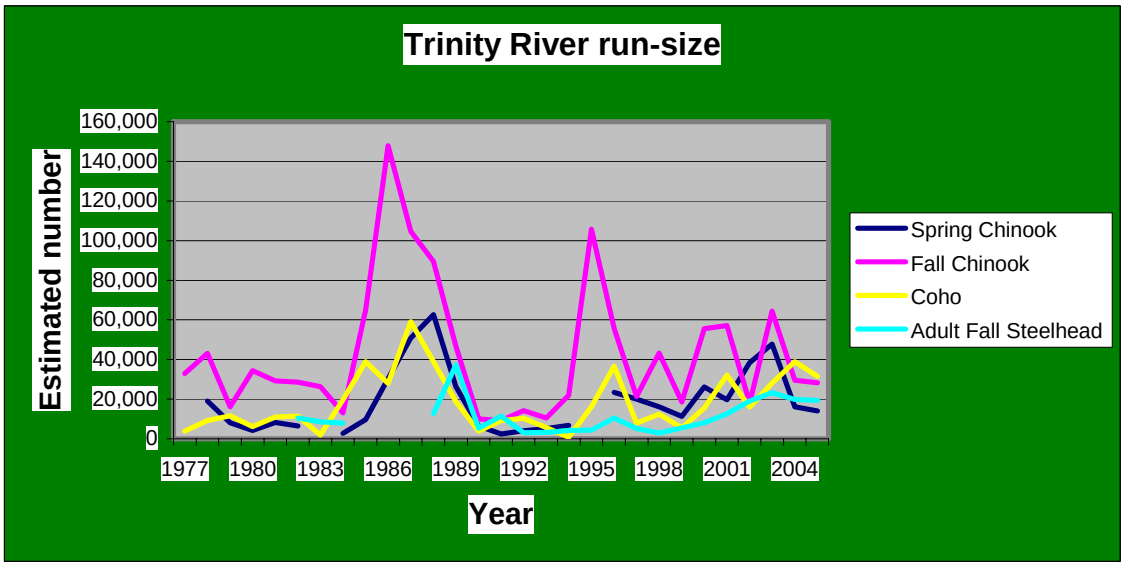
State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

# ANNUAL REPORT
# TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT
# 2005-2006 SEASON



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# 2005-2006 SEASON


Authored by:

Wade Sinnen, Patrick Garrison, Morgan Knechtle, and Sara Borok
Northern California – North Coast Region
Klamath and Trinity River Projects

Edited by:

Larry Hanson – Senior Biologist Supervisor
Northern California – North Coast Region

Northern California – North Coast Region
601 Locust Street
Redding, CA 96001



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## Foreward

This is the eighteenth annual report to the United States Bureau of Reclamation (USBOR). This year's activities were conducted under terms of Cooperative Agreement Number 02FG200027, and cover the period October 1, 2005 through September 30, 2006 (FFY 2006). The field work was conducted by personnel of the California Department of Fish and Game's (CDFG) Klamath-Trinity Program. Cooperators of CDFG field studies include the Hoopa Valley Tribe (HVT) fisheries department, Yurok Tribe (YT) fisheries department, U.S. Fish and Wildlife Service (USFWS) fisheries department and U.S. Forest Service (USFS) fisheries department. The HVT, YT, and USFWS were contracted separately by the USBOR for cooperative and singular work performed during FFY 2006. Please refer to the respective agency/tribal fisheries departments or USBOR for information regarding cooperative or other projects/studies.

This year's CDFG work was comprised of five separate projects (**Tasks)** performed on the lower Klamath River, mainstem Trinity River, and at Trinity River Hatchery. The necessity for performing our Klamath-Trinity basin monitoring activities have been outlined in several Acts of Congress including Public Law 386 (69 Stat. 719), August 12, 1955; Public Law 98-541, October 24, 1984; "Trinity River Basin Fish and Wildlife Management Reauthorization Act" of 1995; and Trinity River "Record of Decision", 2000.

## Acknowledgements

The following CDFG technicians made possible our field work for the season: Ron Smith, Mike and Linda Allen, Linda Battin, Paula Whitten, Todd Newhouse, Craig Imamoto, Charlie Wehrlie, Burt Blank, Randy Green and Tom Barnes. We also wish to thank the Hoopa tribal biologists George Kautsky and Spencer Stiff, technicians Clyde Matilton, Craig Reese and Timothy Melony and Yurok tribal technicians Hank Alemeda, Robert Hunsucker Jr., Leroy Silvia, and biologists Seth Naman, Aaron Martin, Ryan Benson and Tim Hayden, USFWS project staff of Charlie Chamberlin, Mike Reichmuth, Eric Moberly, Jane Sartori, Tom Cambell, Pat McNeil, Celia Cambell, Mike Cunanan, Mijanou Brown and Steve Fortney, and Loren Everest, USFS biologist who worked on cooperative field projects.

We also appreciate the cooperation of the CDFG Trinity River Hatchery staff during processing of returning salmonids and the following landowners for granting us access through/on their properties: Fred and Doris Chase, Tom Ogorman, the Bureau of Land Management and U.S. Forest Service.

The CDFG monitoring program was approved by the Trinity Management Council (TMC) and funded through the Trinity River Restoration Program (TRRP) office in Weaverville, CA. We thank Doug Schleusner and his TRRP staff for their input and effort administering our contract.

Trinity River Basin Salmon and Steelhead Project
2005 - 2006 Season

## Table of Contents



## List of Tables

**Task 1. Annual Run-size, Harvest, and Spawner Escapement Estimates for Trinity River Basin Chinook and Coho Salmon and Steelhead.**

**List of Tables** (continued)

**List of Tables** (continued)



**Task 2. Survival and Contributions to the In-river Sport Fisheries and Spawner Escapements Made by Spring- and Fall-run Chinook Salmon Produced at Trinity River Hatchery**



**Task 3. Survival and Contributions to the to the In-river Sport Fisheries and Spawner Escapements Made by Coho Salmon Produced at Trinity River Hatchery**

**List of Tables** (continued)



**Task 4. Salmon Spawner Surveys in the Upper Trinity River**

**List of Tables** (continued)



**Task 5. Angler Creel Surveys in the Lower Klamath River**

Trinity River Basin Salmon and Steelhead Project
2005 - 2006 Season

## List of Figures

**Task 1. Annual Run-size, Harvest, and Spawner Escapement Estimates for Trinity River Basin Chinook and Coho Salmon and Steelhead.**

**List of Figures** (continued)



**Task 4. Salmon Spawner Surveys in the Upper Trinity River**

**List of Figures** (continued)

**Task 5. Angler Creel Surveys in the Lower Klamath River**

Trinity River Basin Salmon and Steelhead Project
2005 - 2006 Season

## List of Appendices

**Task 1. Annual Run-size, Harvest, and Spawner Escapement Estimates for Trinity River Basin Chinook and Coho Salmon and Steelhead.**

**List of Appendices** (continued)

**List of Appendices** (continued)

**Task 4. Salmon Spawner Surveys in the Upper Trinity River**



**Task 5. Angler Creel Surveys in the Lower Klamath River**

ANNUAL REPORT
TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT
2005-06 SEASON

TASK 1
ANNUAL RUN-SIZE, HARVEST, AND SPAWNER ESCAPEMENT ESTIMATES FOR TRINITY RIVER BASIN CHINOOK AND COHO SALMON AND STEELHEAD

by

Morgan Knechtle and Wade Sinnen

## ABSTRACT

The California Department of Fish and Game's Trinity River Project (TRP) conducted tagging and recapture operations from July 2005 through March 2006 to obtain adult spring-run (spring) and fall-run (fall) Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and fall steelhead (*O. mykiss*) run-size, angler harvest, and spawner escapement estimates in the Trinity River basin. The project is conducted by the California Department of Fish and Game (CDFG) with cooperation from the Hoopa Valley Tribal Fisheries Department (HVT). Two mainstem weirs were placed in the Trinity River near the towns of Junction City and Willow Creek, and trapped 2,160 Chinook salmon, 1,899 coho salmon, 2,986 fall steelhead and 351 brown trout (*Salmo trutta*).

Based on tagged fish recovered at Trinity River Hatchery (TRH) and on the return of reward tags by anglers, an estimated 13,984 spring Chinook salmon migrated into the Trinity River basin upstream of Junction City weir (JCW). An estimated 961 spring Chinook were caught by anglers, leaving 13,023 fish as potential spawners. An estimated 28,231 fall Chinook salmon migrated past Willow Creek weir (WCW) and an estimated 956 of these were caught by anglers, leaving 27,275 potential spawners. An estimated 25,858 fall Chinook migrated past JCW and an estimated 578 of these were caught by anglers, leaving 25,280 potential spawners.

The coho salmon run in the Trinity River basin, upstream of WCW, was estimated at 31,419 fish. An estimated 21 adult coho were harvested by anglers, leaving 31,398 potential spawners. An estimated 24,615 coho salmon migrated above JCW and none were estimated to be caught by anglers, leaving all 24,615 as potential spawners.

An estimated 19,412 (5,363 naturally produced and 14,049 hatchery produced) adult fall steelhead entered the Trinity River basin upstream of WCW. Anglers harvested an estimated 207 adult fall steelhead above the WCW, leaving 19,205 fish as potential spawners.

## JOB 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 in-river angler harvest and spawner escapements of Trinity River Chinook and coho salmon, and steelhead.

## INTRODUCTION

The California Department of Fish and Game's TRP, in cooperation with the HVT conducts annual tagging and recapture operations for adult Chinook and coho salmon, and fall steelhead in the mainstem Trinity River. This effort determines the composition (race and proportion of hatchery marked[1/] or Project-tagged[2/] fish), distribution, and timing of Chinook and coho salmon, and fall steelhead runs in the Trinity River basin. Recaptures of hatchery marked or Project-tagged fish are used to develop run-size, angler harvest, and spawner escapement estimates for Chinook and coho salmon, and steelhead runs. Additionally, tagging of brown trout continued to determine angler harvest and growth rates.

This is a continuation of studies that began in 1977 with the trapping, tagging, and recapture of fall Chinook salmon (fall Chinook), coho salmon (coho), and fall steelhead (steelhead). In 1978, similar studies were added to include spring run Chinook salmon (spring Chinook). Steelhead were dropped from the program in 1985 through 1989 and reinstated in 1990. Results of these studies are available from California Department of Fish and Game (Heubach 1984a, 1984b; Heubach and Hubbell 1980; Heubach et al. 1992a, 1992b; Lau et al. 1994; Zuspan et al. 1985; Zuspan et al. 1995; Zuspan and Sinnen 1995, Zuspan 1996, Zuspan 1997, Lau and Sinnen 1998, Lau and Sinnen 2000, Sinnen et al. 2000, Reese, 2001; Reese and Sinnen 2004; Sinnen and Knechtle 2005; and Knechtle and Sinnen 2006).

Earlier studies were funded by the U.S. Bureau of Reclamation (USBR), and with Anadromous Fish Act funds administered by the U.S. Fish and Wildlife Service and National Marine Fisheries Service. The USBR has funded the program from 1 October 1989 through the present.

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1/ Adipose fin clipped and coded-wire-tagged (Ad and CWT), hatchery produced Chinook and right-maxillary-clipped coho salmon.

2/ Spaghetti tags applied by CDFG personnel to returning sea-run fish.

Prior to the current program, all efforts to measure salmon and steelhead populations in the Trinity River basin had been restricted to portions of the upper mainstem Trinity River and several of its tributaries, including the South Fork Trinity River and some of its tributaries (Gibbs 1956; La Faunce 1965a, 1965b, 1967; Miller 1975; Moffett and Smith 1950; Rogers 1970, 1972, 1973a, 1973b, 1982; Smith 1975; Weber 1965). Earlier efforts did not include fish which used the mainstem and tributaries of the lower Trinity River or attempt to determine the proportion of hatchery fish in the runs and the rates at which various runs contributed to the fisheries. To develop a comprehensive management plan for the Trinity River basin, all salmon stocks utilizing the basin must be considered.

## METHODS

### Trapping and Tagging

#### Trapping Locations and Periods

Trapping and tagging operations were conducted by TRP and HVT personnel from July through late November 2005 at temporary weir sites near the towns of Willow Creek and Junction City on the mainstem Trinity River. The downstream site, WCW, was located 36.5 km upstream from the Trinity River's confluence with the Klamath River (40º 58' 29.85" N, 123º 38' 8.61" W). The upstream site, JCW, was located 132.7 km upstream from the Klamath River confluence (40º 41' 5.51" N, 123º 01' 35.55" W) (Figure 1). Prior to 1995, JCW was operated from May through November. During 1995 through 2004 the JCW was operated from late June or mid-July through September. In an effort to obtain addition estimates above the JCW during 2005 the JCW was operated from mid July through the end of November. WCW is generally operated from mid-August through November. Most fall Chinook salmon spawning occurs upstream of WCW, while the majority of spring Chinook spawning occurs upstream of JCW.

The WCW was operated from August 22 through November 4, 2005 and the JCW was operated from July 22 through November 28, 2005. At both weir sites, trapping was attempted during a five day period beginning late afternoon on Sunday and ending mid afternoon on Friday. Each trapping day the weir was opened for approximately four hours to allow fish to pass unimpeded through the weir site. Occasionally, trapping schedules were modified for holidays or for safety purposes during high flows. Trapping and tagging were not conducted if stream temperatures exceeded 22º Celsius.

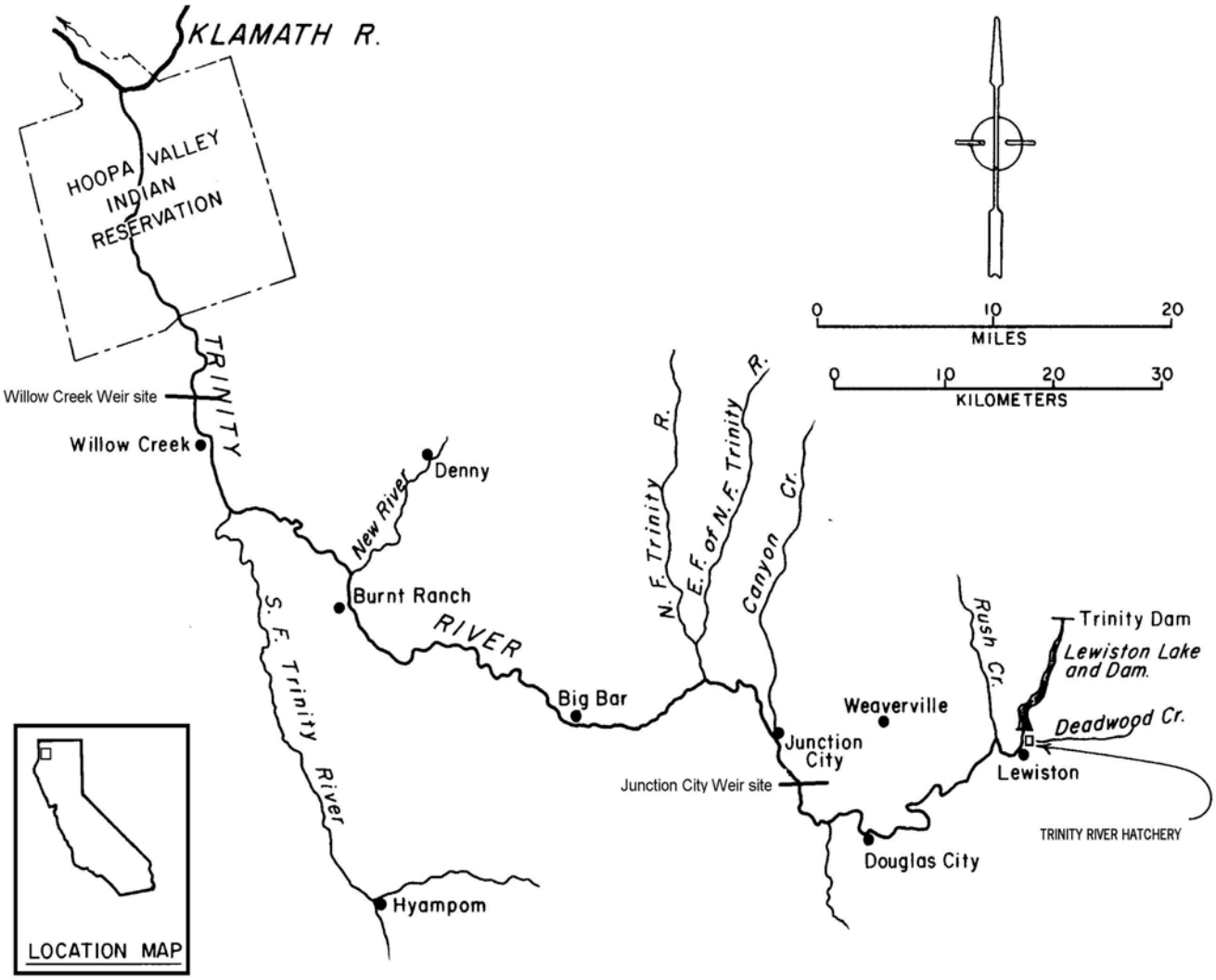


Figure 1. Location of trapping and tagging weirs for anadromous salmonids near Willow Creek and Junction City in the mainstem Trinity River, 2005-06 season.

Weir and Trap Design

Since 1989, a Bertoni (Alaskan) weir design has been used at both sites (Figures 2-4). The weir is supported by wooden tripods set 2.5 m apart. Weir panels consisted of 3.0-m X 1.9-cm. (10-ft X ¾-in) electrical conduit spaced 5.1 cm. apart on center, leaving a gap of 3.2 cm. between conduits. Conduits are supported by three pieces of aluminum channel arranged 0.92 m apart, that connected to the supporting tripods. The tripods are anchored with cable to 1.8-m stakes driven into the stream bottom. The weir panels are angled at roughly a 45º angle, with the top of the weir standing 1.8 m above the river bottom.

Figure 2. Photograph of Alaskan style weir tripods, support channels and conduit.

Figure 3. Photograph (taken from downstream) of Alaskan weir. Note the boat gate (right side of picture).

Figure 4. Photograph of Alaskan weir (taken upstream) showing the trapping boxes on the upstream side of the weir.

The trap is made of 1.9-cm. electrical conduit spaced 2.5 cm. apart and welded into panels. The panels are wired together at the corners to produce a 2.4-m square box which is bolted to a plywood floor and covered with a plywood lid to prevent fish from jumping out. A fyke, also made of conduit panels, is installed in the trap to guide fish into the trap and prevent their escape. The trap is placed on the upstream side of the weir directly in front of 12 raised weir conduits creating an opening approximately 60 cm. This opening allows fish to pass through the weir through the fyke and into the trap. To allow boat passage, at both weirs, gates approximately 6m were inserted between two weir panels. The gate at JCW was constructed of welded conduit panels with 2.5-cm. spacing between conduits and was perpendicular to the stream substrate. The gate at WCW was constructed of 4.0 cm. mesh chain-link fencing supported by a livestock gate and was sloped even with the weir.

Processing of Fish

At both weirs, all trapped salmonids were identified to species, measured to the nearest cm. fork length (FL), and examined for hook, predator, gill-net scars, fin clips, and tags. Each untagged salmonid judged in good condition and un-spawned was tagged with a serially numbered FT-4[3/] spaghetti tag (Project-tagged). Tags were inserted using an applicator needle through the fish's back approximately two cm. below the base of the dorsal fin and ¼ the length of the dorsal fin anterior of the posterior edge of the dorsal fin. At both weirs one-third

3/ The use of brand or trade names is for identification purposes only, and does not imply the endorsement of any product by the CDFG.

of the Chinook salmon received $10-reward tags, while the remaining tags were non-reward. At WCW, half of the steelhead received reward tags, while the remaining received non-reward tags. At both weirs all coho were tagged with non-reward tags. At JCW, brown trout were tagged with serially numbered FD-94[4/] anchor tags. All brown trout tagged during 2005 received non-reward tags. Steelhead and were not tagged at JCW.

Determining the Separation Between Spring and Fall Chinook Salmon Runs at the Weirs

Each year there is a temporal overlap in the spring and fall Chinook runs in the Trinity River. Run timing varies between years, and each season dates are assigned that separate the spring and fall Chinook runs. This separation is determined by comparing proportions of known and estimated spring and fall Chinook trapped at the weirs each week. The week in which the proportion of fall Chinook exceeds spring Chinook is designated as the first week of the fall Chinook run at that weir. If there are two consecutive weeks with nearly identical proportions, then the first week is designated as spring run and the following as fall run. A recovered tagged Chinook is identified as either a spring or a fall Chinook based on two separate criteria; 1) Chinook tagged at the weirs carried coded-wire tags (CWT's), placed in their snouts as juveniles at TRH. These fish are identified by the absence of an adipose (AD) fin, which is clipped during the tagging process. If these fish are recovered at the hatchery or during spawning surveys, the CWT code indicated whether they were spring or fall fish. 2) non-CWT'ed Chinook tagged at the weir and recovered at the hatchery are classified as either spring or fall fish based on the date they entered the hatchery. If they entered the hatchery during the period associated with the spring run (based on CWT recoveries at the hatchery) they were considered spring Chinook. Those Chinook entering the hatchery during the period associated with the fall run (based on CWT recoveries) were considered fall Chinook.

Estimating Numbers of Spring and Fall Chinook Salmon at Trinity River Hatchery

As at the weirs, there is an overlap in the return timing of spring and fall Chinook into TRH. To estimate the respective numbers of spring and fall Chinook without CWT's that entered TRH, the numbers of tags recovered from each returning CWT group were expanded by the CWT production multiplier (the ratio of tagged to total Chinook salmon released by same strain, brood year [BY], release site, release group and date). For example, 126,729 fall Chinook of CWT group 06-52-99 plus 382,157 unmarked fall Chinook were released directly from TRH in June of 2003. The expanded estimate for each return of this group is 4.015 (126,729+382,157/126,729). Each CWT return was expanded by its production multiplier to estimate the total number of spring and fall Chinook that entered the hatchery.

If more Chinook salmon entered the hatchery on a particular sorting day than could be accounted for by the expansion of all CWT groups, the additional fish were considered to be naturally produced. These fish were designated as either spring run or fall run in the same proportions that were determined by the expansion of the CWT groups on that day.

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4/ The use of brand names is for identification purposes only, and does not imply the endorsement of any product be the CDFG.

To estimate spring and fall Chinook run-sizes, a separation date at the hatchery was assigned between the two runs. The separation date was the week in which fall Chinook out numbered spring Chinook based on the expansion of CWT's.

Size Discrimination Between Adult and Grilse Chinook and Coho Salmon

The size separating adult and grilse spring and fall Chinook was based on two criteria; 1) length frequency data obtained at the two trapping sites and TRH and length data obtained from groups of CWT'ed fish that entered TRH whose exact age was known. 2) FL data from TRH Chinook was only used from weeks in which ≥ 90% of the Chinook could be designated as either spring run or fall run as explained by the expansion of CWT's.

Coho salmon do not receive CWT's, therefore exact ages are unknown. The separation of grilse and adult coho was based entirely on length frequency analysis.

Chinook and coho length frequency data collected at the weirs and TRH were smoothed with a moving average of five 1-cm increments to determine the nadir separating grilse and adults.

Size Discrimination Between Adult and Immature Steelhead

All steelhead >41 cm FL were considered adults, and steelhead ≤41 cm FL captured at the weirs were assumed to be half-pounders (assumed to have migrated to the ocean). Steelhead ≤41 cm FL that entered TRH were not counted and were classified as sub-adults.

## Recovery of Tagged Fish

Weir Recovery

All salmonid carcasses recovered at the weir were measured to the nearest cm FL and examined for tags, fin clips, and spawning condition. Any head of an adipose fin-clipped (Ad-clipped) fish was removed for the potential recovery and decoding of the CWT. After examination, the carcasses were cut in half to prevent recounting and returned to the river downstream of the weir.

Tagging Mortalities

Tagged salmonids recovered dead at the weir, in spawning surveys, or reported dead by anglers were considered tagging mortalities if there was no evidence they had spawned and they were recovered dead ≤21 days after tagging. Tagged fish recovered dead more than 21 days after tagging, or those that had spawned, regardless of the number days after tagging, were not considered tagging mortalities.

Angler Tag Returns

All the tags placed on fish at the weirs were inscribed with the TRP Arcata field office address and the word RETURN. The information from returned Project-tags by anglers and river enthusiasts allowed for estimation of angler harvest and catch and release rates for all species marked. All anglers that returned tags were sent questionnaires asking the date and location of

their catch and whether they harvested (kept) or released their catch. The questionnaire informed them of the fish's tagging date and location.

Tags returned to the TRP Arcata field office through June 1, 2006 were included in assessing harvest and catch and release rates. Tags returned after that date were processed for payment but not used for analysis. This date was chosen due to time constraints associated with the completion of this report and because the vast majority of tags have been returned by this date in previous years.

Trinity River Hatchery

The TRH fish ladder was open from September 8th 2005 through March 14th 2006. Hatchery personnel conducted fish sorting and spawning operations generally two days per week. All salmon and steelhead entering TRH were identified to species, sexed, and examined for tags and fin clips. For spawning purposes TRH staff initially sort fish as either ripe or unripe. Ripe salmon are either spawned or killed, and ripe steelhead are either spawned or are returned to the river. Unripe salmon are held in holding ponds for further ripening, and unripe steelhead are either held for further ripening or are returned to the river. Prior to transfer to the holding ponds unripe fish that bore Ad-clips or Project tags were given a date specific fin clip to indicate the initial week that they entered TRH. Unripe fish that did not have an Ad-clip or bore a project tag were tallied prior to being transferred to the holding pond. When held salmon were processed on a spawning day they were either spawned or killed and steelhead were either spawned or returned to the river. Weekly fin clips were recorded from all holdover fish when they were processed. All salmon and steelhead that entered TRH were measured to the nearest cm FL, except those that were Project-tagged from the weirs. Project-tagged salmon and steelhead recovered at TRH were assigned the FL recorded for them at the weir. On the day they were processed, the heads of all Ad-clipped salmon were removed and placed individually in a plastic bag with a serially numbered head tag noting the date, location of recovery, species, sex, and FL. Project personnel later performed CWT extraction and decoding.

At TRH it is not possible to distinguish between large rainbow trout and small steelhead trout, therefore only O.mykiss >41 cm. FL were counted. O.mykiss ≤ 41cm were returned to the river.

Spawner Surveys

In cooperation with the U.S. Fish and Wildlife Service, U.S. Forest Service and the Yurok Tribe, TRP staff conducted spawner surveys in the upper Trinity River from Lewiston Dam (RK 180) downstream to Cedar Flat (RK 78). Fish recovered in these surveys were examined for spawning success and project tags. Results of these surveys are presented in Task 4 of this report.

## Statistical Analyses

Effectively Tagged Fish

The number of effectively tagged fish was estimated by subtracting from the total tagged, those fish that were classified as tagging mortalities, tagged fish recovered downstream of the tagging site, and angler caught and released fish.

Run-size Estimates

Run-size estimates were calculated using Chapman's version[5/] of the Petersen Single Census Method (Ricker 1975):

$$N = \frac{(M+1)\ (C+1)}{(R+1)}, \text{ where}$$

N = estimated run-size
M = the number of effectively tagged fish
C = the number of fish examined at TRH
R = the number of Project-marked fish recovered in the hatchery sample.

Annually, TRP staff attempt to tag and recover enough fish to obtain 95% confidence within $\pm$10% of the run-size estimate. The confidence interval estimator is selected using criteria established by Chapman (1948). Estimates were not stratified into grilse and adult salmon this season because there were not sufficient grilse and adult salmon recovered to obtain 95% confidence of $\pm$10% of each of the stratified portions of the run. To estimate the number of grilse and adult fall Chinook and coho above the WCW the proportions of grilse and adults observed at WCW were applied to the respective run size estimate. To estimate the number of grilse and adult spring Chinook above the JCW the proportions of grilse and adults observed at JCW were applied to the run size estimate.

All steelhead run-size estimates were for adults only. Since the 1997 BY, all TRH-produced steelhead have received adipose-fin clips. The proportion of the run that was hatchery produced is based upon the percentage of adipose fin-clipped steelhead observed at WCW.

Assumptions of run size estimates are: 1) fish trapped and released from the weir were a random sample representative of the population; 2) tagged and untagged fish were equally vulnerable to recapture at TRH; 3) all Project tags were recognized upon recovery 4) tagged and untagged fish were randomly mixed throughout the population and among the fish recovered at TRH and; 5) all tag loss was accounted for.

Angler Harvest and Catch and Release Rates and Harvest Estimates

When reward tags are returned at a higher rate than non-reward tags only returns from reward

5/ Chapman, D. G. 1951. Some properties of the hypergeometric distribution with applications to zoological census. Univ. Calif. Publ. Stat. 1:131-160, As cited in Ricker (1975).

tags are used to determine harvest rates. When non-reward tags are returned at higher rates than reward tags, harvest rates were determined by combining the returns of both reward and non-reward tags.

Harvest rates were calculated for each species (and race of Chinook) by dividing the number of angler-returned tags from harvested fish by the number of fish that were effectively tagged. Independent harvest rates were calculated for grilse and adult salmon. Catch and release rate for each species (and race of Chinook) were calculated by dividing the number of angler-returned tags from caught and released fish by the number of fish effectively tagged plus the number of fish reported as released.

The numbers of fish harvested upstream of each weir were estimated by multiplying the harvest rates (for each species and race) by their respective run-sizes upstream of each weir.

### Use of Standard Julian Week

Weekly sampling data collected by project personnel at the weirs are presented in Julian week (JW) format. Each JW is defined as one of a consecutive set of 52 weekly periods, beginning 1 January, regardless of the day of the week on which 1 January falls. The extra day in leap years is included in the ninth week (Appendix 1). This procedure allows inter annual comparisons of identical weekly periods.

## RESULTS

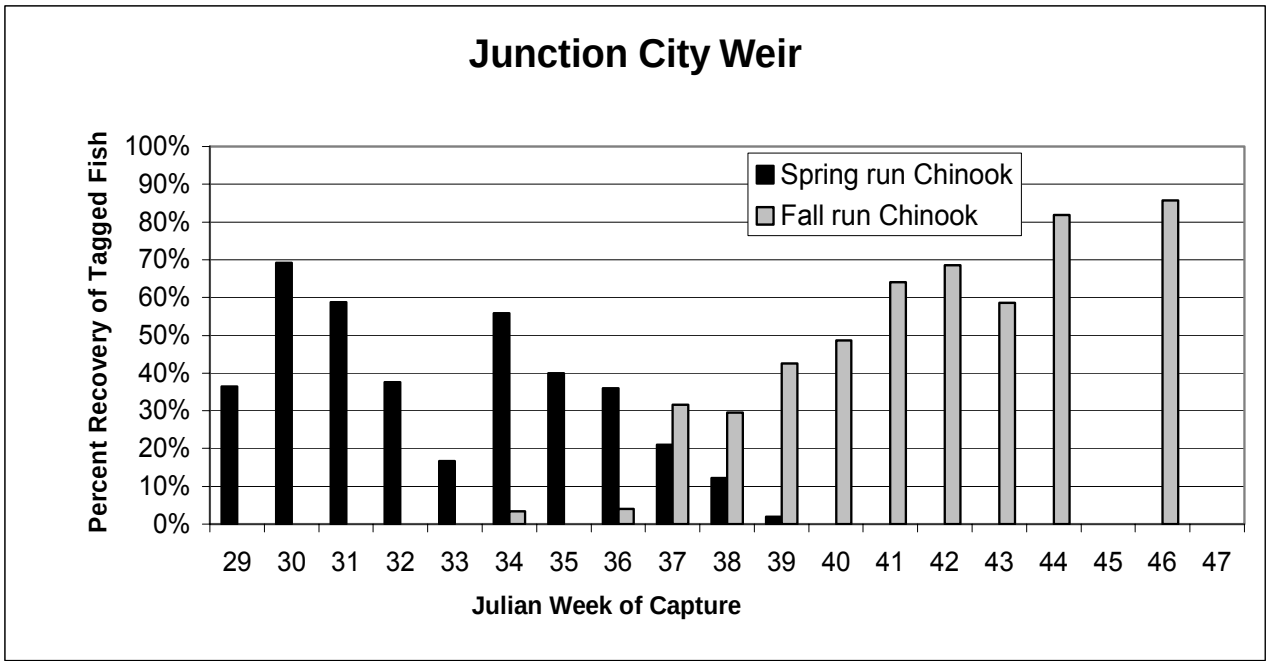
### Trapping and Tagging

#### Chinook Salmon

Spring and Fall Chinook Separation and Run Timing. Spring Chinook were the predominant race of Chinook trapped at JCW through JW 36, after which fall Chinook became predominate. For the purpose of analysis all Chinook salmon trapped at the JCW before JW 37 were considered spring run (Figure 5). At JCW spring Chinook catch was never high and peaked during JW 34 at 13.0 fish per night. Fall Chinook were the dominate race of Chinook trapped at JCW after JW 36 and had a normal distribution with two peaks of trapping occurring during JW's 38 and 42 when 21.2 and 29.4 fish per night were trapped (Table 1, Figure 6).

Based on the return of project-tagged and Ad-clipped fish, the proportion of fall Chinook tagged at WCW exceeded spring Chinook starting in JW 35. During the first week of trapping, JW 34, spring Chinook dominated the catch at WCW. For the purpose of analysis all Chinook salmon trapped at the WCW after JW 34 were considered fall run (Figure 5). Fall Chinook daily catch (fish per night) was normally distributed with peak trapping occurring during JW's 37 and 38 when >70 fish per night were trapped. Only 3% (46/1,319) of the fall Chinook were caught during the second week of trapping, indicating that the trap was installed prior to the arrival of upstream migrating fall Chinook. During JW 42 daily catch of Chinook dropped to

<10.0 fish per night. Chinook catch stayed below 10.0 fish per night for the remainder of the season and 1.7% (23/1319) of the seasons fall Chinook was captured during the last week of trapping (Table 2, Figure 7).



