ANNUAL
PERFORMANCE REPORT

AGENCY: California Department of Fish and Game

PROJECT (CONTRACT) NO: 1-FG-20-09820 (FG 0414)

PROJECT TITLE: Trinity River Basin Salmon and Steelhead Monitoring Project

PERIOD COVERED: July 1, 1995 through June 30, 1996

INTRODUCTION: This is the eighth in a series of annual reports detailing various monitoring activities (Tasks) conducted by the Department of Fish and Game in the Trinity River basin. This report fulfills requirements set forth under the terms of Cooperative Agreement Number 1-FG-20-09820 between the Department of Fish and Game (Department) and the United States Bureau of Reclamation (USBOR).

Specific Tasks were designed to complement restoration activities authorized by Public Law 98-541 (Trinity River Basin Fish and Wildlife Restoration Act) enacted by Congress in 1984. Task titles and prior study years are listed in the table below. Reports detailing results of these activities are available upon request from: California Department of Fish and Game, Inland Fisheries Division, 1416 9th Street, Sacramento, CA 95814.

Task title	Inclusive years
I. Spawner Surveys in the Upper Trinity River Basin	1988-1995
II. Capture and Coded-Wire Tagging of Naturally Produced Chinook Salmon in The Trinity River Basin	1988-1994
III. Life History, Distribution, Run Size and Angler Harvest of Steelhead in the South Fork Trinity River Basin	1988-1994
IV. Annual Run-Size, Harvest, and Spawner Escapement Estimates for Trinity River Basin Chinook and Coho Salmon and Steelhead	1989-1995
V. Survival and Contribution of the Fisheries and Spawner Escapements Made by Chinook and Coho Salmon Produced at Trinity River Hatchery.	1999-1995
VI. Survival and Contributions to the Fisheries and Spawner Escapements Made by Steelhead Produced at Trinity River Hatchery.	1990-1994
VII. Life History, Distribution, Run Size, and Harvest of Spring Chinook Salmon in the South Fork Trinity River Basin.	1990-1994
VIII. Special Project: Technical Analysis and Report Preparation	1991-1993

TASK REPORTS:

Due to minor changes in Task objectives beginning with this reporting year, Task numbers have been revised to better reflect Department prioritization.

TASK 1: Annual Run-size, Harvest and Spawner Escapement Estimates for Trinity River Basin Chinook and Coho Salmon and Steelhead

Task Objectives:

1. To determine the size, composition, distribution and timing of adult chinook and coho salmon, and steelhead runs in the Trinity River basin.

2. To determine the angler harvest and spawner escapements of Trinity River chinook and coho salmon, and steelhead.

Procedures:

From 8/25/95 through 12/01/95, returning fall chinook, coho and steelhead were captured and tagged at a temporary weir in the Trinity River near the town of Willow Creek, California. A second weir, near the town of Junction City, normally operated to capture spring chinook, was not installed this season due to funding uncertainties.

All salmon and steelhead captured were identified to species, measured to the nearest cm fork length (FL), examined for hook and gill-net scars and hatchery marks. All fish, but those judged to be in poor condition, were tagged with FT-4 spaghetti tags (Project tags). To determine the number of effectively tagged fish, we subtracted from the tagged population all known tagging mortalities, fish from which anglers reported removing the tags and releasing the fish and fish which were harvested downstream of the weir.

Project tags were inscribed with a unique number identifying the individual fish and a return address so anglers could mail the tags to us for processing. Approximately one-third of the salmon and all of the steelhead were tagged with $10 reward tags while the remainder received non reward tags.

We estimated the harvest rate for each species by dividing the number of reward tags returned, by the number of fish effectively reward tagged. Total harvest was then determined by multiplying the harvest rate for each species by their respective run-size estimates.

The length data collected at the weir and Trinity River Hatchery (TRH) were smooth with a moving average of five, 1-cm increments to determine the nadir separating grilse (two-year old) and adult (three-year and older) salmon in the runs. All steelhead > 41 cm

FL were consider adults, and steelhead $\leq$ 41 cm FL were consider half-pounders.

All salmon and steelhead entering TRH were counted, measured and examined for Project tags. Run-size estimates, upstream of the weir, were based on the recovery of Project-tagged and untagged fish entering TRH. In essence, the recovery of tagged and untagged fish at the hatchery gave us the trapping efficiency rate at the weir, which was then applied to the number of fish tagged at the weir. For example, if 10% of the fall chinook entering TRH were Project tagged, this would imply that 10% of the fall chinook run migrating upstream of the weir was trapped and tagged at the weir. Run-sizes, upstream of the weir, were estimated with the formula: $N=((M+1)(C+1)/(R+1)$ where ***N*** is the estimated run size, ***M*** is the number of effectively tagged fish, ***C*** is the number of fish examined for tags and ***R*** is the number of Project-marked fish recovered in the hatchery sample. This year all run-size, angler-harvest and spawner-escapement estimates are for Trinity River basin fish migrating upstream of the Willow Creek Weir.

