

REF 90418

Regional Manager

601 Locust Street
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September 29, 1998

Mr. William Hogarth, Director
Southwest Region
National Marine Fisheries Service
501 West Ocean Boulevard, Room 4200
Long Beach, California 90802-4213

Attention Mr. James J. Morgan

Dear Mr. Hogarth:

Enclosed are three copies each of the annual reports for Study 1 (Ocean Salmon Project) and Study 2 (Klamath River Project) of our Salmon and Steelhead Research, Management and Enhancement Project (AFC-16, Award Number, NA76FA0296). The reports cover the period of July 1, 1997 - June 30, 1998.

If you have any questions regarding these reports, please contact Senior Biologist Supervisor (Marine/Fisheries) Robert McAllister at (530) 225-2866.

Sincerely,

Donald B. Koch
Regional Manager

Enclosures

cc: Mr. Gene Flemming, Chief
Inland Fisheries Division
Department of Fish and Game
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Messrs. Gary Stacey and Robert McAllister
Northern California-North Coast Region
Department of Fish and Game
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bc: Ms. Melodie Palmer-Zwahlen, MRD-Healdsburg
Mr. Frank Henry, MRD-Menlo Park
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Anadromous Fish Conservation Act Annual Progress Report

Salmon and Steelhead Research, Management
and Enhancement Project

(AFC 16-NA76FA0296 July 1, 1997, through June 30, 1998)

Study 1. Ocean Salmon Project

- Job 1. Ocean Commercial Salmon Fishery Monitoring
and Evaluation
- Job 2. Ocean Recreational Salmon Fishery Evaluation

Prepared by: Ocean Salmon Project
Cooperator: California Department of Fish and Game
Address: 1528 Healdsburg Avenue
Healdsburg, California 95448

This study was financed in part with Anadromous Fish Act (P.L. 89-304) funds administered by the National Marine Fisheries Service.

Prepared September 17, 1998

1997 OCEAN SALMON FISHERIES ANNUAL REPORT

INTRODUCTION

The Ocean Salmon Project (OSP) of the California Department of Fish and Game (DFG) is responsible for estimating annual salmon landings and effort in California's commercial and recreational ocean salmon fisheries. In addition, the OSP determines the contribution of coded-wire tagged (CWT) salmon to the commercial and recreational fisheries for use in ocean and inland management efforts. The project also conducts ocean fishery research and provides technical assistance to the Klamath Fishery Management Council (KFMC) as the KFMC continues to work toward the development and refinement of the Klamath Ocean Harvest Model.

A general description of the stratified random sampling model developed by the OSP to estimate ocean salmon landings and fishing effort is presented in a DFG report entitled "Outline of California Department of Fish and Game's Current Program for Estimating Ocean Landings of Coded-Wire Tagged Salmon" (Boydston *et al.*, 1982). A detailed description of these methods can be found in the DFG report entitled "Summary of Methods Used to Estimate the California Ocean Salmon Catch and the Coded-Wire Tag Contribution for 1993."

The California ocean salmon harvest and CWT catch statistics for 1997 were extrapolated from data collected by the OSP's fishery sampling programs combined with information obtained from commercial landings receipts and charter boat logbooks. In California, commercial dealers are required by law to submit landing receipts to the DFG for all salmon purchased; salmon charter boats are required to submit logs monthly that record their fishing activities on a daily basis.

The fishery sampling programs are designed to sample at least 20% of salmon (chinook and coho¹) landed by ocean commercial (troll) and recreational (charter boat and skiff) fisheries in California. Five major port areas are sampled between the Oregon border and Pt. Conception: Crescent City, Eureka, Fort Bragg, San Francisco, and Monterey (Figure 1). All of these port areas consist of several smaller "minorports" where salmon landings occur (Table 1).

In 1997, commercial fishing was allowed everywhere in California except for the area between Horse Mountain and the Humboldt south jetty; thus, sampling of commercial landings occurred in all major port areas during their respective seasons (Table 2).

In 1997, recreational fishing for all salmon except coho was allowed statewide in California (Table 2). Minorports for the recreational skiff fishery were generally launch ramps or hoists within the port area where samplers could interview all sport anglers

¹Commercial and recreational landings of coho salmon were prohibited in California during the 1997 season.

Table 1. Sampling activity at major port areas in California and their associated minorports, 1997.

Major Port	Minorport	Commercial Troll	Recreational Skiff	Charter Boat
Crescent City	Crescent City launch ramp	-	X	-
	Crescent City skiff docks	-	X	X
	Crescent City commercial docks	X	-	-
Eureka	Field's Landing	X	X	-
	King Salmon	X	X	X
	Trinidad launch hoist	X	X	-
	Trinidad floating docks	-	X	X
Fort Bragg	Fort Bragg/Noyo	X	X	X
	Shelter Cove	X	X	X
	Albion	-	X	-
San Francisco	Princeton	X	X	X
	San Francisco	X	-	X
	Berkeley/Emeryville	-	X	X
	Sausalito	X	X	X
	Bodega Bay	X	X	X
Monterey	Santa Cruz	X	X	X
	Moss Landing	X	X	X
	Monterey	X	X	X
	Morro Bay	X	X	X
	Avila/Port San Luis	X	X	X

landing at the site during a sample day. Minorports for the charter boat fishery were all docks within a port area where recreational salmon fishing trips were made by commercial passenger fishing vessels.

PROCEDURES

Sampling

Sampling was stratified into bimonthly time periods for all fisheries. Commercial landings were sampled generally on an opportunistic basis; the field sampler had to find out when and where local commercial landings of salmon were expected and was

Table 2. Commercial and recreational regulations for California ocean salmon fishing in 1997.

Fishery Area	Open Season	Minimum Size Limit*	Salmon Species	Quota (# salmon)	Special Restrictions
Commercial					
Oregon to S. Humboldt jetty	September 1-30	26" TL	All except coho	6,000	Maximum 6 lines/boat; barbless hooks; Landing limit: 30 salmon/day; Klamath Conservation Zone closed.
Horse Mt. to Pt. Arena	September 1-30	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
Pt. Arena to Pt. Reyes	July 16-September 30	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
Pt. Reyes to Pt. San Pedro	July 1-September 30	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
Pt. San Pedro to Mexico border	May 1-31	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
	June 23-July 18	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
	September 1-30	26" TL	All except coho	None	Maximum 6 lines/boat; barbless hooks.
Pt. Lopez to Pt. Mugu	April 15-28	26" TL	All except coho	10,000	Maximum 6 lines/boat; barbless hooks. All salmon must be landed within area.
Recreational					
Oregon border to Horse Mt. (Klamath Management Zone)	May 24-30	20" TL	All except coho	None	Barbless hooks required; 1 salmon/day;
	June 17-July 6	20" TL	All except coho	None	No more than 4 salmon/7 days;
	August 12-September 14	20" TL	All except coho	None	Klamath Conservation Zone closed.
Horse Mt. to Pt. Arena	February 15-July 6	24" TL	All except coho	None	Barbless hooks required; 2 salmon/day.
	August 1-November 16	24" TL	All except coho	None	Barbless hooks required; 2 salmon/day.
Pt. Arena to Pigeon Pt.	March 29-September 1	24" TL**	All except coho	None	Barbless hooks required; 2 salmon/day.
	September 2-November 2	24" TL	All except coho	None	Barbless circle hooks required; 2 salmon/day.
Pigeon Pt. to Mexico border	March 15-October 19	24" TL	All except coho	None	Barbless hooks required***; 2 salmon/day.
	September 2-November 2	24" TL	All except coho	None	Barbless circle hooks required***; 2 salmon/day.