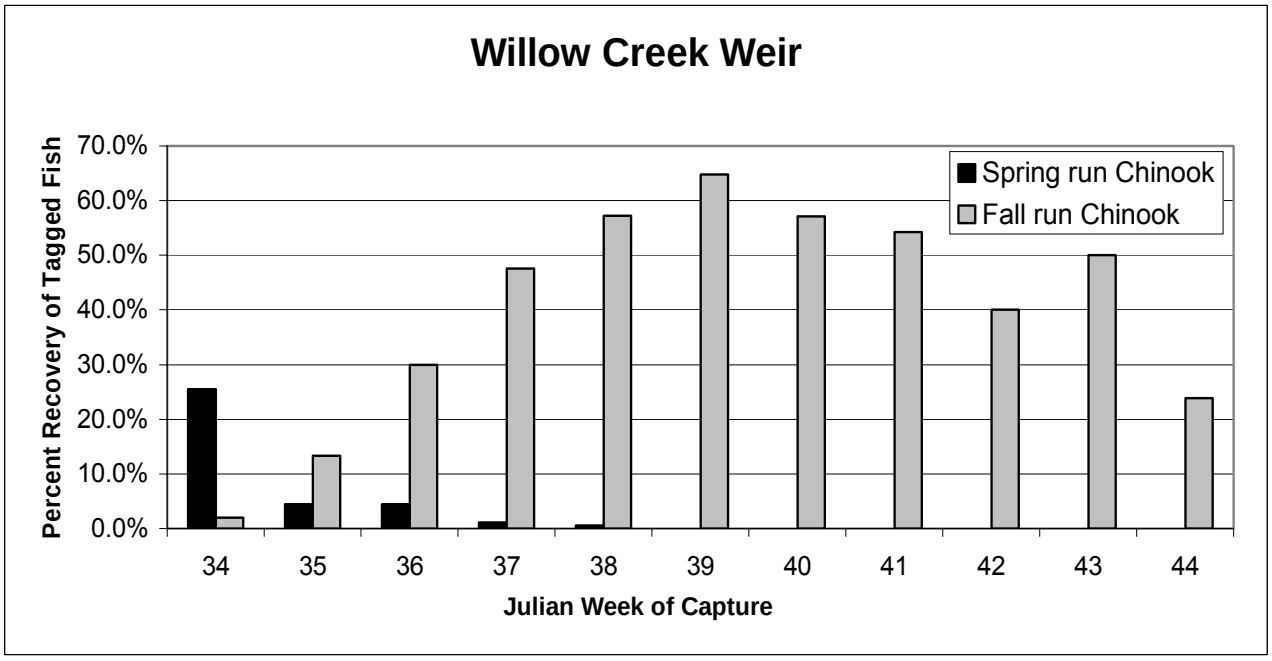




Figure 5. Percent recovery of Junction City and Willow Creek Weir marked Chinook at Trinity River Hatchery during the 2005 season. Chinook salmon were designated as either spring run or fall run based on recoveries of coded-wire tags or entry timing into Trinity River Hatchery. For the purposes of analysis, all Chinook salmon captured at Junction City Weir prior to Julian week 37 were considered spring run and Chinook salmon captured after Julian week 36 were considered fall run. Additionally, for analysis purposes, all Chinook captured at Willow Creek Weir prior to Julian week 35 were considered spring run and Chinook captured after Julian week 34 were considered fall run.

Table 1. Weekly summary of spring run and fall run Chinook salmon trapped in the Trinity River at Junction City weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped | | | fish/night |
|---|---|---|---|---|---|---|---|---|
| | | | | | Grilse b/ | Adults | Total | |
| **Spring run Chinook** | | | | | | | | |
| 29 | 16-Jul | - | 22-Jul | 1 | | 11 | 11 | 11.0 |
| 30 | 23-Jul | - | 29-Jul | 5 | 1 | 12 | 13 | 2.6 |
| 31 | 30-Jul | - | 5-Aug | 5 | 0 | 34 | 34 | 6.8 |
| 32 | 6-Aug | - | 12-Aug | 5 | 1 | 24 | 25 | 5.0 |
| 33 | 13-Aug | - | 19-Aug | 5 | 0 | 6 | 6 | 1.2 |
| 34 | 20-Aug | - | 26-Aug | 5 | 0 | 65 | 65 | 13.0 |
| 35 | 27-Aug | - | 2-Sep | 2 | 1 | 5 | 6 | 3.0 |
| 36 | 3-Sep | - | 9-Sep | 4 | | 26 | 26 | 6.5 |
| | | | Sub-total: | 32 | 3 | 183 | 186 | |
| | | | Sub-mean: | | | | | 5.8 |
| **Fall run Chinook** c/ | | | | | | | | |
| 37 | 10-Sep | - | 16-Sep | 5 | 1 | 18 | 19 | 3.8 |
| 38 | 17-Sep | - | 23-Sep | 5 | 6 | 100 | 106 | 21.2 |
| 39 | 24-Sep | - | 30-Sep | 5 | 7 | 55 | 62 | 12.4 |
| 40 | 1-Oct | - | 7-Oct | 5 | 8 | 68 | 76 | 15.2 |
| 41 | 8-Oct | - | 14-Oct | 4 | 4 | 79 | 83 | 20.8 |
| 42 | 15-Oct | - | 21-Oct | 5 | 3 | 144 | 147 | 29.4 |
| 43 | 22-Oct | - | 28-Oct | 5 | | 45 | 45 | 9.0 |
| 44 | 29-Oct | - | 4-Nov | 4 | | 23 | 23 | 5.8 |
| 45 | 5-Nov | - | 11-Nov | 3 | | 0 | 0 | 0.0 |
| 46 | 12-Nov | - | 18-Nov | 5 | | 10 | 10 | 2.0 |
| 47 | 19-Nov | - | 25-Nov | 3 | | 2 | 2 | 0.7 |
| 48 | 26-Nov | - | 2-Dec | 1 | | | 0 | 0.0 |
| | | | Sub-total: | 50 | 29 | 544 | 573 | |
| | | | Sub-mean: | | | | | 11.5 |
| | | | Grand total: | 82 | 32 | 727 | 759 | |
| | | | Combined mean: | | | | | 9.3 |

a/ Trapping at Junction City took place from 22 July (Julian week 29) through November 28 (Julian week 48)
b/ Spring run Chinook <49 cm, FL and fall run Chinook <50 cm, FL were considered grilse.
c/ There was a temporal overlap of spring run and fall run Chinook during Julian weeks 36-39. For the purpose of analysis all Chinook trapped prior to Julian week 37 were considered spring run and Chinook trapped after Julian week 36 were considered fall run.

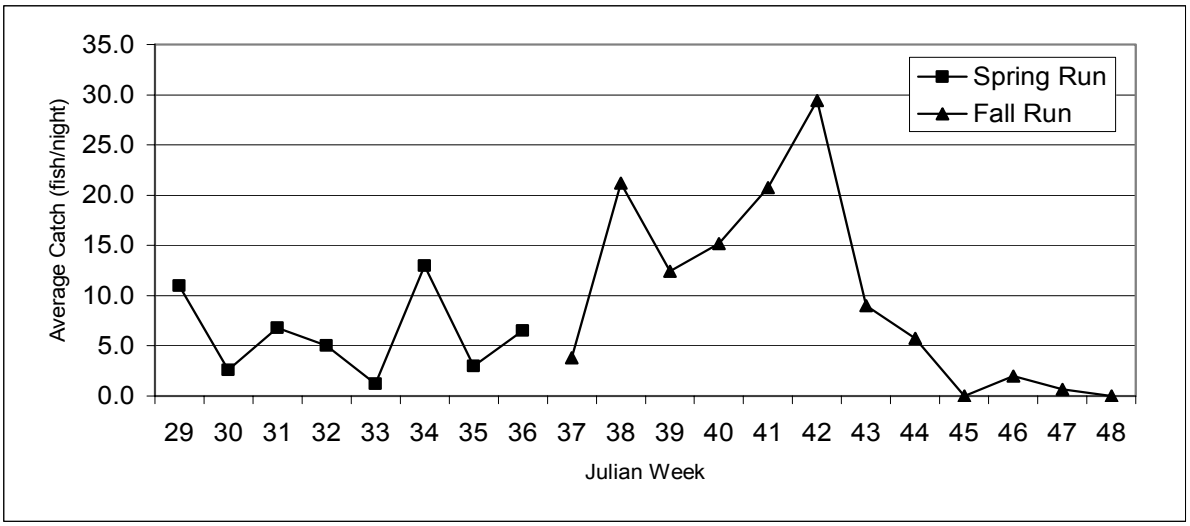



Figure 6. Average catch of spring run and fall run Chinook salmon in the Trinity River at Junction City Weir during 2005.

Table 2. Weekly summary of spring run and fall run Chinook salmon trapped in the Trinity River at Willow Creek Weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped | | | fish/night |
|---|---|---|---|---|---|---|---|---|
| | | | | | Grilse b/ | Adults | Total | |
| **Spring run Chinook** c/ | | | | | | | | |
| 34 | 20-Aug | - | 26-Aug | 4 | 6 | 101 | 107 | 26.8 |
| **Fall run Chinook** c/ | | | | | | | | |
| 35 | 27-Aug | - | 2-Sep | 2 | 1 | 45 | 46 | 23 |
| 36 | 7-Jan | - | 13-Jan | 5 | 10 | 153 | 163 | 32.6 |
| 37 | 7-Jan | - | 13-Jan | 5 | 10 | 350 | 360 | 72.0 |
| 38 | 7-Jan | - | 13-Jan | 5 | 10 | 368 | 378 | 75.6 |
| 39 | 3-Sep | - | 9-Sep | 5 | 3 | 105 | 108 | 21.6 |
| 40 | 14-Jan | - | 20-Jan | 5 | 0 | 92 | 92 | 18.4 |
| 41 | 14-Jan | - | 20-Jan | 5 | 4 | 84 | 88 | 17.6 |
| 42 | 14-Jan | - | 20-Jan | 5 | 2 | 39 | 41 | 8.2 |
| 43 | 10-Sep | - | 16-Sep | 5 | 1 | 19 | 20 | 4.0 |
| 44 | 21-Jan | - | 27-Jan | 5 | 1 | 22 | 23 | 4.6 |
| | | | Sub-total: | 47 | 42 | 1,277 | 1,319 | |
| | | | Sub-mean: | | | | | 28.1 |
| | | | Grand total: | 51 | 48 | 1,378 | 1,426 | |
| | | | Combined mean: | | | | | 28.0 |

a/ Trapping at Willow Creek Weir took place from August 22 (Julian week 34) through November 4 (Julian week 44).
b/ Spring run Chinook <49 cm, FL and fall run Chinook <50 cm, FL were considered grilse.
c/ There was a temporal overlap of spring run and fall run Chinook during Julian weeks 34-38. For the purpose of analysis all Chinook trapped prior to Julian week 35 were considered spring run and Chinook trapped after Julian week 34 were considered fall run.

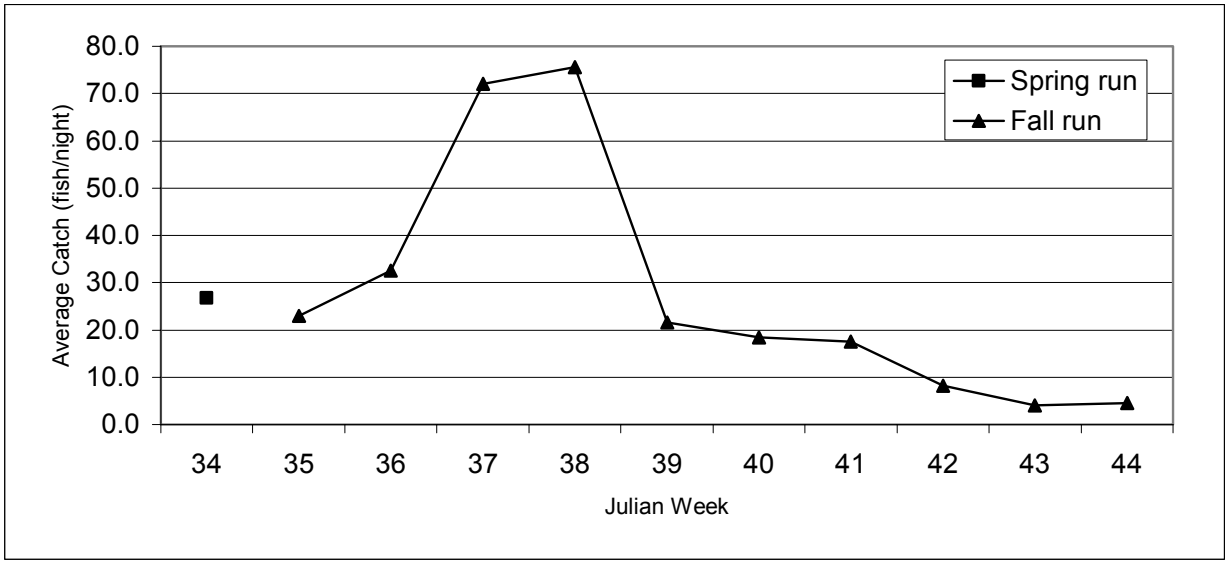



Figure 7. Average catch of spring run and fall run Chinook salmon in the Trinity River at Willow Creek Weir during 2005.

Fall Chinook trapped at WCW, JCW and TRH averaged 68.3, 63.2 and 69.4 cm FL respectively. The average FL of the three sites combined was 69.2 cm FL (Figure 9). Size data of known age, hatchery marked, fall Chinook entering TRH supported this size separation, however there was some overlap between sizes of age 2 and age 3 fall Chinook (Appendix 3). There were so few two year old fish recovered at any of the trapping locations that a nadir was not present in the fork length frequency analysis. Based on a maximum grilse size of 49 cm., fall Chinook grilse comprised 3.2, 5.1 and 0.35% of the run observed at WCW, JCW and TRH respectively. Fall Chinook age composition at TRH based on CWT analysis alone was 0.01, 76.1, 23.1, and 0.7 percent age 2, 3, 4, and 5 year old fish respectively. Since 1977 the maximum grilse FL has averaged 54 cm and has been greater than 49 cm. 24 of the 29 years.

Effectively Tagged Fish. A total of 186 spring Chinook at were trapped JCW, of which 177 (2 grilse and 175 adults) were effectively tagged (Appendix 4). Due to poor condition three spring Chinook trapped at JCW were not tagged. There were 2 tagging mortalities and 4 caught and released spring Chinook, from which anglers reported removing tags (Appendix 8). A total of 60 (32.0 %) spring Chinook were tagged with reward tags (1 grilse and 59 adults). The remaining fish received non-reward tags.

A total of 573 fall Chinook were trapped at JCW and 529 of them (18 grilse and 511 adults) were effectively tagged (Appendix 5). Due to poor condition 34 fall Chinook were not tagged. There were six tagging mortalities and 4 caught and released fall Chinook, from which anglers reported removing tags (Appendix 9). Reward tags were placed on 171 (9 grilse and 162 adults), or 30%, of the fall Chinook trapped at JCW.

A total of 1,319 fall Chinook were trapped at WCW and 1,281 of them (38 grilse and 1,243 adults) were effectively tagged (Appendix 5). Due to poor condition 14 fall Chinook were not tagged. There were four tagging mortalities and 20 caught and released fall Chinook, from which anglers reported removing tags (Appendix 11). Reward tags were placed on 435 (11 grilse and 424 adults), or 33%, of the fall Chinook trapped at WCW.

Incidence of Tags and Fin Clips. Twenty five Chinook tagged at WCW were subsequently recaptured at JCW this year. Ad-clipped fish comprised 19.9% (37/186) of the spring Chinook captured at JCW (Appendix 4). Twenty seven of 37 (73.0%) Ad-clipped spring Chinook tagged at JCW were subsequently recovered at TRH (Table 3). These were predominantly from CWT release groups 065288 and 065308 which were three and four year old spring Chinook released as yearlings in October of 2002 and 2003. Of the 573 Chinook designated as fall run captured at JCW, 20.6% (118) were Ad-clipped. Seventy eight of these fish were subsequently recaptured at TRH. These were predominantly from CWT release group 065309, three year olds released as yearlings in October 2003.

Ad-clipped fish comprised 17.7% (234/1,319) of the fall Chinook observed at WCW (Appendix 5). One hundred thirty nine (59.4%) of the Ad-clipped fall Chinook tagged at WCW were recovered at TRH (Table 3). Of these, the vast majorities were three and four year old fall Chinook released from TRH as fingerlings or yearlings in 2002 or 2003 (CWT

groups:065289, 065298, 065299, 065306, 065307 and 065309).

Incidence of Gill net Wounds, Hook Scars, and Predator Wounds. Forty (21.5%) of the 186 spring Chinook trapped at JCW had gill net wounds. The average size of spring Chinook with gill net wounds verses those without gill net wounds was 67.3 and 65.8 cm. FL respectively. Although subjective, crews noted five old hooking scars, one fresh hooking scar and 3 wounds of unknown origin on spring Chinook at JCW.

Fifty two (9.1%) of the 573 fall Chinook trapped at JCW had gill net wounds. The average size of fall Chinook with gill net wounds verses those without gill net wounds was 65.9 and 62.9 cm FL respectively. Although subjective, crews noted 4 old hooking scars, 3 fresh hooking scars, 13 predator wounds and 23 wounds of unknown origin on fall Chinook trapped at JCW.

One hundred fifty seven (11.9%) of the 1,319 fall Chinook trapped at WCW had gill net wounds. The average size of fall Chinook with gill net wounds verses those without gill net wounds was 70.1 and 68.01 cm FL respectively. Although subjective, crews noted 16 old hooking scars, 21 fresh hooking scars, 38 predator wounds and 20 wounds of unknown origin on fall Chinook trapped at WCW.

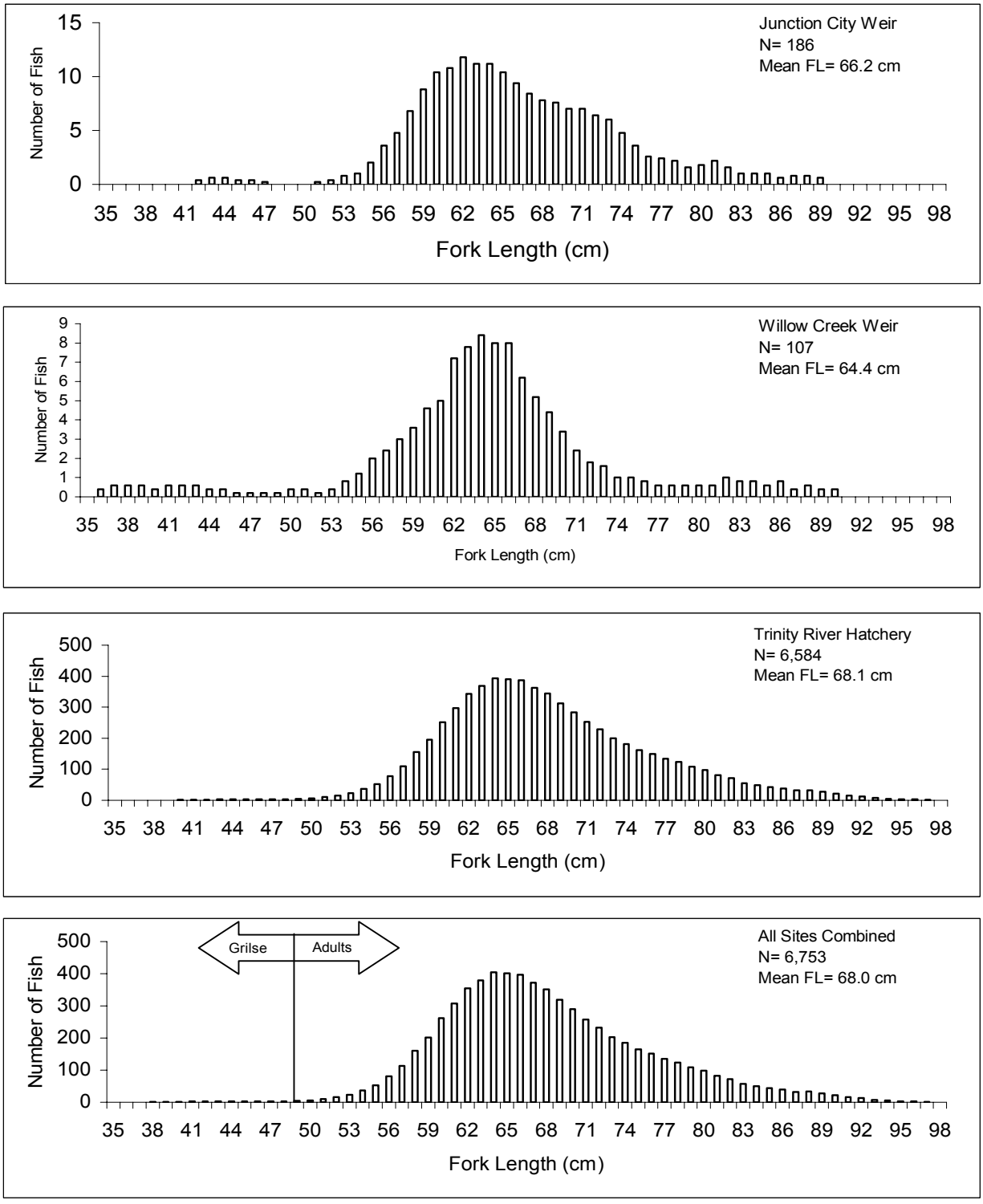



Figure 8. Spring-run Chinook salmon fork lengths (cm) observed at Junction City Weir, Willow Creek Weir, Trinity River Hatchery and all three sites combined (recaptured fish were only counted once) during the 2005-06 season. The number of fish at each fork length is shown as a moving average of five, 1-cm increments. The arrow denotes the size used to separate grilse and adults for analysis.

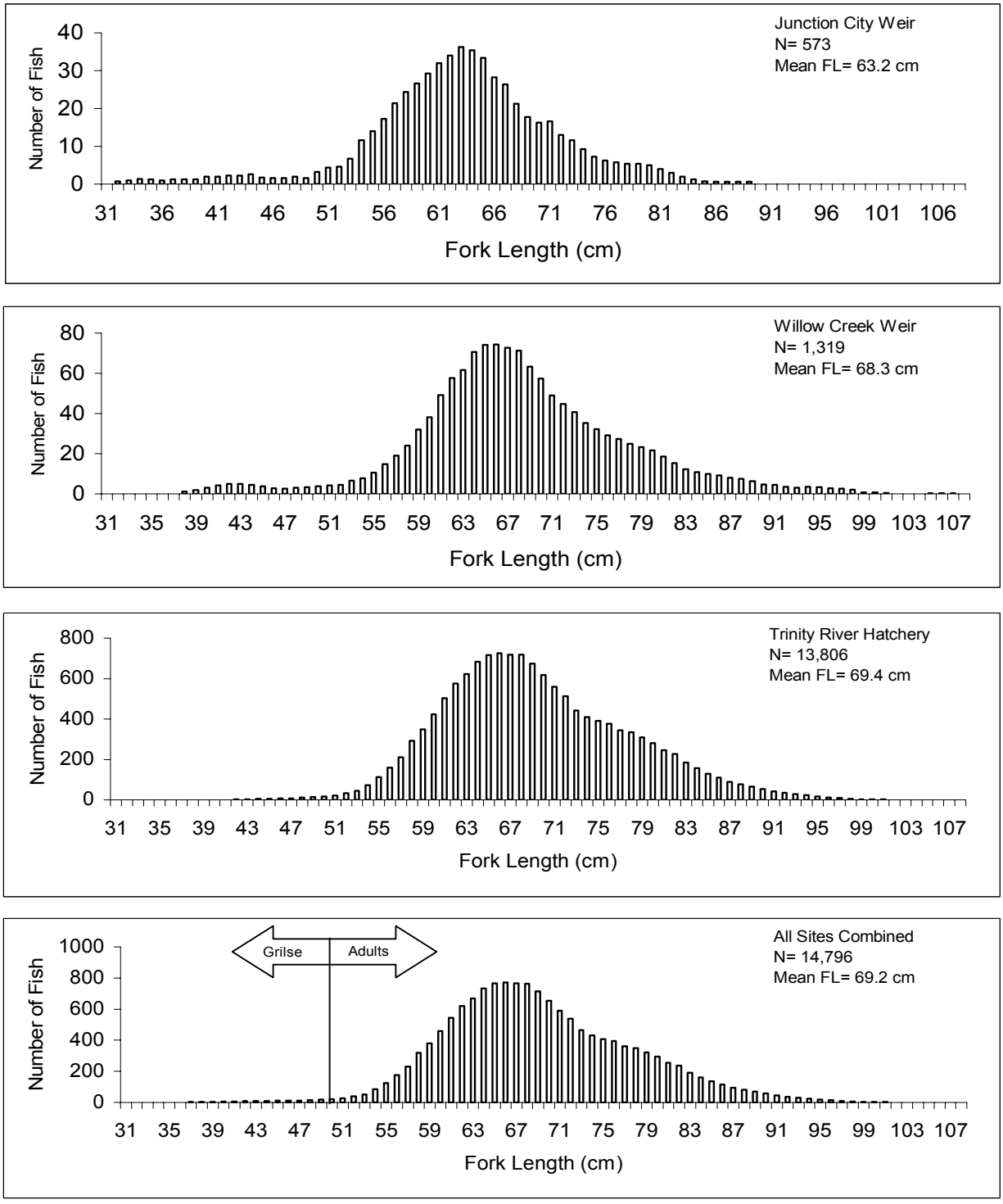



Figure 9. Fall-run Chinook salmon fork lengths (cm) observed at Junction City Weir, Willow Creek Weir, Trinity River Hatchery and all three sites combined (recaptured fish were only counted once) during the 2005-06 season. The number of fish at each fork length is shown as a moving average of five, 1-cm increments. The arrow denotes the size used to separate grilse and adults for analysis.

Table 3. Release data and recoveries of coded-wire tagged (CWT) and maxillary-clipped salmon trapped in the Trinity River at Willow Creek Weir (WCW) and Junction City Weir (JCW), and subsequently recovered at Trinity River Hatchery (TRH) during the 2005-06 season.

| CWT and release type | Species | Release data: Race | Brood year | Date | Number of fish | Site | Numbers recovered from tagging site: WCW | JCW |
|---|---|---|---|---|---|---|---|---|
| | | | ***Spring run Chinook*** | | | | | |
| 065260-f | Chinook | spring | 2000 | 06/06-13/01 | 33,049 | TRH | 0 | 0 |
| 065261-f | Chinook | spring | 2000 | 06/06-13/01 | 32,621 | TRH | 0 | 0 |
| 065262-f | Chinook | spring | 2000 | 06/06-13/01 | 24,480 | TRH | 0 | 0 |
| 065263-f | Chinook | spring | 2000 | 06/06-13/01 | 34,385 | TRH | 0 | 0 |
| 065264-f | Chinook | spring | 2000 | 06/06-13/01 | 31,857 | TRH | 0 | 0 |
| 065269-f | Chinook | spring | 2000 | 06/06-13/01 | 52,491 | TRH | 0 | 0 |
| 065270-f | Chinook | spring | 2000 | 06/06-13/01 | 52,580 | TRH | 0 | 0 |
| 065279-y | Chinook | spring | 2000 | 10/01-10/01 | 99,304 | TRH | 0 | 1 |
| 065281-f | Chinook | spring | 2001 | 06/03-10/02 | 89,482 | TRH | 0 | 0 |
| 065282-f | Chinook | spring | 2001 | 06/03-10/02 | 89,978 | TRH | 0 | 0 |
| 065283-f | Chinook | spring | 2001 | 06/03-10/02 | 73,788 | TRH | 0 | 1 |
| 065288-y | Chinook | spring | 2001 | 10/10-16/02 | 104,627 | TRH | 2 | 8 |
| 065295-f | Chinook | spring | 2002 | 06/03-09/03 | 89,284 | TRH | 0 | 2 |
| 065296-f | Chinook | spring | 2002 | 06/03-09/03 | 84,568 | TRH | 2 | 2 |
| 065297-f | Chinook | spring | 2002 | 06/03-09/03 | 70,902 | TRH | 1 | 2 |
| 065308-y | Chinook | spring | 2002 | 10/01-07-03 | 106,139 | TRH | 3 | 7 |
| 065310-f | Chinook | spring | 2003 | 06/04-10/04 | 94,182 | TRH | 0 | 0 |
| 065311-f | Chinook | spring | 2003 | 06/04-10/04 | 78,663 | TRH | 0 | 0 |
| 065312-f | Chinook | spring | 2003 | 06/04-10/04 | 92,711 | TRH | 0 | 0 |
| 065317-y | Chinook | spring | 2003 | 10/20/2004 | 104,974 | TRH | 0 | 0 |
| shed tag a/ | Chinook | spring | | | | | | 4 |
| ***Total spring run Chinook:*** | | | | | | | 8 | 27 |
| | | | ***Fall run Chinook*** | | | | | |
| 065265-f | Chinook | fall | 2000 | 06/06-13/01 | 32,795 | TRH | 0 | 0 |
| 065266-f | Chinook | fall | 2000 | 06/06-13/01 | 33,806 | TRH | 0 | 0 |
| 065267-f | Chinook | fall | 2000 | 06/06-13/01 | 34,852 | TRH | 0 | 0 |
| 065268-f | Chinook | fall | 2000 | 06/06-13/01 | 33,240 | TRH | 0 | 0 |
| 065271-f | Chinook | fall | 2000 | 06/06-13/01 | 54,867 | TRH | 0 | 0 |
| 065272-f | Chinook | fall | 2000 | 06/06-13/01 | 36,035 | TRH | 0 | 0 |
| 065273-f | Chinook | fall | 2000 | 06/06-13/01 | 57,444 | TRH | 0 | 0 |
| 065274-f | Chinook | fall | 2000 | 06/06-13/01 | 32,096 | TRH | 0 | 0 |
| 065275-f | Chinook | fall | 2000 | 06/06-13/01 | 64,250 | TRH | 0 | 0 |
| 065276-f | Chinook | fall | 2000 | 06/06-13/01 | 27,159 | TRH | 0 | 0 |
| 065277-f | Chinook | fall | 2000 | 06/06-13/01 | 56,582 | TRH | 0 | 0 |
| 065278-f | Chinook | fall | 2000 | 06/06-13/01 | 34,183 | TRH | 0 | 0 |
| 065280-y | Chinook | fall | 2000 | 10/01-10/01 | 216,593 | TRH | 2 | 0 |
| 065643-f | Chinook | fall | 2000 | 06/06-13/01 | 25,007 | TRH | 0 | 0 |
| 065284-f | Chinook | fall | 2001 | 06/03-10/02 | 119,555 | TRH | 3 | 1 |
| 065285-f | Chinook | fall | 2001 | 06/03-10/02 | 114,119 | TRH | 0 | 0 |
| 065286-f | Chinook | fall | 2001 | 06/03-10/02 | 126,135 | TRH | 1 | 1 |
| 065287-f | Chinook | fall | 2001 | 06/03-10/02 | 121,607 | TRH | 0 | 0 |
| 065290-f | Chinook | fall | 2001 | 06/03-10/02 | 10,234 | TRH | 0 | 0 |
| 065291-f | Chinook | fall | 2001 | 06/03-10/02 | 8,269 | TRH | 1 | 0 |
| 065289-y | Chinook | fall | 2001 | 10/10-16/02 | 230,055 | TRH | 20 | 6 |
| 065292-f | Chinook | fall | 2002 | 06/03-09/03 | 10,355 | TRH | 2 | 0 |
| 065298-f | Chinook | fall | 2002 | 06/03-09/03 | 124,602 | TRH | 27 | 10 |
| 065299-f | Chinook | fall | 2002 | 06/03-09/03 | 126,729 | TRH | 13 | 12 |
| 065306-f | Chinook | fall | 2002 | 06/03-09/03 | 124,014 | TRH | 11 | 0 |
| 065307-f | Chinook | fall | 2002 | 06/03-09/03 | 123,263 | TRH | 19 | 7 |
| 065309-y | Chinook | fall | 2002 | 10/01-07/03 | 236,319 | TRH | 33 | 35 |
| 065293-f | Chinook | fall | 2003 | 06/04-10/04 | 11,342 | TRH | 0 | 0 |
| 065294-f | Chinook | fall | 2003 | 06/04-10/04 | 5,230 | TRH | 0 | 0 |
| 065313-f | Chinook | fall | 2003 | 06/04-10/04 | 125,073 | TRH | 0 | 0 |
| 065314-f | Chinook | fall | 2003 | 06/04-10/04 | 132,044 | TRH | 0 | 0 |
| 065315-f | Chinook | fall | 2003 | 06/04-10/04 | 131,548 | TRH | 0 | 0 |
| 065316-f | Chinook | fall | 2003 | 06/04-10/04 | 128,982 | TRH | 0 | 0 |
| 065318-y | Chinook | fall | 2003 | 10/20/2004 | 225,798 | TRH | 0 | 0 |
| shed tag a/ | Chinook | fall | | | | | 7 | 6 |
| ***Total fall run Chinook:*** | | | | | | | 139 | 78 |
| | | | ***Coho*** | | | | | |
| RM b/ | coho | | 2002 | 03/15 - 03/18 | 516,906 | TRH | 347 | 588 |
| RM b/ | coho | | 2003 | 03/15 - 03/17 | 520,656 | TRH | 73 | 209 |
| | | | | | | ***Total coho:*** | 420 | 797 |

a/ Fish with shed CWTs were designated as either spring or fall Chinook based on the date they were trapped at the weirs.
b/ Since 1996, all coho produced at TRH have received a right maxillary clip (RM). Coho less than 51 cm, FL were classified as brood year 2003 and coho greater than 50 cm, FL were classified as brood year 2002. Age cutoff based on fork length distribution.