The accuracy of the run-size estimate is dependent not so much on the total number of fish tagged but on the total percentage of the population which is tagged. Clearly, the greater the percentage of the population tagged, the more accurate the estimate. We determine the accuracy of the estimate by applying statistical procedures which bound the estimate within confidence limits. We operated the weir in an attempt to capture enough fish to obtain 95% confidence limits within $\pm$ 10% of the run-size estimates. In other words, we want be 95% sure that our estimate is within 10% of the actual run size. To achieve that level of accuracy, we attempt to capture and tag between 5% and 10% of the population.

The Trinity River supports both spring- and fall-chinook runs. Prior to the construction of Trinity and Lewiston dams these runs were separated both temporally in their run timing and spatially in their spawning location. However, now the runs overlap both in run timing and spawning location. The seasonal trend in run timing is that during the transition between runs, spring chinook numbers decrease while fall chinook increase.

In order to make independent estimates for the two runs, a means to differentiate the two runs at the weir and hatchery was needed. Coded-wire tag (CWT) analysis was used for this determination. Each year a portion of spring and fall chinook produced at TRH are given adipose-fin clips and CWTs. These CWTs carry a binary code which identifies the origin of the fish carrying it. When the catch of fall CWTed chinook exceeds spring CWTed chinook at the weir that date is chosen as the start of the fall run. All chinook trapped after that date were considered fall chinook while those trapped prior were considered spring chinook.

Results:

Willow Creek Weir (WCW) was installed and began fishing 08/20/95 and continued through 12/02/95. During this time we fished 71 nights and caught 6,418 chinook, 356 coho and 542 steelhead. We effectively tagged 4,788 fall chinook, 320 coho and 497 steelhead.

CWT analysis indicated spring chinook were trapped through 09/09/95 after which fall chinook were trapped. Length frequency analysis indicated that spring grilse were $\leq$ 51 cm FL, fall grilse were $\leq$ 53 cm FL and coho grilse were $\leq$ 52 cm FL.

Based on the above analysis, our catch at WCW this season was composed of 217 grilse and 921 adult spring chinook, 494 grilse and 4,786 adult fall chinook, 14 grilse and 342 adult coho and 20 half-pounder and 522 adult steelhead.

Totals of 15,254 fall chinook, 4,767 coho and 705 adult steelhead entered Trinity River Hatchery this season. Project tags were recovered from 690 (4.5% of the total) fall chinook, 94 (2.0%) coho and 81 (11.5%) steelhead.

We were unable to estimate spring chinook run size this year. Previous spring chinook run-size estimates have ranged from 2,381 in 1991 to 62,692 in 1988 (Appendix 1).

This year's fall chinook run-size was estimated to be 105,725 fish composed of 9,892 grilse and 95,833 adults. Of these, anglers harvested an estimated 554 grilse and 2,779 adults leaving 9,338 grilse and 93,054 adults available to spawn. This spawner escapement was composed of natural spawners (9,262 grilse and 77,876 adults) and TRH spawners (76 grilse and 15,178 adults). Since 1977, fall chinook run-size estimates have ranged from 9,207 (in 1991) to 147,888 (in 1986) (Appendix 2).

We estimated the coho run size at 16,111 fish composed of 634 grilse and 15,477 adults. Anglers harvested 294 (all adults) leaving 15,817 available to spawn. The spawner escapement was split between natural spawners (370 grilse and 10,680 adults) and TRH spawners (264 grilse and 4,503 adults). Coho run size upstream of WCW has ranged from 852 in 1994 to 59,079 in 1987 (Appendix 3).

All steelhead released from TRH since the 1989 brood year (BY) have been fin-clipped. Recovery of these fin-clipped fish as adults at the weirs and TRH allow us to make independent run-size, spawner-escapement and angler-harvest estimates for hatchery- and naturally produced steelhead in the basin. The steelhead marking program at TRH was discontinued with the 1994 BY. Next year will be the last we will be able distinguish between hatchery- and naturally produced adult steelhead in the Trinity River basin.

