKLAND OIL NET PENS	2000
06-02-53	5	99	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	2000
06-02-54	4	99	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	2000
06-02-55	2	99	MOKELUMNE	NEW HOPE LANDING	2000
06-02-57	2	99	MOKELUMNE	NEW HOPE LANDING	2000
06-02-43	1	98	MOKELUMNE	WOODS BRIDGE	1999
06-02-44	1	99	MOKELUMNE	WOODS BRIDGE	2000
06-25-29	1	94	FEATHER	YUBA CITY	1995
06-26-22	1	97	FEATHER	KLAMATH R.	1998
06-26-63	1	99	MOKELUMNE	MOUTH OF MOKE R. MOKELUMNE R.	2000
06-26-38	2	98	FEATHER	WICKLANDS OIL NET PENS	1999
06-26-48	1	98	FEATHER	HATCHERY OUTLET FEATHER R.	2000
06-29-39	1	98	NIMBUS	TIBURON NET PENS SAN FRANCISCO BAY	2000
06-49-20	5	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-49-21	7	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-49-22	5	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
06-49-23	9	98	MOKELUMNE	SHERMAN ISLAND SAN JOAQUIN R.	1999
NO TAGS FOUND	155				
TOTAL	742				

Appendix Figure 1. Daily water temperature for Merced River Hatchery from July 1, 2001 through June 30, 2002.

DAILY WATER TEMPERATURES BY MONTH





DRAFT

DATA