Coho Salmon

Run timing. During the first nine weeks of trapping at JCW no coho were trapped. The first coho was trapped at JCW on 27 September, 2005 (JW 39). Once coho were trapped at JCW their capture was normally distributed and peaked during JW 44 when 82.8 fish per night were trapped (Table 4, Figure 10). The average catch of fish per night was normally distributed indicating that the JCW effectively trapped the beginning and end of the coho run. A total of 1,161 (279 grilse, 882 adults) coho were trapped at JCW this season.

During the first two weeks of trapping at WCW no coho were trapped. The first coho was trapped at WCW on 6 September, 2005 (JW 36). Coho trapping peaked during JW 41 when average catch was 53.8 fish per night (Table 5, Figure 11). A total of 772 coho were trapped (152 grilse and 620 adults) at WCW this season.

Size of Fish Trapped. Coho salmon trapped at JCW, WCW and TRH average FL was 58.0, 59.3 and 63.5 cm respectively (Figure 12, Appendix 6). The size separating grilse and adult coho was based on the combined fork length data from coho trapped at WCW and that entered TRH (Figure 12). This year all coho ≤50 cm. FL were considered grilse. Grilse coho comprised 24.0, 19.7 and 9.4% of the coho trapped at JCW, WCW and TRH respectively.

Effectively Tagged Fish. A total of 1,161 coho salmon were trapped at JCW, of which 1,112 (273 grilse and 839 adults) were effectively tagged (Appendix 6). Due to poor condition 41 coho trapped at JCW were not tagged. There were 6 tagging mortalities and 2 caught and released coho, from which anglers reported removing tags (Appendix 10).

A total of 772 coho salmon were trapped WCW, of which 747 (145 grilse and 602 adults) were effectively tagged (Appendix 6). Due to poor condition 17 coho trapped at WCW were not tagged. There were 2 tagging mortalities and 6 caught and released coho, from which anglers reported removing tags (Appendix 12).

To discourage anglers from targeting coho, all coho at both tagging sites received non-reward

tags.

Incidence of Tags and Maxillary Clips. Ninety two percent (1,071/1,161) of the coho salmon trapped at JCW (279 grilse and 795 adults) bore right maxillary (RM) clips (Appendix 6). Seven hundred ninety seven of the JCW project tagged, RM-clipped coho, were recovered at TRH (Table 3).

Ninety two percent (710/772) of the coho salmon trapped at WCW (148 grilse and 562 adults) bore right maxillary (RM) clips (Appendix 6). Four hundred twenty of the WCW project tagged, RM-clipped coho, were recovered at TRH (Table 3).

Incidence of Gill net Wounds, Hook Scars and Predator Wounds. Thirty seven (3.2%) of the 1,161 coho observed at JCW had gill net wounds. The average size of coho with gill net wounds verses without gill net wounds was 65.0 and 57.9 cm FL respectively. Although subjective, crews at JCW noted on adult coho: 1 old hooking scar, 7 fresh hooking scars, 41 predator scars and 43 wounds of unknown origin.

Twenty one (2.7%) of the 772 coho observed at WCW had gill net wounds. The average size of coho with gill net wounds verses without gill net wounds was 63.8 and 59.2 cm FL respectively. Although subjective, crews at WCW noted on adult coho: 2 old hooking scars, 6 fresh hooking scars, 62 predator scars and 12 wounds of unknown origin.

Table 4. Weekly summary of coho trapped in the Trinity River at Junction City Weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped | | | fish/night |
|---|---|---|---|---|---|---|---|---|
| | | | | | Grilse b/ | Adults | Total | |
| 29-38 | 16-Jul | - | 23-Sep | 42 | 0 | 0 | 0 | 0.0 |
| 39 | 24-Sep | - | 30-Sep | 5 | 0 | 5 | 5 | 1.0 |
| 40 | 1-Oct | - | 7-Oct | 5 | 3 | 25 | 28 | 5.6 |
| 41 | 8-Oct | - | 14-Oct | 4 | 32 | 61 | 93 | 23.3 |
| 42 | 15-Oct | - | 21-Oct | 5 | 75 | 93 | 168 | 33.6 |
| 43 | 22-Oct | - | 28-Oct | 5 | 91 | 278 | 369 | 73.8 |
| 44 | 29-Oct | - | 4-Nov | 4 | 53 | 278 | 331 | 82.8 |
| 45 | 5-Nov | - | 11-Nov | 3 | 5 | 73 | 78 | 26.0 |
| 46 | 12-Nov | - | 18-Nov | 5 | 16 | 38 | 54 | 10.8 |
| 47 | 19-Nov | - | 25-Nov | 3 | 2 | 16 | 18 | 6.0 |
| 48 | 26-Nov | - | 2-Dec | 1 | 2 | 15 | 17 | 17.0 |
| Total | | | | 82 | 279 | 882 | 1,161 | |
| Mean:c/ | | | | | | | | 29.0 |

a/ Trapping at Junction City took place from 22 July (Julian week 29) through November 28 (Julian Week 48) of 2005.
b/ Coho <51 cm, FL were considered grilse.
c/ Weeks prior to the first coho being trapped were excluded.

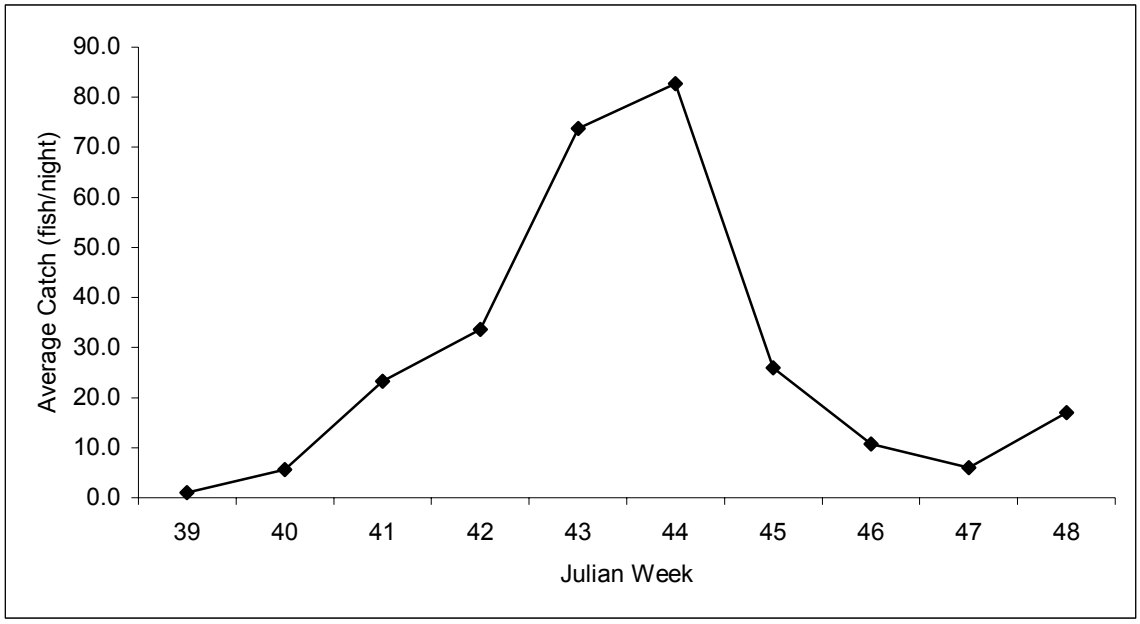



Figure 10. Average catch of coho in the Trinity River at Junction City Weir during 2005.

Table 5. Weekly summary of coho trapped in the Trinity River at Willow Creek Weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped | | | fish/night |
|---|---|---|---|---|---|---|---|---|
| | | | | | Grilse b/ | Adults | Total | |
| 34 | 20-Aug | - | 26-Aug | 4 | | | 0 | 0 |
| 35 | 27-Aug | - | 2-Sep | 2 | | | 0 | 0 |
| 36 | 3-Sep | - | 9-Sep | 5 | 1 | 1 | 2 | 0.4 |
| 37 | 10-Sep | - | 16-Sep | 5 | 0 | 2 | 2 | 0.4 |
| 38 | 17-Sep | - | 23-Sep | 5 | 4 | 28 | 32 | 6.4 |
| 39 | 24-Sep | - | 30-Sep | 5 | 31 | 66 | 97 | 19.4 |
| 40 | 1-Oct | - | 7-Oct | 5 | 18 | 94 | 112 | 22.4 |
| 41 | 8-Oct | - | 14-Oct | 5 | 66 | 203 | 269 | 53.8 |
| 42 | 15-Oct | - | 21-Oct | 5 | 8 | 32 | 40 | 8 |
| 43 | 22-Oct | - | 28-Oct | 5 | 20 | 113 | 133 | 26.6 |
| 44 | 29-Oct | - | 4-Nov | 5 | 4 | 81 | 85 | 17 |
| Total | | | | 51 | 152 | 620 | 772 | |
| Mean:c/ | | | | | | | | 17.2 |

a/ Trapping at Willow Creek took place from 22 August (Julian Week 34) through 4 November (Julian Week 44) of 2005.
b/ Coho <51 cm, FL were considered grilse.
c/ Weeks prior to the first coho being trapped were excluded.

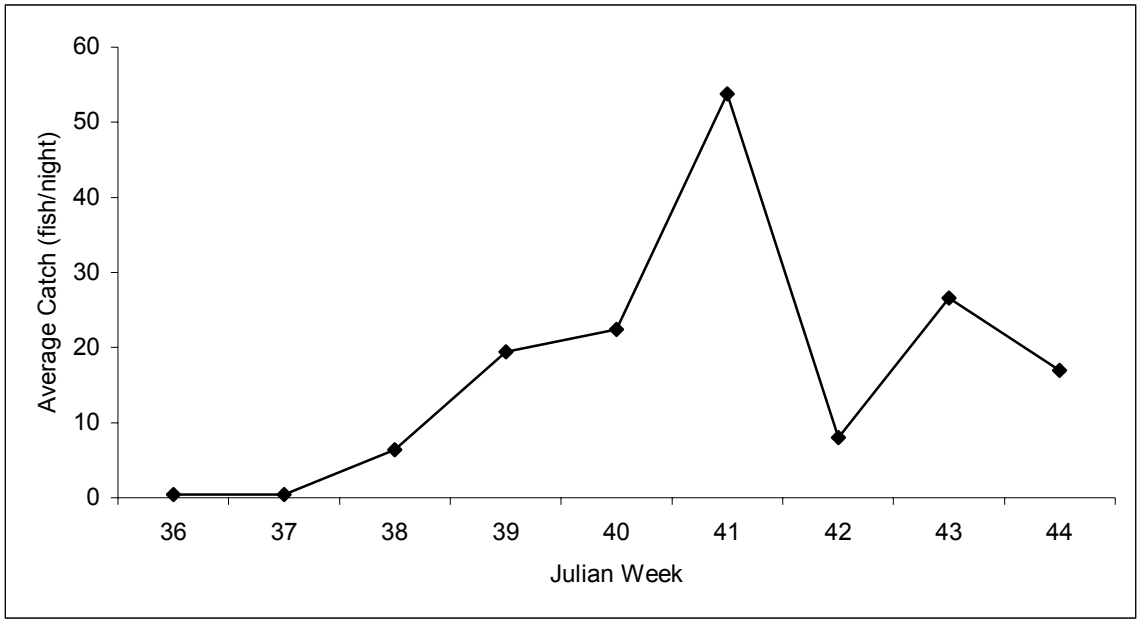



Figure 11. Average catch of coho in the Trinity River at Willow Creek Weir during 2005.

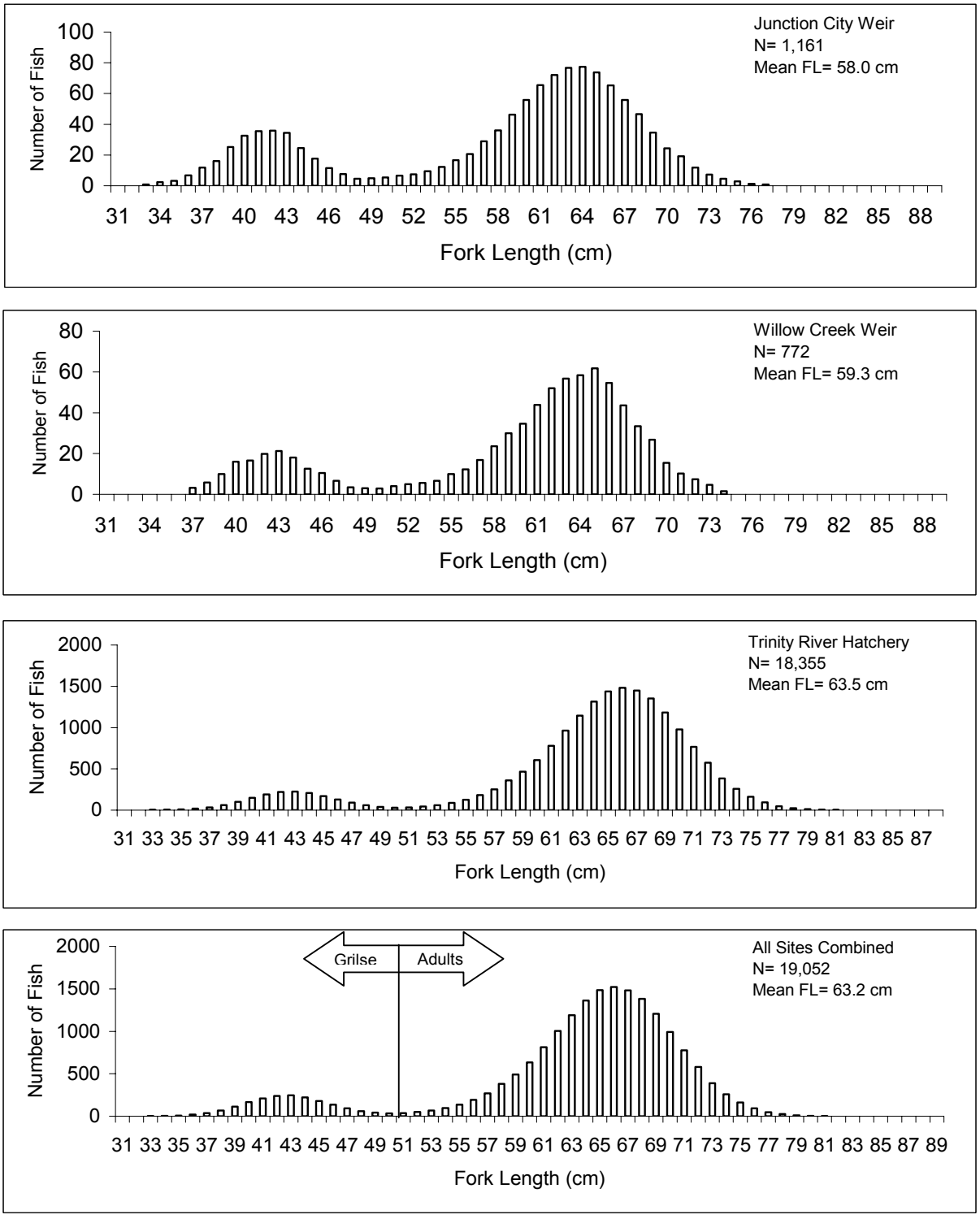



Figure 12. Coho salmon fork lengths (cm) observed at Junction City Weir, Willow Creek Weir, Trinity River Hatchery and all three sites combined (recaptured fish were only counted once) during the 2005-06 season. The number of fish at each fork length is shown as a moving average of five, 1-cm increments. The arrow denotes the size used to separate grilse and adults for analysis.

Fall Steelhead

Run Timing. Steelhead were trapped during all weeks of trapping at WCW (Table 6, Figure 13). Peak trapping of steelhead occurred during JW 41 when 80.4 fish per night were trapped. During the first week of trapping at WCW eleven percent (244/2,220) of the season's steelhead were trapped, which indicates that the trap was installed during a pulse of steelhead migration. In total, 2,220 adult steelhead were trapped at WCW this season. At JCW, less than 6.0 fish per night were trapped throughout the season until JW 40, when the main steelhead run arrived. At JCW steelhead peaked during JW 45, when 83.7 fish per night were trapped. A total of 840 adult steelhead were trapped at JCW this season (Table 7, Figure 14).

Size of Fish Trapped. Steelhead caught at JCW, WCW, and TRH averaged 58.9, 60.4 and 61.9 cm FL respectively (Figure 15). Adult steelhead (> 41 cm., FL) made up 96.8% and 96.0% of the steelhead trapped at JCW and WCW respectively.

Effectively Tagged Fish. Of the 2,220 steelhead trapped at WCW 1,975 were effectively tagged (Appendix 7). Two tagging mortalities were detected, 105 fish were not tagged, and anglers reported removing tags from 138 caught and released fish. Nine hundred sixty three of the effectively tagged adults were reward-tagged, the remainder received non-reward tags. Steelhead were not tagged at JCW.

Incidence of Tags and Fin Clips. Ad-clips were observed on 1,610 (72.5 %) of the steelhead trapped at WCW, 768 (91.4 %) of those trapped at JCW, and 8,080 (99.2%) of those recovered at TRH (Appendix 7). Additionally, nine steelhead trapped at WCW had various other clips (2-left maxillary and 7-right maxillary). All steelhead released from TRH have been Ad-clipped prior to release since brood year 1997.

Incidence of Gill-net Wounds, Hook Scars and Predator Wounds. At WCW, 28 of the steelhead trapped had gill-net wounds, 8 had old hook wounds, 12 had fresh hook wounds, 30 had unknown wounds, and 193 had predator wounds. At JCW, 3 steelhead had gill-net wounds, 5 had fresh hook wounds, 13 had wounds of unknown origin and 13 had predator wounds.

Table 6. Weekly summary of steelhead trapped in the Trinity River at Willow Creek Weir during 2005. a/

| Julian Week | Inclusive dates | Nights Trapped | Number Trapped | | | fish/night |
|---|---|---|---|---|---|---|
| | | | 1/2 lbers b/ | Adults | Total | |
| 34 | 20-Aug - 26-Aug | 4 | 6 | 238 | 244 | 61.0 |
| 35 | 27-Aug - 2-Sep | 2 | 3 | 90 | 93 | 46.5 |
| 36 | 3-Sep - 9-Sep | 5 | 6 | 138 | 144 | 28.8 |
| 37 | 10-Sep - 16-Sep | 5 | 8 | 96 | 104 | 20.8 |
| 38 | 17-Sep - 23-Sep | 5 | 9 | 241 | 250 | 50.0 |
| 39 | 24-Sep - 30-Sep | 5 | 7 | 187 | 194 | 38.8 |
| 40 | 1-Oct - 7-Oct | 5 | 26 | 352 | 378 | 75.6 |
| 41 | 8-Oct - 14-Oct | 5 | 15 | 387 | 402 | 80.4 |
| 42 | 15-Oct - 21-Oct | 5 | 5 | 176 | 181 | 36.2 |
| 43 | 22-Oct - 28-Oct | 5 | 0 | 105 | 105 | 21.0 |
| 44 | 29-Oct - 4-Nov | 5 | 3 | 122 | 125 | 25.0 |
| Total | | 51 | 88 | 2,132 | 2,220 | |
| Mean: | | | | | | 43.5 |

a/ Trapping at Willow Creek took place from 22 August (Julian Week 34) through 4 November (Julian Week 44) of 2005.

b/ Steelhead < 42 cm, FL were considered 1/2 half-pounders.

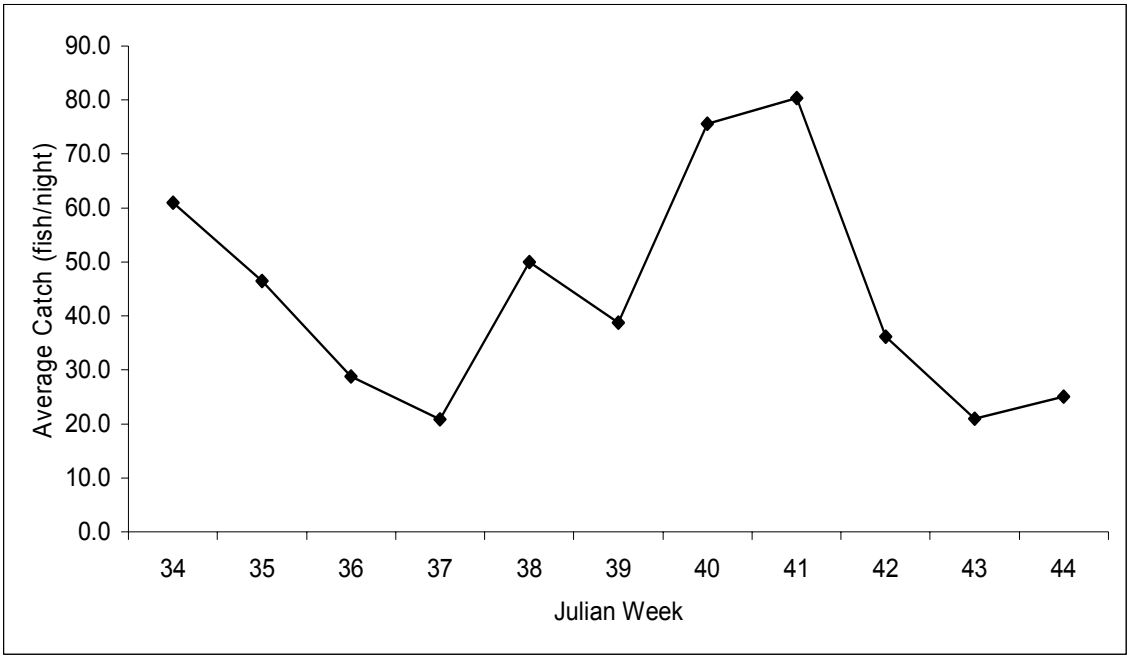



Figure 13. Average catch of steelhead in the Trinity River at Willow Creek Weir during 2005.

Table 7. Weekly summary of steelhead trapped in the Trinity River at Junction City Weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped 1/2 lbers b/ | Adults | Total | fish/night |
|---|---|---|---|---|---|---|---|---|
| 29 | 16-Jul | - | 23-Sep | 1 | 0 | 2 | 2 | 2.0 |
| 30 | 23-Jul | - | 29-Jul | 5 | 0 | 15 | 15 | 3.0 |
| 31 | 30-Jul | - | 5-Aug | 5 | 0 | 12 | 12 | 2.4 |
| 32 | 6-Aug | - | 12-Aug | 5 | 0 | 0 | 0 | 0.0 |
| 33 | 13-Aug | - | 19-Aug | 5 | 0 | 1 | 1 | 0.2 |
| 34 | 20-Aug | - | 26-Aug | 5 | 0 | 8 | 8 | 1.6 |
| 35 | 27-Aug | - | 2-Sep | 2 | 0 | 8 | 8 | 4.0 |
| 36 | 3-Sep | - | 9-Sep | 4 | 0 | 6 | 6 | 1.5 |
| 37 | 10-Sep | - | 16-Sep | 5 | 0 | 3 | 3 | 0.6 |
| 38 | 17-Sep | - | 23-Sep | 5 | 0 | 8 | 8 | 1.6 |
| 39 | 24-Sep | - | 30-Sep | 5 | 0 | 29 | 29 | 5.8 |
| 40 | 1-Oct | - | 7-Oct | 5 | 5 | 82 | 87 | 17.4 |
| 41 | 8-Oct | - | 14-Oct | 4 | 8 | 99 | 107 | 26.8 |
| 42 | 15-Oct | - | 21-Oct | 5 | 2 | 73 | 75 | 15.0 |
| 43 | 22-Oct | - | 28-Oct | 5 | 4 | 124 | 128 | 25.6 |
| 44 | 29-Oct | - | 4-Nov | 4 | 2 | 78 | 80 | 20.0 |
| 45 | 5-Nov | - | 11-Nov | 3 | 5 | 246 | 251 | 83.7 |
| 46 | 12-Nov | - | 18-Nov | 5 | 0 | 11 | 11 | 2.2 |
| 47 | 19-Nov | - | 25-Nov | 3 | 0 | 6 | 6 | 2.0 |
| 48 | 26-Nov | - | 2-Dec | 1 | 1 | 2 | 3 | 3.0 |
| Total | | | | 82 | 27 | 813 | 840 | |
| Mean: | | | | | | | | 10.2 |

a/ Trapping at Junction City took place from 22 July (Julian week 29) through November 28 (Julian Week 48) of 2005.
b/ Steelhead < 42 cm, FL were considered 1/2-pounders.

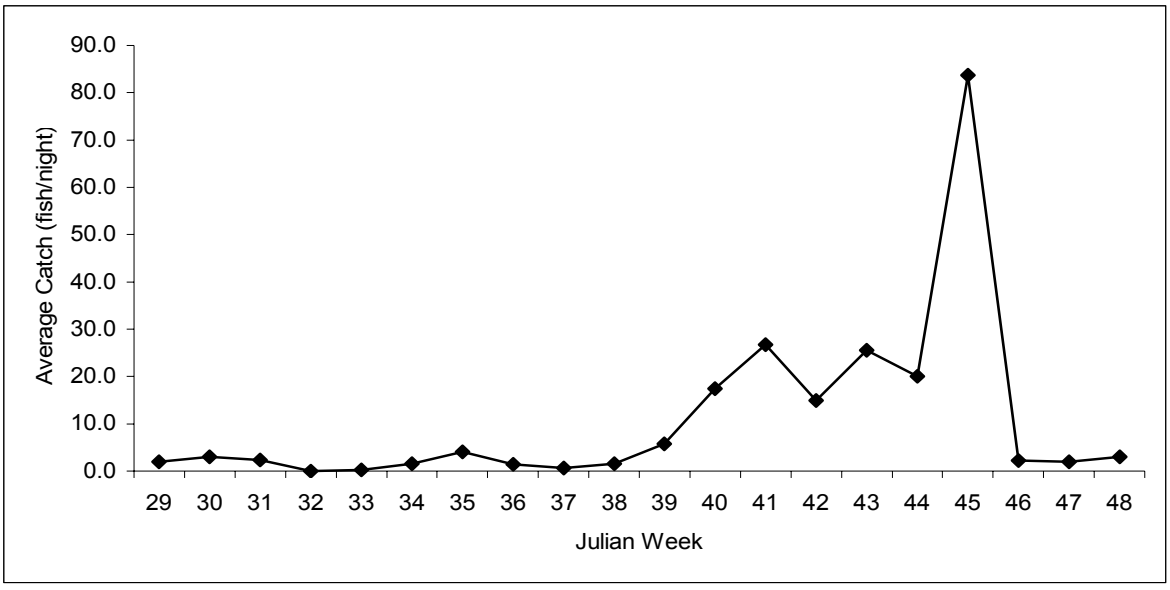



Figure 14. Average catch of steelhead in the Trinity River at Junction City Weir during 2005.

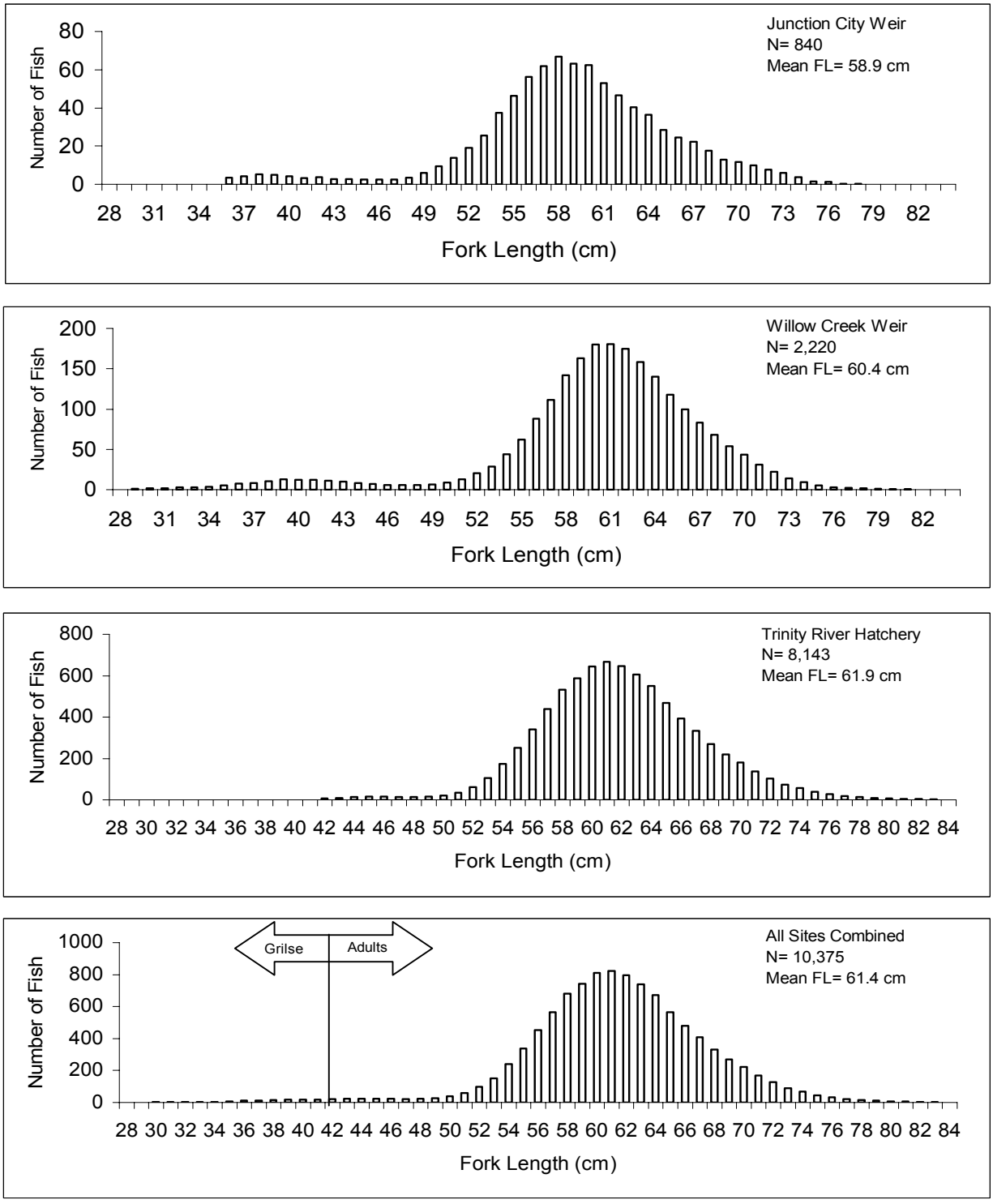



Figure 15. Steelhead fork lengths (cm) observed at Junction City Weir, Willow Creek Weir, Trinity River Hatchery and all three sites combined (recaptured fish were only counted once) during the 2005-06 season. The number of fish at each fork length is shown as a moving average of five, 1-cm increments. The arrow denotes the size used to separate grilse and adults for analysis.

Brown Trout

Capture Timing. Brown trout were captured during every week of trapping at JCW during the 2005 season except for JW 36 and JW 48 (Table 8, Figure 16). The JCW was installed during an upstream migration of brown trout. This initial pulse peaked during JW 31, when an average of 19.2 fish per night were trapped. This initial pulse ended during JW 32 when an average of 8.0 fish per night were trapped. Average trapping of brown trout remained below 8.0 fish per night the remainder of the season. Although an additional pulse of brown trout were trapped later in the season peaking during JW 42. Two brown trout were observed at WCW during 2005.

Size of Fish Trapped. Brown trout captured this season ranged in size from 33 to 63 cm FL and averaged 45.3 cm (Table 9, Figure 17). Average size by week of capture was variable. Length frequency analysis suggests that several year classes of brown trout were trapped at JCW in 2005. Eight brown trout were recaptured from the 2004 trapping season. Observed growth rates for the recaptured brown trout averaged 5.3 cm per year and ranged from 2 to 9 cm per year.

Effectively Tagged Fish. At JCW 349 brown trout were captured, of which 328 were effectively tagged. Thirteen brown trout were reported as caught and released by anglers. All of the brown trout at JCW were tagged with non-reward tags. Two brown trout were trapped at WCW and both were tagged with non-reward tags

Recovery of Tagged Fish

Total Recoveries. Fish tagged at JCW and WCW were recovered from four different sources; at TRH, upper Trinity River spawner surveys, angler returns, and tagging mortalities found on or near the tagging weirs. Length frequencies of spring and fall Chinook, coho, and steelhead tagged at the weirs and subsequently recovered are presented in Appendices 8-13.

Fifty nine percent of the tagged spring Chinook at JCW were recovered. Sixty five and 60% of fall Chinook tagged at JCW and WCW were recovered respectively. Seventy seven and 61% of coho tagged at JCW and WCW were recovered respectively. Forty seven percent of steelhead tagged at WCW were also recovered. The highest number of recoveries for all species occurred at TRH.

Tag Returns by Anglers

Angler Harvest Regulations. Department of Fish and Game fishing regulations can affect the return of tags each year by limiting harvest. Special quota restrictions were in place for the 2005-06 angling season (Appendix 14). The adult fall Chinook salmon sport quota for the Trinity River was 416 fish, split equally between the lower River (Weitchpec to Cedar Flat) and the upper River (Cedar Flat to Lewiston). Additionally, anglers were allowed to retain 1 Ad-clipped steelhead and 1 brown trout per day, the take of coho was prohibited.