Steelhead run size was estimated at 4,288 adults composed of 2,693 wild and 1,595 hatchery-produced fish. Anglers harvested 145 and 147 wild and hatchery-produced steelhead, respectively. Spawner escapement was estimated at 2,524 wild and 767

hatchery-produced fish spawning naturally and 24 wild and 681 hatchery-produced fish spawning in the hatchery. Steelhead run size upstream of WCW has ranged from 3,046 in 1992 to 37,276 in 1989 (Appendix 4).

Prepared by: _____ Date: October 10, 2003

Mark Zuspan

TASK 2: Survival and Contributions to the Fisheries and Spawner Escapement Made by Chinook and Coho Salmon Produced at Trinity River Hatchery

Task Objectives:

To determine relative return rates and the contribution to spawning escapement and the fisheries made by chinook and coho salmon produced at Trinity River Hatchery, and to evaluate experimental hatchery management practices aimed at increasing adult returns.

Background:

To achieve Task 2 objective, representative samples from Trinity River Hatchery's (TRH) annual salmon production must be adipose-fin clipped (ad-clipped) and coded-wire tagged (CWT) for subsequent identification as adults. Prior to 1995, the Department was responsible for the coded-wire tagging program at TRH and the results were published as noted in the Introduction. Beginning in 1995, the Department turned over the coded-wire tagging program at TRH to the Hoopa Valley Fisheries Department. Due to the change in responsibilities, the Department will no longer report on the juvenile tagging effort at TRH. Our efforts are directed at the recovery of these coded-wire tagged fish as adults and analyzing the information derived from recovery

Procedures:

We examined all adult salmon entering TRH for fin-clips and Project tags (also part of Tasks 1 and 3). The heads from ad-clipped salmon were retained for later coded-wire tag removal and decoding.

The information needed to estimate the numbers of salmon of a specific CWT group that returned to the Trinity River basin, and contributed to the fisheries and spawner escapement are; 1) run size, 2) the proportion of the run comprised by the various CWT groups, and 3) the harvest rate. Methods to determine the run-size and angler-harvest estimates were presented in Task 1.

To estimate the numbers of the salmon above a specific weir site with a CWT, we used the equation:

$$N_{CWT} = \frac{NW_{ADclip}}{NW} \times \frac{NH_{ADCWT}}{NH_{ADclip}} \times N_{\text{run-size estimate}}$$

where, N_{CWT} = estimated number of the specific species of salmon above the weir with a CWT; NW_{ADclip} = number of salmon observed at the weir with an Ad clip; NW = total number of salmon observed at the respective weir; NH_{ADCWT} = number of salmon observed at TRH with an ad clip and a CWT; NH_{ADclip} = total number of Ad-clipped salmon

observed at TRH; and $N_{\text{run-size estimate}}$ = run-size estimate.

Using the various CWT groups recovered at TRH, we estimated the fraction of the population upstream of the weir with a specific CWT with the equation:

$$F_{\text{CWT group}} = \frac{NH_{\text{CWT group}}}{NH_{\text{ADCWT}}}$$

where, $F_{\text{CWT group}}$ = fraction of the salmon population with a specific CWT code; and $NH_{\text{CWT group}}$ = number of salmon observed at TRH with a specific CWT code.

We estimated the total number of chinook salmon upstream of the weir with a specific CWT code with the equation:

$$N_{\text{CWT group}} = N_{\text{CWT}} \times F_{\text{CWT group}}$$

where, $N_{\text{CWT group}}$ = estimated total number of salmon of a specific CWT group.

The estimated number of fish from each CWT group caught in the Trinity River sport fishery upstream of the weir was then estimated by the equation:

$$SF_{\text{CWT group}} = N_{\text{CWT group}} \times N_{\text{harvest rate estimate}}$$

where, $SF_{\text{CWT group}}$ = number of salmon of a specific CWT group caught in the Trinity River sport fishery; and $N_{\text{harvest rate estimate}}$ = harvest rate estimate.

We estimated the total number of fish of a specific CWT code group available to the spawner escapement by the equation:

$$N_{\text{CWT escapement}} = N_{\text{CWT group}} - SF_{\text{CWT group}}$$

where, $N_{\text{CWT escapement}}$ = the total number of salmon of a specific CWT group available to the spawner escapement.

The estimated number of salmon of specific CWT code group available to natural spawner escapement was:

$$N_{\text{CWT natural escapement}} = N_{\text{CWT escapement}} - NH_{\text{CWT group}}$$

where, $N_{\text{CWT natural escapement}}$ = the estimated number of a specific CWT group contributing to natural spawning escapement.

All estimates for spring and fall chinook are for the Trinity River upstream of the

Junction City Weir (JCW) (river km [RKM] 137.1) and the Willow Creek Weir (WCW) (RKM 48.4), respectively.