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- Minimum size limit is in total length (TL).
- ** No size limit in effect July 1-September 1 between Pigeon Pt. and Pt. Reyes.
- *** North of Pt. Conception only.

responsible for sampling $\geq 20\%$ of all commercial landings (by weight) in his/her port area. A sample unit was the total catch of salmon by a commercial troller returning from a single or multiday trip. Data collected included total number and pounds of salmon landed, number of days fished, ocean catch area, gear used, number of shakers (sublegal salmon) released and number of sea lion encounters. In addition, the sampler would measure the fork length (millimeter [mm]) and take the head from any marked salmon (adipose fin clipped) so that the CWT could be retrieved and decoded at OSP's Healdsburg laboratory.

In addition to bimonthly sampling periods, recreational skiff sampling was stratified into weekday and weekend/holiday periods. Each month, field samplers were given a precise schedule to follow (i.e., sample a specific minorport on a certain day). The schedule was created so that all minorports within a major port area were randomly sampled for each sampling period. Samplers were instructed to interview all skiff fishermen who landed at their assigned minorport area during a sample day and to keep a tally of nonsalmon boats and any boats missed. In addition, charter boats were sampled on an opportunistic basis such that $\geq 20\%$ of all charter boats landing in a minorport were sampled during each sampling period. Data collected from both skiffs and charter boats included the total number of anglers fishing, total number of salmon caught, number of shakers released and number of salmon taken by sea lions. As in commercial sampling, the sampler would measure the fork length (mm) and retain the head from any marked salmon.

Catch Estimations

The total number of salmon landed by the commercial fishery within a time and port stratum was estimated by dividing the total pounds landed (as reported by dealers on DFG landing receipts) by an average weight ratio. This weight ratio was calculated by dividing the total pounds of salmon sampled by the total number sampled within the same time and port stratum.

The total number of salmon landed by the recreational skiff fishery within each time and port stratum was estimated by dividing the total number of salmon sampled by a sampling ratio. This ratio was derived by dividing the number of minorports sampled to the total number of minorports available for sampling within the same time and port stratum. In addition, the ratio of salmon to nonsalmon boats was used to determine the contribution of unknown boats to the fishery.

The contributions of tagged salmon to both the commercial and recreational fisheries were estimated by multiplying the number of CWTs sampled in each fishery by an expansion factor. This expansion factor was derived by dividing the total number of salmon landed by the total number of salmon sampled within a fishery, corrected for any heads observed but not recovered and any CWTs lost during processing. The estimated contribution of CWTs to each fishery (by binary code, port area and time period) were forwarded to the Pacific States Marine Fisheries Commission (PSMFC), which maintains a database of all Pacific coast tag returns.

RESULTS

Observations

An estimated 487,500 chinook salmon were landed commercially during 1997; the majority of these fish were landed in San Francisco and Monterey port areas (Table 3). Project staff sampled 151,325 chinook salmon statewide, approximately 31% of the estimated total landings for 1997 (Table 3). Since it was illegal to commercially land coho salmon in California during 1997, coho were not observed in the fishery.

Table 3. Ocean chinook salmon catch and sampling statistics for 1997 California commercial troll fishery.

Year(s)	# Salmon	# Days Fished	Pounds Landed	\$ Exvessel Value	Sampling Effort		
					# Sampled	% Sampled	# CWTs
1997							
Crescent City	<50	<50	1,300	--	--	--	0
Eureka	1,400	100	16,300	--	--	--	38
Fort Bragg	3,800	300	53,600	--	--	--	4
San Francisco	254,300	9,300	2,644,200	--	--	--	3,521
Monterey	228,000	9,000	2,484,700	--	--	--	3,830
Total	487,500	18,700	5,200,100	\$ 7,200,000	151,325	31.0%	7,393
1996	380,600	21,100	4,113,000	\$ 5,984,000	91,760	24.1%	3,854
1995	679,300	25,800	6,633,500	\$11,693,000	181,410	26.7%	3,163
1994	295,600	21,200	3,103,000	\$ 6,437,000	58,123	19.7%	1,162
1993	279,600	25,900	2,536,900	\$ 5,707,000	56,289	20.1%	818
1992	163,400	20,300	1,632,100	\$ 4,505,000	32,032	19.6%	303
1988-1992 (5-year average)	545,960	46,980	5,782,600	\$16,204,000	--	--	--

Approximately 229,400 chinook salmon were landed by the recreational fishery during 1997; most of the recreational catch and fishing effort occurred in the San Francisco and Monterey port areas (Table 4). In the skiff fishery, samplers interviewed 23,744 anglers who landed 19,640 salmon (Table 5). In the charter boat fishery, samplers interviewed 25,659 anglers and sampled 30,581 salmon (Table 5). Overall, almost 22% of the total recreational catch in 1997 was sampled (Table 5).

During 1997, OSP samplers observed 10,436 CWT salmon during monitoring. In the commercial fishery, 7,393 CWTs were retrieved (Tables 3, 6) and 3,043 CWTs recovered in the recreational fishery (Tables 5, 6).

Table 4. California ocean salmon recreation landings in 1997 by port area and month.

Month	Monterey			San Francisco			Fort Bragg			Eureka			Crescent City			California Total		
	# salmon	# anglers	CPUE	# salmon	# anglers	CPUE	# salmon	# anglers	CPUE	# salmon	# anglers	CPUE	# salmon	# anglers	CPUE	# salmon	# anglers	CPUE
February	closed	closed	--	closed	closed	--	<50	<50	--	closed	closed	--	closed	closed	--	<50	<50	--
March	16,900	16,400	1.0	3,000	4,700	0.6	100	400	0.3	closed	closed	--	closed	closed	--	20,000	21,500	0.9
April	15,400	17,600	0.9	11,000	10,900	1.0	500	1,100	0.5	closed	closed	--	closed	closed	--	26,900	29,600	0.9
May	4,200	9,100	0.5	19,800	16,600	1.2	1,900	4,000	0.5	1,500	2,500	0.6	300	900	0.3	27,700	33,100	0.8
June	26,400	18,300	1.4	15,100	14,000	1.1	4,300	7,000	0.6	1,700	3,400	0.5	500	1,700	0.3	48,000	44,400	1.1
July	20,000	18,600	1.1	49,200	34,500	1.4	3,700	3,500	1.1	1,200	2,100	0.6	900	1,500	0.6	75,000	60,200	1.2
August	1,500	3,700	0.4	20,800	21,200	1.0	1,300	4,100	0.3	2,100	4,000	0.5	800	2,200	0.4	26,500	35,200	0.8
September	100	200	0.5	2,800	5,500	0.5	100	300	0.3	100	400	0.3	<50	300	--	3,100	6,700	0.5
October	<50	<50	--	2,000	3,200	0.6	<50	<50	--	closed	closed	--	closed	closed	--	2,000	3,200	0.6
November	closed	closed	--	200	400	0.5	<50	<50	--	closed	closed	--	closed	closed	--	200	400	0.5
Total	84,500	83,900	1.0	123,900	111,000	1.1	11,900	20,400	0.6	6,600	12,400	0.5	2,500	6,600	0.4	229,400	234,300	1.0

ESTIMATIONS/COMPARISONS

Commercial Fishery

In 1997, the California commercial fishery landed over 5.2 million pounds of chinook salmon with an exvessel value of \$7.2 million (Table 3). The total number of salmon landed was estimated to be 487,500 and fishing effort (days fished) totaled 18,700 days. Although this represents a 28% increase in the number of salmon landed compared to 1996 landings, fishermen actually spent less days fishing in 1997 than in the previous year.

Recreational Fishery

In 1997, the California recreational fishery landed approximately 229,400 salmon during 234,300 angler days fished (Table 5). Both catch and effort were higher than 1996 totals. Anglers on private skiffs fished approximately 131,900 days and landed 107,200 salmon; anglers on charter boats fished 102,400 days and caught 122,200 salmon.