Table 8. Weekly summary of brown trout trapped in the Trinity River at Junction City Weir during 2005. a/

| Julian Week | Inclusive dates | | | Nights Trapped | Number Trapped | |
|---|---|---|---|---|---|---|
| | | | | | Total | fish/night |
| 29 | 16-Jul | - | 22-Jul | 1 | 14 | 14.0 |
| 30 | 23-Jul | - | 29-Jul | 5 | 56 | 11.2 |
| 31 | 30-Jul | - | 5-Aug | 5 | 96 | 19.2 |
| 32 | 6-Aug | - | 12-Aug | 5 | 40 | 8.0 |
| 33 | 13-Aug | - | 19-Aug | 5 | 8 | 1.6 |
| 34 | 20-Aug | - | 26-Aug | 5 | 7 | 1.4 |
| 35 | 27-Aug | - | 2-Sep | 2 | 2 | 1.0 |
| 36 | 3-Sep | - | 9-Sep | 4 | 0 | 0.0 |
| 37 | 10-Sep | - | 16-Sep | 5 | 1 | 0.2 |
| 38 | 17-Sep | - | 23-Sep | 5 | 1 | 0.2 |
| 39 | 24-Sep | - | 30-Sep | 5 | 13 | 2.6 |
| 40 | 1-Oct | - | 7-Oct | 5 | 16 | 3.2 |
| 41 | 8-Oct | - | 14-Oct | 4 | 14 | 3.5 |
| 42 | 15-Oct | - | 21-Oct | 5 | 37 | 7.4 |
| 43 | 22-Oct | - | 28-Oct | 5 | 19 | 3.8 |
| 44 | 29-Oct | - | 4-Nov | 4 | 8 | 2.0 |
| 45 | 5-Nov | - | 11-Nov | 3 | 12 | 4.0 |
| 46 | 12-Nov | - | 18-Nov | 5 | 4 | 0.8 |
| 47 | 19-Nov | - | 25-Nov | 3 | 1 | 0.3 |
| 48 | 26-Nov | - | 2-Dec | 1 | 0 | 0.0 |
| | | | Total: | 82 | 349 | |
| | | | Mean: | | | 4.3 |

a/ Trapping at Junction City took place from 22 July (Julian week 29) through November 28 (Julian week 48).

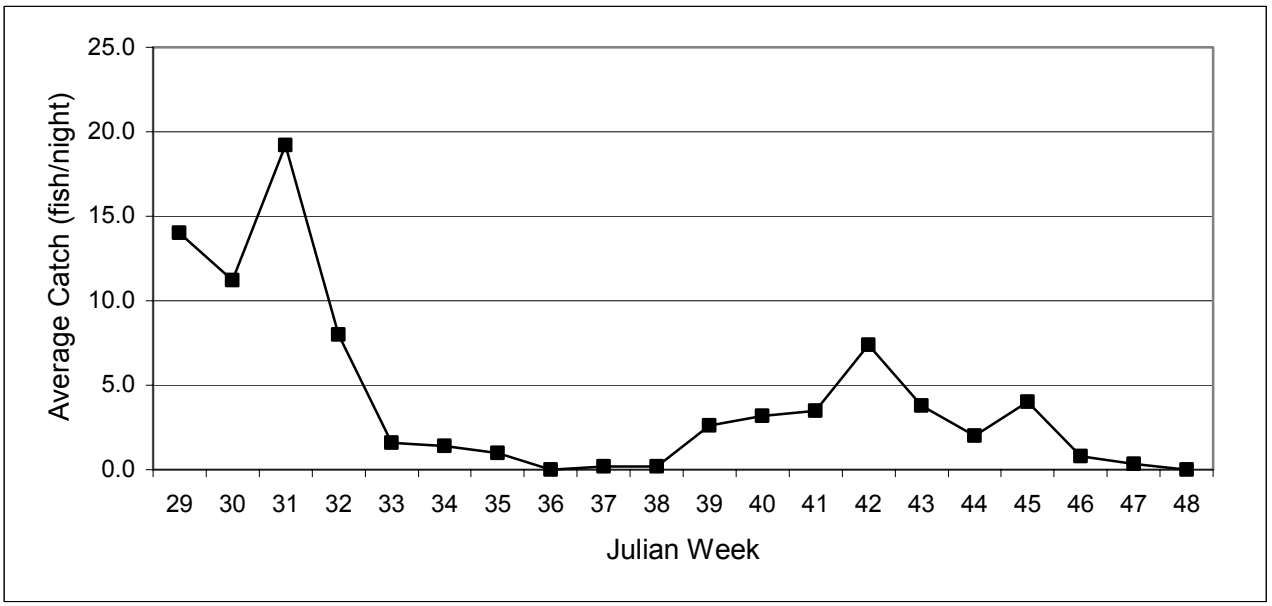



Figure 16. Average catch of brown trout in the Trinity River at Junction City Weir during 2005.

Table 9. Summary of brown trout trapped by Julian Week at Junction City Weir during 2005.

| | Julian week of capture | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | |
| Fork length | Number of trapping days | | | | | | | | | | | | | | | | | | | | |
| (cm) | 1 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 3 | 5 | 3 | 1 | Totals |
| 33 | | 1 | | | | | | | | | 1 | | | | | 1 | | | | | 3 |
| 34 | | 2 | 4 | | | | | | | | 1 | | | | 1 | 0 | | | | | 8 |
| 35 | | 1 | 2 | 2 | | | | | | | 0 | | 1 | | 0 | 0 | | | | | 6 |
| 36 | | 1 | 3 | 1 | | 1 | | | | | 0 | | 0 | 1 | 0 | 0 | | | | | 7 |
| 37 | | 2 | 2 | 1 | | 0 | | | | | 0 | | 0 | 0 | 0 | 0 | | | | | 5 |
| 38 | | 0 | 6 | 3 | 1 | 0 | | | | | 0 | | 0 | 1 | 0 | 0 | | | | | 11 |
| 39 | | 4 | 3 | 2 | 0 | 2 | | | | | 1 | 1 | 1 | 0 | 0 | 0 | 1 | | 1 | | 16 |
| 40 | | 2 | 7 | 3 | 0 | 1 | | | | | 0 | 1 | 0 | 2 | 2 | 0 | 1 | | | | 19 |
| 41 | 1 | 1 | 7 | 5 | 0 | 1 | | | | | 0 | 1 | 1 | 4 | 1 | 0 | 0 | | | | 22 |
| 42 | 0 | 8 | 6 | 4 | 2 | 0 | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 1 | | | | 23 |
| 43 | 1 | 4 | 6 | 4 | 1 | 0 | 1 | | | | 2 | 1 | 0 | 1 | 2 | 1 | 0 | 2 | | | 26 |
| 44 | 1 | 3 | 6 | 3 | 0 | 0 | 0 | | | | 1 | 1 | 2 | 3 | 0 | 1 | 1 | 0 | | | 22 |
| 45 | 1 | 2 | 8 | 1 | 1 | 1 | 0 | | | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | | | 19 |
| 46 | 1 | 5 | 7 | 4 | 1 | 1 | 0 | | | | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | | | 26 |
| 47 | 0 | 1 | 6 | 1 | 0 | | 0 | | | | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | | | 14 |
| 48 | 1 | 2 | 4 | 0 | 1 | | 0 | | | | 0 | 1 | 0 | 3 | 1 | 1 | 0 | | | | 14 |
| 49 | 1 | 3 | 5 | 1 | 0 | | 0 | | | | 2 | 3 | 4 | 5 | 3 | 0 | 1 | | | | 28 |
| 50 | 0 | 3 | 3 | 2 | 0 | | 1 | | 1 | | 0 | 1 | 0 | 2 | 1 | 0 | 1 | | | | 15 |
| 51 | 0 | 2 | 3 | 0 | 0 | | | | | | 0 | 2 | 0 | 1 | 2 | 1 | 1 | | | | 12 |
| 52 | 0 | 4 | 2 | 0 | 0 | | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | | 7 |
| 53 | 3 | 0 | 1 | 0 | 1 | | | | | | 1 | 2 | 1 | 3 | 2 | 0 | 1 | | | | 15 |
| 54 | 3 | 0 | 1 | 0 | | | | | | | 1 | 0 | 1 | 0 | 1 | 0 | 0 | | | | 7 |
| 55 | 0 | 1 | 1 | 1 | | | | | | | | 2 | 0 | 2 | 1 | 0 | 0 | | | | 8 |
| 56 | 0 | 2 | 1 | 1 | | | | | | | | | 0 | 0 | | 0 | 0 | | | | 4 |
| 57 | 0 | 1 | 2 | 0 | | | | | | | | | 1 | 0 | | 0 | 0 | | | | 4 |
| 58 | 0 | 0 | | 0 | | | | | | | | | | 1 | | 0 | 0 | | | | 1 |
| 59 | 0 | 1 | | 1 | | | | | | | | | | 0 | | 1 | 0 | | | | 3 |
| 60 | 1 | | | | | | | | | | | | | 2 | | | 0 | | | | 3 |
| 61 | | | | | | | | | | | | | | | | | 0 | | | | 0 |
| 62 | | | | | | | | | | | | | | | | | 0 | | | | 0 |
| 63 | | | | | | | | | | | | | | | | | 1 | | | | 1 |
| Totals: | 14 | 56 | 96 | 40 | 8 | 7 | 2 | 0 | 1 | 1 | 13 | 16 | 14 | 37 | 19 | 8 | 12 | 4 | 1 | 0 | 349 |
| Mean FL: | 49.8 | 44.9 | 43.9 | 43.2 | 44.6 | 40.9 | 46.5 | 0.0 | 50.0 | 45.0 | 44.5 | 48.1 | 46.8 | 47.5 | 47.2 | 46.3 | 47.3 | 44.8 | 39.0 | 0.0 | 45.3 |

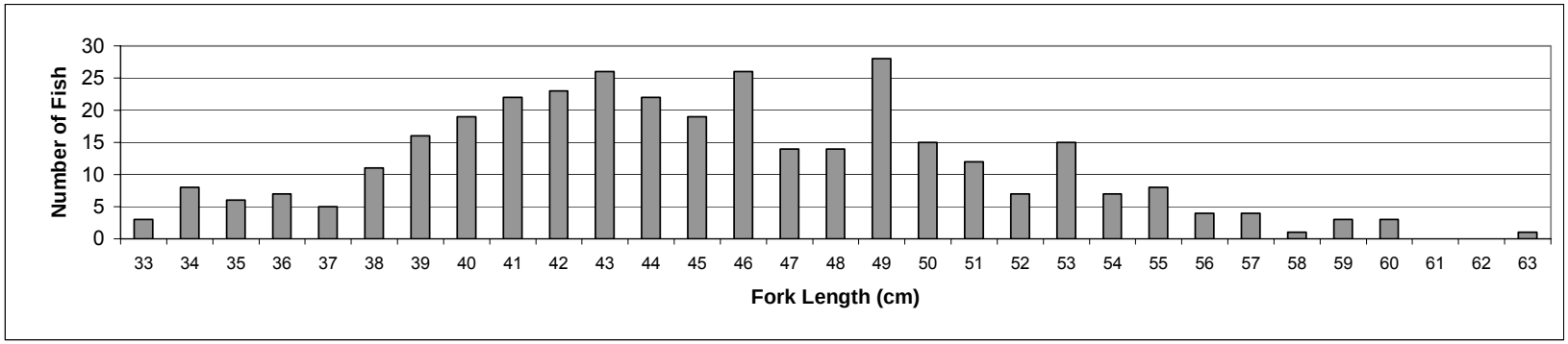



Figure 17. Fork length distribution of brown trout captured in the Trinity River at the Junction City weir during 2005.

Spring Chinook. Anglers returned 6 (4 reward and 2 non-reward) tags from harvested adult spring Chinook tagged at JCW. No tags were returned as harvested from grilse spring Chinook at JCW this season (Appendix 8). Harvest rate was estimated, based on the return of reward tags, at 0.0 for grilse and 6.9% for adults. Anglers reported releasing 1 reward tagged adult and 3 non-reward tagged adults. The catch and release rate for adults was estimated at 2.2% by averaging returns from reward and non-reward tags. The catch and release rate for grilse was estimated at zero by averaging returns from reward and non-reward tags.

Fall Chinook. Anglers returned tags from 1 grilse (1 reward tag) and 31 (13 reward, 18 non-reward) adult harvested fall Chinook salmon tagged at WCW. Based on the return of reward tags, the estimated harvest rate of fall Chinook upstream of WCW was 3.1% for adults and 11.1% for grilse. Anglers reported catching and releasing 18 (7 reward and 11 non-reward) adult fall Chinook tagged at WCW this season. Anglers reported catching and releasing two additional (2 reward and 0 non-reward) grilse fall Chinook tagged at WCW (Appendix 11). Catch and release rates for fall Chinook upstream of the WCW were estimated using reward tags only at 1.7% for adults and 18.2% for grilse. For management purposes the harvest rates generated from tagging operations at WCW are used verses rates generated from JCW.

Anglers returned tags from 6 (4 reward, 2 non-reward) harvested fall Chinook adult salmon tagged at JCW and no tags from grilse . Based on those returns the estimated harvest rate of fall Chinook upstream of JCW was 2.4% for adults and 0.0% for grilse. Anglers reported catching and releasing 2 (1 reward and 1 non-reward) adult fall Chinook tagged at JCW this season. Anglers reported catching and releasing two additional (2 reward and 0 non-reward) grilse fall Chinook tagged at JCW (Appendix 9). Catch and release rates for fall Chinook upstream of the JCW were estimated using reward tags only at 0.6% for adults and 20.0% for grilse

Coho Salmon. To discourage the harvest of ESA listed coho salmon, all coho tagged at WCW and JCW received non-reward tags. One tag (non-reward tag) was returned from a harvested grilse coho tagged at WCW. Six tagged coho salmon (five adults and one grilse) were reported as caught and released by anglers during the season (Appendix 12). Catch and release rates for coho salmon above the WCW were estimated at 0.7% for grilse and 0.8% for adults.

Anglers did not report harvesting any grilse or adult coho salmon tagged at the JCW this season. Two coho salmon tagged at JCW (one adult and one grilse) were reported as caught and released by anglers during the season (Appendix 10). Catch and release rates for coho salmon above the JCW were estimated at 0.4% for grilse and 0.1% for adults.

Fall Steelhead. Anglers returned 21 tags (8 reward and 13 non-reward) from harvested steelhead tagged at WCW. Based on the combination of reward and non-reward tags angler harvest was estimated at 1.1% of the steelhead migrating upstream of WCW. Two of the 21 tags returned (one reward and one non-reward) by anglers were from unmarked steelhead (0.37%). Anglers returned 138 tags from steelhead reported as caught and released (Appendix 13). Based on the return of reward tags, an estimated 8.8% of the steelhead migrating upstream

of WCW were caught and released.

Brown Trout. All brown trout tagged at JCW received non-reward tags during 2005. Anglers reported returning 17 tags from brown trout tagged at JCW this season. Anglers returned 4 tags from harvested brown trout and 13 from caught and released fish. Harvest and catch and release rates of brown trout tagged at JCW this season were 1.2% and 3.8% respectively.

Spawner Surveys

Main stem spawner surveys led to recoveries of 4 spring Chinook tagged at JCW (Appendix 8). Thirty five and 73 fall Chinook tagged at JCW and WCW respectively were recovered during the spawner survey this year (Appendices 9 and 11). Twenty four and 18 salmon tagged at JCW and WCW respectively were recovered during the survey (Appendices 10 and 12). Coho spawning in the Trinity River (December through February) typically peaks after the cessation of the main stem spawner surveys, therefore it is likely that the time frame of the spawner surveys (October through December) inhibited full recovery of coho salmon. Steelhead tagged at WCW were not recovered as carcasses during spawner surveys this season (Appendix 13). For additional information on the 2005 spawner survey refer to Task 4 of this report.

Trinity River Hatchery

Operation Dates. The fish ladder and trapping facility at TRH were operated from September 8th, 2005 (JW 36) through March 14th, 2006 (JW 11). The ladder and trap were closed for a two week period from October 11 through October 24, 2005 (part of JW 41, all of JW 42 and part of JW 43) to allow for separation of the spring and fall runs of Chinook. The ladder is also occasionally closed at the discretion of the hatchery manager for fish health concerns or labor constraints.

Spring Chinook. Based on CWT recoveries, spring Chinook began entering TRH during JW 36 and continued through JW 44 (Figure 18, Table 10). Recovery of spring Chinook peaked during JW 39 when 1,955 fish entered the facility. Recoveries decreased there after until ceasing in JW 44. Based upon CWT expansion, an estimated 6,761 spring Chinook entered TRH (Figure 18) in 2005.

Eighty eight of the 177 (49.7) effectively tagged spring Chinook at JCW were recovered at TRH. The mean FL for effectively tagged JCW spring Chinook was 66.2 cm, this value is almost identical to tagged spring Chinook recovered at TRH, which averaged 66.3 cm FL (Table 11, Appendix 4). Twenty six of the 102 (25.5%) effectively tagged spring Chinook at WCW were recovered at TRH. The mean FL for effectively tagged WCW spring Chinook and WCW tagged spring Chinook recovered at TRH was 64.7 cm (Appendix 4).

A total of 1,599 Ad-clipped spring Chinook were recovered at TRH, from which 1,520 CWTs were recovered (Table 10). The age structure of TRH spring Chinook, based on CWT's, was composed of two (0.6%), three (67.2%), four (30.5%) and five (1.7%) year old returns (See

Task 2 of this report).

Fall Chinook. Based on the recovery of CWTs, the first fall Chinook entered TRH during JW 39 of 2005 (Table 12). The fall run peaked during JW 45 when 3,788 Chinook salmon entered the facility, decreasing thereafter until the last Chinook entered during JW 51 (Figure 18, Table 12). Based on CWT expansions, an estimated 14,031 fall Chinook entered TRH (Figure 18).

Six hundred twenty six of the 1,281 (48.9%) effectively tagged fall Chinook from WCW were recovered at TRH. The mean FL of effectively tagged WCW fall Chinook was 68.3 cm., almost identical to tagged fall Chinook recovered at TRH, which averaged 68.4 cm (Appendix 5). Two hundred eighty two of the 529 (53.3%) effectively tagged fall Chinook from JCW were recovered at TRH. The mean FL for effectively tagged JCW fall Chinook and JCW tagged spring Chinook recovered at TRH was 63.7 cm and 64.7 cm respectively (Appendix 5).

A total of 3,267 Ad-clipped fall Chinook were recovered at TRH, from which 3,132 CWT's were recovered (Table 12). The age structure of TRH fall Chinook based on CWT's was composed of two (0.1%), three (76.1%), four (23.1%) and five (0.7%) year old returns (See Task 2 of this report).

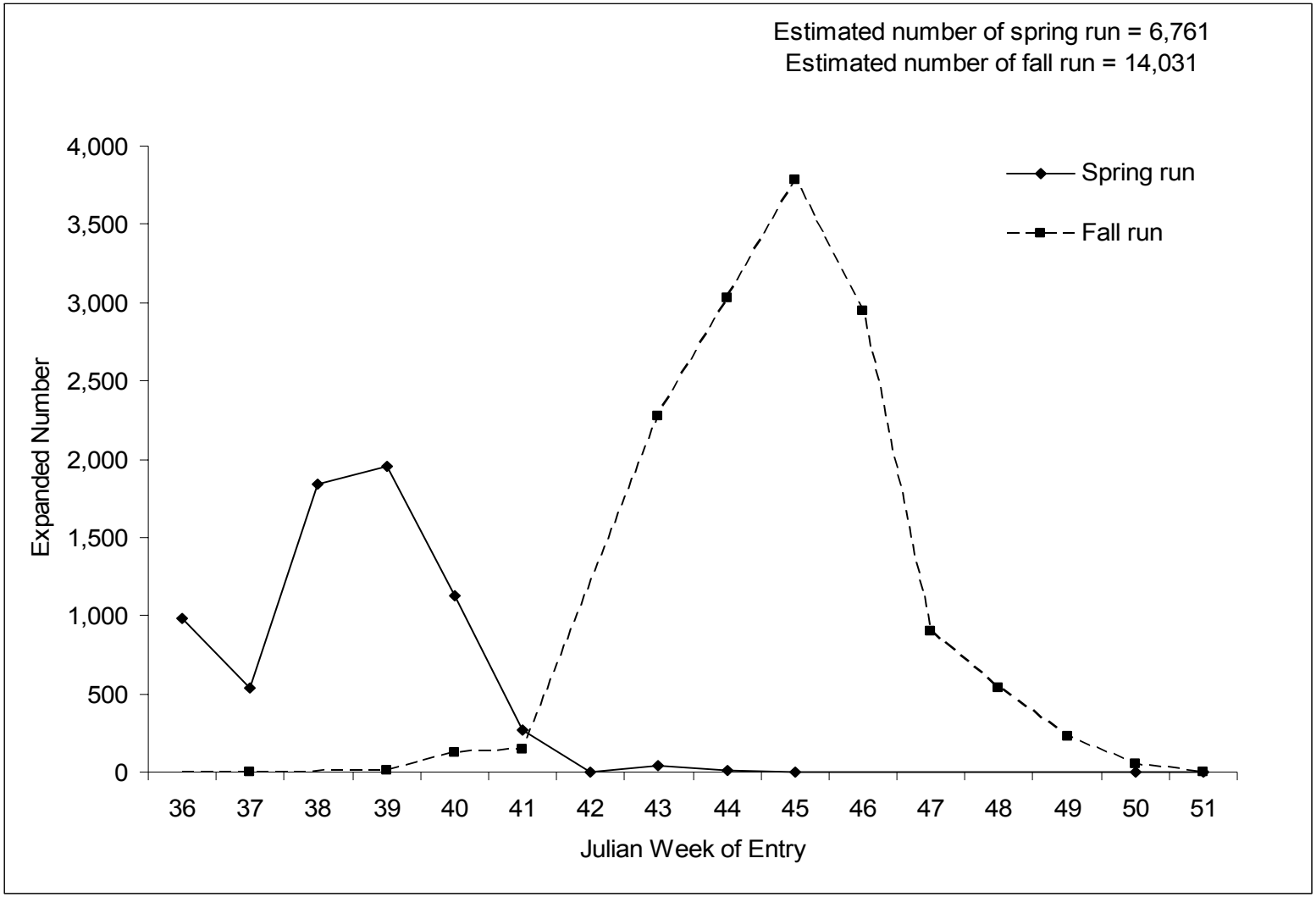



Figure 18. Estimated numbers of spring run and fallrun Chinook salmon that entered Trinity River Hatchery during the 2005 season, based on expansion of coded-wire tagged fish.

Table 10. Recoveries at Trinity River Hatchery of coded-wire tagged, spring run Chinook salmon during the 2005-06 season. a/

| Coded-wire tag number and release type c/ | Brood year | Julian week of entry b/ 36 | 37 | 38 | 39 | 40 | 41 | 42 d/ | 43 | 44 | 45 | 46 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 065261-f | 2000 | 1 | | | | | | | | | | | 1 |
| 065264-f | 2000 | 0 | | | 1 | | | | | | | | 1 |
| 065269-f | 2000 | 0 | | 2 | 0 | | | | | | | | 2 |
| 065279-y | 2000 | 2 | 4 | 4 | 6 | 5 | 1 | | | | | | 22 |
| 065281-f | 2001 | 2 | 4 | 14 | 2 | 3 | 0 | | | | | | 25 |
| 065282-f | 2001 | 1 | 1 | 7 | 6 | 2 | 1 | | | | | | 18 |
| 065283-f | 2001 | 3 | 0 | 4 | 3 | 2 | 0 | | 1 | | | | 13 |
| 065288-y | 2001 | 78 | 12 | 92 | 123 | 78 | 21 | | 3 | 1 | | | 408 |
| 065295-f | 2002 | 69 | 48 | 110 | 75 | 28 | 4 | | 0 | 0 | | | 334 |
| 065296-f | 2002 | 22 | 17 | 103 | 92 | 44 | 10 | | 0 | 0 | | | 288 |
| 065297-f | 2002 | 25 | 17 | 54 | 84 | 50 | 13 | | 2 | 0 | | | 245 |
| 065308-y | 2002 | 16 | 3 | 31 | 49 | 40 | 11 | | 3 | 1 | | | 154 |
| 065310-f | 2003 | | 1 | 0 | 1 | 0 | | | | | | | 2 |
| 065311-f | 2003 | | | 2 | 3 | 0 | | | | | | | 5 |
| 065312-f | 2003 | | | 0 | | 1 | | | | | | | 1 |
| 065317-y | 2003 | | | 1 | | | | | | | | | 1 |
| No CWT e/ | | 7 | 15 | 19 | 21 | 16 | 1 | | | | | | 79 |
| Weekly totals: | | 226 | 122 | 443 | 466 | 269 | 62 | 0 | 9 | 2 | 0 | 0 | |
| | | | | | | | | | | | | Grand Total: | 1,599 |

a/ The fish ladder was open from September 8, 2005 through March 14, 2006 (Julian weeks 36-11).

b/ Entry week was the week that fish were initally sorted, although they may have actually entered the hatchery during the previous sorting week.

c/ Release types are either fingerling (f) or yearling (y).

d/ The hatchery was closed to fish entry this week.

e/ No CWT's were recovered from these Ad-clipped fish. Chinook salmon with shed or lost tags recovered after October 11, 2005 (JW 41) were considered fall run and are shown on Table 11.

Table 11. Total number and numbers of Willow Creek Weir (WCW) and Junction City Weir (JCW) tagged Chinook and coho salmon that entered Trinity River Hatchery (TRH) during the 2005-06 season.a/

| | | | | Chinook | | | | | coho | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Spring run from tagging site | | Fall run from tagging site | | Total | From tagging site | |
| Julian Week of entry b/ | Inclusive Dates | | | entering TRH | WCW | JCW | WCW | JCW | entering TRH | WCW | JCW |
| 36 | 3-Sep | - | 9-Sep | 314 | | 3 | | | | | |
| 37 | 10-Sep | - | 16-Sep | 460 | | 1 | | | | | |
| 38 | 17-Sep | - | 23-Sep | 1,379 | 1 | 22 | | | | | |
| 39 | 24-Sep | - | 30-Sep | 3,181 | 12 | 36 | 2 | 3 | | | |
| 40 | 1-Oct | - | 7-Oct | 1,250 | 7 | 22 | 6 | 9 | 8 | | |
| 41 | 8-Oct | - | 14-Oct | 406 | 6 | 4 | 9 | 6 | 14 | | 1 |
| 42 | 15-Oct | - | 21-Oct | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| 43 | 22-Oct | - | 28-Oct | 1,395 | 2 | 3 | 143 | 67 | 945 | 17 | 66 |
| 44 | 29-Oct | - | 4-Nov | 3,273 | | | 162 | 96 | 699 | 20 | 85 |
| 45 | 5-Nov | - | 11-Nov | 4,476 | | | 168 | 80 | 3,292 | 64 | 183 |
| 46 | 12-Nov | - | 18-Nov | 2,942 | | | 103 | 29 | 3,034 | 81 | 165 |
| 47 | 19-Nov | - | 25-Nov | 898 | | | 33 | 5 | 2,244 | 70 | 122 |
| 48 | 26-Nov | - | 2-Dec | 536 | | | 15 | 5 | 2,622 | 66 | 89 |
| 49 | 3-Dec | - | 9-Dec | 232 | | | 3 | | 2,671 | 70 | 62 |
| 50 | 10-Dec | - | 16-Dec | 49 | | | | | 1,487 | 28 | 33 |
| 51 | 17-Dec | - | 23-Dec | 4 | | | | | 1,128 | 15 | 21 |
| 52 | 24-Dec | - | 31-Dec | 0 | | | | | 156 | 4 | 1 |
| 1 | 1-Jan | - | 7-Jan | 0 | | | | | 47 | 1 | 1 |
| 2 | 8-Jan | - | 14-Jan | 1 | | | | | 7 | | |
| 3 | 15-Jan | - | 21-Jan | | | | | | 1 | | |
| 4 | 22-Jan | - | 28-Jan | | | | | | | | |
| 5 | 29-Jan | - | 4-Feb | | | | | | | | |
| 6 | 5-Feb | - | 11-Feb | | | | | | | | |
| 7 | 12-Feb | - | 18-Feb | | | | | | | | |
| 8 | 19-Feb | - | 25-Feb | | | | | | | | |
| Totals: | | | | 20,796 | 28 | 91 | 644 | 300 | 18,355 | 436 | 829 |

a/ The fish ladder was open from September 8, 2005 through October 11, 2005 and October 24, 2005 through March 14, 2006 (Julian Week 36-11)
b/ Entry week was the week that fish were initally sorted, although they may have actually entered the hatchery during the previous sorting week.

Table 12. Recoveries of Trinity River Hatchery origin fall run Chinook salmon by coded wire tag (CWT) group during the 2005-06 season.

| CWT number and release type c/ | Brood year | Julian week of entry a/ 37 | 38 | 39 | 40 | 41 | 42 d/ | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 065268-f | 2000 | | | | | | | | | | 1 | | | | | | | 1 |
| 065272-f | 2000 | | | | | | | | 1 | | 0 | | | | | | | 1 |
| 065280-y | 2000 | | | | | | | 3 | 4 | 5 | 6 | | | 1 | 1 | | | 20 |
| 065284-f | 2001 | | | | 1 | | | 7 | 4 | 7 | 1 | | | 0 | 0 | | | 20 |
| 065285-f | 2001 | | | | 0 | | | 5 | 3 | 3 | 1 | | | 0 | 0 | | | 12 |
| 065286-f | 2001 | | | | 0 | | | 1 | 6 | 3 | 3 | | | 0 | 0 | | | 13 |
| 065287-f | 2001 | | | | 0 | | | 2 | 0 | 4 | 2 | | | 0 | 0 | | | 8 |
| 065290-f | 2001 | | | | 0 | | | 0 | 1 | 0 | 0 | | | 0 | 0 | | | 1 |
| 065291-f | 2001 | | | | 0 | | | 0 | 1 | 0 | 1 | | | 0 | 0 | | | 2 |
| 065289-y | 2001 | | | | 2 | 5 | | 67 | 105 | 189 | 149 | 64 | 50 | 29 | 6 | | | 666 |
| 065292-f | 2002 | | | | 0 | 0 | | 0 | 1 | 4 | 2 | 0 | 1 | 1 | 0 | | | 9 |
| 065298-f | 2002 | | | 3 | 10 | 13 | | 128 | 117 | 87 | 24 | 9 | 0 | 1 | 0 | | | 392 |
| 065299-f | 2002 | | | | 2 | 5 | | 59 | 88 | 85 | 50 | 17 | 5 | 0 | 0 | | | 311 |
| 065306-f | 2002 | | | | 2 | 2 | | 33 | 63 | 104 | 65 | 20 | 2 | 2 | 1 | | | 294 |
| 065307-f | 2002 | | | | 0 | 0 | | 37 | 60 | 74 | 63 | 17 | 5 | 2 | 0 | | | 258 |
| 065309-y | 2002 | | | | 11 | 8 | | 154 | 186 | 280 | 304 | 87 | 58 | 24 | 8 | 1 | | 1,121 |
| 065314-f | 2003 | | | | | | | 0 | 1 | 0 | | | | | | | | 1 |
| 065318-y | 2003 | | | | | | | 0 | 1 | 1 | | | | | | | | 2 |
| No CWT e/ | | | | | | | | 14 | 33 | 40 | 33 | 7 | 7 | 1 | | | | 135 |
| Weekly totals: | | 0 | 0 | 3 | 28 | 33 | 0 | 510 | 675 | 886 | 705 | 221 | 128 | 61 | 16 | 1 | 0 | |
| | | | | | | | | | | | | | | | | | Grand Total: | 3,267 |

a/ The fish ladder was open from September 8, 2005 through October 11, 2005 and October 24, 2005 through March 14, 2006 (Julian Week 36-11)

b/ Entry week was the week that fish were initally sorted, although they may have actually entered the hatchery during the previous sorting week.

c/ Release types are either fingerling (f) or yearling (y).

d/ The hatchery was closed to fish entry this week.

e/ No CWT's were recovered from these Ad-clipped fish. Chinook salmon with shed or lost tags recovered prior to October 21,2005 (JW 42) were considered spring run.

Coho Salmon. The first coho entered TRH during JW 40, 2005. The coho run peaked during JW 45 and the last coho entered TRH during JW 3, 2006 (Table 13). A total of 18,355 coho (16,624 adults and 1,731 grilse) salmon were recovered at TRH this season. Four hundred and thirty six WCW tagged coho (76 grilse and 360 adults) were recovered at TRH (58.4 % of those effectively tagged). The mean FL of effectively tagged coho at WCW was 59.3 cm and the mean FL of WCW tagged coho recovered at TRH was 59.9 cm (Appendix 6). Eight hundred and twenty nine JCW tagged coho (210 grilse and 619 adults) were recovered at TRH (74.6 of those effectively tagged). The mean FL of effectively tagged coho at JCW was 57.8 cm and the mean FL of JCW tagged coho recovered at TRH was 57.7 cm (Appendix 6).

Of the 18,355 coho recovered at TRH, 17,405 (94.8%) were observed to have RM clips, indicating they were of TRH origin. Nine hundred nineteen (5.0%) had no clips. These unclipped fish were assumed to be either naturally produced or poorly marked or unmarked prior to release from the hatchery. Thirty one other marks were observed on coho which entered TRH this year, including four LM (left maxillary), seven ADRM (Adipose and right maxillary), and twenty RMLM (right and left maxillary) clips (Table 13).

Based on length frequency analysis, TRH produced RM-clipped coho were apportioned into two brood years. Coho $\leq$ 50 cm, FL were considered grilse (age 2) from BY 2003 and accounted for 9.9% (1,721/17,405) of the total. The remaining 15,684 were considered adults (age 3), progeny of BY 2002. The 950 non RM clipped coho which entered the hatchery were also considered grilse or adults based on their length (Appendix 15).

Fall Steelhead. Appreciable numbers of steelhead did not enter the hatchery until mid November (Table 14). A total of 8,143 adult steelhead (>41 cm, FL) entered TRH during the season. Eight hundred and twenty eight adult steelhead tagged at WCW (41.9% of those effectively tagged) were among those that entered TRH (Appendix 7). The mean FL of effectively tagged steelhead at WCW was 61.4 cm and the mean FL of WCW tagged steelhead recovered at TRH was 61.6 cm.

Ad-clipped adult steelhead composed 99.2% (8,080/8,143) of the steelhead that entered TRH this season (Appendix 7). Beginning with BY 1997 all steelhead released from TRH are Ad-clipped prior to release.