Results:

We recovered 4,533 ad-clipped salmon at TRH this season. These included 2,513 spring chinook, 1,499 fall chinook and 514 coho. The returning spring chinook CWTed fish were composed of ten release groups from the 1990 through 1993 Brood years (BY)s (Appendix 1). The fall chinook CWTs were also from ten groups representing the 1990 through 1993 BYs (Appendix 1). Only one coho CWT group was recovered at TRH this season (Appendix 1).

Return rates for hatchery spring chinook were not determined this year because we unable to produce a spring chinook run-size estimate (see Task 1 above). Unfortunately, hatchery recovery alone would not be a good indication of the performance of individual CWT groups. Due to exceptionally high run size, the hatchery ladder was operated on a part-time basis. Many fish, including ad-clipped fish, were denied access to the hatchery during the times the ladder was closed. Therefore, the count of ad-clipped fish at TRH is less, by an unknown number, than it would have been under normal hatchery operation.

Of the ten fall chinook CWT groups returning to TRH this season, the 1992 BY released as yearlings were by far the most prevalent. This season's return rates for fall CWTed chinook ranged from .006% (1990 BY yearlings) to 3.263% (1992 BY yearlings) (Appendix 2). Historic return rates of three-year old yearling-released fall chinook have ranged from 0.06% (1990 BY) to 5.73% (1983 BY).

The 1992 BY fall chinook fingerling release group returning as three-year old fish also performed well, with a return rate of 0.92% (Appendix 2). Historic return rates of fingerling-release three-year old returnees have ranged from 0.95% (1985 BY) to 0.01% (1989 BY).

We estimated that 1,511 coho salmon from the 1992 BY returned to the Trinity River basin upstream of WCW this season. Of these, anglers harvested 29 leaving 463 to spawn in the hatchery and 1,020 to spawn naturally. The return rate of this release group was 2.761%.

All coho and fall chinook release groups from the 1992 BY had exceptionally high return rates this year. This is attributable to good survival of the 1992 BY both in the riverine and marine environment.

Prepared by: _____ Date: October 10, 2003
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TASK 3: Naturally and Artificially Produced Coho Evaluations in the Trinity River Basin

Task Objectives:

To determine, through mass marking of TRH-produced coho, the relative return rates and contributions to spawning escapement and the fisheries made by naturally and hatchery-produced coho salmon in the Trinity River basin.

Procedures:

Procedures for this task involves two phases: marking all TRH-produced coho; and recovering adult coho returning to the basin. The procedures for the marking phase will be covered in this section while the adult recovery phase will be covered under Tasks 1 and 2.

Marking coho involved anaesthetizing them with MS-222, removing their right maxillary, and releasing them into a hatchery pond. To keep count of fish marked, each marking station was equipped with a manual counter to tally each fish as it was marked.

To determine overall marking accuracy, we examined a sample of the marked coho just prior to their release into the river. These fish were anaesthetized with carbon dioxide, measured to the nearest mm fork length (FL), and checked for quality of the maxillary clip. If more than 3/4 of the bone was excised it was considered a good clip; less than that was considered a poor clip. We estimated the total number of coho effectively marked by multiplying the percent of fish with good clips by the total marked.

Results:

We began marking the 1994 BY TRH coho on 02/28/96 and finished on 03/11/96. All 72,311 fish from this BY received a right-maxillary clip. On 3/28/96 we measured and checked 1,645 marked coho for clip effectiveness. All fish were properly marked and the group averaged 160.0 mm FL. The entire BY was released from the hatchery release facility on 4/2/96.

Coho from the 1994 BY should begin to show up as two-year old fish during the fall of 1996.

Prepared by: _____ Date: October 10, 2003

Mark Zuspan

TASK 4: Salmon Spawner Surveys in the Upper Trinity River Basin

Task Objectives:

To determine, through a system of spawning ground surveys, the distribution, size, sex composition, incidence of marked/tagged individuals, and pre-spawning mortality of naturally spawning chinook and coho salmon in the main stem Trinity River.

Procedures:

Personnel from the Resource Conservation District in Weaverville conducted the spawner survey this year. They followed methods used by the Department of Fish and Game in previous year's surveys. Data collected in this year's survey were compiled, edited and analyzed by the Department.

Our study area was the main stem Trinity River from the upstream limit of anadromous fish migration at Lewiston Dam (river km 180.1) to the confluence of North Fork Trinity River (river km 116.7). This area was surveyed once a week by personnel in rafts throughout the salmon spawning season.