Table 5. Ocean salmon catch and sampling statistics for 1997 California recreational fishery.

Year(s)	Recreational Catch		Sampling Effort			
	# salmon	# anglers	# sampled	% sampled	# CWTs	# anglers
1997						
Private skiffs	107,200	131,900	19,640		1,317	23,744
Charter boats	122,200	102,400	30,571		1,726	25,659
Total	229,400	234,300	50,211	22%	3,043	49,403
1996	164,100	225,500	33,107	20%	2,176	45,324
1995	397,200	378,500	88,056	22%	33	81,524
1994	183,200	189,900	47,328	26%	9	52,415
1993	110,000	174,900	28,973	26%	786	59,210
1992	73,600	127,900	25,269	34%	261	46,790
1988-1992 (5-year average)	130,440	212,780	--	--	--	--

CWTs

Heads from 10,436 tagged salmon were collected by project staff and processed in the Healdsburg laboratory. This is almost double the number of CWTs collected in 1996 (note: the increase is due to increased tagging rates by California hatcheries). Most CWTs were collected in San Francisco and Monterey port areas (Table 6). The CWTs were retrieved, decoded and verified by project staff in the Healdsburg laboratory. The final 1997 CWT database was sent to the PSMFC in Oregon.

Table 6. CWTs recovered by major port and fishery, 1997.

Fishery	Chinook		Coho		Total	
	CWTs	% Total	CWTs	% Total	CWTs	% Total
Crescent City						
Private skiff	26		4		30	
Charter boat	0		0		0	
Commercial	0		0		0	
Port Total	26	0%	4	29%	30	0%
Eureka						
Private skiff	55		1		56	
Charter boat	7		0		7	
Commercial	38		0		38	
Port Total	100	1%	1	7%	101	1%
Fort Bragg						
Private skiff	121		1		122	
Charter boat	13		0		13	
Commercial troll	4		0		4	
Port Total	138	1%	1	7%	139	1%
San Francisco						
Private skiff	437		6		443	
Charter boat	1,259		0		1,259	
Commercial troll	3,521		0		3,521	
Port Total	5,217	50%	6	43%	5,223	50%
Monterey						
Private skiff	665		1		666	
Charter boat	447		0		447	
Commercial troll	3,829		1		3,830	
Port Total	4,941	47%	2	14%	4,943	47%
All Ports						
Private skiff	1,304		13		1,317	
Charter boat	1,726		0		1,726	
Recreational Total	3,030	29%	13	93%	3,043	29%
Commercial troll	7,392		1		7,393	
Commercial Total	7,392	71%	1	7%	7,393	71%
TOTAL CWTs	10,422		14		10,436	

ANNUAL
PERFORMANCE REPORT

STATE: California

AWARD NUMBER: NA66FAO281

PROJECT TYPE: Anadromous Fish - Research

PROJECT TITLE: Salmon and Steelhead Research, Management and Enhancement Project

PERIOD COVERED: July 1, 1997-June 30, 1998

Study 2. Klamath River Project (Project)

Study Objectives

- 1) To determine the size, composition, distribution and timing of runs of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 2) To determine sport fishery harvest levels of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 3) To determine the relative return rates and contributions to spawning escapements and the fisheries of salmon produced at Iron Gate Hatchery (IGH) and to evaluate experimental management practices aimed at increasing adult returns.

JOB 1. Klamath River Salmon and Steelhead Study Objectives

- 1) To determine the in-river distribution and relative harvest rates of the fall salmon runs in the Klamath River sport fishery from the mouth to the falls at Coon Creek.
- 2) To estimate the sport harvest of fall-run chinook salmon in the Klamath River system upstream of the falls at Coon Creek (excluding the Trinity River basin).
- 3) To determine the length, age and marked fish compositions of fall-run chinook salmon in the run and sport catch.
- 4) To determine the timing and size of the fall-run chinook salmon run in the Klamath River.

(a) Activities:

- i) Procedures: A creel census was conducted to collect information for estimating the sport harvest of anadromous salmonids in the lower Klamath River from its mouth to the falls at Coon Creek (river mile [RM] 34). Shore and boat anglers originating from resorts and landings between the river mouth and Klamath Glen (Blakes Riffle - RM 7) were sampled by Project personnel in a stratified selection program designed to sample as close to 100% of the landings and effort for the particular unit being sampled as possible. The census period ran from

August 6 through September 27 below the Highway 101 bridge (RM 3) and from August 7 through October 6 between the Highway 101 bridge to the falls at Coon Creek (RM 34).

All sea-run fish sampled in the creel census were identified to species, measured to the nearest 1.0 centimeter (cm) fork length (FL) and examined for marks and tags. Heads were collected from all adipose (Ad) fin-clipped, presumably coded-wire tagged (CWT), salmon observed. Anglers interviewed were queried as to the species of fish they had caught, their fishing mode (shore or boat) and whether they were through fishing for the day. Census data were recorded on prepared forms for subsequent data entry into Project computers throughout the season. CWTs were extracted from salmon heads and decoded by Project personnel in the laboratory as they were received. Funding for removal and decoding of CWTs was provided by a contract with the Klamath River Fish and Wildlife Restoration Act (P.L. 99-552). Data obtained from that contract are presented here for completeness sake.

The Shasta River Fish Counting Facility (SRFCF) was operated this year to determine chinook salmon spawner escapement for the Shasta River in spite of being heavily damaged during the January 1, 1997, flood. This facility was installed below the major spawning areas prior to initiation of the fall-run chinook salmon immigration past that site. Immigrating salmonids were enumerated and systematically subsampled for species identification, FL, scales, sex and examined for marks and external tags.

Chinook salmon examined at the SRFCF were marked with an operculum punch prior to release to permit the development of an independent estimate of escapement in the Shasta subbasin. Some of these marked salmon were subsequently recovered during Shasta River spawning ground surveys conducted by Project staff.

This year in Bogus Creek, the fish counting facility was operated as a marking station for approximately 8 hours per day. For the remainder of the day, the trap was left open allowing fish to pass unobstructed. During hours of operation, anadromous fish trapped were identified to species, enumerated, measured FL, sampled for scales, sexed and examined for fin-clips and external tags. Prior to release, chinook salmon were given an operculum punch to identify them as fish examined at the weir. An estimate of chinook salmon spawners occupying Bogus Creek above the weir was developed using the ratio of marked to unmarked fish observed during spawning ground surveys.

Scales taken from fish at each facility were read by non-Project personnel in the laboratory to determine age. Heads from all Ad fin-clipped fish encountered at both facilities were retained for CWT processing by Project personnel in the laboratory.

Spawning stock surveys were conducted in the Salmon and Scott rivers as well as selected minor Klamath River tributaries upstream of the Trinity River where fish trapping or counting facilities did not provide an estimate of the chinook salmon spawning escapement. Like last year, Project personnel worked cooperatively with US Forest Service (USFS) personnel, local coordinated resource management plan (CRMP) members, the Salmon River Restoration Council, Karuk tribal members, AmeriCorps volunteers and others to complete these surveys.

During each survey, carcasses encountered were identified to species and sex, categorized by size class (adult or grilse) and examined for marks and Project-applied tags. All fresh carcasses found were tagged with serially numbered washers attached with hog rings and returned to the stream for possible later recovery. Decayed carcasses were enumerated then cut in half before being returned to the stream. Carcasses examined in all areas were systematically subsampled to determine the sex and FL compositions of spawners in the different streams. Mark-recapture estimators (Peterson or Schaefer) were used, when possible, to expand survey data and make spawner escapement estimates.

In smaller streams where a low number of spawners were encountered (i.e., Horse Creek, Beaver Creek, Indian Creek, etc.), redd surveys instead of carcass surveys were performed. The total redd count was used to estimate the number of chinook salmon spawning in that tributary.