Table 13. Total number of coho salmon by brood year and clip that returned to Trinity River Hatchery by julian week during the 2005-06 season. a/

| Julian Week of entry c/ | Inclusive Dates | | | Brood year and clip b/ 2002 No clip | 2002 RM | 2002 LM | 2002 ADRM | 2002 RMLM | 2003 No clip | 2003 RM | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 1-Oct | - | 7-Oct | | 6 | | | | | 2 | 8 |
| 41 | 8-Oct | - | 14-Oct | | 12 | | | | | 2 | 14 |
| 42 | 15-Oct | - | 21-Oct | | 0 | | | | | 0 | 0 |
| 43 | 22-Oct | - | 28-Oct | 25 | 646 | | 1 | | 2 | 271 | 945 |
| 44 | 29-Oct | - | 4-Nov | 31 | 177 | | 1 | | 1 | 489 | 699 |
| 45 | 5-Nov | - | 11-Nov | 87 | 2,795 | 3 | 1 | | 0 | 406 | 3,292 |
| 46 | 12-Nov | - | 18-Nov | 83 | 2,809 | 0 | 0 | | 3 | 139 | 3,034 |
| 47 | 19-Nov | - | 25-Nov | 173 | 1,933 | 0 | 0 | 1 | 0 | 137 | 2,244 |
| 48 | 26-Nov | - | 2-Dec | 155 | 2,347 | 0 | 2 | 9 | 1 | 108 | 2,622 |
| 49 | 3-Dec | - | 9-Dec | 162 | 2,403 | 0 | 0 | 3 | 2 | 101 | 2,671 |
| 50 | 10-Dec | - | 16-Dec | 83 | 1,357 | 0 | 1 | 6 | 0 | 40 | 1,487 |
| 51 | 17-Dec | - | 23-Dec | 90 | 1,014 | 1 | 0 | 1 | 1 | 21 | 1,128 |
| 52 | 24-Dec | - | 31-Dec | 15 | 137 | | 1 | | | 3 | 156 |
| 1 | 1-Jan | - | 7-Jan | 5 | 40 | | | | | 2 | 47 |
| 2 | 8-Jan | - | 14-Jan | | 7 | | | | | | 7 |
| 3 | 15-Jan | - | 21-Jan | | 1 | | | | | | 1 |
| | | | Totals: | 909 | 15,684 | 4 | 7 | 20 | 10 | 1,721 | 18,355 |

a/ The fish ladder was open from September 8, 2005 through October 11, 2005 and October 24, 2005 through March 14, 2006 (Julian Week 36-11)

b/ Coho ≤ 50 cm. fork length were considered to be from the 2003 brood year, and coho > 50 cm. fork length were considered to from the 2002 brood year. Fin clips: RM-right maxillary; LM-left maxillary; ADRM-adipose and right maxillary; RMLM-right and left maxillary.

c/ Entry week was the week the fish were initially sorted, although they may have actually entered the hatchery during the previous week.

Table 14. Total number of steelhead entering Trinity River Hatchery (TRH) and number recovered that were tagged at Willow Creek weir (WCW) during the 2005-2006 season. a/

| Julian Week of entry b/ | Inclusive Dates | | | Number entering TRH c/ | Recoveries from WCW |
|---|---|---|---|---|---|
| 36 | 3-Sep | - | 9-Sep | | |
| 37 | 10-Sep | - | 16-Sep | 2 | |
| 38 | 17-Sep | - | 23-Sep | 3 | |
| 39 | 24-Sep | - | 30-Sep | 2 | |
| 40 | 1-Oct | - | 7-Oct | 6 | |
| 41 | 8-Oct | - | 14-Oct | 1 | |
| 42 | 15-Oct | - | 21-Oct | 0 | |
| 43 | 22-Oct | - | 28-Oct | 17 | |
| 44 | 29-Oct | - | 4-Nov | 22 | 1 |
| 45 | 5-Nov | - | 11-Nov | 147 | 15 |
| 46 | 12-Nov | - | 18-Nov | 154 | 14 |
| 47 | 19-Nov | - | 25-Nov | 80 | 7 |
| 48 | 26-Nov | - | 2-Dec | 81 | 10 |
| 49 | 3-Dec | - | 9-Dec | 393 | 46 |
| 50 | 10-Dec | - | 16-Dec | 560 | 59 |
| 51 | 17-Dec | - | 23-Dec | 830 | 84 |
| 52 | 24-Dec | - | 31-Dec | 1,094 | 106 |
| 1 | 1-Jan | - | 7-Jan | 1,691 | 165 |
| 2 | 8-Jan | - | 14-Jan | 1,252 | 122 |
| 3 | 15-Jan | - | 21-Jan | 739 | 65 |
| 4 | 22-Jan | - | 28-Jan | 427 | 48 |
| 5 | 29-Jan | - | 4-Feb | 252 | 25 |
| 6 | 5-Feb | - | 11-Feb | 207 | 28 |
| 7 | 12-Feb | - | 18-Feb | 77 | 9 |
| 8 | 19-Feb | - | 25-Feb | 29 | 7 |
| 9 | 26-Feb | - | 4-Mar | 34 | 8 |
| 10 | 5-Mar | - | 11-Mar | 29 | 4 |
| 11 | 12-Mar | - | 18-Mar | 14 | 5 |
| | | | Totals: | 8,143 | 828 |

a/ The fish ladder was open from September 8, 2005 through October 11, 2005 and October 24, 2005 through March 14, 2006 (Julian Week 36-11).

b/ Entry week was the week the fish were initially sorted, although they may have actually entered the hatchery during the previous sorting week.

c/ Steelhead less than or equal to 41 cm FL are considered sub-adults and were not counted at TRH.

Too few grilse salmon (spring Chinook, fall Chinook and coho) were tagged to generate independent estimates for adults and grilse. Therefore, numbers of adults and grilse were combined to generate the total tagged, total recaptured and total recovered fish when calculating population estimates. There are two run-size estimates for fall Chinook and coho, one for above WCW and another for above JCW. The two run-size estimates for fall Chinook were separated into grilse and adults by the ratio of grilse and adults observed at each respective weir. The two run-size estimates for coho were separated into grilse and adults by the ratio of grilse and adults observed at each respective weir and TRH combined. For spring Chinook the total run-size estimate was stratified based on the ratio of adults and grilse observed at JCW and TRH combined. Steelhead estimates are for adults only above WCW.

Spring Chinook Salmon

An estimated 13,984 (13,929 adults and 55 grilse) spring Chinook migrated into the Trinity River basin upstream of JCW. Based on the Poisson Approximation, the 95% confidence interval for the run-size estimate was 11,423–17,342 spring Chinook salmon (Table 15). Spawning escapement above JCW was estimated at 12,968 adult fish, including 6,966 adult spring Chinook that entered TRH (Table 16). This year's run-size estimate is 25% below the 26 year average spring Chinook run-size of 18,714. Estimated spring Chinook run-size has ranged from 2,381 fish in 1991 to 62,692 fish in 1988 (Appendix 16). Anglers caught and kept an estimated 961 (6.9%) of the adults from the spring run. Additionally, angler harvest of grilse spring Chinook was estimated to be zero (Table 16).

Fall Chinook Salmon

An estimated 28,231 (27,332 adults and 899 grilse) fall Chinook migrated into the Trinity River basin upstream of WCW. Based on the Poisson Approximation, the 95% confidence interval for the fall Chinook run-size estimate upstream of WCW was 26,126-30,557 (Table 15). Trinity River fall Chinook spawner escapement, upstream of WCW, was estimated at 26,476 adult fish, including 13,758 adult fall Chinook that entered TRH (Table 16). Harvest rates generated from tags applied at WCW were used to estimate 100 (11.1%) grilse and 856 (3.1%) adult fall Chinook harvested by anglers. The estimated total fall Chinook run-size, upstream of WCW, has ranged from 9,207 fish in 1991 to 147,888 fish in 1986 (Appendix 17). This year's fall Chinook estimated run-size of 28,231 fish is 34% less than the mean run-size since 1977 of 42,777 fish.

An estimated 25,858 (24,549 adults and 1,309 grilse) fall Chinook migrated into the Trinity River basin upstream of JCW. Based on the Poisson Approximation, the 95% confidence interval for the fall Chinook run-size estimate upstream of JCW was 23,053-29,112 (Table 15). Trinity River fall Chinook spawner escapement, upstream of JCW, was estimated at 23,971 adult fish, including 13,758 adult fall Chinook that entered TRH (Table 16). Harvest rates generated from tags applied at JCW were used to estimate zero grilse and 578 (2.4%) adult fall Chinook harvested by anglers. The estimated total fall Chinook run-size, upstream of

Table 15. Run-size estimates and 95% confidence limits for Trinity River basin spring and fall Chinook and coho, and adult fall-run steelhead during the 2005-2006 season.

| Species/ race | Area of Trinity River basin for run size estimate | Stratum a/ | Number effectively tagged b/ | Trinity River Hatchery recoveries: Number examined for tags c/ | Trinity River Hatchery recoveries: Number of tags in sample | Run-size estimate d/ | Confidence limits 1-p= 0.95 | Confidence limit estimator |
|---|---|---|---|---|---|---|---|---|
| Spring run Chinook | Upstream of Junction City Weir | Grilse | 2 | 25 | 1 | 55 | | |
| | | Adults | 175 | 6,966 | 87 | 13,929 | | |
| | | Total | 177 | 6,991 | 88 | 13,984 | 11,423 - 17,342 | Poisson Approximation |
| Fall run Chinook | Upstream of Willow Creek Weir | Grilse | 38 | 48 | 1 | 899 | | |
| | | Adults | 1,243 | 13,758 | 625 | 27,332 | | |
| | | Total | 1,281 | 13,806 | 626 | 28,231 | 26,126 - 30,557 | Poisson Approximation |
| Fall run Chinook | Upstream of Junction City Weir | Grilse | 18 | 48 | 0 | 1,309 | | |
| | | Adults | 511 | 13,758 | 282 | 24,549 | | |
| | | Total | 529 | 13,806 | 282 | 25,858 | 23,053 - 29,112 | Poisson Approximation |
| Coho | Upstream of Willow Creek Weir | Grilse | 145 | 1,731 | 75 | 3,093 | | |
| | | Adults | 602 | 16,624 | 361 | 28,326 | | |
| | | Total | 747 | 18,355 | 436 | 31,419 | 28,636 - 34,548 | Poisson Approximation |
| Coho | Upstream of Junction City Weir | Grilse | 273 | 1,731 | 210 | 2,535 | | |
| | | Adults | 839 | 16,624 | 619 | 22,080 | | |
| | | Total | 1,112 | 18,355 | 829 | 24,615 | 23,003 - 26,358 | Poisson Approximation |
| Fall run steelhead | Upstream of Willow Creek Weir | Adults | 1,975 | 8,143 | 828 | 19,412 | 18,181 - 20,686 | Normal Approximation |

a/ Stratum: Grilse = two year old salmon, Adults = three years old or older, Steelhead adults were fish greater than 41 cm FL.

b/ The number of effectively tagged fish was corrected for tagging mortalities, fish not tagged and fish which had their tags removed (caught and released).

c/ Numbers of spring run and fall Chinook were estimated from expansion of coded wire tag recoveries at Trinity River Hatchery, coho and steelhead numbers were actual recoveries.

d/ Estimates for grilse and adult spring run Chinook and coho salmon were based on proportioning the total run size by the ratio of grilse to adults observed at each mainstem Weir and Trinity River Hatchery combined. Estimates for grilse and adult fall run Chinook salmon were based on proportioning the total run size by the ratio of grilse to adults observed at each mainstem Weir.

Table 16. Estimates of Trinity River basin spring and fall Chinook and coho, and adult fall-run steelhead run size, angler harvest, and spawner escapements during the 2005-2006 season.

| Species/ race | Area of Trinity River basin for run size estimate | Stratum a/ | Run-size estimate | Angler Harvest | | Spawner Escapement | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Harvest rate b/ | Number of fish c/ | Natural Area Spawners d/ | Trinity River Hatchery | Total |
| Spring run Chinook | Upstream of Junction City Weir | Grilse | 55 | 0.000 | 0 | 30 | 25 | 55 |
| | | Adults | 13,929 | 0.069 | 961 | 6,002 | 6,966 | 12,968 |
| | | Total | 13,984 | | 961 | 6,032 | 6,991 | 13,023 |
| Fall run Chinook | Upstream of Willow Creek Weir | Grilse | 899 | 0.111 | 100 | 751 | 48 | 799 |
| | | Adults | 27,332 | 0.031 | 856 | 12,718 | 13,758 | 26,476 |
| | | Total | 28,231 | | 956 | 13,469 | 13,806 | 27,275 |
| Fall run Chinook | Upstream of Junction City Weir | Grilse | 1,309 | 0.000 | 0 | 1,261 | 48 | 1,309 |
| | | Adults | 24,549 | 0.024 | 578 | 10,213 | 13,758 | 23,971 |
| | | Total | 25,858 | | 578 | 11,474 | 13,806 | 25,280 |
| Coho | Upstream of Willow Creek Weir | Grilse | 3,093 | 0.007 | 21 | 1,341 | 1,731 | 3,072 |
| | | Adults | 28,326 | 0.000 | 0 | 11,702 | 16,624 | 28,326 |
| | | Total | 31,419 | | 21 | 13,043 | 18,355 | 31,398 |
| Coho | Upstream of Junction City Weir | Grilse | 2,535 | 0.000 | 0 | 804 | 1,731 | 2,535 |
| | | Adults | 22,080 | 0.000 | 0 | 5,456 | 16,624 | 22,080 |
| | | Total | 24,615 | | 0 | 6,260 | 18,355 | 24,615 |
| Fall run adult steelhead | Upstream of Willow Creek Weir | Natural | 5,363 | 0.004 | 20 | 5,280 | 63 | 5,343 |
| | | Hatchery | 14,049 | 0.013 | 187 | 5,782 | 8,080 | 13,862 |
| | | Total | 19,412 | | 207 | 11,062 | 8,143 | 19,205 |

a/ Stratum: Grilse = two year old salmon, Adults = three years old or older, Steelhead adults were fish greater than 41 cm FL.

b/ Harvest rates were based on the return of: reward tags for Chinook, non reward tags for coho, and the combination of reward and non reward tags for steelhead.

c/ Calculated as the run size times the harvest rate.

d/ Calculated as run size minus angler harvest minus hatchery escapement. Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

JCW, has ranged from 4,787 fish in 1990 to 121,033 fish in 1986 (Appendix 18). Although the dataset is incomplete, this year's fall Chinook estimated run-size of 25,858 fish is 14% less than the fifteen year mean run-size of 29,968.

Coho Salmon

An estimated 31,419 (28,326 adults and 3,093 grilse) coho migrated into the Trinity River basin upstream of WCW. Based on the Poisson Approximation, the 95% confidence interval for the coho run-size estimate upstream of WCW was 28,636-34,548 fish (Table 15). The spawning escapement estimate for coho upstream of WCW this year was 28,326 adult fish, 16,624 of which entered TRH (Table 16). Estimated coho salmon run-size, upstream of WCW, has ranged from 852 fish in 1994 to 59,079 fish in 1987 (Appendix 19). The mean run-size since 1977 is 18,249 fish. This year's coho estimate was 72.2% larger than the long term average. Harvest rates generated from tags applied at WCW were used to estimate 21 (0.7%) grilse and zero adult coho harvested by anglers (Table 16).

An estimated 24,615 (22,080 adults and 2,535 grilse) coho migrated into the Trinity River basin upstream of JCW. Based on the Poisson Approximation, the 95% confidence interval for the coho run-size estimate upstream of JCW was 23,003-26,358 fish (Table 15). The spawning escapement estimate for coho upstream of JCW this year was 22,080 adult fish, 16,624 of which entered TRH (Table 16). This year's coho estimated run-size of 24,615 fish is 93.2% higher than the eleven year mean run-size of 12,741 (Appendix 20). Harvest rates generated from tags applied at JCW were used to estimate zero grilse and adult coho harvested by anglers (Table 16).

Adult Fall Steelhead

An estimated 19,412 adult fall steelhead migrated upstream of WCW this season. The 95% confidence interval for the estimate, based on the Normal Approximation, was 18,181-20,686 adult steelhead (Table 15). The adult steelhead spawning escapement was composed of 5,363 naturally produced fish and 14,049 steelhead of TRH origin. An estimated 20 (0.4%) wild and 187 (1.3%) TRH produced steelhead were harvested by anglers above WCW (Table 16).

Intermittent fall steelhead run-size estimates made since 1980 have ranged from 2,972 in 1998 to 37,276 in 1989 (Appendix 21). Mean run-size for fall adult steelhead, for the 22 years in which there are estimates, is 11,816 fish. This years run-size estimate, the fifth highest on record, of 19,412 adult fall steelhead is 64.3% higher than the historical average.

## DISCUSSION

This season both runs of Chinook that are monitored, spring and fall, were estimated to have had run-sizes below the long term averages this season. Coho salmon and steelhead run-sizes were estimated to have been above the historical averages. Although Chinook runs were below average this year all of these runs have experienced fairly good returns since 1995 (Appendices 16-21), with the exception of fall Chinook in 2002, which fell victim to the large adult fish kill in the lower Klamath River (CDFG, 2004).

With the extended operation of the JCW a second independent weir based population estimate for fall Chinook and coho salmon is available for comparison with the estimates generated from tagging operations at the WCW. With the exception of fall Chinook grilse all estimates of grilse and adult Chinook and coho were higher at WCW. Based on the comparisons of run size point estimates between the two weirs there were 2,373 and 6,804 fall Chinook and coho salmon respectively that utilized tributaries, mainstem areas or were harvested between the two weirs (Table 15).

This year's estimate of fall grilse above the WCW is the 3rd lowest estimated during the 28 year data record (Appendix 17). With the very low abundance of two year old grilse Chinook there is increased difficulty in estimating this variable. With the low sample size the estimate is extremely sensitive to each additional grilse captured. In the case of fall Chinook grilse the estimate of grilse above JCW was higher than at WCW which is not possible. When compared to previous seasons, estimates of spring and fall Chinook grilse this year were extremely low in both total number of fish and the proportion of the run that they represented. There were 55 estimated spring Chinook grilse upstream of JCW. This year's estimate of spring grilse is the lowest on record for the 26 years for which there is data. As noted above this years estimated number of fall grilse above WCW was 899 fish which is the third lowest estimated during the 28 year record. The fall grilse estimate above JCW this year was 1,309, which is the fourth lowest estimated during the 15 years that there is data. The low number of grilse Chinook is of considerable interest as next years three year old year class is modeled from these numbers and will most likely be very low.

At the current JCW location the trap is unable to be installed prior to late June or early July when Trinity River mainstem flows are in excess of 800cfs in Junction City. Historically, JCW was installed in May and observed peak numbers of spring Chinook were in late May and early June. However, in these years spring flow releases from Lewiston Dam were much lower than under the current flow schedule. This year's low precision of the spring Chinook run-size estimate, low observed tag rate of recovered spring Chinook at TRH and observations of live spring Chinook above the JCW site prior to installation of the weir all indicate that a portion of the spring run migrated above the weir site prior to the installation. To investigate how a change in trapping duration and coincident lowered number of fish trapped may influence the run-size estimates, run-size estimates were calculated for six years where data was available from trapping in May and June through September and compared these data to recalculated estimates excluding the number of spring Chinook trapped in May and June. The partial season estimates were not significantly different from the whole season estimates (Sinnen and Knechtle 2004), although the recalculated estimates did produce a small positive bias. This assumes that the fish's migration timing is independent of the two flow regimes. Ongoing research in the basin may aid in our understanding of adult fish migration timing and the influence of various flow regimes.

The WCW was installed prior to the arrival of the coho run, although due to high flows the WCW was removed on 4 November, 2005 and it was feared that the end of the coho run had not been effectively trapped. Coho arrived at JCW 21 days after arriving at the WCW and peak

trapping of coho at the two weirs were three weeks apart. The end of the coho run was effectively trapped at JCW and it was operated for an additional 24 days after the WCW was removed. With a general travel time of three weeks between the two weirs it is reasonable to conclude that only a small portion of the coho run wasn't trapped at WCW. Additionally, the entire coho run was effectively trapped at TRH and the proportion of adults returning with WCW tags was consistent throughout the entire run.

Unaccounted tagging mortality creates a positive bias in all mark-recapture studies (Hankin 2001). We attempt to account for tagging mortalities through recovery of tagged fish found dead at the weirs or in carcass surveys, although we can not be sure that all tagging mortalities are accounted for. Most of our tagging mortalities from WCW are observed during the early part of the season when water temperatures are high (near 22° C). It appears that tagging mortality is not a constant rate and is most likely a function of water temperature. This postulation leads to difficulty in applying a potential tagging mortality rate for the season. Hankin (2001) concluded that tagging mortality could substantially positively bias our estimates. Using Hankin's example: if 90% of untagged fish passing WCW survive to arrive at TRH (assuming that they are otherwise programmed to arrive at that destination), but only 75% of WCW tagged fish survive to arrive at TRH, then the approximate positive proportional bias would be almost 30%. We have attempted to address this concern through our tagging protocols at the weirs. Fish are not tagged if deemed in poor physical condition, appear to have already spawned or if water temperatures exceed 21°C.

## RECOMMENDATIONS

1. Tagging and recapture operations for adult spring and fall Chinook and coho salmon, and

adult fall steelhead in the Trinity River basin should be continued during the migration season, using the capture sites near Willow Creek and Junction City.

2. An alternate weir site for the Junction City area should be investigated. The current site does not allow for trapping at flows that exceed approximately 800 cfs. During extremely wet, wet, and normal water years releases from Lewiston Dam do not subside below 800 cfs until mid/late July. During dry and critically dry water years releases from Lewiston Dam will subside below 800 cfs in mid June which is after spring Chinook have already begun migrating to the upper Trinity basin. Ideally, trapping should commence in mid to late May.

3. Continue to trap five (instead of four) nights-per-week with mid-day weir openings at the weirs. Preliminary data indicates that our trapping efficiency has increased using the five-day schedule, while reducing numbers of fish “stacking up" downstream of the weir.

4. Conduct snorkel surveys upstream of the weirs for several miles to recover any tagging mortalities.

5. During weekend openings of the weir, open the boat gate and traps and raise the conduit up to the middle channeling a minimum of 25 pieces (in the middle of the panel) on every other panel.

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Appendix 1. List of Julian weeks and their calendar date equivalents.

| Julian Week | Inclusive dates | | | Julian Week | Inclusive dates | | |
|---|---|---|---|---|---|---|---|
| 1 | 1-Jan | - | 7-Jan | 27 | 2-Jul | - | 8-Jul |
| 2 | 8-Jan | - | 14-Jan | 28 | 9-Jul | - | 15-Jul |
| 3 | 15-Jan | - | 21-Jan | 29 | 16-Jul | - | 22-Jul |
| 4 | 22-Jan | - | 28-Jan | 30 | 23-Jul | - | 29-Jul |
| 5 | 29-Jan | - | 4-Feb | 31 | 30-Jul | - | 5-Aug |
| 6 | 5-Feb | - | 11-Feb | 32 | 6-Aug | - | 12-Aug |
| 7 | 12-Feb | - | 18-Feb | 33 | 13-Aug | - | 19-Aug |
| 8 | 19-Feb | - | 25-Feb | 34 | 20-Aug | - | 26-Aug |
| 9/a | 26-Feb | - | 4-Mar | 35 | 27-Aug | - | 2-Sep |
| 10 | 5-Mar | - | 11-Mar | 36 | 3-Sep | - | 9-Sep |
| 11 | 12-Mar | - | 18-Mar | 37 | 10-Sep | - | 16-Sep |
| 12 | 19-Mar | - | 25-Mar | 38 | 17-Sep | - | 23-Sep |
| 13 | 26-Mar | - | 1-Apr | 39 | 24-Sep | - | 30-Sep |
| 14 | 2-Apr | - | 8-Apr | 40 | 1-Oct | - | 7-Oct |
| 15 | 9-Apr | - | 15-Apr | 41 | 8-Oct | - | 14-Oct |
| 16 | 16-Apr | - | 22-Apr | 42 | 15-Oct | - | 21-Oct |
| 17 | 23-Apr | - | 29-Apr | 43 | 22-Oct | - | 28-Oct |
| 18 | 30-Apr | - | 6-May | 44 | 29-Oct | - | 4-Nov |
| 19 | 7-May | - | 13-May | 45 | 5-Nov | - | 11-Nov |
| 20 | 14-May | - | 20-May | 46 | 12-Nov | - | 18-Nov |
| 21 | 21-May | - | 27-May | 47 | 19-Nov | - | 25-Nov |
| 22 | 28-May | - | 3-Jun | 48 | 26-Nov | - | 2-Dec |
| 23 | 4-Jun | - | 10-Jun | 49 | 3-Dec | - | 9-Dec |
| 24 | 11-Jun | - | 17-Jun | 50 | 10-Dec | - | 16-Dec |
| 25 | 18-Jun | - | 24-Jun | 51 | 17-Dec | - | 23-Dec |
| 26 | 25-Jun | - | 1-Jul | 52 b/ | 24-Dec | - | 31-Dec |

a/ Eight day week in each leap year.
b/ Eight day week every year.

Appendix 2. Fork length (FL) distribution of coded-wire-tagged, Trinity River Hatchery produced, spring run Chinook salmon recovered at TRH during the 2005-2006 season. a/

| FL | | Brood Year | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | | | | 2001 | | | | 2002 | | | | 2003 | | | | |
| (cm) | CWT # b/ | 65261-f | 65264-f | 65269-f | 65279-y | 65281-f | 65282-f | 65283-f | 65288-y | 65295-f | 65296-f | 65297-f | 65308-y | 65310-f | 65311-f | 65312-f | 65317-y | Total |
| 40 | | | | | | | | | | | | | | 1 | | | | 1 |
| 41 | | | | | | | | | | | | | | | | | 1 | 1 |
| 42 | | | | | | | | | | | | | | | | | | 0 |
| 43 | | | | | | | | | | | | | | | | | | 0 |
| 44 | | | | | | | | | | | | | | | 1 | | | 1 |
| 45 | | | | | | | | | | | | | | | 2 | | | 2 |
| 46 | | | | | | | | | | | | | | | 0 | | | 0 |
| 47 | | | | | | | | | | | | | | 1 | 0 | | | 1 |
| 48 | | | | | | | | | | 1 | | | | | 0 | | | 1 |
| 49 | | | | | | | | | 1 | 0 | | | | | 0 | | | 1 |
| 50 | | | | | | | | | 0 | 0 | | | | | 0 | 1 | | 1 |
| 51 | | | | | | | | | 0 | 0 | | | 3 | | 1 | | | 4 |
| 52 | | | | | | | | | 0 | 0 | | | 0 | | 0 | | | 0 |
| 53 | | | | | | | | | 0 | 1 | | | 3 | | 0 | | | 4 |
| 54 | | | | | | | | | 0 | 2 | 1 | 1 | 6 | | 0 | | | 10 |
| 55 | | | | | | | | | 0 | 0 | 2 | 0 | 5 | | 0 | | | 7 |
| 56 | | | | | | | | | 1 | 2 | 0 | 0 | 9 | | 1 | | | 13 |
| 57 | | | | | | | | | 0 | 4 | 9 | 2 | 10 | | | | | 25 |
| 58 | | | | | | | | | 0 | 9 | 5 | 3 | 11 | | | | | 28 |
| 59 | | | | | | | | | 3 | 16 | 8 | 5 | 11 | | | | | 43 |
| 60 | | | | | | | | | 1 | 14 | 23 | 10 | 21 | | | | | 69 |
| 61 | | | | | | | | | 2 | 32 | 10 | 8 | 11 | | | | | 63 |
| 62 | | | | | | 2 | | | 6 | 30 | 26 | 18 | 12 | | | | | 94 |
| 63 | | | | | | 0 | | | 6 | 33 | 14 | 14 | 18 | | | | | 85 |
| 64 | | | | | | 0 | | | 12 | 25 | 26 | 17 | 5 | | | | | 85 |
| 65 | | | | | 1 | 2 | | | 9 | 21 | 24 | 20 | 10 | | | | | 87 |
| 66 | | | | | 0 | 0 | | | 12 | 27 | 23 | 26 | 8 | | | | | 96 |
| 67 | | | | | 0 | 2 | | | 14 | 19 | 16 | 15 | 3 | | | | | 69 |
| 68 | | | | | 0 | 1 | | 1 | 21 | 18 | 20 | 13 | 1 | | | | | 75 |
| 69 | | | | | 0 | 0 | | 0 | 20 | 15 | 13 | 21 | 4 | | | | | 73 |
| 70 | | | | | 0 | 2 | 3 | 0 | 30 | 14 | 12 | 12 | 1 | | | | | 74 |
| 71 | | | | | 0 | 0 | 1 | 0 | 26 | 9 | 9 | 10 | 0 | | | | | 55 |
| 72 | | | | | 0 | 1 | 1 | 0 | 25 | 12 | 6 | 15 | 2 | | | | | 62 |
| 73 | | | | | 1 | 1 | 2 | 0 | 21 | 6 | 7 | 6 | | | | | | 44 |
| 74 | | | | | 0 | 1 | 1 | 4 | 24 | 3 | 7 | 7 | | | | | | 47 |
| 75 | | | | | 0 | 1 | 0 | 1 | 21 | 3 | 5 | 7 | | | | | | 38 |
| 76 | | | | | 3 | 0 | 0 | 1 | 19 | 6 | 4 | 5 | | | | | | 38 |
| 77 | | | | | 0 | 1 | 0 | 0 | 13 | 3 | 3 | 3 | | | | | | 23 |
| 78 | | | 1 | 1 | 1 | 0 | 3 | 1 | 21 | 2 | 5 | 1 | | | | | | 36 |
| 79 | | | | | 2 | 3 | 1 | 1 | 12 | 1 | 2 | 1 | | | | | | 23 |
| 80 | | | | | 1 | 0 | 0 | 0 | 12 | 2 | 4 | 1 | | | | | | 20 |
| 81 | | | | | 1 | 1 | 1 | 1 | 10 | 2 | 0 | 1 | | | | | | 17 |
| 82 | | | | | 1 | 1 | 0 | 1 | 15 | 2 | 2 | 1 | | | | | | 23 |
| 83 | | | | | 1 | 2 | 1 | 0 | 8 | | 1 | 0 | | | | | | 13 |
| 84 | | | | | 1 | 0 | 1 | 0 | 10 | | 1 | 1 | | | | | | 14 |
| 85 | | | | | 3 | 1 | 0 | 1 | 1 | | | 0 | | | | | | 6 |
| 86 | | | | | 1 | 0 | 1 | 0 | 7 | | | 0 | | | | | | 9 |
| 87 | | | | | 1 | 0 | 1 | 1 | 11 | | | 0 | | | | | | 14 |
| 88 | | | | | 0 | 0 | 0 | | 0 | | | 1 | | | | | | 1 |
| 89 | | | | 1 | 1 | 0 | 0 | | 3 | | | | | | | | | 5 |
| 90 | | 1 | | | 1 | 1 | 0 | | 5 | | | | | | | | | 8 |
| 91 | | | | | 1 | 1 | 1 | | 2 | | | | | | | | | 5 |
| 92 | | | | | 0 | 1 | | | 3 | | | | | | | | | 4 |
| 93 | | | | | 0 | | | | 0 | | | | | | | | | 0 |
| 94 | | | | | 0 | | | | 1 | | | | | | | | | 1 |
| 95 | | | | | 0 | | | | | | | | | | | | | 0 |
| 96 | | | | | 0 | | | | | | | | | | | | | 0 |
| 97 | | | | | 1 | | | | | | | | | | | | | 1 |
| 98 | | | | | | | | | | | | | | | | | | 0 |
| 99 | | | | | | | | | | | | | | | | | | 0 |
| 100 | | | | | | | | | | | | | | | | | | 0 |
| Totals: | | 1 | 1 | 2 | 22 | 25 | 18 | 13 | 408 | 334 | 288 | 245 | 154 | 2 | 5 | 1 | 1 | 1,520 |
| Mean | | 90.0 | 78.0 | 83.5 | 82.1 | 75.6 | 77.7 | 77.5 | 74.0 | 65.3 | 66.1 | 67.2 | 60.6 | 43.5 | 48.2 | 50.0 | 41.0 | 68.2 |

a/ The fish ladder was open from September 8, 2005 through March 14, 2006 (Julian Week 36-11).
b/ Age at release: f = fingerlings, y = yearlings.