The survey area was divided into seven zones based on access and historic spawner use (Table 1). These zones were the same as used by the Department during spawner surveys since 1988.

Table 1. Description and lengths of river zones used in the 1995 main stem Trinity River spawner survey.

River zone	Length (km)	Zone description
1	3.2	Lewiston Dam - Old Lewiston Bridge
2	7.9	Old Lewiston Bridge - Browns Mtn. Bridge
3	10.2	Brown Mtn. Bridge - Steel Bridge
4	10.4	Steel Bridge - Douglas City Camp
5	11.3	Douglas City Camp - Junction City Weir
6	13.2	Junction City Weir - McCartney Pond
7	7.2	McCartney Pond - Mouth of the North Fork Trinity River

During the survey all dead fish (carcasses) encountered were examined to determine

species, sex, spawning condition of the females, presence of fin clips, presence of spaghetti tags, and condition. The first 30 chinook found in each survey zone were measured to the nearest cm fork length (FL).

We flagged all chinook carcasses which we felt had died no more than one week prior to the survey as evidenced by at least one clear eye and a relatively firm body. Flags consisted of plastic surveyor's tape wrapped tightly around a hog ring and affixed to the fish's mandible. Recovery of flagged fish in subsequent weeks provided an estimate of the survey's efficiency which was used to estimate the total number of fish dying in each survey zone.

We chose a date to separate spring from fall chinook based on the presence of spring and fall coded-wire tagged (CWT) chinook. The date that the number of fall CWTed chinook exceeded spring CWTed chinook in the survey was the separation date. Chinook recovered prior to that date were considered spring chinook and those recovered that date and after were considered fall chinook.

Tributaries to the main stem Trinity River, including Rush, Grass Valley, Indian, Reading, Browns, Weaver and Canyon creeks and the North Fork Trinity River were surveyed on foot once a week throughout the chinook salmon spawning season. Sections surveyed for each tributary ranged in length from 0.5 to 2.5 km, and were chosen based on accessibility and their historic use by spawning chinook.

Results:

During the main stem survey over 25,000 adult chinook were observed. Spawner density, in spawners per km of river, ranged from 6,472 in zone 1 to 605 in zone 4 with an overall average of 1,121 fish per km for the entire survey area (Table 2). We estimated a total of 71,095 adult chinook died in the survey zone this season (Table 2).

Table 2. Adult chinook salmon spawner distribution and estimated density by river zone during the 1996 Trinity River spawner survey.

Zone	Number carcasses flagged	Flags recovered	% recovery	Total observed	Expanded total	% distribution	Spawner density (fish/km)
1	1,656	935	56.5%	11,694	20,712	29.1%	6,472
2	1,230	717	58.3%	8,624	14,794	20.8%	1,873
3	420	137	32.6%	3,019	9,255	13.0%	907
4	177	30	16.9%	1,067	6,295	8.9%	605
5-7	116	4	3.4%	691	20,039	28.2%	632

Zone	Number carcasses flagged	Flags recovered	% recovery	Total observed	Expanded total	% distribution	Spawner density (fish/km)
Total	3,599	1,823	50.7%	25,095	71,095	100%	1,121

We recovered a total of 1,030 adipose-fin clipped chinook during the main stem survey this season. Coded-wire tags were extracted from 864 of these and represented 32 different code groups from four brood years (BY) (Table 3). Based on timing of CWTed fish recovered in the survey, we assume that only spring chinook were recovered through 10/29 after which only fall chinook were recovered.

Table 3. Release and recovery data for coded-wire tagged chinook salmon recovered in the 1995 Trinity River spawner survey.

CWT a/	Type b/	Brood year	Location c/	Number effectively tagged d/	Number recovered
601080112	Wild	1990	Steelbridge	19,090	1
601080113	Wild	1990	Sky Ranch	26,741	1
601080114	Wild	1990	Sky Ranch	27,034	1
65636	S-y	1990	TRH	48,553	1
601080304	Wild	1991	Sky Ranch	9,408	1
601080308	Wild	1991	Hardhat	4,260	1
0601040104	F-f	1991	TRH	206,416	7
0601040105	S-f	1991	TRH	198,277	3
065658	S-y	1991	TRH	110,797	3
065731	F-y	1991	TRH	58,580	6
065732	F-y	1991	TRH	56,720	3
0601040106	S-f	1992	TRH	215,038	449
0601080402	Wild	1992	Hardhat	9,816	12
0601080403	Wild	1992	Sky Ranch	7,781	4
0601080404	Wild	1992	Sky Ranch	7,495	4
0601080405	Wild	1992	Sky Ranch	6,568	3
0601080407	Wild	1992	Sky Ranch	7,993	2
065733	F-f	1992	TRH	192,032	143
065734	S-y	1992	TRH	53,575	61
065735	S-y	1992	TRH	56,281	52
065748	F-y	1992	TRH	54,586	49
065749	F-y	1992	TRH	54,308	44
0601040107	S-f	1993	TRH	222,056	3
0601080212	Wild	1993	Sheridan	9,177	1
601080214	Wild	1993	Sheridan	7,125	1
0601080313	Wild	1993	Sheridan	11,699	1
0601080502	Wild	1993	Sheridan	11,837	2
601080503	Wild	1993	Sheridan	10,115	1