Again this year, landowners with private property along streams surveyed by Project personnel were queried prior to the start of the field season to obtain permission to conduct surveys on stream reaches passing through their land. No surveys were conducted on stream sections situated on private property whose owner had not specifically granted permission for Project personnel to survey.

ii) Results:

Angler Harvest

Mouth Upstream to the Falls at Coon Creek. We interviewed 7,653 anglers, 4,133 in the area from the mouth upstream to the Highway 101 bridge (Area 1) and 3,520 fishing between the Highway 101 bridge and the falls at Coon Creek (Area 2). Combined, anglers interviewed in the two areas caught a total of 481 steelhead (232 half-pounders and 249 adults) and 1,654 chinook salmon (546 grilse and 1,108 adults) (Table 1). No coho salmon were observed this year in the creel due to their listing status under the Federal Endangered Species Act. Twenty-six cutthroat trout were observed in the creel this season.

Anglers interviewed above the Highway 101 bridge caught 90.2% of the steelhead and 45.1% of the chinook salmon. Boat anglers caught 76.7% of the steelhead, 82.9% of the chinook salmon and 50.0% of the cutthroat trout in both areas combined.

Based on expansions of our creel sampling data, anglers completed an estimated 17,730 trips and fished a total of 67,154 hours (3.8 hours/trip average) in areas 1 and 2 during the sample period. They caught an estimated 1,122 steelhead (540 half-pounders and 582 adults) and 3,969 chinook salmon (1,275 grilse and 2,694 adults) (Table 1). We also estimate anglers caught a total of 63 cutthroat trout.

In Area 1, angler harvest of adult chinook salmon peaked the week ending September 2 while the catch of grilse chinook peaked the week ending September 9. Catch of adult chinook salmon in Area 2 also peaked during the week ending September 2 and catch of grilse chinook peaked the week ending September 23. Harvest of steelhead half-pounders peaked the weeks ending August 26 and September 2 for areas 1 and 2, respectively. Harvest of adult steelhead peaked the week ending September 2 in Area 1 and September 16 in Area 2.

For the 1997 season, the allowable sport harvest of adult chinook salmon (chinook salmon ≥ 61 cm TL) in the Klamath basin was set at 3,500, a significant decrease from the previous year's quota of 15,700. This year, 54.3% of the allowable harvest was allocated to the river reach downstream of the falls at Coon Creek. 1997 harvest regulations further specified that, in the event 49.3% (1,725 adults) of the total allowable harvest was landed prior to the Labor Day weekend (which began August 30), restrictions prohibiting the take of additional adult chinook would be implemented. Anglers would then be allowed to harvest adult chinook in Area 1 beginning Saturday of Labor Day weekend until the allowable sport harvest was reached (54.3% or 1,900 fish).

Harvest of adult chinook salmon below the falls at Coon Creek ended Wednesday, September 3. For the second consecutive year, anglers were allowed to harvest adult chinook salmon through the Labor Day weekend without interruption. For the main stem Klamath above the falls at Coon Creek, anglers were permitted to harvest adult chinook for an additional 28 days (until October 1).

Chinook salmon harvested by sport anglers in the lower Klamath River ranged in size from 33 to 105 cm FL. Based on locating the nadir in the length frequency distribution of measured salmon, we determined the grilse-adult separation to be 52 cm, 9 cm less than the 61 cm defined as the cutoff in the regulations. This downward adjustment to the grilse/adult separation resulted in 195 chinook originally classified as grilse to be reclassified as adults and were subsequently counted against the quota.

Table 1. Fall 1997 angler effort and harvest estimates, lower Klamath River (mouth to falls at Coon Creek - River Mile 34), with comparable 1993 through 1996 totals (sample sizes in parentheses).

Area	Angler Trips	Angler Hours	Steelhead ^{a/}		Chinook Salmon ^{b/}		Coho Salmon ^{c/}	
			Half-Pounders	Adults	Grilse	Adults	Grilse	Adults
Mouth-Highway 101	9,951	32,920	14	99	49	2,182	0	0
	(4,133)	(13,336)	(6)	(41)	(20)	(888)	(0)	(0)
Highway 101-Falls at Coon Creek	8,179	34,235	526	483	1,226	512	0	0
	(3,520)	(14,693)	(226)	(208)	(526)	(220)	(0)	(0)
Totals	17,730	67,155	540	582	1,275	2,694	0	0
	(7,653)	(28,029)	(232)	(249)	(546)	(1,108)	(0)	(0)
1996	27,929	91,019	561	511	1,228	7,162	7	153
	(10,545)	(35,547)	(237)	(219)	(518)	(2,879)	(3)	(52)
1995	19,881	63,369	317	302	2,397	1,582	4	45
	(7,523)	(28,043)	(127)	(129)	(1,073)	(1,041)	(2)	(19)
1994	15,100	54,748	1,002	301	1,179	843	2	2
	(5,786)	(21,665)	(432)	(127)	(508)	(375)	(1)	(1)
1993	16,081	51,889	344	324	1,087	1,577	7	2
	(5,823)	(19,417)	(134)	(137)	(464)	(600)	(3)	(1)

a/ Steelhead half-pounders are ≤41 cm FL; adults are >41 cm FL.

b/ Chinook salmon grilse are ≤52 cm FL; adults are >52 cm FL.

c/ No coho salmon were harvested by sport anglers this year due to their listing under the Endangered Species Act.

The size 52 cm FL separation determined from the creel data was also observed at IGH and in the Salmon, Scott and Shasta rivers between grilse and adults. A review of the CWT data collected from the creel revealed that the average FL for known two-year-old (n=11) and three-year-old (n=14) chinook in the creel was 46.2 cm and 60.6 cm, respectively.

Overall, grilse chinook examined in the angler catch averaged 45 cm FL (range 33-52 cm FL) while adults averaged 75 cm FL (range, 53-105 cm FL). Half-pounder steelhead seen averaged 34 cm FL (range, 27-41 cm FL) and adult steelhead averaged 54 cm FL (range, 42-72 cm FL).

Heads were collected from 40 Ad fin-clipped chinook salmon (12 grilse and 28 adult) observed in the creel census. Twenty-five different tag codes were represented in the CWTs obtained from these heads (Table 2). Since 1993, no Ad-clipped coho salmon have been encountered in the creel surveys. Based on CWTs observed, peak recovery of spring-run chinook in the creel census occurred during the week ending September 2. Recovery of Klamath origin chinook peaked during the week ending September 23. Recovery of Trinity River origin fall chinook also peaked during the week ending September 23 (Figure 1).

Falls at Coon Creek to Iron Gate Dam. Since 1990, angler harvest in the Klamath River upstream of RM 34 (Area 3) has been based on using the average of proportions of total annual Klamath River angler harvest estimated to have occurred in Area 3 during each of the years 1984 and 1986 through 1989 (1985 was not included due to emergency harvest restrictions implemented that year). On average during the five years, 38% (range 20% to 69%) of the total angler harvest of chinook salmon in the Klamath River occurred in Area 3 and 62% occurred below the falls at Coon Creek (areas 1 and 2 combined). Based on this proportion, we estimate that, during the 1997 season, anglers harvested 781 grilse and 1,651 adult chinook salmon from the Klamath River between the falls at Coon Creek (RM 34) and IGH (RM 190). Unknown numbers of additional grilse and adult chinook salmon were harvested by sport anglers in the Klamath River between the Interstate 5 Bridge and IGH in a secondary fishery allowed under existing regulations. This secondary fishery was triggered when the 28-day regular season had ended and IGH reached 8,000 adult chinook spawners.