Appendix 3. Fork length (FL) distribution of coded-wire-tagged, Trinity River Hatchery produced, fall run Chinook salmon recovered at TRH during the 2005-2006 season. a/

| FL | | Brood Year | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | | | 2001 | | | | | | | 2002 | | | | | | 2003 | | |
| (cm) | CWT # b/ | 65268-f | 65272-f | 65280-y | 65284-f | 65285-f | 65286-f | 65287-f | 65289-y | 65290-f | 65291-f | 65292-f | 65298-f | 65299-f | 65306-f | 65307-f | 65309-y | 65314-f | 65318-y | Total: |
| 39 | | | | | | | | | | | | | | | | | | | | 0 |
| 40 | | | | | | | | | | | | | | | | | | | | 0 |
| 41 | | | | | | | | | | | | | | | | | | | | 0 |
| 42 | | | | | | | | | | | | | | | | | | | | 0 |
| 43 | | | | | | | | | | | | | | | | | | | | 0 |
| 44 | | | | | | | | | | | | | | | | | | | | 0 |
| 45 | | | | | | | | | | | | | | | | 1 | | | | 1 |
| 46 | | | | | | | | | | | | | | | | 0 | | 1 | | 1 |
| 47 | | | | | | | | | | | | | | | | 0 | | | | 0 |
| 48 | | | | | | | | | | | | | | | | 0 | 1 | | 1 | 2 |
| 49 | | | | | | | | | | | | | | 1 | | 0 | 1 | | 1 | 3 |
| 50 | | | | | | | | | | | | | | 0 | 1 | 0 | 1 | | | 2 |
| 51 | | | | | | | | | | | | | | 0 | 0 | 0 | 5 | | | 5 |
| 52 | | | | | | | | | | | | | | 0 | 0 | 0 | 6 | | | 6 |
| 53 | | | | | | | | | | | | | 2 | 0 | 0 | 1 | 6 | | | 9 |
| 54 | | | | | | | | | | | | | 1 | 0 | 2 | 1 | 9 | | | 13 |
| 55 | | | | | | | | | | | | | 0 | 0 | 1 | 1 | 16 | | | 18 |
| 56 | | | | | | | | | | | | | 2 | 1 | 2 | 3 | 27 | | | 35 |
| 57 | | | | | | | | | | | | 1 | 4 | 1 | 3 | 4 | 47 | | | 60 |
| 58 | | | | | | | | | 1 | | | 0 | 5 | 3 | 5 | 1 | 47 | | | 62 |
| 59 | | | | | | | | | 1 | | | 2 | 8 | 7 | 7 | 6 | 52 | | | 83 |
| 60 | | | | | | | | | 1 | | | 0 | 11 | 12 | 8 | 9 | 88 | | | 129 |
| 61 | | | | | | | | | 3 | | | 0 | 11 | 5 | 5 | 5 | 71 | | | 100 |
| 62 | | | | | | | | | 1 | | | 0 | 22 | 8 | 13 | 9 | 79 | | | 132 |
| 63 | | | | | | | | | 3 | | | 1 | 17 | 20 | 18 | 11 | 80 | | | 150 |
| 64 | | | | | | | | | 1 | | | 0 | 20 | 14 | 14 | 14 | 96 | | | 159 |
| 65 | | | | | | | | | 3 | | | 0 | 19 | 22 | 11 | 11 | 78 | | | 144 |
| 66 | | | | | 1 | 1 | | | 10 | | | 0 | 30 | 26 | 13 | 12 | 74 | | | 167 |
| 67 | | | | 1 | 0 | 0 | | | 7 | | | 0 | 24 | 21 | 23 | 16 | 69 | | | 161 |
| 68 | | | | 0 | 1 | 0 | 1 | | 5 | | | 1 | 26 | 22 | 17 | 17 | 57 | | | 147 |
| 69 | | | | 0 | 0 | 0 | 0 | 1 | 14 | | | 1 | 36 | 20 | 18 | 20 | 49 | | | 159 |
| 70 | | | | 0 | 0 | 1 | 1 | 0 | 13 | | | 1 | 29 | 23 | 30 | 22 | 59 | | | 179 |
| 71 | | | | 0 | 1 | 0 | 0 | 0 | 10 | | | 0 | 23 | 19 | 14 | 15 | 30 | | | 112 |
| 72 | | | | 0 | 0 | 0 | 0 | 1 | 19 | | | 0 | 17 | 17 | 14 | 16 | 21 | | | 105 |
| 73 | | | | 0 | 1 | 1 | 0 | 0 | 23 | | | 0 | 13 | 16 | 17 | 11 | 6 | | | 88 |
| 74 | | | | 0 | 1 | 0 | 0 | 1 | 28 | | | 1 | 11 | 9 | 7 | 8 | 11 | | | 77 |
| 75 | | | | 0 | 0 | 1 | 1 | 1 | 30 | | | 0 | 16 | 9 | 4 | 6 | 11 | | | 79 |
| 76 | | | | 1 | 3 | 1 | 0 | 0 | 37 | | 1 | 0 | 7 | 7 | 9 | 9 | 11 | | | 86 |
| 77 | | | | 0 | 1 | 1 | 1 | 0 | 46 | | 0 | 0 | 12 | 10 | 9 | 8 | 5 | | | 93 |
| 78 | | | | 1 | 1 | 0 | 1 | 0 | 56 | | 0 | 1 | 7 | 2 | 4 | 5 | 4 | | | 82 |
| 79 | | | | 0 | 1 | 0 | 2 | 0 | 40 | | 0 | | 6 | 3 | 5 | 4 | 1 | | | 62 |
| 80 | | | | 1 | 1 | 0 | 0 | 0 | 49 | | 0 | | 4 | 7 | 8 | 4 | 2 | | | 76 |
| 81 | | | | 1 | 1 | 1 | 1 | 0 | 33 | | 0 | | 1 | 3 | 3 | 3 | 1 | | | 48 |
| 82 | | | | 4 | 1 | 3 | 1 | 0 | 36 | | 0 | | 2 | 1 | 4 | 4 | | | | 56 |
| 83 | | | | 1 | 1 | 0 | 1 | 0 | 36 | | 0 | | 3 | 1 | 3 | 1 | | | | 47 |
| 84 | | | | 0 | 3 | 0 | 1 | 3 | 31 | 1 | 0 | | 1 | 1 | 1 | | | | | 42 |
| 85 | | | | 0 | 0 | 0 | 0 | 0 | 20 | | 0 | | 1 | | 0 | | | | | 21 |
| 86 | | | | 0 | 1 | 0 | 1 | 0 | 17 | | 0 | | 1 | | 1 | | | | | 21 |
| 87 | | | | 0 | 0 | 0 | 0 | 0 | 28 | | 0 | | | | | | | | | 28 |
| 88 | | | | 3 | 0 | 0 | 1 | 0 | 14 | | 1 | | | | | | | | | 19 |
| 89 | | 1 | 1 | 1 | 0 | 0 | | 0 | 13 | | | | | | | | | | | 16 |
| 90 | | | | 2 | 0 | 0 | | 0 | 12 | | | | | | | | | | | 14 |
| 91 | | | | 2 | 1 | 2 | | 0 | 6 | | | | | | | | | | | 11 |
| 92 | | | | 0 | | | | 0 | 7 | | | | | | | | | | | 7 |
| 93 | | | | 0 | | | | 0 | 4 | | | | | | | | | | | 4 |
| 94 | | | | 1 | | | | 0 | 2 | | | | | | | | | | | 3 |
| 95 | | | | 0 | | | | 0 | 4 | | | | | | | | | | | 4 |
| 96 | | | | 0 | | | | 0 | 0 | | | | | | | | | | | 0 |
| 97 | | | | 0 | | | | 1 | 0 | | | | | | | | | | | 1 |
| 98 | | | | 0 | | | | | 1 | | | | | | | | | | | 1 |
| 99 | | | | 0 | | | | | 1 | | | | | | | | | | | 1 |
| 100 | | | | 1 | | | | | | | | | | | | | | | | 1 |
| 101 | | | | | | | | | | | | | | | | | | | | 0 |
| 102 | | | | | | | | | | | | | | | | | | | | 0 |
| 103 | | | | | | | | | | | | | | | | | | | | 0 |
| 104 | | | | | | | | | | | | | | | | | | | | 0 |
| Totals: | | 1 | 1 | 20 | 20 | 12 | 13 | 8 | 666 | 1 | 2 | 9 | 392 | 311 | 294 | 258 | 1,121 | 1 | 2 | 3,132 |
| Mean | | 89.0 | 89.0 | 85.1 | 78.5 | 78.8 | 79.2 | 79.9 | 79.1 | 84.0 | 82.0 | 66.3 | 68.3 | 68.5 | 68.7 | 68.6 | 63.9 | 46.0 | 48.5 | 69.4 |

a/ The fish ladder was open from September 8, 2005 through March 14, 2006 (Julian Week 36-11).
b/ Age at release: f = fingerlings, y = yearlings.

Appendix 4. Fork length (FL) distribution of spring run Chinook salmon trapped and tagged in the Trinity River at Willow Creek (WCW) and Junction City (JCW) Weirs, and recovered at Trinity River Hatchery (TRH) during the 2005-06 season. a/

| FL (cm) | Willow Creek Weir | | | | Junction City Weir | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Trapped | Ad-clips b/ | Effective Tags c/ | TRH Recoveries | Total Trapped | Ad-clips b/ | Effective Tags c/ | TRH Recoveries |
| 35 | | | | | | | | |
| 36 | 1 | | | | | | | |
| 37 | 1 | | | | | | | |
| 38 | 0 | | | | | | | |
| 39 | 1 | | 1 | | | | | |
| 40 | 0 | | 0 | | | | | |
| 41 | 1 | | 1 | | | | | |
| 42 | 0 | | 0 | | 1 | | 1 | |
| 43 | 1 | | 1 | | 0 | | 0 | |
| 44 | 1 | | 1 | | 1 | | 1 | 1 |
| 45 | 0 | | 0 | | 1 | | 0 | 0 |
| 46 | 0 | | 0 | | 0 | | 0 | 0 |
| 47 | 0 | | 0 | | 0 | | 0 | 0 |
| 48 | 0 | | 0 | | 0 | | 0 | 0 |
| 49 | 1 | | 1 | | 0 | | 0 | 0 |
| 50 | 0 | | 0 | | 0 | | 0 | 0 |
| 51 | 0 | | 0 | | 0 | | 0 | 0 |
| 52 | 1 | | 1 | | 0 | | 0 | 0 |
| 53 | 0 | | 0 | | 1 | | 1 | 0 |
| 54 | 0 | | 0 | | 1 | | 1 | 1 |
| 55 | 1 | | 1 | | 2 | | 2 | 0 |
| 56 | 2 | | 2 | | 1 | | 1 | 1 |
| 57 | 3 | | 3 | 2 | 5 | 1 | 5 | 5 |
| 58 | 4 | | 4 | 0 | 9 | 0 | 8 | 3 |
| 59 | 2 | | 2 | 1 | 7 | 1 | 7 | 6 |
| 60 | 4 | 1 | 4 | 1 | 12 | 2 | 12 | 4 |
| 61 | 5 | 1 | 5 | 2 | 11 | 5 | 11 | 4 |
| 62 | 8 | 0 | 7 | 3 | 13 | 4 | 13 | 5 |
| 63 | 6 | 1 | 6 | 2 | 11 | 1 | 10 | 2 |
| 64 | 13 | 2 | 13 | 4 | 12 | 2 | 12 | 7 |
| 65 | 7 | 1 | 7 | 1 | 9 | 3 | 9 | 5 |
| 66 | 8 | 0 | 8 | 3 | 11 | 4 | 10 | 7 |
| 67 | 6 | 2 | 6 | 2 | 9 | 0 | 8 | 4 |
| 68 | 6 | 0 | 6 | 1 | 6 | 0 | 6 | 1 |
| 69 | 4 | 0 | 3 | 0 | 7 | 3 | 7 | 5 |
| 70 | 2 | 1 | 2 | 2 | 6 | 1 | 5 | 2 |
| 71 | 4 | 1 | 4 | 1 | 10 | 1 | 9 | 6 |
| 72 | 1 | 0 | 1 | 0 | 6 | 1 | 5 | 2 |
| 73 | 1 | 0 | 1 | 0 | 6 | 2 | 6 | 5 |
| 74 | 1 | 1 | 1 | 0 | 4 | 0 | 4 | 1 |
| 75 | 1 | | 1 | 0 | 4 | 0 | 4 | 2 |
| 76 | 1 | | 1 | 0 | 4 | 2 | 3 | 1 |
| 77 | 1 | | 1 | 0 | 0 | 0 | 0 | 0 |
| 78 | 0 | | 0 | 0 | 1 | 1 | 1 | 1 |
| 79 | 0 | | 0 | 0 | 3 | 2 | 3 | 2 |
| 80 | 1 | | 1 | 0 | 3 | 0 | 3 | 2 |
| 81 | 1 | | 1 | 0 | 1 | 1 | 1 | 1 |
| 82 | 1 | | 1 | 1 | 1 | | 1 | 0 |
| 83 | 0 | | 0 | | 3 | | 3 | 0 |
| 84 | 2 | | 2 | | 0 | | 0 | 0 |
| 85 | 0 | | 0 | | 0 | | 0 | 0 |
| 86 | 1 | | 1 | | 1 | | 1 | 0 |
| 87 | 0 | | 0 | | 1 | | 1 | 1 |
| 88 | 1 | | 0 | | 1 | | 1 | 1 |
| 89 | 0 | | 0 | | 1 | | 1 | |
| 90 | 1 | | 1 | | | | | |
| 91 | | | | | | | | |
| 92 | | | | | | | | |
| 93 | | | | | | | | |
| 94 | | | | | | | | |
| 95 | | | | | | | | |
| 96 | | | | | | | | |
| 97 | | | | | | | | |
| 98 | | | | | | | | |
| 99 | | | | | | | | |
| 100 | | | | | | | | |
| 101 | | | | | | | | |
| Totals: | 107 | 11 | 102 | 26 | 186 | 37 | 177 | 88 |
| Mean FL: | 64.4 | 66.0 | 64.7 | 64.7 | 66.2 | 66.9 | 66.2 | 66.3 |
| Total grilse d/: | 6 | 0 | 4 | 0 | 3 | 0 | 2 | 1 |
| Total adults: | 101 | 11 | 98 | 26 | 183 | 37 | 175 | 87 |

a/ Trapping at JCW took place from July 22 through November 28 (Julian Weeks 29-48). Chinook trapped prior to Julian week 37 at JCW were considered spring Chinook. Trapping at WCW took place from August 22 through November 4 (Julian Weeks 34-44). Chinook trapped prior to Julian Week 35 at WCW were considered spring Chinook.

b/ Ad-clip = Adipose fin clipped fish.

c/ Number of effectively tagged fish excludes fish that were not tagged, tagging mortalities, and fish that had their tags removed (caught and released).

d/ Spring run Chinook salmon less than or equal to 48 cm FL were considered grilse.

Appendix 5. Fork length (FL) distribution of fall run Chinook salmon trapped and tagged in the Trinity River at Willow Creek (WCW) and Junction City (JCW) Weirs, and recovered at Trinity River Hatchery (TRH) during the 2005-06 season. a/

| FL (cm) | Willow Creek Weir | | | | Junction City Weir | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Trapped | Ad-clips b/ | Effective Tags c/ | TRH Recoveries | Total Trapped | Ad-clips b/ | Effective Tags c/ | TRH Recoveries |
| 32 | | | | | 1 | | | |
| 33 | | | | | 2 | | 2 | |
| 34 | | | | | 1 | | 0 | |
| 35 | | | | | 1 | | 0 | |
| 36 | | | | | 2 | | 0 | |
| 37 | | | | | 0 | | 0 | |
| 38 | 2 | | 2 | | 1 | | 1 | |
| 39 | 2 | | 1 | | 2 | | 1 | |
| 40 | 2 | | 2 | | 1 | | 1 | |
| 41 | 4 | | 4 | | 2 | | 2 | |
| 42 | 5 | | 4 | | 4 | | 2 | |
| 43 | 8 | | 7 | | 1 | | 0 | |
| 44 | 6 | 1 | 5 | | 3 | | 3 | |
| 45 | 2 | 0 | 2 | | 1 | | 0 | |
| 46 | 1 | 0 | 1 | | 4 | | 4 | |
| 47 | 2 | 0 | 2 | | 0 | | 0 | |
| 48 | 3 | 0 | 3 | | 0 | | 0 | |
| 49 | 5 | 0 | 5 | 1 | 3 | | 2 | |
| 50 | 4 | 0 | 4 | 1 | 3 | | 3 | |
| 51 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | |
| 52 | 5 | 0 | 5 | 0 | 8 | 3 | 7 | 3 |
| 53 | 5 | 0 | 4 | 2 | 6 | 2 | 6 | 4 |
| 54 | 6 | 3 | 5 | 3 | 4 | 0 | 3 | 2 |
| 55 | 15 | 2 | 14 | 7 | 14 | 2 | 13 | 8 |
| 56 | 8 | 0 | 7 | 2 | 26 | 3 | 25 | 14 |
| 57 | 19 | 3 | 18 | 5 | 20 | 6 | 19 | 12 |
| 58 | 26 | 4 | 25 | 11 | 22 | 6 | 18 | 13 |
| 59 | 27 | 5 | 27 | 16 | 25 | 5 | 22 | 11 |
| 60 | 40 | 7 | 39 | 19 | 29 | 5 | 29 | 15 |
| 61 | 48 | 13 | 47 | 26 | 37 | 8 | 37 | 12 |
| 62 | 50 | 13 | 50 | 26 | 33 | 8 | 31 | 17 |
| 63 | 81 | 14 | 77 | 44 | 36 | 5 | 34 | 18 |
| 64 | 69 | 10 | 67 | 36 | 35 | 9 | 31 | 21 |
| 65 | 60 | 10 | 59 | 33 | 40 | 10 | 39 | 21 |
| 66 | 93 | 15 | 93 | 50 | 33 | 5 | 32 | 21 |
| 67 | 68 | 11 | 66 | 33 | 23 | 5 | 21 | 11 |
| 68 | 82 | 20 | 82 | 42 | 10 | 4 | 9 | 6 |
| 69 | 61 | 11 | 61 | 32 | 26 | 4 | 24 | 12 |
| 70 | 53 | 7 | 53 | 30 | 14 | 2 | 14 | 10 |
| 71 | 53 | 10 | 51 | 26 | 16 | 7 | 14 | 5 |
| 72 | 38 | 9 | 37 | 21 | 15 | 2 | 15 | 11 |
| 73 | 40 | 11 | 37 | 24 | 12 | 2 | 12 | 4 |
| 74 | 39 | 8 | 37 | 14 | 8 | 1 | 8 | 4 |
| 75 | 34 | 4 | 33 | 20 | 7 | 2 | 5 | 4 |
| 76 | 26 | 7 | 25 | 14 | 4 | 1 | 4 | 1 |
| 77 | 22 | 2 | 21 | 13 | 5 | 1 | 5 | 4 |
| 78 | 25 | 4 | 25 | 10 | 7 | 2 | 7 | 3 |
| 79 | 30 | 5 | 28 | 14 | 6 | 2 | 6 | 1 |
| 80 | 22 | 6 | 22 | 7 | 5 | 1 | 5 | 4 |
| 81 | 17 | 3 | 16 | 8 | 4 | 2 | 4 | 4 |
| 82 | 14 | 1 | 14 | 7 | 3 | 0 | 3 | 2 |
| 83 | 10 | 3 | 10 | 6 | 2 | 1 | 2 | 2 |
| 84 | 13 | 3 | 13 | 4 | 1 | 0 | 0 | 0 |
| 85 | 7 | 2 | 7 | 3 | 0 | 0 | 0 | 0 |
| 86 | 10 | 2 | 9 | 3 | 0 | 0 | 0 | 0 |
| 87 | 10 | 0 | 8 | 2 | 1 | 0 | 0 | 0 |
| 88 | 6 | 0 | 6 | 1 | 1 | 1 | 1 | 1 |
| 89 | 7 | 0 | 7 | 2 | 1 | | 1 | 1 |
| 90 | 5 | 1 | 5 | 1 | | | | |
| 91 | 4 | 1 | 4 | 1 | | | | |
| 92 | 2 | 0 | 2 | 0 | | | | |
| 93 | 4 | 0 | 4 | 2 | | | | |
| 94 | 3 | 1 | 3 | 0 | | | | |
| 95 | 2 | 1 | 2 | 2 | | | | |
| 96 | 7 | | 7 | 1 | | | | |
| 97 | 0 | | 0 | | | | | |
| 98 | 2 | | 2 | | | | | |
| 99 | 2 | | 2 | | | | | |
| 100 | 0 | | 0 | | | | | |
| 101 | 0 | | 0 | | | | | |
| 102 | 0 | | 0 | | | | | |
| 103 | 0 | | 0 | | | | | |
| 104 | 0 | | 0 | | | | | |
| 105 | 0 | | 0 | | | | | |
| 106 | 0 | | 0 | | | | | |
| 107 | 1 | | 1 | | | | | |
| Totals: | 1,319 | 234 | 1,281 | 626 | 573 | 118 | 529 | 282 |
| Mean FL: | 68.3 | 68.6 | 68.3 | 68.4 | 63.2 | 64.8 | 63.7 | 64.7 |
| Total grilse d/: | 42 | 1 | 38 | 1 | 29 | 0 | 18 | 0 |
| Total adults: | 1,277 | 233 | 1,243 | 625 | 544 | 118 | 511 | 282 |

a/ Trapping at JCW took place from July 22 through November 28 (Julian Weeks 29-48). Chinook trapped after Julian week 36 at JCW were considered fall Chinook. Trapping at WCW took place from August 22 through November 4 (Julian Weeks 34-44). Chinook trapped after Julian Week 34 at WCW were considered fall Chinook.

b/ Ad-clip = Adipose fin clipped fish.

c/ Number of effectively tagged fish excludes fish that were not tagged, tagging mortalities, and fish that had their tags removed (caught and released).

d/ Fall run Chinook salmon less than or equal to 49 cm FL were considered grilse.

Appendix 6. Fork length (FL) distribution of coho salmon trapped and tagged in the Trinity River at Willow Creek (WCW) and Junction City (JCW) Weirs, and recovered at Trinity River Hatchery (TRH) during the 2005-06 season. a/

| FL (cm) | Willow Creek Weir | | | | Junction City Weir | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Trapped | RM-clips b/ | Effective Tags c/ | TRH Recoveries | Total Trapped | RM-clips b/ | Effective Tags c/ | TRH Recoveries |
| 32 | | | | | | | | |
| 33 | | | | | 1 | 1 | 1 | |
| 34 | | | | | 0 | 0 | 0 | |
| 35 | | | | | 3 | 3 | 3 | 2 |
| 36 | | | | | 8 | 8 | 8 | 7 |
| 37 | 1 | 1 | 1 | | 4 | 4 | 4 | 3 |
| 38 | 10 | 10 | 10 | 4 | 19 | 19 | 19 | 12 |
| 39 | 5 | 5 | 5 | 2 | 25 | 25 | 24 | 19 |
| 40 | 13 | 13 | 11 | 7 | 24 | 24 | 22 | 17 |
| 41 | 21 | 20 | 20 | 6 | 54 | 54 | 53 | 43 |
| 42 | 31 | 31 | 31 | 13 | 41 | 41 | 40 | 31 |
| 43 | 13 | 12 | 13 | 8 | 34 | 34 | 33 | 25 |
| 44 | 21 | 21 | 21 | 15 | 26 | 26 | 26 | 21 |
| 45 | 20 | 20 | 18 | 12 | 17 | 17 | 17 | 12 |
| 46 | 5 | 5 | 4 | 3 | 5 | 5 | 5 | 6 |
| 47 | 4 | 4 | 3 | 1 | 6 | 6 | 6 | 4 |
| 48 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 1 |
| 49 | 2 | 1 | 2 | 1 | 7 | 7 | 7 | 5 |
| 50 | 4 | 3 | 4 | 2 | 2 | 2 | 2 | 2 |
| 51 | 3 | 3 | 3 | 2 | 6 | 6 | 5 | 2 |
| 52 | 3 | 3 | 3 | 2 | 9 | 8 | 8 | 6 |
| 53 | 8 | 7 | 8 | 3 | 9 | 8 | 9 | 5 |
| 54 | 7 | 6 | 7 | 4 | 11 | 11 | 10 | 6 |
| 55 | 7 | 6 | 7 | 2 | 12 | 12 | 12 | 6 |
| 56 | 8 | 6 | 8 | 4 | 20 | 18 | 19 | 13 |
| 57 | 20 | 19 | 19 | 10 | 31 | 29 | 30 | 22 |
| 58 | 19 | 19 | 18 | 10 | 29 | 28 | 28 | 22 |
| 59 | 30 | 29 | 28 | 13 | 53 | 50 | 51 | 39 |
| 60 | 41 | 39 | 40 | 28 | 47 | 43 | 47 | 37 |
| 61 | 40 | 36 | 39 | 27 | 71 | 69 | 68 | 53 |
| 62 | 43 | 39 | 42 | 30 | 79 | 68 | 78 | 58 |
| 63 | 65 | 60 | 64 | 33 | 77 | 69 | 75 | 56 |
| 64 | 71 | 63 | 68 | 42 | 86 | 76 | 81 | 58 |
| 65 | 65 | 60 | 63 | 37 | 71 | 62 | 69 | 55 |
| 66 | 48 | 43 | 46 | 28 | 74 | 65 | 70 | 54 |
| 67 | 60 | 48 | 57 | 37 | 61 | 55 | 58 | 41 |
| 68 | 29 | 27 | 29 | 17 | 34 | 31 | 31 | 22 |
| 69 | 16 | 14 | 16 | 9 | 39 | 37 | 37 | 28 |
| 70 | 14 | 14 | 14 | 7 | 25 | 21 | 22 | 17 |
| 71 | 15 | 13 | 15 | 12 | 14 | 12 | 10 | 8 |
| 72 | 3 | 3 | 3 | 1 | 10 | 7 | 9 | 5 |
| 73 | 3 | 3 | 3 | 2 | 8 | 6 | 7 | 4 |
| 74 | 2 | 2 | 2 | | 2 | 1 | 2 | 0 |
| 75 | | | | | 2 | 1 | 2 | 1 |
| 76 | | | | | 1 | 1 | 1 | 1 |
| 77 | | | | | 1 | 1 | | |
| 78 | | | | | | | | |
| 79 | | | | | | | | |
| Totals: | 772 | 710 | 747 | 436 | 1,161 | 1,074 | 1,112 | 829 |
| Mean FL: | 59.3 | 59.0 | 59.3 | 59.9 | 58.0 | 57.5 | 57.8 | 57.7 |
| Total grilse d/: | 152 | 148 | 145 | 76 | 279 | 279 | 273 | 210 |
| Total adults: | 620 | 562 | 602 | 360 | 882 | 795 | 839 | 619 |

a/ Trapping at JCW took place from July 22 through November 28 (Julian Weeks 29-48). Trapping at WCW took place from August 22 through November 4 (Julian Weeks 34-44).

b/ RM-clip = Right Maxillary clipped fish.

c/ Number of effectively tagged fish excludes fish that were not tagged, tagging mortalities, and fish that had their tags removed (caught and released).

d/ Coho salmon less than or equal to 50 cm FL were considered grilse.

Appendix 7. Fork length (FL) distribution of fall run steelhead trapped in the Trinity River at the Willow Creek Weir, Junction City Weir and Trinity River Hatchery (TRH) during the 2005-2006 season.

| | Willow Creek Weir a/ | | | | | Junction City Weir a/ | | TRH f/ | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Trapped | Ad-clips b/ | Other-clips c/ | Effective Tags d/ | TRH Recoveries f/ | Total Trapped | Ad-clips b/ | Total Trapped | Ad-clips b/ |
| 29 | 2 | | | | | | | | |
| 30 | 2 | | | | | | | | |
| 31 | 2 | | | | | | | | |
| 32 | 2 | | | | | | | | |
| 33 | 2 | 2 | | | | | | | |
| 34 | 6 | 4 | | | | | | | |
| 35 | 2 | 2 | | | | | | | |
| 36 | 6 | 4 | | | | 2 | 2 | | |
| 37 | 11 | 9 | | | | 6 | 6 | | |
| 38 | 12 | 11 | | | | 9 | 8 | | |
| 39 | 11 | 9 | | | | 4 | 4 | | |
| 40 | 13 | 11 | | | | 5 | 4 | | |
| 41 | 17 | 15 | | | | 1 | 1 | | |
| 42 | 9 | 8 | | 6 | 1 | 2 | 2 | 4 | 3 |
| 43 | 11 | 10 | | 9 | 0 | 4 | 4 | 13 | 13 |
| 44 | 6 | 5 | | 6 | 1 | 6 | 4 | 18 | 18 |
| 45 | 8 | 6 | | 7 | 1 | 1 | 1 | 16 | 15 |
| 46 | 6 | 3 | | 5 | 2 | 1 | 1 | 15 | 14 |
| 47 | 3 | 0 | | 2 | 0 | 1 | 1 | 18 | 18 |
| 48 | 7 | 0 | | 7 | 0 | 4 | 2 | 11 | 11 |
| 49 | 5 | 3 | | 5 | 0 | 5 | 5 | 10 | 10 |
| 50 | 8 | 2 | | 7 | 1 | 6 | 6 | 18 | 18 |
| 51 | 9 | 3 | | 9 | 2 | 14 | 10 | 21 | 19 |
| 52 | 14 | 4 | | 12 | 2 | 18 | 16 | 46 | 45 |
| 53 | 29 | 15 | 2 | 26 | 6 | 26 | 24 | 79 | 77 |
| 54 | 43 | 30 | 0 | 42 | 17 | 31 | 26 | 149 | 146 |
| 55 | 48 | 35 | 0 | 42 | 11 | 39 | 36 | 226 | 224 |
| 56 | 87 | 70 | 0 | 78 | 36 | 73 | 68 | 367 | 365 |
| 57 | 105 | 86 | 1 | 99 | 50 | 62 | 56 | 437 | 436 |
| 58 | 157 | 118 | 0 | 146 | 57 | 76 | 73 | 527 | 526 |
| 59 | 159 | 134 | 0 | 140 | 80 | 60 | 56 | 635 | 633 |
| 60 | 203 | 162 | 1 | 186 | 82 | 63 | 60 | 697 | 695 |
| 61 | 192 | 144 | 1 | 178 | 86 | 55 | 50 | 640 | 639 |
| 62 | 188 | 144 | 0 | 175 | 78 | 58 | 56 | 722 | 720 |
| 63 | 160 | 117 | 0 | 151 | 73 | 29 | 26 | 648 | 642 |
| 64 | 131 | 92 | 2 | 123 | 50 | 28 | 25 | 531 | 527 |
| 65 | 122 | 81 | 1 | 117 | 48 | 32 | 26 | 493 | 487 |
| 66 | 99 | 58 | 0 | 93 | 37 | 35 | 31 | 364 | 359 |
| 67 | 77 | 53 | 0 | 73 | 31 | 18 | 16 | 304 | 302 |
| 68 | 71 | 43 | 0 | 64 | 25 | 10 | 10 | 278 | 276 |
| 69 | 48 | 25 | 0 | 47 | 14 | 17 | 15 | 229 | 228 |
| 70 | 46 | 34 | 1 | 44 | 14 | 8 | 8 | 179 | 176 |
| 71 | 27 | 19 | | 24 | 6 | 12 | 12 | 108 | 106 |
| 72 | 24 | 18 | | 23 | 9 | 11 | 10 | 107 | 103 |
| 73 | 10 | 6 | | 10 | 2 | 2 | 2 | 67 | 65 |
| 74 | 5 | 2 | | 5 | 1 | 5 | 4 | 54 | 53 |
| 75 | 4 | 4 | | 3 | 1 | 0 | 0 | 34 | 34 |
| 76 | 4 | 4 | | 4 | 1 | 0 | 0 | 27 | 27 |
| 77 | 3 | 3 | | 3 | 1 | 0 | 0 | 18 | 18 |
| 78 | 0 | 0 | | 0 | 0 | 1 | 1 | 6 | 6 |
| 79 | 2 | 1 | | 2 | 1 | | | 8 | 8 |
| 80 | 1 | 0 | | 1 | 0 | | | 11 | 10 |
| 81 | 1 | 1 | | 1 | 1 | | | 5 | 5 |
| 82 | | | | | | | | 0 | 0 |
| 83 | | | | | | | | 3 | 3 |
| Totals: | 2,220 | 1,610 | 9 | 1,975 | 828 | 840 | 768 | 8,143 | 8,080 |
| Mean FL: | 60.4 | 60.3 | 60.8 | 61.4 | 61.6 | 58.9 | 58.9 | 61.9 | 61.9 |
| Total 1/2 pounders e/: | 88 | 67 | 0 | 0 | 0 | 27 | 25 | 0 | 0 |
| Total adults: | 2,132 | 1,543 | 9 | 1,975 | 828 | 813 | 743 | 8,143 | 8,080 |

a/ Trapping at Willow Creek took place from August 22 through November 4 (Julian Weeks 34-44) and at Junction City from July 22 through November 28 (Julian Weeks 29-48).

b/ Ad clips= Adipose fin clipped fish.

c/ Other clips include: 2-LM (left maxillary) and 7-RM (right maxillary) clips.

d/ Number of effectively tagged fish excludes fish that were not tagged, tagging mortalities, and fish that had their tags removed (

e/ Steelhead less than or equal to 41 cm FL were considered half pounders.

f/ The fish ladder was open from September 8, 2005 through March 14, 2006 (Julian Weeks 36-11). Only steelhead >41cm were recorded at TRH.