CWT a/	Type b/	Brood year	Location c/	Number effectively tagged d/	Number recovered
065704	F-f	1993	TRH	201,032	1
065705	F-y	1993	TRH	55,039	1
065706	F-y	1993	TRH	55,297	1
065708	S-y	1993	TRH	53,738	1
100000 e/					166
Totals:					1,030

a/ Coded-wire tag number assigned to that group of fish.
b/ S = spring, F = fall, y = yearling, f= fingerling, Wild = Naturally produced
c/ TRH = Trinity River Hatchery; release locations for wild fish (Chapter 2 in past Annual Reports).
d/ Number effectively tagged = (Total number tagged) - (tagging mortalities + estimated shed tags + estimated poor fin-clipped fish).
e/ Adipose fin-clipped recovered fish. CWTs were either unreadable, shed, or lost while decoding.

Spring chinook females comprised 62.1% of the adults while fall chinook females comprised 59.0% of the total. Females accounted for 59.6% of the of the total (spring plus fall) adult recovery in the survey.

We observed a female pre-spawning mortality rate of 16.0% for spring chinook and 27.3% for fall chinook. The overall (spring and fall chinook) pre-spawning mortality rate for female adults was 24.8%. For comparison, female pre-spawning mortality rates in the Trinity River have ranged from 1.1% (1991) to 44.9% (1988) during prior surveys conducted sporadically since 1955. As noted by the Department in the past, pre-spawning mortality in the Trinity River is closely tied to escapement: as escapement increases so does pre-spawning mortality.

The survey crews observed 577 adult coho salmon this season. Based on the efficiency rates developed from chinook flag recovery, we estimated 1,361 adult coho died in the main stem survey area this season (Table 4). Spawner density was highest in zone 1 (177 fish per km) and lowest in zone 4 (3 fish per km) with a overall average of 22 fish per km (Table 4).

Table 4. Adult coho salmon spawner distribution and estimated density by river zone during the 1996 Trinity River spawner survey

Zone	Total observed	Observation efficiency (%)	Expanded total	% distribution	Spawner density (fish/km)
1	320	56.5	566	41.6	177
2	183	58.3	314	23.1	40
3	59	32.6	181	13.3	18
4	6	16.9	36	2.6	3
5-7	9	3.4	265	19.4	8
Total	577		1,361	100.0	22

We recovered 64 chinook and 10 coho carcasses and observed a total of 585 redds during the tributary surveys. Based on the proportion of chinook to coho carcasses, the redds were composed of 479 chinook redds and 106 coho redds. The number of redds observed ranged from 21 in Weaver Creek to 123 in the North Fork of the Trinity River (Table 5).

Table 5. Observed salmon redd numbers and distribution for the 1995-1996 Trinity River tributary spawner survey.

	Number observed			Proportional redd distribution a/	
Tributary	Chinook	Coho	Redds	Chinook	Coho
Rush Creek	16	3	88	74	14
Grass Valley Creek	17	4	106	86	20
Indian Creek	5	1	60	50	10
Reading Creek	0	1	33	0	33
Browns Creek	1	1	58	29	29
Weaver Creek	2	0	21	21	0
Canyon Creek	6	0	67	67	0
N. F. Trinity River (NFT)	17	0	123	123	0
E. Fork of the NFT	0	0	29	29	0
Totals:	64	10	585	479	106

a/ The number of redds, by species, was derived by proportioning the total number of redds by the ratio of chinook to coho carcasses observed in the survey.

Prepared by: _____ Date: October 10, 2003

Mark Zuspan

TASK 5: Capture and Coded-wire Tagging of Naturally Produced Chinook Salmon in the Trinity River Basin

Task Objectives:

To capture, mark (adipose fin clip), tag (binary-coded wire) and release representative groups (up to 200,000 fish/group) of naturally produced chinook salmon fry/fingerlings in the main stem Trinity River for use in subsequent determination of their survival and contributions as adults to the ocean and river fisheries and spawning escapements.