Fish Counting and Spawning Stock Surveys

Salmon River. In 1997, the Salmon River from its mouth to milepost marker 12 on the North Fork and Cecil Creek on the South Fork was divided into 13 reaches for survey. Surveys began October 16 and continued, in most reaches, twice weekly until November 17.

TABLE 2. Release information for Ad fin-clipped (Ad+CWT) salmon recovered in the lower Klamath River angler harvest census, 1997.

CWT Code	Number Recovered	Brood		Location
		Type ^{a/}	Year	
<u>Chinook Salmon</u>				
<u>Klamath River Drainage Origin</u>				
06-01-02-01-09	1	Ff	92	IGH ^{b/}
06-59-02	1	Fy	92	IGH
06-63-19	1	Fy	93	IGH
06-63-36	1	Fy	93	IGH
06-01-02-02-01	1	Ff	94	IGH
06-63-21	2	Fy	94	IGH
06-63-29	1	Fy	94	IGH
06-01-02-02-05	1	Ff	95	IGH
06-01-02-02-07	2	Fy	95	IGH
<u>Trinity River Drainage Origin</u>				
06-57-05	1	Fy	93	TRH ^{c/}
06-57-08	2	Sy	93	TRH
06-57-09	1	Sy	93	TRH
06-01-08-02-12	1	Ff	93	TRW ^{d/}
06-01-08-05-02	1	Ff	93	TRW
06-01-04-01-07	1	Sf	93	TRH
06-50-21	2	Ff	94	TRH
06-50-22	1	Ff	94	TRH
06-52-21	3	Sy	94	TRH
06-52-22	6	Fy	94	TRH
06-52-23	2	Sf	95	TRH
06-52-24	2	Ff	95	TRH
06-01-08-02-01	2	Ff	95	TRW
06-01-08-02-06	1	Ff	95	TRW
06-01-08-02-07	1	Ff	95	TRW
<u>Out of Basin Origin</u>				
06-25-19	1	Ff	93	FRH ^{e/}
100000 ^{f/}	1			
TOTAL	40			

- a/ Ff=fall fingering; Fy=fall yearling; Sf=spring fingering; Sy=spring yearling.
- b/ IGH=Iron Gate Hatchery.
- c/ TRH=Trinity River Hatchery.
- d/ TRW=Trinity River Wild.
- e/ FRH=Feather River Hatchery.
- f/ 100000=No CWT found or tag was lost or unreadable.

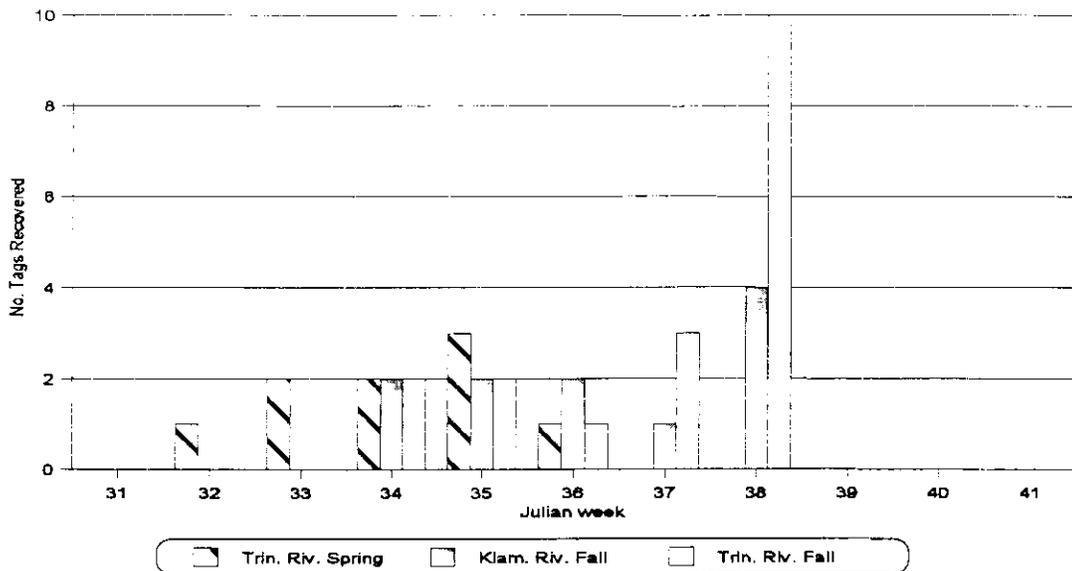


Figure 1. Origin of CWT salmon recovered, by Julian week in the lower Klamath River sport fishery, 1997.

We examined a total of 3,167 chinook salmon carcasses this season. From this total we flagged and returned to the water 1,125 fresh carcasses (carcass with at least one clear eye). We subsequently recovered 640 of these. We also saw 62 chinook that were still alive during the last survey of the season and recovered one Ad fin-clipped salmon. No CWT was found in the snout of this fish.

This season, we saw and mapped a total of 1,641 chinook salmon redds during our spawner surveys. Only one coho salmon and zero steelhead were observed this season in the Salmon River.

We measured 2,624 of the 3,167 chinook salmon carcasses encountered during the surveys. We constructed a length frequency histogram, smoothed the curve using a running average of three, to determine the grilse/adult cutoff length. The nadir in the length frequency histogram occurred at 53 cm FL. We assumed this to be the maximum size for grilse chinook in the Salmon River in 1996. Based on this, 3.6% of the 1997 fall chinook run in the Salmon River consisted of two-year-old fish. This compares to 5.0%, 24.4% and 7.9% for the 1996, 1995 and 1994 seasons, respectively. The average length of the 95 grilse chinook salmon measured was 44 cm FL (range, 21-53 cm FL). The average length of the 2,529 adult chinook measured was 77 cm FL (range, 54-111 cm FL).

The adjusted Peterson mark and recapture model produced an estimate of 5,565 (95% CI 5,151-6,012) spring-run plus fall-run chinook salmon. To this number we added the 62 live fish observed during the last survey of the season as well as 1,236 fall chinook we estimated in Wooley Creek

(based on USFS redd surveys). After conducting surveys in August 1997, USFS personnel estimated that 863 spring-run chinook spawned in the reaches of the Salmon River surveyed for fall chinook. Subtracting the spring-run fish, we estimate 6,000 (217 grilse and 5,783 adults) fall-run chinook salmon spawned in the Salmon River in 1997 (Table 3).

Scott River. We divided the Scott River from its mouth to Highway 3 near Fort Jones into eight reaches. We also divided approximately 12 miles of the Scott River above Highway 3 into sections and surveyed those known to support spawning salmon.

Scott River surveys were performed twice weekly beginning October 17 and ending December 5, 1997. Survey conditions were generally unimpaired by high river flows or bad weather.

We examined 4,831 chinook salmon carcasses in the Scott River this season. From this total we flagged and returned to the stream 1,790 fresh carcasses. We later recovered 1,072 of these. In addition to the carcasses observed this season, we saw 44 live chinook during our last survey and a total of 2,886 chinook salmon redds. One steelhead and no coho salmon carcasses were seen this year in the Scott River. Two Ad fin-clipped salmon were observed this season. No CWT was found in either snout.

We measured 4,333 of the 4,831 chinook salmon carcasses encountered during the surveys. All were presumed to be fall-run fish. We used a length frequency histogram, smoothed using a running average of three, to determine the grilse/adult cutoff length. The nadir in the length frequency histogram occurred at 53 cm FL. We assumed this to be the maximum size for grilse chinook in the Scott River in 1997. Based on this, the average length of the 140 grilse chinook salmon measured was 43 cm FL (range, 31-53 cm FL). Grilse chinook salmon comprised approximately 3.2% of the 1997 Scott River run. The average length of the 4,193 adult chinook measured was 79 cm FL (range, 54-106 cm FL).