Appendix 8 . Fork Length (FL) distribution of spring run Chinook salmon tagged at Junction City Weir and subsequently recovered during the 2005-2006 season. a/

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass c/ Recoveries | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 41 | | | | | | | | 0 | |
| 42 | 1 | | | | | | | 0 | 0.0 |
| 43 | 0 | | | | | | | 0 | - |
| 44 | 1 | | | 1 | | | | 1 | 100.0 |
| 45 | 1 | 1 | | 0 | | | | 1 | 100.0 |
| 46 | 0 | 0 | | 0 | | | | 0 | - |
| 47 | 0 | 0 | | 0 | | | | 0 | - |
| 48 | 0 | 0 | | 0 | | | | 0 | - |
| 49 | 0 | 0 | | 0 | | | | 0 | - |
| 50 | 0 | 0 | | 0 | | | | 0 | - |
| 51 | 0 | 0 | | 0 | | | | 0 | - |
| 52 | 0 | 0 | | 0 | | | | 0 | - |
| 53 | 1 | 0 | 1 | 0 | | | | 1 | 100.0 |
| 54 | 1 | 0 | 0 | 1 | | | | 1 | 100.0 |
| 55 | 2 | 0 | 0 | 0 | | 1 | | 1 | 50.0 |
| 56 | 1 | 0 | 0 | 1 | | 0 | | 1 | 100.0 |
| 57 | 5 | 0 | 0 | 5 | | 0 | | 5 | 100.0 |
| 58 | 9 | 0 | 1 | 3 | 1 | 1 | | 6 | 66.7 |
| 59 | 7 | 0 | 0 | 6 | 0 | 0 | | 6 | 85.7 |
| 60 | 12 | 0 | 0 | 4 | 0 | 1 | | 5 | 41.7 |
| 61 | 11 | 0 | 0 | 5 | 0 | 0 | | 5 | 45.5 |
| 62 | 13 | 0 | 0 | 5 | 0 | 1 | | 6 | 46.2 |
| 63 | 11 | 0 | 1 | 3 | 1 | 1 | | 6 | 54.5 |
| 64 | 12 | 0 | 0 | 7 | 0 | 0 | | 7 | 58.3 |
| 65 | 9 | 0 | 0 | 5 | 0 | 0 | | 5 | 55.6 |
| 66 | 11 | 1 | 0 | 7 | 0 | 0 | | 8 | 72.7 |
| 67 | 9 | | 0 | 4 | 1 | 0 | | 5 | 55.6 |
| 68 | 6 | | 0 | 1 | 0 | 0 | | 1 | 16.7 |
| 69 | 7 | | 0 | 5 | 0 | 0 | | 5 | 71.4 |
| 70 | 6 | | 0 | 2 | 1 | 0 | | 3 | 50.0 |
| 71 | 9 | | 0 | 6 | | 0 | | 6 | 66.7 |
| 72 | 5 | | 0 | 2 | | 0 | | 2 | 40.0 |
| 73 | 6 | | 0 | 6 | | 0 | | 6 | 100.0 |
| 74 | 4 | | 1 | 1 | | 0 | | 2 | 50.0 |
| 75 | 4 | | | 2 | | 0 | | 2 | 50.0 |
| 76 | 3 | | | 1 | | 0 | | 1 | 33.3 |
| 77 | 0 | | | 0 | | 0 | | 0 | - |
| 78 | 1 | | | 1 | | 0 | | 1 | 100.0 |
| 79 | 3 | | | 2 | | 1 | | 3 | 100.0 |
| 80 | 3 | | | 2 | | | | 2 | 66.7 |
| 81 | 1 | | | 1 | | | | 1 | 100.0 |
| 82 | 1 | | | 0 | | | | 0 | 0.0 |
| 83 | 3 | | | 0 | | | | 0 | 0.0 |
| 84 | 0 | | | 0 | | | | 0 | - |
| 85 | 0 | | | 0 | | | | 0 | - |
| 86 | 1 | | | 0 | | | | 0 | 0.0 |
| 87 | 1 | | | 1 | | | | 1 | 100.0 |
| 88 | 1 | | | 1 | | | | 1 | 100.0 |
| 89 | 1 | | | | | | | 0 | 0.0 |
| 90 | | | | | | | | 0 | - |
| Grilse: h/ | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 66.7 |
| Adults: | 180 | 1 | 4 | 90 | 4 | 6 | 0 | 105 | 58.3 |
| Total: | 183 | 2 | 4 | 91 | 4 | 6 | 0 | 107 | 58.5 |

a/ Trapping at Junction City took place from July 22 through November 28 (Julian Weeks 29-48). Chinook trapped prior to Julian Week 37 were considered spring run.
b/ Tagged fish found dead and unspawned within 30 days of tagging.
c/ Fish recovered in upper Trinity River spawner surveys.
d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 through March 13, 2006 (Julian Weeks 36-11).
e/ Fish reported as caught and released by anglers.
f/ Fish reported as harvested by anglers.
g/ Tags found on dead fish or found unattached.
h/ Grilse were considered fish less than or equal to 48 cm FL.

Appendix 9 . Fork Length (FL) distribution of fall run Chinook salmon tagged at Junction City Weir and subsequently recovered during the 2005-2006 season. a/

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass c/ Recoveries | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 33 | 2 | | | | | | | 0 | 0.0 |
| 34 | 0 | | | | | | | 0 | - |
| 35 | 0 | | | | | | | 0 | - |
| 36 | 0 | | | | | | | 0 | - |
| 37 | 0 | | | | | | | 0 | - |
| 38 | 1 | | | | | | | 0 | 0.0 |
| 39 | 2 | 1 | | | | | | 1 | 50.0 |
| 40 | 1 | 0 | | | | | | 0 | 0.0 |
| 41 | 2 | 0 | | | | | | 0 | 0.0 |
| 42 | 2 | 0 | | | | | | 0 | 0.0 |
| 43 | 1 | 0 | | | 1 | | | 1 | 100.0 |
| 44 | 3 | 0 | | | 0 | | | 0 | 0.0 |
| 45 | 0 | 0 | | | 0 | | | 0 | - |
| 46 | 4 | 0 | | | 0 | | | 0 | 0.0 |
| 47 | 0 | 0 | | | 0 | | | 0 | - |
| 48 | 0 | 0 | | | 0 | | | 0 | - |
| 49 | 3 | 0 | | | 1 | | | 1 | 33.3 |
| 50 | 3 | 0 | 2 | | 0 | 1 | | 3 | 100.0 |
| 51 | 2 | 0 | 0 | 1 | 0 | 0 | | 1 | 50.0 |
| 52 | 7 | 0 | 1 | 4 | 0 | 0 | | 5 | 71.4 |
| 53 | 6 | 0 | 0 | 4 | 0 | 0 | | 4 | 66.7 |
| 54 | 3 | 0 | 0 | 2 | 0 | 0 | | 2 | 66.7 |
| 55 | 13 | 0 | 1 | 8 | 0 | 0 | | 9 | 69.2 |
| 56 | 25 | 0 | 2 | 17 | 0 | 0 | | 19 | 76.0 |
| 57 | 19 | 0 | 2 | 13 | 0 | 0 | | 15 | 78.9 |
| 58 | 20 | 1 | 1 | 13 | 1 | 0 | | 16 | 80.0 |
| 59 | 23 | 1 | 0 | 13 | 0 | 1 | | 15 | 65.2 |
| 60 | 29 | 0 | 3 | 15 | 0 | 1 | | 19 | 65.5 |
| 61 | 37 | 0 | 4 | 15 | 0 | 1 | | 20 | 54.1 |
| 62 | 31 | 0 | 1 | 17 | 0 | 0 | | 18 | 58.1 |
| 63 | 34 | 0 | 2 | 18 | 0 | 0 | 1 | 21 | 61.8 |
| 64 | 32 | 0 | 4 | 21 | 1 | 0 | | 26 | 81.3 |
| 65 | 40 | 1 | 0 | 21 | | 1 | | 23 | 57.5 |
| 66 | 32 | 0 | 2 | 21 | | 0 | | 23 | 71.9 |
| 67 | 21 | 0 | 2 | 12 | | 0 | | 14 | 66.7 |
| 68 | 9 | 0 | 0 | 6 | | 0 | | 6 | 66.7 |
| 69 | 24 | 0 | 1 | 14 | | 0 | | 15 | 62.5 |
| 70 | 14 | 0 | 1 | 10 | | 0 | | 11 | 78.6 |
| 71 | 14 | 0 | 0 | 6 | | 0 | | 6 | 42.9 |
| 72 | 15 | 0 | 0 | 11 | | 1 | | 12 | 80.0 |
| 73 | 12 | 0 | 2 | 4 | | | | 6 | 50.0 |
| 74 | 8 | 0 | 1 | 5 | | | | 6 | 75.0 |
| 75 | 6 | 1 | 0 | 4 | | | | 5 | 83.3 |
| 76 | 4 | 0 | 0 | 2 | | | | 2 | 50.0 |
| 77 | 5 | 0 | 0 | 4 | | | | 4 | 80.0 |
| 78 | 7 | 0 | 2 | 4 | | | | 6 | 85.7 |
| 79 | 6 | 0 | 1 | 1 | | | | 2 | 33.3 |
| 80 | 5 | 0 | | 4 | | | | 4 | 80.0 |
| 81 | 4 | 0 | | 4 | | | | 4 | 100.0 |
| 82 | 3 | 0 | | 2 | | | | 2 | 66.7 |
| 83 | 2 | 0 | | 2 | | | | 2 | 100.0 |
| 84 | 1 | 1 | | 0 | | | | 1 | 100.0 |
| 85 | 0 | | | 0 | | | | 0 | - |
| 86 | 0 | | | 0 | | | | 0 | - |
| 87 | 0 | | | 0 | | | | 0 | - |
| 88 | 1 | | | 1 | | | | 1 | 100.0 |
| 89 | 1 | | | 1 | | | | 1 | 100.0 |
| 90 | | | | | | | | 0 | - |
| Grilse: h/ | 21 | 1 | 0 | 0 | 2 | 0 | 0 | 3 | 14.3 |
| Adults: | 518 | 5 | 35 | 300 | 2 | 6 | 1 | 349 | 67.4 |
| Total: | 539 | 6 | 35 | 300 | 4 | 6 | 1 | 352 | 65.3 |

a/ Trapping at Junction City took place from July 22 through November 28 (Julian Weeks 29-48). Chinook trapped after Julian week 36 were considered fall run.
b/ Tagged fish found dead and unspawned within 30 days of tagging.
c/ Fish recovered in upper Trinity River spawner surveys.
d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 through March 13, 2006 (Julian Weeks 36-11).
e/ Fish reported as caught and released by anglers.
f/ Fish reported as harvested by anglers.
g/ Tags found on dead fish or found unattached.
h/ Grilse were considered fish less than or equal to 49 cm FL.

Appendix 10. Fork Length (FL) distribution of coho salmon tagged at Junction City Weir and subsequently recovered during the 2005-2006 season. a/

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass c/ Recoveries | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 33 | 1 | | | | | | | 0 | 0.0 |
| 34 | 0 | | | | | | | 0 | - |
| 35 | 3 | | | 2 | | | | 2 | 66.7 |
| 36 | 8 | | | 7 | | | | 7 | 87.5 |
| 37 | 4 | | | 3 | | | | 3 | 75.0 |
| 38 | 19 | | | 12 | | | | 12 | 63.2 |
| 39 | 25 | | | 19 | 1 | | | 20 | 80.0 |
| 40 | 23 | 1 | | 17 | 0 | | | 18 | 78.3 |
| 41 | 54 | 1 | 1 | 43 | 0 | | | 45 | 83.3 |
| 42 | 40 | 0 | 0 | 31 | 0 | | | 31 | 77.5 |
| 43 | 33 | 0 | 1 | 25 | 0 | | | 26 | 78.8 |
| 44 | 26 | 0 | 0 | 21 | 0 | | | 21 | 80.8 |
| 45 | 17 | 0 | 1 | 12 | 0 | | | 13 | 76.5 |
| 46 | 5 | 0 | 0 | 6 | 0 | | | 6 | 120.0 |
| 47 | 6 | 0 | 0 | 4 | 0 | | | 4 | 66.7 |
| 48 | 3 | 0 | 0 | 1 | 0 | | | 1 | 33.3 |
| 49 | 7 | 0 | 0 | 5 | 0 | | | 5 | 71.4 |
| 50 | 2 | 0 | 0 | 2 | 0 | | | 2 | 100.0 |
| 51 | 6 | 1 | 0 | 2 | 0 | | | 3 | 50.0 |
| 52 | 9 | 1 | 0 | 6 | 0 | | | 7 | 77.8 |
| 53 | 9 | 0 | 0 | 5 | 0 | | | 5 | 55.6 |
| 54 | 10 | 0 | 0 | 6 | 0 | | | 6 | 60.0 |
| 55 | 12 | 0 | 0 | 6 | 0 | | | 6 | 50.0 |
| 56 | 19 | 0 | 0 | 13 | 0 | | | 13 | 68.4 |
| 57 | 30 | 0 | 0 | 22 | 0 | | | 22 | 73.3 |
| 58 | 28 | 0 | 1 | 22 | 0 | | | 23 | 82.1 |
| 59 | 51 | 0 | 1 | 39 | 0 | | | 40 | 78.4 |
| 60 | 47 | 0 | 2 | 37 | 0 | | | 39 | 83.0 |
| 61 | 68 | 0 | 1 | 53 | 0 | | | 54 | 79.4 |
| 62 | 78 | 0 | 0 | 58 | 0 | | | 58 | 74.4 |
| 63 | 75 | 0 | 3 | 56 | 0 | | 1 | 60 | 80.0 |
| 64 | 81 | 0 | 2 | 58 | 0 | | | 60 | 74.1 |
| 65 | 69 | 0 | 1 | 55 | 0 | | | 56 | 81.2 |
| 66 | 71 | 1 | 4 | 54 | 0 | | | 59 | 83.1 |
| 67 | 58 | 0 | 4 | 41 | 0 | | | 45 | 77.6 |
| 68 | 32 | 1 | 1 | 22 | 0 | | | 24 | 75.0 |
| 69 | 37 | | 0 | 28 | 0 | | | 28 | 75.7 |
| 70 | 23 | | 0 | 17 | 1 | | | 18 | 78.3 |
| 71 | 10 | | 0 | 8 | | | | 8 | 80.0 |
| 72 | 9 | | 0 | 5 | | | | 5 | 55.6 |
| 73 | 7 | | 0 | 4 | | | | 4 | 57.1 |
| 74 | 2 | | 1 | 0 | | | | 1 | 50.0 |
| 75 | 2 | | | 1 | | | | 1 | 50.0 |
| 76 | 1 | | | 1 | | | | 1 | 100.0 |
| 77 | 0 | | | | | | | 0 | - |
| Grilse: h/ | 276 | 2 | 3 | 210 | 1 | 0 | 0 | 216 | 78.3 |
| Adults: | 844 | 4 | 21 | 619 | 1 | 0 | 1 | 646 | 76.5 |
| Total: | 1,120 | 6 | 24 | 829 | 2 | 0 | 1 | 862 | 77.0 |

a/ Trapping at Junction City took place from July 22 through November 28 (Julian Weeks 29-48).
b/ Tagged fish found dead and unspawned within 30 days of tagging.
c/ Fish recovered in upper Trinity River spawner surveys.
d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 through March 13, 2006 (Julian Weeks 36-11).
e/ Fish reported as caught and released by anglers.
f/ Fish reported as harvested by anglers.
g/ Tags found on dead fish or found unattached.
h/ Grilse were considered fish less than or equal to 50 cm FL.

Appendix 11. Fork Length (FL) distribution of fall run Chinook salmon tagged at Willow Creek Weir and subsequently recovered during the 2005-06 season a/.

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass c/ Recoveries | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 38 | 2 | | | | | | | 0 | 0.0 |
| 39 | 1 | | | | | | | 0 | 0.0 |
| 40 | 2 | | | | | | | 0 | 0.0 |
| 41 | 4 | | | | | | | 0 | 0.0 |
| 42 | 4 | | 1 | | | | | 1 | 25.0 |
| 43 | 8 | | 0 | | 1 | | | 1 | 12.5 |
| 44 | 6 | | 0 | | 1 | | | 1 | 16.7 |
| 45 | 2 | | 0 | | 0 | | | 0 | 0.0 |
| 46 | 1 | | 0 | | 0 | | | 0 | 0.0 |
| 47 | 2 | | 0 | | 0 | 1 | | 1 | 50.0 |
| 48 | 3 | | 0 | | 0 | 0 | | 0 | 0.0 |
| 49 | 5 | | 0 | 1 | 0 | 0 | | 1 | 20.0 |
| 50 | 4 | | 0 | 1 | 0 | 0 | | 1 | 25.0 |
| 51 | 2 | | 0 | 1 | 0 | 0 | | 1 | 50.0 |
| 52 | 5 | | 0 | 0 | 0 | 0 | | 0 | 0.0 |
| 53 | 4 | | 1 | 2 | 0 | 0 | | 3 | 75.0 |
| 54 | 6 | | 0 | 3 | 1 | 0 | | 4 | 66.7 |
| 55 | 15 | | 1 | 7 | 1 | 0 | | 9 | 60.0 |
| 56 | 8 | | 0 | 2 | 1 | 0 | | 3 | 37.5 |
| 57 | 18 | | 1 | 5 | 0 | 0 | | 6 | 33.3 |
| 58 | 26 | | 1 | 11 | 1 | 2 | | 15 | 57.7 |
| 59 | 27 | | 1 | 16 | 0 | 0 | | 17 | 63.0 |
| 60 | 40 | | 2 | 21 | 1 | 2 | | 26 | 65.0 |
| 61 | 47 | | 2 | 26 | 0 | 1 | | 29 | 61.7 |
| 62 | 50 | | 1 | 27 | 0 | 0 | | 28 | 56.0 |
| 63 | 81 | | 4 | 45 | 4 | 2 | 1 | 56 | 69.1 |
| 64 | 68 | 1 | 3 | 37 | 0 | 2 | 0 | 43 | 63.2 |
| 65 | 60 | 0 | 5 | 34 | 1 | 2 | 0 | 42 | 70.0 |
| 66 | 93 | 0 | 8 | 52 | 0 | 3 | 0 | 63 | 67.7 |
| 67 | 68 | 1 | 5 | 34 | 1 | 4 | 0 | 45 | 66.2 |
| 68 | 82 | 0 | 5 | 45 | 0 | 2 | 0 | 52 | 63.4 |
| 69 | 61 | 0 | 3 | 32 | 0 | 2 | 0 | 37 | 60.7 |
| 70 | 53 | 0 | 2 | 30 | 0 | 1 | 0 | 33 | 62.3 |
| 71 | 52 | 0 | 2 | 27 | 1 | 1 | 0 | 31 | 59.6 |
| 72 | 38 | 0 | 1 | 22 | 1 | 1 | 0 | 25 | 65.8 |
| 73 | 39 | 0 | 1 | 24 | 2 | 0 | 0 | 27 | 69.2 |
| 74 | 38 | 0 | 3 | 15 | 1 | 1 | 0 | 20 | 52.6 |
| 75 | 34 | 0 | 1 | 20 | 1 | 1 | 0 | 23 | 67.6 |
| 76 | 25 | 0 | 1 | 14 | 0 | 0 | 1 | 16 | 64.0 |
| 77 | 22 | 1 | 1 | 13 | 0 | 0 | | 15 | 68.2 |
| 78 | 25 | 0 | 3 | 10 | 0 | 1 | | 14 | 56.0 |
| 79 | 29 | 0 | 2 | 15 | 1 | 0 | | 18 | 62.1 |
| 80 | 22 | 0 | 0 | 7 | | 2 | | 9 | 40.9 |
| 81 | 16 | 0 | 1 | 9 | | 0 | | 10 | 62.5 |
| 82 | 14 | 0 | 1 | 8 | | 0 | | 9 | 64.3 |
| 83 | 10 | 0 | 1 | 6 | | 0 | | 7 | 70.0 |
| 84 | 13 | 0 | 3 | 4 | | 1 | | 8 | 61.5 |
| 85 | 7 | 0 | 1 | 3 | | | | 4 | 57.1 |
| 86 | 9 | 0 | 0 | 3 | | | | 3 | 33.3 |
| 87 | 9 | 1 | 1 | 2 | | | | 4 | 44.4 |
| 88 | 6 | | 1 | 1 | | | | 2 | 33.3 |
| 89 | 7 | | 1 | 2 | | | | 3 | 42.9 |
| 90 | 5 | | 1 | 1 | | | | 2 | 40.0 |
| 91 | 4 | | 0 | 1 | | | | 1 | 25.0 |
| 92 | 2 | | 0 | 0 | | | | 0 | 0.0 |
| 93 | 4 | | 0 | 2 | | | | 2 | 50.0 |
| 94 | 3 | | 0 | 0 | | | | 0 | 0.0 |
| 95 | 2 | | 0 | 2 | | | | 2 | 100.0 |
| 96 | 7 | | 1 | 1 | | | | 2 | 28.6 |
| 97 | 0 | | | | | | | 0 | - |
| 98 | 2 | | | | | | | 0 | 0.0 |
| 99 | 2 | | | | | | | 0 | 0.0 |
| 100 | 0 | | | | | | | 0 | - |
| 101 | 0 | | | | | | | 0 | - |
| 102 | 0 | | | | | | | 0 | - |
| 103 | 0 | | | | | | | 0 | - |
| 104 | 0 | | | | | | | 0 | - |
| 105 | 0 | | | | | | | 0 | - |
| 106 | 0 | | | | | | | 0 | - |
| 107 | 1 | | | | | | | 0 | 0.0 |
| Grilse: h/ | 40 | 0 | 1 | 1 | 2 | 1 | 0 | 5 | 12.5 |
| Adults: | 1,265 | 4 | 72 | 643 | 18 | 31 | 2 | 770 | 60.9 |
| Total: | 1,305 | 4 | 73 | 644 | 20 | 32 | 2 | 775 | 59.4 |

a/ Trapping at Willow Creek took place from August 22 through November 4 (Julian Weeks 34-44). Chinook trapped after Julian week 34 were considered fall run.
b/ Tagged fish found dead and unspawned within 30 days of tagging.
c/ Fish recovered in upper Trinity River spawner surveys.
d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 through March 13, 2006 (Julian Weeks 36-11).
e/ Fish reported as caught and released by anglers.
f/ Fish reported as harvested by anglers.
g/ Tags found on dead fish or found unattached.
h/ Grilse were considered fish less than or equal to 49 cm FL.

Appendix 12. Fork Length (FL) distribution of coho salmon tagged at Willow Creek Weir and subsequently recovered during the 2005-06 season a/.

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass Recoveries c/ | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 36 | | | | | | | | 0 | |
| 37 | 1 | | | | | | | 0 | 0.0 |
| 38 | 10 | | 3 | 4 | | | | 7 | 60.0 |
| 39 | 5 | | 0 | 2 | | | | 2 | 40.0 |
| 40 | 11 | | 0 | 7 | | | | 7 | 63.6 |
| 41 | 20 | | 0 | 6 | | | | 6 | 30.0 |
| 42 | 31 | | 1 | 13 | | 1 | | 15 | 48.4 |
| 43 | 13 | | 0 | 8 | | | | 8 | 61.5 |
| 44 | 21 | | 1 | 15 | | | | 16 | 76.2 |
| 45 | 19 | | 0 | 12 | 1 | | | 13 | 68.4 |
| 46 | 4 | | 0 | 3 | 0 | | | 3 | 75.0 |
| 47 | 3 | | 1 | 1 | 0 | | | 2 | 66.7 |
| 48 | 2 | | 0 | 2 | 0 | | | 2 | 100.0 |
| 49 | 2 | | 0 | 1 | 0 | | | 1 | 50.0 |
| 50 | 4 | | 0 | 2 | 0 | | | 2 | 50.0 |
| 51 | 3 | | 0 | 2 | 0 | | | 2 | 66.7 |
| 52 | 3 | | 0 | 2 | 0 | | | 2 | 66.7 |
| 53 | 8 | | 0 | 3 | 0 | | | 3 | 37.5 |
| 54 | 7 | | 0 | 4 | 0 | | | 4 | 57.1 |
| 55 | 7 | | 0 | 2 | 0 | | | 2 | 28.6 |
| 56 | 8 | | 0 | 4 | 0 | | | 4 | 50.0 |
| 57 | 19 | | 0 | 10 | 0 | | | 10 | 52.6 |
| 58 | 18 | | 0 | 10 | 0 | | | 10 | 55.6 |
| 59 | 28 | | 0 | 13 | 0 | | | 13 | 46.4 |
| 60 | 41 | | 2 | 28 | 1 | | | 31 | 75.6 |
| 61 | 39 | | 2 | 27 | 0 | | | 29 | 74.4 |
| 62 | 43 | | 1 | 30 | 1 | | | 32 | 74.4 |
| 63 | 64 | | 0 | 33 | 0 | | | 33 | 51.6 |
| 64 | 70 | | 1 | 42 | 2 | | 1 | 46 | 65.7 |
| 65 | 64 | 1 | 2 | 37 | 0 | | | 40 | 62.5 |
| 66 | 46 | 0 | 2 | 28 | 0 | | | 30 | 65.2 |
| 67 | 59 | 1 | 1 | 37 | 1 | | | 40 | 67.8 |
| 68 | 29 | | 1 | 17 | | | | 18 | 62.1 |
| 69 | 16 | | | 9 | | | | 9 | 56.3 |
| 70 | 14 | | | 7 | | | | 7 | 50.0 |
| 71 | 15 | | | 12 | | | | 12 | 80.0 |
| 72 | 3 | | | 1 | | | | 1 | 33.3 |
| 73 | 3 | | | 2 | | | | 2 | 66.7 |
| 74 | 2 | | | | | | | 0 | 0.0 |
| 75 | | | | | | | | 0 | |
| Grilse: h/ | 146 | 0 | 6 | 76 | 1 | 1 | 0 | 84 | 57.5 |
| Adults: | 609 | 2 | 12 | 360 | 5 | 0 | 1 | 380 | 62.4 |
| Total: | 755 | 2 | 18 | 436 | 6 | 1 | 1 | 464 | 61.5 |

a/ Trapping at Willow Creek took place from August 22 through November 4 (Julian Weeks 34-44).

b/ Tagged fish found dead and unspawned within 30 days of tagging.

c/ Fish recovered in upper Trinity River spawner surveys.

d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 through March 13, 2006 (Julian Weeks 36-11).

e/ Fish reported as caught and released by anglers.

f/ Fish reported as harvested by anglers.

g/ Tags found on dead fish or found unattached.

h/ Grilse were considered fish less than or equal to 50 cm FL.

Appendix 13. Fork Length (FL) distribution of fall-run steelhead tagged at Willow Creek Weir and subsequently recovered during the 2005-06 season. a/

| | | Recoveries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FL (cm) | Total Tagged | Tag Morts b/ | Carcass Recoveries c/ | TRH d/ Recoveries | Angler Released e/ | Angler Harvest f/ | Angler Found Tags g/ | Total Recoveries | % Recoveries |
| 42 | 7 | | | 1 | 1 | | | 2 | 28.6 |
| 43 | 10 | | | 0 | 1 | | | 1 | 10.0 |
| 44 | 6 | | | 1 | 0 | | | 1 | 16.7 |
| 45 | 8 | | | 1 | 1 | 1 | | 3 | 37.5 |
| 46 | 6 | | | 2 | 1 | 0 | | 3 | 50.0 |
| 47 | 3 | | | 0 | 1 | 0 | | 1 | 33.3 |
| 48 | 7 | | | 0 | 0 | 0 | | 0 | 0.0 |
| 49 | 5 | | | 0 | 0 | 1 | | 1 | 20.0 |
| 50 | 8 | | | 1 | 1 | 0 | | 2 | 25.0 |
| 51 | 9 | | | 2 | 0 | 0 | | 2 | 22.2 |
| 52 | 14 | | | 2 | 2 | 0 | | 4 | 28.6 |
| 53 | 28 | | | 6 | 2 | 0 | | 8 | 28.6 |
| 54 | 43 | | | 17 | 0 | 1 | | 18 | 41.9 |
| 55 | 48 | | | 11 | 6 | 0 | | 17 | 35.4 |
| 56 | 87 | | | 36 | 9 | 3 | | 48 | 55.2 |
| 57 | 105 | | | 50 | 6 | 2 | | 58 | 55.2 |
| 58 | 155 | | | 57 | 9 | 2 | | 68 | 43.9 |
| 59 | 159 | | | 81 | 19 | 0 | | 100 | 62.9 |
| 60 | 202 | | | 83 | 16 | 0 | | 99 | 49.0 |
| 61 | 189 | 1 | 1 | 85 | 10 | 4 | 1 | 102 | 54.0 |
| 62 | 188 | 0 | | 78 | 13 | 0 | 0 | 91 | 48.4 |
| 63 | 159 | 0 | | 73 | 8 | 2 | 0 | 83 | 52.2 |
| 64 | 130 | 0 | | 50 | 8 | 0 | 1 | 59 | 45.4 |
| 65 | 122 | 0 | | 48 | 5 | 1 | | 54 | 44.3 |
| 66 | 99 | 1 | | 37 | 5 | 2 | | 45 | 45.5 |
| 67 | 76 | | | 31 | 3 | 1 | | 35 | 46.1 |
| 68 | 70 | | | 24 | 6 | 1 | | 31 | 44.3 |
| 69 | 47 | | | 14 | 0 | | | 14 | 29.8 |
| 70 | 46 | | | 14 | 2 | | | 16 | 34.8 |
| 71 | 26 | | | 6 | 2 | | | 8 | 30.8 |
| 72 | 23 | | | 9 | 0 | | | 9 | 39.1 |
| 73 | 10 | | | 2 | 0 | | | 2 | 20.0 |
| 74 | 5 | | | 1 | 0 | | | 1 | 20.0 |
| 75 | 4 | | | 1 | 1 | | | 2 | 50.0 |
| 76 | 4 | | | 1 | | | | 1 | 25.0 |
| 77 | 3 | | | 1 | | | | 0 | 0.0 |
| 78 | 0 | | | 0 | | | | 0 | - |
| 79 | 2 | | | 1 | | | | 0 | 0.0 |
| 80 | 1 | | | 0 | | | | 0 | 0.0 |
| 81 | 1 | | | 1 | | | | 0 | 0.0 |
| 82 | | | | | | | | 0 | - |
| Adults: | 2,115 | 2 | 1 | 828 | 138 | 21 | 2 | 989 | 46.8 |

a/ Trapping at Willow Creek took place from August 22 through November 4 (Julian Weeks 34-44).
b/ Tagged fish found dead and unspawned within 30 days of tagging.
c/ Fish recovered in upper Trinity River spawner surveys.
d/ TRH = Trinity River Hatchery. The fish ladder was open from September 8, 2005 - March 13, 2006 (Julian Weeks 36-11).
e/ Fish reported as caught and released by anglers.
f/ Fish reported as harvested by anglers.
g/ Tags found on dead fish or found unattached.

Appendix 14. Summary of California Fish and Game Commission regulations that affected salmonid harvest in the Trinity River during the 2005-2006 season.[a/]

| Body of Water | Open Season and Special Regulations[b/] | Daily Bag Limit (if Different from general bag limits in subsection 7.50(b)(91.1)(D))*. |
|---|---|---|
| 6. Trinity River and Tributaries. | | |
| a. Trinity River main stem from 250 feet below Lewiston Dam to Old Lewiston bridge. | Last Saturday in Apr. through Sept.15. Only artificial flies with barbless hooks may be used. | 0 |
| b. Trinity River main stem from Old Lewiston bridge to the Highway 299 West bridge at Cedar Flat. | All Year | 1 hatchery trout or 1 hatchery steelhead or 1 brown trout. Salmon Quota Area. Also see subsection (b)(91.1)(C)**. |
| c. Canyon Creek above the falls located about four miles above the wilderness area boundary. | Last Saturday in Apr. through Nov.15. | 2 |
| d. Trinity River main stem from the Highway 299 West bridge at Cedar Flat downstream to the Hawkins Bar Bridge (Road to Denny) | Dec.1 through Aug 31. | See subsection (b)(91.1)(D)* |
| e. New River main stem from the mouth upstream to the confluence of the East Fork. | Sept. 15 through Nov. 15 only artifical lures with barbless hooks may be used. | 0 |
| f. Trinity River main stem from Hawkins Bar Bridge (Road to Denny) to the confluence with the Klamath River. | All Year | 1 hatchery trout or 1 hatchery steelhead or 1 brown trout. Salmon Quota Area. Also see subsection (b)(91.1)(C)(c)(ii)*** and (b)(91.1)(C)(f)(i)****. |
| g. Trinity River South Fork downstream from the mouth of Grouse Creek. | Fourth Saturday in May through Mar. 31. | 1 hatchery trout or<br>1 hatchery steelhead or<br>1 brown trout.<br>0 king salmon |
| h. Trinity River South Fork from the mouth of Grouse Creek to the South Fork Trinity River bridge at Hyampom. | Nov. 1. through Mar. 31. | 1 hatchery trout or<br>1 hatchery steelhead or<br>1 brown trout.<br>0 king salmon |
| i. Hayfork Creek main stem, from Highway 3 bridge in Hayfork downstream to the mouth. | Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used. | 0 |

*(b)(91.1)(D) In anadromous waters of the Trinity River basin, except for those with special bag limits provided above, the daily trout/salmon bag limit is three king salmon, but no more than one king salmon over 22 inches total length, and 1 hatchery trout or 1 brown trout or 1 hatchery steelhead. No more than 2 king salmon over 22 inches total length may be retained in any 7 consecutive days. No more than 12 king salmon may be possessed, of which no more than 2 may be over 22 inches total length.

**(b)(91.1)( C)(c)(ii) No salmon over 22 inches total length may be retained after 50% of the basin quota has been taken in the Klamath River basin above Highway 96 bridge at Weitchpec. Exception: King salmon over 22 inches total length may be retained from the Old Lewiston Bridge to the mouth of Indian Creek when the adult fall-run king salmon spawning escapement at Trinity River Hatchery exceeds 4,800 fish.

***(b)(91.1)(C)(e)(ii) No Salmon over 22 inches total length may be retained from the South Fork Trinity River downstream to the confluence with the Klamath River from April 1 through the Friday preceding Memorial Day.

****(b)(91.1)(C)(f)(i) No salmon over 22 inches total length may be retained after 50% of the basin quota has been taken in the Klamath River basin above the Highway 96 bridge at Weitchpec.

(b)(91.1)(E) All anadromous waters of the Trinity River basin are closed to all fishing all year except those listed above.

a/. From State of California, Fish and Game Commission, California Code of Regulations for 2005, Title 14. Natural Resources, Division 1. Fish and Game Commission-Department of Fish and Game, Supplemental regulations, Section 7.50(b)(91.1).

b/. The 2005 Klamath River basin quota is 1,262 king salmon over 22 inches total length.