Procedures:

Task 5 is composed of three distinct phases: trapping; tagging; and recovery. The trapping and tagging phases take place stream side in the spring following juvenile salmon emergence. The recovery phase take place from two-to-five years after emergence and involves the efforts of several agencies including the Department of Fish and Game (Department), Hoopa Valley Tribal Fisheries Department (HVTFD), Yurok Tribal Fisheries Department (YTFD), and the Pacific Fisheries Management Council. This report will deal with the tagging and trapping phases of the Task. The recovery phase of the Task will be covered in a future report.

Trapping was conducted in the main stem Trinity River using from one to seven fyke nets measuring 3.1 m wide by 1.2 m high at the mouth, by 7.6 m long, tapering to a 0.33-m by 0.33-m exit leading into dual live boxes. Fyke nets were attached, at their mouth, to a 2.5-cm diameter galvanized pipe frame of the same dimensions as the net mouth, which was connected by ropes to metal posts driven into the streambed. The nets were normally set at mid-afternoon and recovered at mid-morning the next day, when all captured fish were placed in holding cages placed in the river.

Tagging was conducted inside a 5.5-m long converted office trailer placed adjacent to the trapping site. A 3.5-KW generator was used to supply the electrical needs of the operation (tagging machines, pumps and lights).

Prior to tagging juvenile chinook were anesthetized with tricaine methanesulfonate, their adipose fin removed (ad-clip), and a one-half length coded-wire tag (CWT) implanted in each fish's rostrum. Normally, between two-and three tagging machines were used, depending on availability of fish.

A sample of 100 fish from each CWT group for each day's tagging was held for a quality control check (QC), and the remainder were released back into the river downstream of the tagging site. Fish in the QC sample were held in live boxes in the river and, after a minimum of 24 hours, checked for mortality, tag retention, and ad-clip quality. Tag retention was determined by passing fish though an electronic tag detector, and ad-clips

were checked by direct examination. Each tagging day, we determined a mortality, tag shed and poor ad-clip rate based on our QC sample. The number of effectively tagged fish from each day's tagging effort was determined by subtracting, from the daily total, the estimated mortality, tag shedding and poor ad-clips as determined from our QC sample.

At least once a week we measured, to the nearest mm fork length (FL), a sample of 100 chinook. We kept track of the number of fish trapped each day by placing each trapping day's fish in a separate holding cage. These fish were then counted automatically during the tagging process.

Results:

Our trapping efforts began on March 20 and concluded on May 10, 1996. Total effort during this period was 171 trap nights (one net fished for one night) and total catch was 142,817 chinook, 178 coho and 1,019 steelhead.

While we caught more chinook this season than any past season, catch could have been much higher. Trapping results indicate fish were migrating both before we began and after we completed our efforts. We were unable to trap earlier due to funding uncertainties and scheduled high flows from Lewiston Dam beginning May 12 prevented further trapping.

We began coded-wire tagging operations on April 9 and finished on May 11. Project personnel coded-wire tagged 132,637 chinook this season. After subtracting for tagging mortality, tag shedding and poor fin clips, we effectively tagged a total of 123,610 naturally produced chinook. Prior year's effective tagging totals are; 15,704 (1988-89), 112,133 (1989-90), 72,865 (1990-91), 56,610 (1991-92), 44,565 (1992-93) and 92,486 (1993-94).

We coded-wire tagged five groups of naturally produced chinook this season. The number of fish effectively tagged in each group ranged from 29,007 to 16,353 (Table 1).

Chinook catch per unit effort (CPUE), as measured by the weekly average number of fish caught per trap night, ranged from 304 (April 30 - May 6) to 1,324 (April 2-8), averaging 835 fish through the season. Coho CPUE ranged from zero to three with a season average of one fish per trap night. Steelhead CPUE ranged from two to twelve fish averaging six fish per trap night.

Chinook trapped throughout the season ranged in fork length (FL) from 36 to 84 mm averaging 48.6 mm. The overall average FL of CWTed fish was 48.6 mm.

Table 1. Summary of coded-wire tagging of naturally produced chinook in the Trinity

River basin, 1996 season.

Coded-wire tag number	Inclusive tagging dates	Number effectively tagged	Average fork length (mm)
0601080115	April 4-23	23,248	46.1
0601080201	April 15-24	27,057	47.6
0601080202	April 22-30	29,007	50.0
0601080206	April 30-May 9	27,945	56.0
0601080207	May 9-11	16,353	54.1
Season Total		123,610	48.6

Prepared by: _____ Date: October 10, 2003

Mark Zuspan

TASK 6: Life History, Distribution, Run Size and Angler Harvest for South Fork Trinity River Basin Anadromous Salmonid Populations

Task Objectives:

1. To determine the timing, size, composition, distribution, and angler harvest of adult fall chinook and coho salmon runs in the South Fork Trinity River (SFTR) basin.