We used the adjusted Peterson mark and recapture method to develop an initial estimate of chinook salmon escapement in the surveyed portions of the Scott River in 1997. To this initial estimate of 8,065 (95% CI 7,597-8,562) we added the 44 live fish observed on the last survey of the season for a total of 8,109. An aerial flight was conducted on November 3, 1997, to count redds in portions of the Scott River that were not surveyed because landowners refused to grant us access. During this flight, an additional 222 redds were counted. Based on the additional redds observed, we included an additional 451 chinook salmon (222 redds two adults/redd 0.032 for the grilse component) in our escapement estimate. Our final estimate of fall chinook spawning in the Scott River for 1997 is 8,560 (277 grilse and 8,284 adults) (Table 3).

Table 3. Fall-run chinook salmon spawner escapement estimates for areas of the Klamath River basin upstream of the Trinity River basin, 1997.

	Method	1997			1996	
		Grilse	Adults	Total	Total	
	Salmon River	Carcass mark/recapture	217	5,783	6,000	5,463
	Scott River	Carcass mark/recapture	277	8,284	8,561	12,097
	Shasta River	Weir count	334	1,667	2,001	1,450
	Bogus Creek	Mark/recapture	221	9,809	10,030	10,797
	Main stem Klamath ^{1/}	Redd count	104	3,472	3,576	2,829
	Beaver Creek	Redd count	13	392	405	NS ^{3/}
	Horse Creek	Redd count	3	80	83	NS
	Grider Creek	Redd count	10	312	322	NS
	Thompson Creek	Redd count	2	66	68	119
	Indian Creek	Redd count	22	666	688	756
	Elk Creek	Redd count	16	464	480	402
18	Camp Creek ^{2/}	Redd count	30	880	910	902
	Red Cap Creek	Redd count	23	686	709	1,588
	Bluff Creek	Redd count	10	286	296	363
	Clear Creek	Redd count	9	282	291	425
	Aikens Creek	Redd count	0	0	0	8
	Boise Creek	Redd count	2	50	52	30
	Dillon Creek	Redd count	6	166	172	289
	Independence Creek	Redd count	1	22	23	0
	Slate Creek	Redd count	0	4	4	17
	China Creek	Redd count	0	4	4	12
	Perch Creek	Redd count	0	10	10	10
TOTALS			1,300	33,385	34,685	37,557

^{1/} Estimate based on redd data from US Fish and Wildlife Service (USFWS), CCFWO, Arcata.

^{2/} Estimate of natural spawning. Additional "late fall" chinook taken for Camp Creek rearing program. Data unavailable.

^{3/} NS=not surveyed.

Shasta River. The SRFCF, located about 0.25 RM above the river's mouth, operated seven days/week, 24 hours/day from September 17 through October 28, 1997. Alaskan style weir panels were again placed in front of the SRFCF to help upstream migrating fish quickly locate the trap opening.

For the 1997 season, our fish counters observed a total of 2,017 fish. Based on our subsampling, 2,011 of these were chinook salmon, 6 were coho salmon and none were steelhead (Table 4). We did not observe any Ad fin-clipped salmon in the Shasta River in 1997.

Based on the nadir in their FL distribution of measure chinook salmon, fish less than or equal to 53 cm were considered grilse while those greater than 54 cm were considered adult. Our final estimate for fall chinook in the Shasta River for the 1997 season is 2,011 (334 grilse and 1,667 adults) (Table 3).

Since 1991, we have compared the actual fish counts made at the SRFCF to the "trapping efficiency" determined by the recovery of marked chinook salmon during spawning ground surveys. For the past several years, chinook salmon examined at the SRFCF have been given an operculum punch prior to their release and subsequent recovery. We initially performed this experiment to evaluate the improvements made to the weir during the summer of 1991. We continued this process during the 1997 season to provide a backup escapement estimation procedure in the event weir counts failed (i.e., due to flooding).

Based on the recovery of marked fish during the 1997 Shasta River spawning ground surveys and using the adjusted Peterson estimator, we estimate 2,659 chinook entered the Shasta River in 1997. In the past, we have adjusted the count based on the Peterson estimate and attributed the difference to weir efficiency.

Table 4. Anadromous fish counts for 1997 Shasta River and Bogus Creek fish counting facilities^{a/} (1996 counts in parentheses).

Facility	<u>Chinook salmon</u>		<u>Coho salmon</u>		<u>Steelhead</u>
	Grilse	Adults	Grilse	Adults	(Half-pound + adults)
Shasta River	334 (46)	1,667 (1,405)	0 (0)	6 (0)	0 (23)
Bogus Creek ^{b/}	14 (5)	612 (1,202)	0 (0)	3 (0)	0 (0)

^{a/} Salmon and Scott River weirs have not operated since 1991.

^{b/} Bogus Creek Fish Facility was operated as a marking station with limited hours of operation during the 1995 through 1997 seasons.

However, a report by Law (1994, "Simulation Study of Salmon Carcasses Surveyed by Capture/Recapture Methods," California Department of Fish and Game, 80:(1), pages 14-28) suggests that the Peterson estimator consistently overestimates the true population size in rivers similar to the Shasta. Because of this, we did not adjust the fish counts this year.

Bogus Creek. The Bogus Creek Weir, located approximately 0.5 RM from the creek mouth, operated from September 24 through November 4, 1997. It was staffed approximately six hours/day, seven days/week to mark fish as they passed. We counted 626 chinook salmon (14 grilse and 612 adults), 3 coho salmon and 0 steelhead (Table 6). Of the chinook salmon observed at the weir, a total of 604 were marked prior to release.

Spawning ground surveys occurred above the weir between October 16 and November 20 using similar procedures described for the Salmon and Scott rivers. Based on the recovery of marked fish, we estimate 9,445 (95% CI 8,954-11,233) chinook occupied Bogus Creek above the weir for spawning.

An additional 585 chinook salmon were counted during spawner surveys of the 0.5-mile section of the creek between its mouth and the weir. This brought the total number of chinook salmon spawning in Bogus Creek in 1997 to 10,030 (221 grilse and 9,809 adults) (Table 3).

A length frequency histogram was constructed with measured lengths of chinook salmon observed at the Bogus Creek Weir and during spawning ground surveys. The nadir in the length frequency histogram occurred at 53 cm FL. We assumed this to be the maximum size for grilse chinook in Bogus Creek in 1997. The average length of the grilse chinook salmon measured was 47 cm FL (range, 34-53 cm FL). The average length of the adult chinook measured was 73 cm FL (range, 54-111 cm FL).

Heads from 13 Ad fin-clipped salmon observed this season in Bogus Creek were recovered. Ten of these fish were chinook salmon originating from IGH (brood years 1993 and 1994) and no tags were recovered or tags were unreadable from the remaining three chinook.

Miscellaneous Spawning Tributaries. Klamath River Project and USFS personnel and numerous volunteers conducted coordinated carcass surveys and redd counts on 14 smaller spawning tributaries to the Klamath River above the mouth of the Trinity River. These surveys yielded a combined chinook salmon spawning escapement estimate of 4,578 (150 grilse and 4,428 adults) (Table 3).

No Ad fin-clipped chinook salmon were observed during surveys of these smaller tributaries in 1997.

Main Stem Klamath River. We did not survey the main stem Klamath upstream of its junction with the Trinity River this season. However, USFWS personnel based in Arcata (CCFWO) conducted weekly redd surveys in the main stem from IGH to the confluence of Indian Creek (RM 107) in October and November. Based on their redd count and using the average grilse rate from the Salmon and Scott rivers, we estimate 3,576 chinook salmon (104 grilse and 3,472 adult) spawned in the main stem Klamath River during 1997 (Table 3).

- (b) Target date for achievement: June 30, 1998
- (c) Date for accomplishment: In progress
- (d) Significant deviations: None
- (e) Remarks: Field activities programmed under Job 1 were carried out as scheduled. Data tabulation, analysis and report preparation activities are continuing.

In August 1996, the Project leader was named the California Department of Fish and Game's representative to the Technical Work Group (TWG) of the Klamath Basin Fisheries Task Force (KBFTF). This group, made up of representatives of several State, Federal and Tribal management and conservation agencies, serves as technical advisor to the KBFTF. The TWG meets regularly to discuss issues related to Klamath basin strategic planning, flow studies, restoration activities and other assignments as directed by the KBFTF. For this reporting period, TWG assignments occupied approximately 30% of the Project leader's time.

- (f) Recommendations: Job 1 activities should be continued in fiscal year 1998-99. An alternative method for estimating sport harvest in Area 3 using data collected each year is needed. Implementation of a roving creel census or mandatory punch card system between the falls at Coon Creek and IGH may be appropriate but would require additional funding.

Consideration should be given to rebuilding the SRFCF to improve trapping efficiency and to incorporate a viewing window to permit video recording of fish passage.

Prepared by: _____ Date: September 29, 1998

Associate Fisheries Biologist Mark Pisano
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ANNUAL
PERFORMANCE REPORT

STATE: California

AWARD NUMBER: NA66FAO281

PROJECT TYPE: Anadromous Fish - Research

PROJECT TITLE: Salmon and Steelhead Research, Management and Enhancement Project

PERIOD COVERED: July 1, 1997-June 30, 1998

Study 2. Klamath River Project

Study Objectives

- 1) To determine the size, composition, distribution and timing of runs of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 2) To determine sport fishery harvest levels of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 3) To determine the relative return rates and contributions to spawning escapements and the fisheries of salmon produced at Iron Gate Hatchery (IGH) and to evaluate experimental management practices aimed at increasing adult returns.

JOB 2. IGH Juvenile Salmon Tagging

Objective:

- 1) To determine the relative return rates and contributions to spawning escapements and the fisheries made by salmon produced at IGH and evaluate experimental hatchery management practices aimed at increasing adult returns.

(a) Activities:

- i) Groups of fingerling (up to 200,000 fish/group) fall-run chinook salmon of the 1997 brood year (BY) reared at IGH will be marked (adipose [Ad] fin-clip) and tagged (magnetic binary-coded wire) during State fiscal year 1997-98. Marked groups will be released into the Klamath River directly below the hatchery in June of 1998.

Data on total numbers of fish released, their size and condition at release, in-hatchery growth and survival and time and release location will be collected for each group released. These data will subsequently be used in analyzing survival, contributions to the fisheries and returns as adults of the fish stocked.

ii) Results:

During this reporting period, a total of 201,119 fall-run chinook salmon, BY 1997, was marked (Ad + CWT) at IGH. These fish were released into the Klamath River at the hatchery as fingerlings between June 8 and June 11, 1998, along with 4,904,000 unmarked fingerling chinook salmon. No BY 1997 fall chinook salmon were tagged under this contract for the yearling release program (Table 1).

Table 1. Groups of fall-run chinook salmon marked (Ad fin-clipped), tagged (CWT) and/or released from IGH between July 1, 1997, and June 30, 1998.

Brood Year	Tag Code	Release Size (fish/pound)	Number Marked	Number Effectively Released ^{1/}	Release Dates
1997	06-01-02-02-12	63	59,739	57,375	6/8-11/98
1997	06-01-02-02-13	63	58,660	56,339	6/8-11/98
1997	06-01-02-02-14	63	51,435	49,400	6/8-11/98
1997	06-01-02-02-15	63	<u>31,285</u>	<u>30,047</u>	6/8-11/98
Totals			201,119	193,161	

1/ Number marked less tags shed and mortality prior to release.

- (b) Target date for achievement: June 30, 1998
- (c) Date for accomplishment: In Progress
- (d) Significant deviations: None
- (e) Remarks: Field activities programmed under Job 2 were carried out essentially as scheduled. Data tabulation, analysis and report preparation activities are continuing.
- (f) Recommendations: Job 2 activities should be continued in FY 1998-99. Long-term funding to restore coded-wire tagging of fall chinook for monitoring IGH's yearling production program should be obtained.

Prepared by: _____ Date: _____
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 Klamath River Project

ANNUAL
PERFORMANCE REPORT

STATE: California

AWARD NUMBER: NA66FAO281

PROJECT TYPE: Anadromous Fish - Research

PROJECT TITLE: Salmon and Steelhead Research, Management and Enhancement Project

PERIOD COVERED: July 1, 1997-June 30, 1998

Study 2. Klamath River Project (Project)

Study Objectives

- 1) To determine the size, composition, distribution and timing of runs of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 2) To determine sport fishery harvest levels of fall-run chinook salmon in the Klamath River basin (excluding the Trinity River basin).
- 3) To determine the relative return rates and contributions to spawning escapements and the fisheries of salmon produced at Iron Gate Hatchery (IGH) and to evaluate experimental management practices aimed at increasing adult returns.

JOB 3. Recovery of Coded-Wire Tags (CWT) from Salmon Returning to IGH

Objective:

- 1) To determine rates at which salmon produced at IGH return to the Klamath River system and contribute to the spawning escapements and the fisheries.

(a) Activities:

- i) Procedures: All salmon entering IGH were examined for fin clips. CWT were recovered from salmon lacking adipose fins (Ad-marked) and decoded. Returning fish were systematically sampled for fork length (FL) and scale samples collected. Additional heads from Ad-marked salmon seen during spawner surveys, weir operations and encountered during creel census activities in the lower Klamath River (Job 1) were also collected and tags removed and decoded by Project personnel.

ii) Results:

Heads from 471 chinook (447 adults and 24 grilse) and 43 adult coho salmon were recovered at IGH. We also recovered heads from 40 Ad-marked chinook salmon (27 adult and 13 grilse) seen in the lower Klamath River creel census and from 16 Ad-marked chinook adults collected during the spawner surveys and weir operations (Table 1).

Table 1. Spawning escapement observations and estimates of coded wire tagged (CWT) chinook and coho salmon in the Klamath River basin (excluding the Trinity River basin), 1997.

CWT Code	Release Location	Brood Year	Release Type ^{a/}	Natural Spawners		Iron Gate Hatchery		Total	
				Obs ^{b/}	Exp ^{c/}	Obs	Exp	Obs	Exp
Chinook Salmon									
10 00 00 ^{d/}				6	11	39	39	45	50
0601020108	IGH	92	Ff	0	0	6	6	6	6
0601020109	IGH	92	Ff	0	0	4	4	4	4
065902	IGH	92	Fy	0	0	9	9	9	9
0601020110	IGH	93	Ff	0	0	11	11	11	11
0601110308	IGH	93	Ff	1	2	1	1	2	3
0601110309	IGH	93	Ff	1	2	2	2	3	4
066319	IGH	93	Fy	1	2	41	41	42	43
066333	IGH	93	Ff	0	0	51	51	51	51
601060102	Feather River Hatchery (FRH)	93	Ff	0	0	1	1	1	1
601110307	IGH	93	Ff	0	0	2	2	2	2
601110310	IGH	93	Ff	0	0	2	2	2	2
066336	IGH	93	Fy	2	4	73	73	75	77
0601020113	IGH	94	Ff	1	2	14	14	15	16
0601020114	IGH	94	Ff	0	0	12	12	12	12
0601020115	IGH	94	Ff	1	2	12	12	13	14
0601020201	IGH	94	Ff	2	4	10	10	12	14
066321	IGH	94	Fy	0	0	56	56	56	56
066329	IGH	94	Fy	0	0	49	49	49	49
065701	IGH	94	Fy	1	2	53	53	54	55
601020205	IGH	95	Ff	0	0	1	1	1	1
601020206	IGH	95	Ff	0	0	13	13	13	13
601020207	IGH	95	Fy	0	0	9	9	9	9
Coho Salmon									
071116	Coles River Hatchery (CRH)	95	Y	0	0	4	4	4	4
071221	CRH	95	Y	0	0	13	13	13	13

a/ Fy=fall-run, yearling release; Ff=fall-run, fingerling release.

b/ Observed.

c/ Expanded.

d/ This code represents heads for which no tag data was obtained (head lacked tag, tag lost or unreadable).