2. To determine through mark-and-recovery and direct observation methods, the timing, size, composition, and distribution of adult spring chinook and spring (summer) steelhead runs in the SFTR basin.

3. To determine juvenile salmonid emigration timing patterns, and assess their rearing areas and resident times in the SFTR basin.

4. To describe age compositions and life-history patterns of adult and juvenile salmonids through scale pattern analysis.

Introduction:

Work on Task 6 was initiated at the end of May 1996, when approval to begin work was received. At that time few seasonal employees were available to assist with equipment fabrication and procurement, and field work. The amount of work that was completed during this report period is therefore small.

Procedures:

Weir. The Gates Weir was installed at river km (RK) 31.7 to capture upstream migrants for examination and tagging; provision was made to trap downstream migrating steelhead. The weir was fished five nights/week. All salmon and steelhead captured were examined to determine species, sex, and fork length. Hatchery marks and other scars were recorded if present. Captured fish judged in good condition received an anchor tag and secondary fin clip, and then released to continue their migration.

Results:

Weir. The Gates Weir was installed June 19, 1996 and removed July 8, 1996. Totals of 32 spring-run chinook salmon (4 grilse and 28 adults) and 2 adult steelhead were captured. Twenty one spring-run chinook salmon were effectively tagged. Spring-run chinook salmon averaged 60.1 cm FL, and ranged in length from 51 to 80 cm, FL (Figure

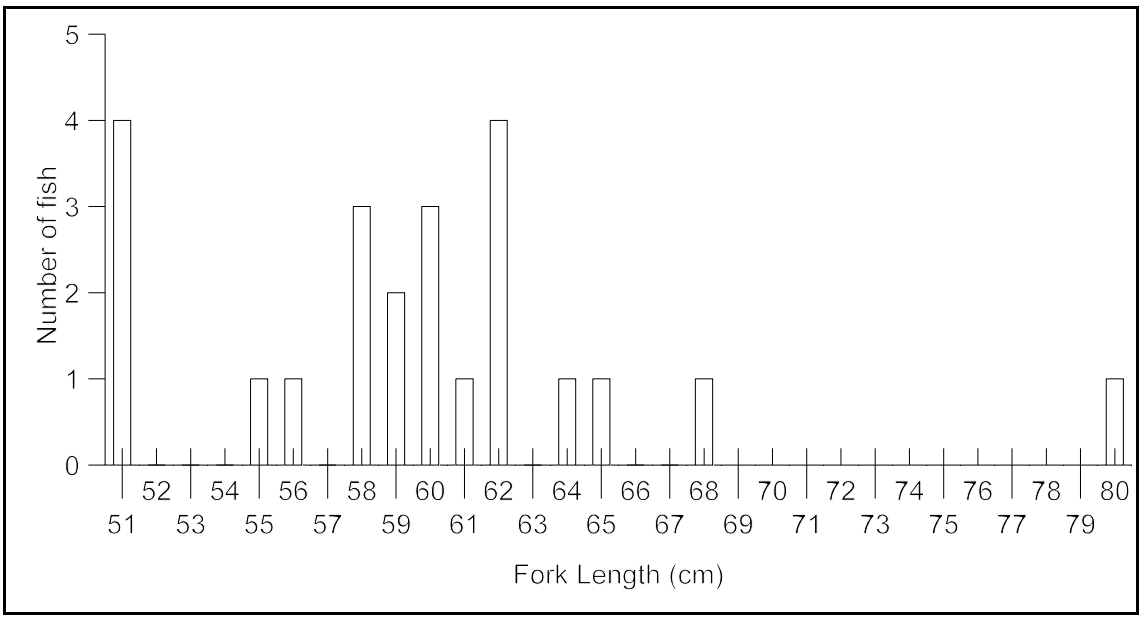

Figure 1 Length frequency for spring-run chinook salmon captured at Gates Weir, South Fork Trinity River, 1996 season.

1). The two captured steelhead were 46 and 58 cm, FL. The weir was removed when morning water temperatures exceeded 15 deg. C to reduce the risk of handling mortality.

Juvenile outmigrant trapping. We are now in the process of hiring seasonal staff, and preparing equipment to conduct juvenile outmigrant sampling. Sampling will commence in early July.

Prepared by: _____ Date: October 10, 2003

Bill Jong