Expanded estimates for the in-river fisheries and spawning escapements, based on sampling by Project personnel, were generated for each CWT code (Tables 1 and 2).

Lengths (centimeter [cm] FL) of fish recovered for each CWT code are provided in Table 3.

- (b) Target date for achievement: June 30, 1998
- (c) Date for accomplishment: In progress
- (d) Significant deviations: None
- (e) Remarks: Field activities programmed under Job 3 were carried out essentially as scheduled. Data tabulation, analysis and report preparation activities are continuing.
- (f) Recommendations: Job 3 activities should be continued in FY 1998-99.

Prepared by: _____
Associate Fisheries Biologist Mark Pisano
Klamath River Project

Date: _____

Table 2. Sport catch observations and estimates of coded wire tagged (CWT) chinook and coho salmon harvested in the Klamath River basin (excluding the Trinity River basin), 1997.

CWT code	Release Location	Brood Year	Release Type ^{a/}	Creel Census Area ^{b/}		Upper River Area ^{b/}		Total		NRR ^{e/}
				Obs ^{c/}	Exp ^{d/}	Obs	Exp	Obs	Exp	
Chinook Salmon										
10 00 00 ^{f/}				1	2	0	1	1	3	0
0601020109	IGH	92	Ff	0	0	0	0	0	0	1
065902	IGH	92	Fy	1	2	0	0	1	3	0
065705	Trinity River Hatchery (TRH)	93	Fy	1	2	0	0	1	2	0
066319	IGH	93	Fy	1	2	0	1	1	3	0
66333	IGH	93	Ff	0	0	0	1	0	1	0
601080212	Trinity River Wild (TRW)	93	Ff	1	2	0	0	1	2	0
601080502	TRW	93	Ff	1	2	0	0	1	2	0
066336	IGH	93	Fy	1	2	0	2	1	4	0
601040107	TRH	93	Sf	0	0	0	0	0	0	1
65708	TRH	93	Sy	1	2	0	0	1	2	1
065709	TRH	93	Sy	0	0	0	0	0	0	1
62519	FRH	93	Ff	1	2	0	0	1	2	0
0601020201	IGH	94	Ff	1	2	0	0	1	3	0
065021	TRH	94	Ff	2	5	0	0	2	5	0
065022	TRH	94	Ff	1	2	0	0	1	2	0
065222	TRH	94	Fy	6	14	0	0	6	14	0
066321	IGH	94	Fy	2	5	0	1	2	6	0
066329	IGH	94	Fy	1	2	0	1	1	3	0
065701	IGH	94	Fy	0	0	0	1	0	1	0
065221	TRH	94	Sy	1	2	0	0	1	2	2
601020205	IGH	95	Ff	1	2	0	1	1	3	0
601020206	IGH	95	Ff	0	0	0	14	0	14	0
601020207	IGH	95	Fy	2	5	0	10	2	14	0
065223	TRH	95	Sf	2	5	0	0	2	5	0
065224	TRH	95	Ff	2	5	0	0	2	5	0
0601080201	TRW	95	Ff	2	5	0	0	2	5	0
0601080206	TRW	95	Ff	1	2	0	0	1	2	0
0601080207	TRW	95	Ff	1	2	0	0	1	2	0
Coho Salmon										
No Ad-marked coho salmon were seen in the creel during the 1997 season										

a/ Fy=fall-run, yearling release; Ff=fall-run, fingerling release; Sf=spring-run, fingerling; Sy=spring-run, yearling.

b/ Creel census zone extended from the mouth of the Klamath River to the falls at Coon Creek (river mile [RM] 34); the upper river zone extended from the falls (RM 34) to Iron Gate Dam (RM 190).

c/ Observed.

d/ Expanded.

e/ NRR=nonrandom return by angler. Not used for expansion calculations.

f/ This code represents heads for which no tag data were obtained (head lacked tag; tag lost or unreadable).

Table 3. Fork lengths (FL) of coded wire tagged (CWT chinook and coho salmon collected from the Klamath River basin (excluding the Trinity River basin), 1997.

CWT Code	Release Location	BY	Release Number		FL (cm)	
			Type ^{a/}	Recovered	Mean	Range
Chinook Salmon						
10 00 00 ^{b/}				46	73.0	40.0-96.0
0601020108	IGH	92	Ff	6	85.7	71.0-94.0
0601020109	IGH	92	Ff	5	83.0	79.0-89.0
065902	IGH	92	Fy	10	82.5	74.0-98.0
0601020110	IGH	93	Ff	11	78.4	68.0-89.0
0601110308	IGH	93	Ff	2	81.0	81.0-81.0
0601110309	IGH	93	Ff	3	86.0	75.0-100.0
065705	TRH	93	Fy	1	67.0	
066319	IGH	93	Fy	43	79.7	58.0-95.0
066333	IGH	93	Ff	51	78.3	60.0-94.0
601060102	FRH	93	Ff	1	85.0	
601080212	TRW	93	Ff	1	67.0	
601080502	TRW	93	Ff	1	70.0	
601110307	IGH	93	Ff	2	84.5	83.0-86.0
601110310	IGH	93	Ff	2	54.0	40.0-68.0
066336	IGH	93	Fy	76	78.9	67.0-95.0
601040107	TRH	93	Sf	1	Not recorded	
065708	TRH	93	Sy	2	62.0	62.0-62.0
065709	TRH	93	Sy	1	Not recorded	
062519	FRH	93	Ff	1	89.0	
0601020113	IGH	94	Ff	15	68.4	52.0-80.0
0601020114	IGH	94	Ff	12	67.4	58.0-76.0
0601020115	IGH	94	Ff	13	67.0	61.0-74.0
0601020201	IGH	94	Ff	13	66.6	52.0-76.0
065021	TRH	94	Ff	2	56.0	56.0-56.0
065022	TRH	94	Ff	1	57.0	
065222	TRH	94	Fy	6	56.3	55.0-61.0
066321	IGH	94	Fy	58	63.7	52.0-74.0
066329	IGH	94	Fy	50	64.9	55.0-79.0
065701	IGH	94	Fy	54	64.4	48.0-79.0
065221	TRH	94	Sy	3	67.0	67.0-67.0
601020205	IGH	95	Ff	2	43.5	42.0-45.0
601020206	IGH	95	Ff	13	43.2	39.0-48.0
601020207	IGH	95	Fy	11	47.0	39.0-83.0
065223	TRH	95	Sf	2	52.5	44.0-61.0
065224	TRH	95	Ff	2	46.0	42.0-50.0
0601080201	TRW	95	Ff	2	43.5	40.0-47.0
0601080206	TRW	95	Ff	1	42.0	
0601080207	TRW	95	Ff	1	49.0	
Coho Salmon						
071116	CRH	Y	95	4	67.3	60.0-73.0
071221	CRH	Y	95	13	65.8	53.0-78.0

a/ Fy=fall-run, yearling release; Ff=fall-run, fingerling release; Sy=spring-run, yearling release; Sf=spring-run, fingerling release.

b/ This code represents heads for which no tag data were obtained (head lacked tag; tag lost or unreadable).