Appendix 15. Fork length (FL) distribution of coho salmon recovered at Trinity River Hatchery during the 2005-06 season. a/

| FL (cm) | Unmarked | Right maxillary clip b/ | Right maxillary and Left maxillary clip | Other Clips c/ | Total |
|---|---|---|---|---|---|
| 31 | | | | | 0 |
| 32 | | 1 | | | 1 |
| 33 | 1 | 0 | | | 1 |
| 34 | 0 | 1 | | | 1 |
| 35 | 0 | 8 | | | 8 |
| 36 | 0 | 16 | | | 16 |
| 37 | 0 | 14 | | | 14 |
| 38 | 0 | 42 | | | 42 |
| 39 | 1 | 80 | | | 81 |
| 40 | 0 | 148 | | | 148 |
| 41 | 2 | 218 | | | 220 |
| 42 | 0 | 254 | | | 254 |
| 43 | 0 | 249 | | | 249 |
| 44 | 1 | 225 | | | 226 |
| 45 | 0 | 184 | | | 184 |
| 46 | 0 | 122 | | | 122 |
| 47 | 0 | 72 | | | 72 |
| 48 | 2 | 41 | | | 43 |
| 49 | 1 | 27 | | | 28 |
| 50 | 2 | 19 | | | 21 |
| 51 | 0 | 27 | | | 27 |
| 52 | 1 | 30 | | | 31 |
| 53 | 3 | 52 | | | 55 |
| 54 | 2 | 84 | | 1 | 87 |
| 55 | 4 | 94 | | 0 | 98 |
| 56 | 4 | 159 | | 0 | 163 |
| 57 | 16 | 205 | | 0 | 221 |
| 58 | 8 | 325 | 1 | 0 | 334 |
| 59 | 20 | 419 | 1 | 1 | 441 |
| 60 | 26 | 612 | 2 | 0 | 640 |
| 61 | 31 | 661 | 0 | 2 | 694 |
| 62 | 36 | 887 | 0 | 0 | 923 |
| 63 | 53 | 1,138 | 1 | 0 | 1,192 |
| 64 | 69 | 1,290 | 3 | 1 | 1,363 |
| 65 | 78 | 1,469 | 0 | 1 | 1,548 |
| 66 | 82 | 1,461 | 1 | 3 | 1,547 |
| 67 | 107 | 1,425 | 4 | 0 | 1,536 |
| 68 | 83 | 1,327 | 1 | 0 | 1,411 |
| 69 | 61 | 1,141 | 2 | 1 | 1,205 |
| 70 | 64 | 1,004 | 1 | 0 | 1,069 |
| 71 | 56 | 639 | 0 | 0 | 695 |
| 72 | 39 | 465 | 1 | 1 | 506 |
| 73 | 31 | 325 | 0 | | 356 |
| 74 | 16 | 221 | 1 | | 238 |
| 75 | 7 | 114 | 0 | | 121 |
| 76 | 6 | 57 | 0 | | 63 |
| 77 | 3 | 25 | 0 | | 28 |
| 78 | 0 | 17 | 1 | | 18 |
| 79 | 2 | 6 | | | 8 |
| 80 | 0 | 3 | | | 3 |
| 81 | 0 | 1 | | | 1 |
| 82 | 0 | 0 | | | 0 |
| 83 | 0 | 1 | | | 1 |
| 84 | 0 | | | | 0 |
| 85 | 0 | | | | 0 |
| 86 | 0 | | | | 0 |
| 87 | 0 | | | | 0 |
| 88 | 1 | | | | 1 |
| 89 | | | | | 0 |
| Totals: | 919 | 17,405 | 20 | 11 | 18,355 |
| Mean FL: | 66.2 | 63.3 | 66.3 | 63.9 | 63.5 |

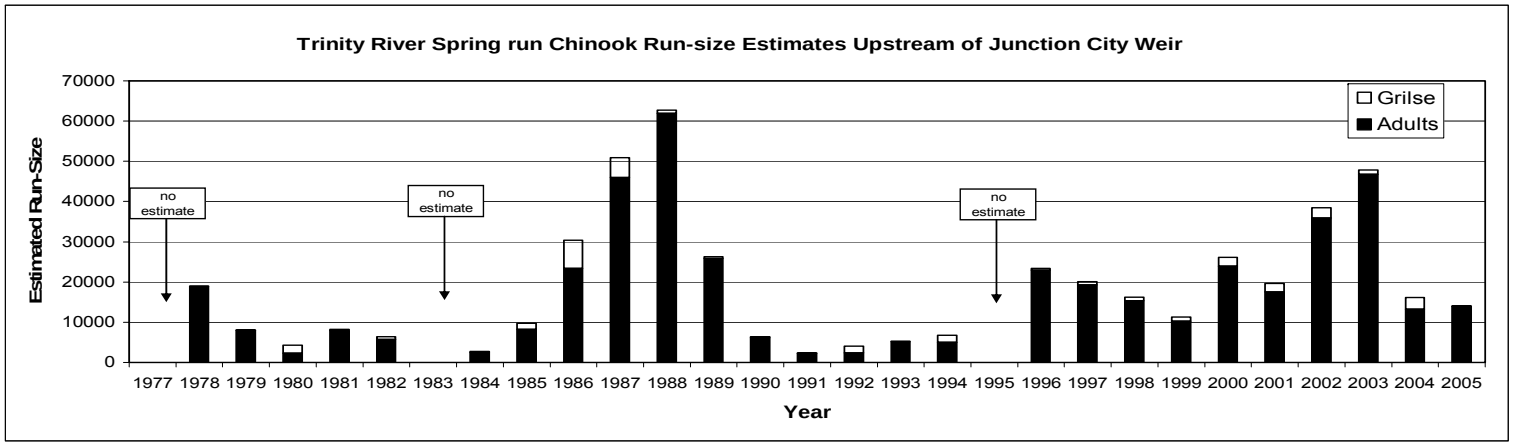
a/ The fish ladder was open from September 8, 2005 through March 14, 2006 (Julian Weeks 36-11).

b/ Beginning with the 1994 brood, all coho salmon reared at Trinity River Hatchery received a right maxillary clip prior to release as yearlings.

c/ Other clips include: 7 ADRM (adipose fin clip and right maxillary clip) and 4 LM (left maxillary clip).

Appendix 16. Spring run Chinook salmon run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Junction City Creek Weir from 1977 through 2005.

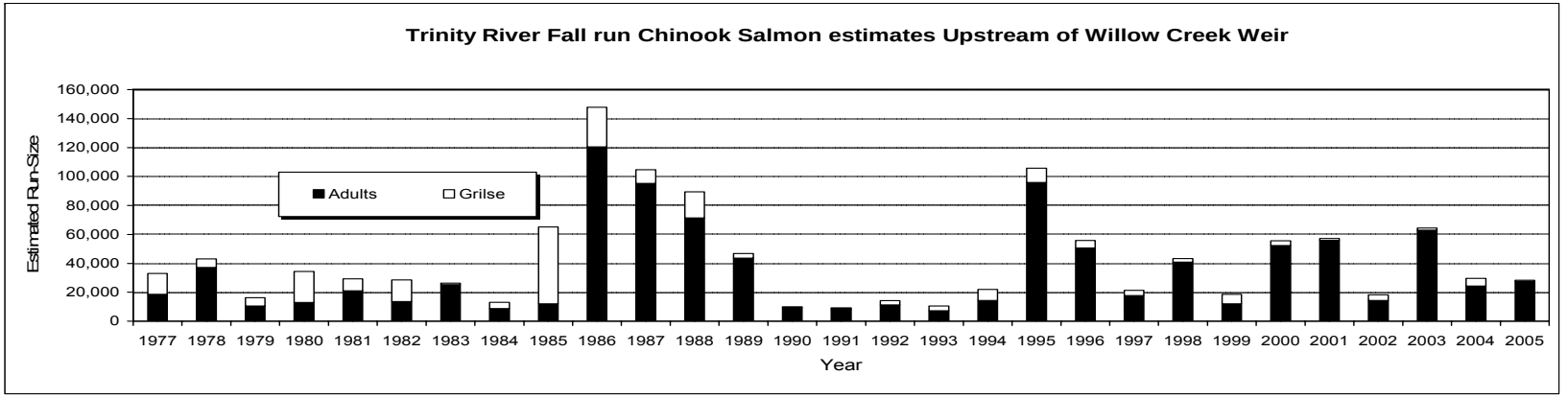
| | Run-size estimate | | | | | Spawner escapements | | | | | | Angler harvest | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Area Spawers c/ | | | Trinity River Hatchery | | | | | | |
| | Grilse | | Adults | | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | | Total |
| Year | Number | Percent | Number | Percent | | | | | | | | | | | |
| 1977 | | | no estimates | | | | no estimates | | 385 | 1,124 | 1,509 | no estimates | | | |
| 1978 | 190 | 1.0 | 18,816 | 99.0 | 19,006 | 29 | 14,384 | 14,413 | 153 | 3,680 | 3,833 | 8 | 752 | a/ | 760 |
| 1979 | 113 | 1.4 | 7,964 | 98.6 | 8,077 | 0 | 5,008 | 5,008 | 113 | 1,658 | 1,771 | 0 | 1,298 | | 1,298 |
| 1980 | 1,949 | 45.9 | 2,301 | 54.1 | 4,250 | 1,312 | 1,614 | 2,926 | 353 | 547 | 900 | 284 | 140 | | 424 |
| 1981 | 347 | 4.2 | 7,913 | 95.8 | 8,260 | 242 | 3,362 | 3,604 | 95 | 2,405 | 2,500 | 10 | 2,146 | | 2,156 |
| 1982 | 656 | 10.3 | 5,731 | 89.7 | 6,387 | 387 | 3,868 | 4,255 | 150 | 1,226 | 1,376 | 119 | 637 | | 756 |
| 1983 | | | no estimates | | | | no estimates | | 385 | 930 | 1,315 | no estimates | | | |
| 1984 | 255 | 9.4 | 2,465 | 90.6 | 2,720 | 140 | 1,354 | 1,494 | 76 | 736 | 812 | 39 | 375 | | 414 |
| 1985 | 1,434 | 14.8 | 8,278 | 85.2 | 9,712 | 799 | 4,897 | 5,696 | 508 | 2,645 | 3,153 | 127 | 736 | b/ | 863 |
| 1986 | 7,018 | 23.1 | 23,403 | 76.9 | 30,421 | 4,335 | 13,371 | 17,706 | 1,461 | 7,083 | 8,544 | 1,222 | 2,949 | | 4,171 |
| 1987 | 4,858 | 9.5 | 46,016 | 90.5 | 50,874 | 2,577 | 29,083 | 31,660 | 1,387 | 8,466 | 9,853 | 894 | 8,467 | | 9,361 |
| 1988 | 720 | 1.1 | 61,972 | 98.9 | 62,692 | 241 | 39,329 | 39,570 | 377 | 13,905 | 14,282 | 102 | 8,738 | | 8,840 |
| 1989 | 502 | 1.9 | 25,804 | 98.1 | 26,306 | 435 | 18,241 | 18,676 | 17 | 4,983 | 5,000 | 50 | 2,580 | | 2,630 |
| 1990 | 265 | 4.1 | 6,123 | 95.9 | 6,388 | 126 | 2,880 | 3,006 | 104 | 2,433 | 2,537 | 35 | 810 | | 845 |
| 1991 | 190 | 8.0 | 2,191 | 92.0 | 2,381 | 92 | 1,268 | 1,360 | 71 | 614 | 685 | 27 | 309 | | 336 |
| 1992 | 1,671 | 41.5 | 2,359 | 58.5 | 4,030 | 944 | 942 | 1,886 | 533 | 1,313 | 1,846 | 194 | 104 | b/ | 298 |
| 1993 | 68 | 1.3 | 5,164 | 98.7 | 5,232 | 37 | 2,111 | 2,148 | 31 | 2,630 | 2,661 | 0 | 423 | b/ | 423 |
| 1994 | 1,793 | 26.4 | 4,995 | 73.6 | 6,788 | 550 | 2,897 | 3,447 | 944 | 1,943 | 2,887 | 299 | 155 | b/ | 454 |
| 1995 | | | no estimates | | | | no estimates | | 385 | 8,722 | 9,107 | no estimates | | | |
| 1996 | 489 | 2.1 | 22,927 | 97.9 | 23,416 | 370 | 16,283 | 16,653 | 119 | 5,131 | 5,250 | 0 | 1,513 | b/ | 1,513 |
| 1997 | 768 | 3.8 | 19,271 | 96.2 | 20,039 | 543 | 13,049 | 13,592 | 225 | 4,892 | 5,117 | 0 | 1,330 | b/ | 1,330 |
| 1998 | 802 | 5.0 | 15,365 | 95.0 | 16,167 | 567 | 9,057 | 9,624 | 184 | 4,679 | 4,863 | 51 | 1,629 | b/ | 1,680 |
| 1999 | 1,028 | 9.1 | 10,265 | 90.9 | 11,293 | 440 | 5,968 | 6,408 | 547 | 3,671 | 4,218 | 41 | 626 | b/ | 667 |
| 2000 | 2,159 | 8.3 | 23,923 | 91.7 | 26,082 | 1,264 | 10,846 | 12,110 | 571 | 11,594 | 12,165 | 324 | 1,483 | b/ | 1,807 |
| 2001 | 2,065 | 10.5 | 17,556 | 89.5 | 19,621 | 1,178 | 10,284 | 11,462 | 629 | 6,366 | 6,995 | 258 | 906 | | 1,164 |
| 2002 | 2,575 | 6.7 | 35,910 | 93.3 | 38,485 | 1,883 | 23,674 | 25,557 | 617 | 10,440 | 11,057 | 75 | 1,796 | | 1,871 |
| 2003 | 1,039 | 2.2 | 46,756 | 97.8 | 47,795 | 909 | 30,211 | 31,120 | 130 | 14,512 | 14,642 | 0 | 2,033 | | 2,033 |
| 2004 | 2,929 | 18.1 | 13,218 | 81.9 | 16,147 | 1,708 | 7,314 | 9,022 | 985 | 5,251 | 6,236 | 236 | 653 | | 889 |
| 2005 | 55 | 0.4 | 13,929 | 99.6 | 13,984 | 30 | 6,003 | 6,033 | 25 | 6,966 | 6,991 | 0 | 961 | | 961 |




a/ The 1978 sport harvest of spring run Chinook was limited by a salmon fishing closure beginning 25 August 1978.
b/ The sport harvest of adult spring run Chinook was limited by fishing closures to the taking of Chinook salmon greater than or equal to 56 cm total length during these years. The closures took effect 22 September in 1985, 5 November 1992, 9 October 1994,. The Trinity River was subject to seasonal closures during the 1995-00 seasons, commencing 9 September in the lower river. Various periods of opening and closures (seasons) were instituted along the river through November 30.
c/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

Appendix 17. Fall run Chinook salmon run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Willow Creek Weir from 1977 through 2005.

| | Run-size estimate | | | | | Spawner escapements | | | | | | Angler harvest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Area Spawners e/ | | | Trinity River Hatchery | | | | | |
| | Grilse | | Adults | | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total |
| Year | Number | Percent | Number | Percent | | | | | | | | | | |
| 1977 | 14,318 | 43.5 | 18,596 | 56.5 | 32,914 | 9,737 | 13,501 | 23,238 | 2,177 | 2,035 | 4,212 | 2,404 | 3,060 | 5,464 |
| 1978 | 6,037 | 14.0 | 37,086 | 86.0 | 43,123 | 4,712 | 31,052 | 35,764 | 1,325 | 6,034 | 7,359 | Fishing closure a/ | | 0 |
| 1979 | 5,665 | 35.0 | 10,520 | 65.0 | 16,185 | 3,936 | 8,028 | 11,964 | 964 | 1,335 | 2,299 | 765 | 1,157 | 1,922 |
| 1980 | 21,549 | 62.7 | 12,797 | 37.3 | 34,346 | 16,837 | 7,700 | 24,537 | 2,256 | 4,099 | 6,355 | 2,456 | 998 | 3,454 |
| 1981 | 8,366 | 28.6 | 20,884 | 71.4 | 29,250 | 5,906 | 15,340 | 21,246 | 1,004 | 2,370 | 3,374 | 1,456 | 3,174 | 4,630 |
| 1982 | 14,938 | 52.2 | 13,653 | 47.8 | 28,591 | 8,149 | 9,274 | 17,423 | 4,235 | 2,058 | 6,293 | 2,554 | 2,321 | 4,875 |
| 1983 | 1,240 | 4.7 | 25,138 | 95.3 | 26,378 | 853 | 17,284 | 18,137 | 271 | 5,494 | 5,765 | 116 | 2,360 | 2,476 |
| 1984 | 4,575 | 34.8 | 8,556 | 65.2 | 13,131 | 3,416 | 5,654 | 9,070 | 766 | 2,166 | 2,932 | 393 | 736 | 1,129 |
| 1985 | 53,062 | 81.6 | 11,954 | 18.4 | 65,016 | 29,454 | 9,217 | 38,671 | 18,166 | 2,583 | 20,749 | 5,442 | 154 b/ | 5,596 |
| 1986 | 27,506 | 18.6 | 120,382 | 81.4 | 147,888 | 20,459 | 92,548 | 113,007 | 3,609 | 15,795 | 19,404 | 3,438 | 12,039 | 15,477 |
| 1987 | 9,325 | 8.9 | 95,287 | 91.1 | 104,612 | 5,949 | 71,920 | 77,869 | 2,453 | 13,934 | 16,387 | 923 | 9,433 | 10,356 |
| 1988 | 18,113 | 20.3 | 71,309 | 79.7 | 89,422 | 10,626 | 44,616 | 55,242 | 4,752 | 17,352 | 22,104 | 2,735 | 9,341 | 12,076 |
| 1989 | 2,991 | 6.4 | 43,631 | 93.6 | 46,622 | 2,543 | 29,445 | 31,988 | 239 | 11,132 | 11,371 | 209 | 3,054 | 3,263 |
| 1990 | 634 | 6.3 | 9,358 | 93.7 | 9,992 | 241 | 7,682 | 7,923 | 371 | 1,348 | 1,719 | 22 | 328 | 350 |
| 1991 | 681 | 7.4 | 8,526 | 92.6 | 9,207 | 382 | 4,867 | 5,249 | 205 | 2,482 | 2,687 | 94 | 1,177 | 1,271 |
| 1992 | 2,932 | 20.7 | 11,232 | 79.3 | 14,164 | 2,563 | 7,139 | 9,702 | 211 | 3,779 | 3,990 | 158 | 314 b/ | 472 |
| 1993 | 3,381 | 32.2 | 7,104 | 67.8 | 10,485 | 2,473 | 5,898 | 8,371 | 736 | 815 | 1,551 | 172 | 391 b/ | 563 |
| 1994 | 7,494 | 34.2 | 14,430 | 65.8 | 21,924 | 2,505 | 10,906 | 13,411 | 4,442 | 3,264 | 7,706 | 547 | 260 b/ | 807 |
| 1995 | 9,892 | 9.4 | 95,833 | 90.6 | 105,725 | 9,262 | 77,876 | 87,138 | 76 | 15,178 | 15,254 | 554 | 2,779 b/ | 3,333 |
| 1996 | 5,072 | 9.1 | 50,574 | 90.9 | 55,646 | 4,478 | 42,646 | 47,124 | 249 | 6,411 | 6,660 | 345 | 1,517 b/ | 1,862 |
| 1997 | 3,767 | 17.6 | 17,580 | 82.4 | 21,347 | 2,845 | 11,507 | 14,352 | 820 | 5,387 | 6,207 | 102 | 686 b/ | 788 |
| 1998 | 2,307 | 5.3 | 40,882 | 94.7 | 43,189 | 1,974 | 24,460 | 26,434 | 192 | 14,296 | 14,488 | 141 | 2,126 b/ | 2,267 |
| 1999 | 6,583 | 35.6 | 11,933 | 64.4 | 18,516 | 4,154 | 6,753 | 10,907 | 2,027 | 5,037 | 7,064 | 402 | 143 c/ | 545 |
| 2000 | 3,163 | 5.7 | 52,310 | 94.3 | 55,473 | 1,964 | 24,880 | 26,844 | 1,028 | 26,018 | 27,046 | 171 | 1,412 d/ | 1,583 |
| 2001 | 1,214 | 2.1 | 55,895 | 97.9 | 57,109 | 914 | 36,152 | 37,066 | 204 | 17,971 | 18,175 | 96 | 1,772 d/ | 1,868 |
| 2002 | 3,812 | 21.0 | 14,344 | 79.0 | 18,156 | 2,566 | 10,310 | 12,876 | 1,078 | 3,475 | 4,553 | 168 | 559 d/ | 727 |
| 2003 | 1,547 | 2.4 | 62,815 | 97.6 | 64,362 | 758 | 31,195 | 31,953 | 634 | 29,752 | 30,386 | 155 | 1,867 d/ | 2,022 |
| 2004 | 5,224 | 17.7 | 24,310 | 82.3 | 29,534 | 3,839 | 11,545 | 15,384 | 1,059 | 12,384 | 13,443 | 327 | 381 d/ | 708 |
| 2005 | 899 | 3.2 | 27,332 | 96.8 | 28,231 | 751 | 12,717 | 13,468 | 48 | 13,758 | 13,806 | 100 | 856 d/ | 956 |




a/ The 1978 sport harvest of fall run Chinook was essentially eliminated by a salmon fishing closure beginning 25 August 1978.

b/ The sport harvest of adult fall run Chinook was limited by fishing closures to the taking of Chinook salmon greater than or equal to 56 cm total length during these years. The closures took effect 22 September 1985, 5 November 1992, 9 October 1993, and 3 October 1994. The Trinity River was subject to seasonal closures during the 1995-'98 seasons, commencing 9 September in the lower river. Various periods of openings and closures (seasons) were instituted along the river through November 30.

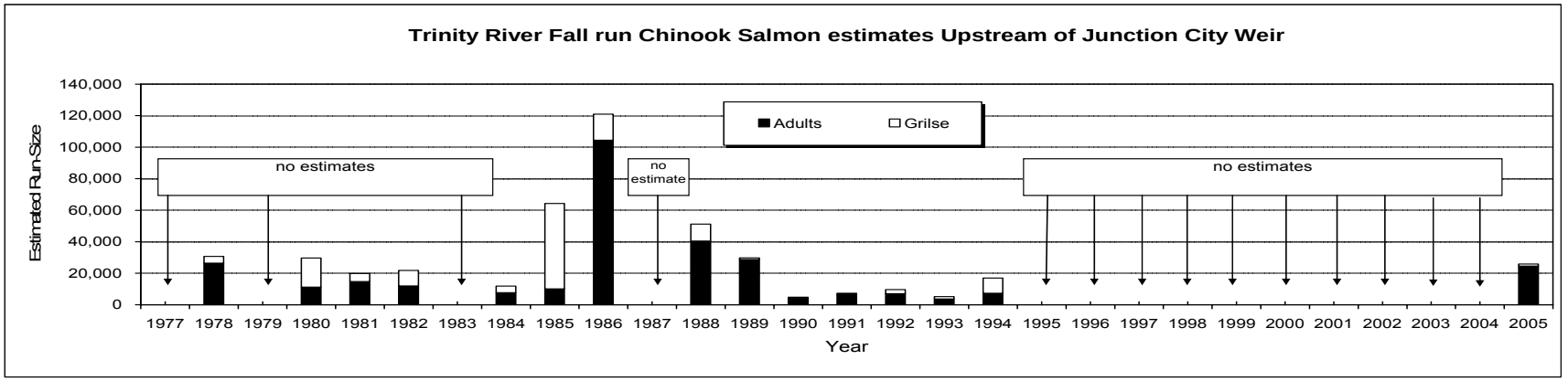
c/ The 1999 sport harvest of Trinity River fall run Chinook was managed with a quota system. In 1999, the quota was 957 adult fall run Chinook.

d/ The 2001-2005 sport harvest of Trinity River fall run Chinook was managed with a quota system. The quota for adult fall run Chinook salmon was 9,834 in 2001; 6,926 in 2002; 10,800 in 2003; 4,700 in 2004; and 1,262 in 2005.

e/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

Appendix 18. Fall run Chinook salmon run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Junction City Weir from 1977 through 2005.

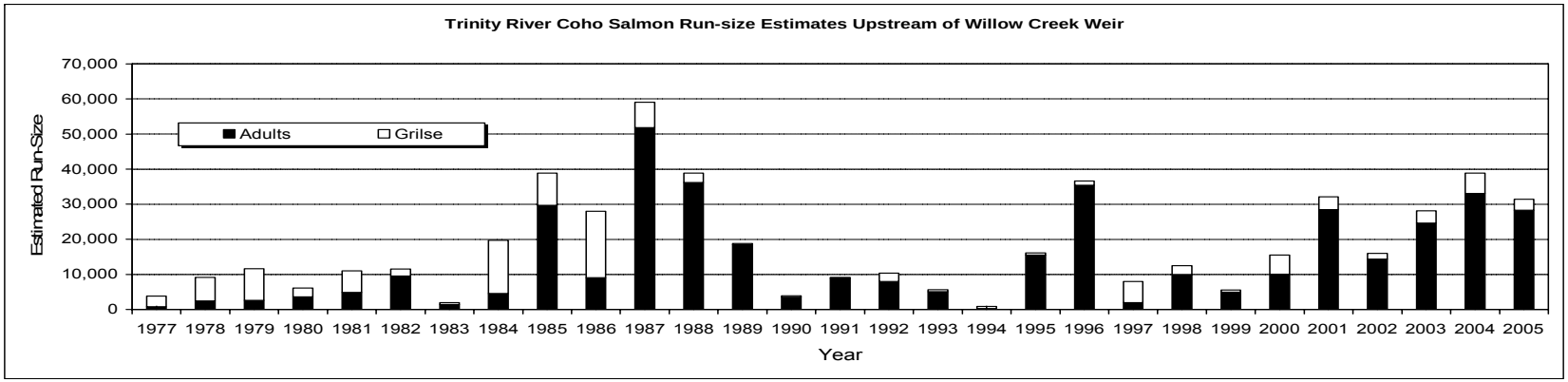
| | Run-size estimate | | | | | Spawner escapements | | | | | | Angler harvest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Area Spawners e/ | | | Trinity River Hatchery | | | | | |
| | Grilse | | Adults | | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total |
| Year | Number | Percent | Number | Percent | | | | | | | | | | |
| 1977 | | | no estimates | | | | no estimates | | 2,177 | 2,035 | 4,212 | | no estimates | |
| 1978 | 4,299 | 14.0 | 26,408 | 86.0 | 30,707 | 2,974 | 20,374 | 23,348 | 1,325 | 6,034 | 7,359 | | Fishing closure a/ | |
| 1979 | | | no estimates | | | | no estimates | | 964 | 1,335 | 2,299 | | no estimates | |
| 1980 | 18,390 | 62.0 | 11,271 | 38.0 | 29,661 | 16,134 | 7,172 | 23,306 b/ | 2,256 | 4,099 | 6,355 | | " | |
| 1981 | 5,155 | 26.0 | 14,673 | 74.0 | 19,828 | 4,151 | 12,303 | 16,454 b/ | 1,004 | 2,370 | 3,374 | | " | |
| 1982 | 9,925 | 45.6 | 11,862 | 54.4 | 21,787 | 5,690 | 9,804 | 15,494 b/ | 4,235 | 2,058 | 6,293 | | " | |
| 1983 | | | no estimates | | | | no estimates | | 271 | 5,494 | 5,765 | | " | |
| 1984 | 4,121 | 34.8 | 7,722 | 65.2 | 11,843 | 3,355 | 5,556 | 8,911 b/ | 766 | 2,166 | 2,932 | | " | |
| 1985 | 54,154 | 84.3 | 10,072 | 15.7 | 64,226 | 33,267 | 7,412 | 40,679 | 18,166 | 2,583 | 20,749 | 2,721 | 77 c/ | 2,798 |
| 1986 | 16,564 | 13.7 | 104,469 | 86.3 | 121,033 | 11,615 | 83,982 | 95,597 | 3,609 | 15,795 | 19,404 | 1,340 | 4,692 | 6,032 |
| 1987 | | | no estimates | | | | no estimates | | 2,453 | 13,934 | 16,387 | | no estimates | |
| 1988 | 10,750 | 21.0 | 40,427 | 79.0 | 51,177 | 5,145 | 20,160 | 25,305 | 4,752 | 17,352 | 22,104 | 853 | 2,915 | 3,768 |
| 1989 | 973 | 3.3 | 28,743 | 96.7 | 29,716 | 691 | 16,346 | 17,037 | 239 | 11,132 | 11,371 | 43 | 1,265 | 1,308 |
| 1990 | 457 | 9.5 | 4,330 | 90.5 | 4,787 | 83 | 2,931 | 3,014 | 371 | 1,348 | 1,719 | 3 | 51 | 54 |
| 1991 | 552 | 7.6 | 6,679 | 92.4 | 7,231 | 338 | 4,088 | 4,426 | 205 | 2,482 | 2,687 | 9 | 109 | 118 |
| 1992 | 2,530 | 26.4 | 7,054 | 73.6 | 9,584 | 2,304 | 3,148 | 5,452 | 211 | 3,779 | 3,990 | 15 | 127 c/ | 142 |
| 1993 | 1,542 | 30.0 | 3,597 | 70.0 | 5,139 | 806 | 2,742 | 3,548 | 736 | 815 | 1,551 | 0 | 40 c/ | 40 |
| 1994 | 9,661 | 57.0 | 7,276 | 43.0 | 16,937 | 5,171 | 4,012 | 9,183 | 4,442 | 3,264 | 7,706 | 48 | 0 c/ | 48 |
| 1995 | | | no estimates | | | | no estimates | | 76 | 15,178 | 15,254 | | no estimates | |
| 1996 | | | " | | | | " | | 249 | 6,411 | 6,660 | | " | |
| 1997 | | | " | | | | " | | 820 | 5,387 | 6,207 | | " | |
| 1998 | | | " | | | | " | | 192 | 14,296 | 14,488 | | " | |
| 1999 | | | " | | | | " | | 2,027 | 5,037 | 7,064 | | " | |
| 2000 | | | " | | | | " | | 1,028 | 26,018 | 27,046 | | " | |
| 2001 | | | " | | | | " | | 204 | 17,971 | 18,175 | | " | |
| 2002 | | | " | | | | " | | 1,078 | 3,475 | 4,553 | | " | |
| 2003 | | | " | | | | " | | 634 | 29,752 | 30,386 | | " | |
| 2004 | | | " | | | | " | | 1,059 | 12,384 | 13,443 | | " | |
| 2005 | 1,309 | 5.1 | 24,549 | 94.9 | 25,858 | 1,261 | 10,213 | 11,474 | 48 | 13,758 | 13,806 | 0 | 578 d/ | 578 |




a/ The 1978 sport harvest of fall run Chinook was essentially eliminated by a salmon fishing closure beginning 25 August 1978.
b/ The natural spawner escapemant reflects an overestimate due th the unknown number of fish harvested by anglers upstream of the Junction City Weir.
c/ The sport harvest of adult fall run Chinook was limited by fishing closures to the taking of Chinook salmon greater than or equal to 56 cm total length during these years. The closures took effect 22 September 1985, 5 November 1992, 9 October 1993, and 3 October 1994. The Trinity River was subject to seasonal closures during the 1995-'98 seasons, commencing 9 September in the lower river. Various periods of openings and closures (seasons) were instituted along the river through November 30.
d/ The 2005 sport harvest of Trinity River fall run Chinook adults was managed with a quota system. The quota for adult fall run Chinook salmon was 1,262 in 2005.
e/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

Appendix 19. Coho salmon run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Willow Creek Weir from 1977 through 2005.

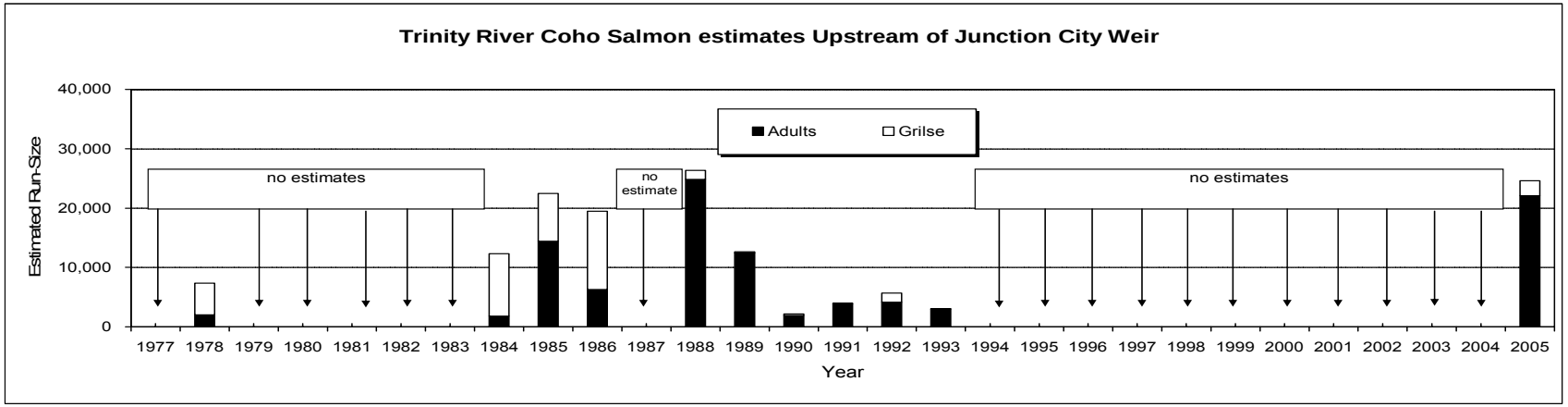
| | Run-size estimate | | | | | Spawner escapements | | | | | | Angler harvest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Area Spawners d/ | | | Trinity River Hatchery | | | | | |
| | Grilse | | Adults | | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total |
| Year | Number | Percent | Number | Percent | | | | | | | | | | |
| 1977 | 3,106 | 80.5 | 752 | 19.5 | 3,858 | 1,756 | 25 | 1,781 | 1,230 | 698 | 1,928 | 120 | 29 | 149 |
| 1978 | 6,685 | 73.2 | 2,447 | 26.8 | 9,132 | 4,309 | 1,168 | 5,477 | 2,376 | 1,279 | 3,655 | Fishing closure a/ | | 0 |
| 1979 | 9,067 | 78.0 | 2,557 | 22.0 | 11,624 | 5,567 | 1,695 | 7,262 | 2,793 | 742 | 3,535 | 707 | 120 | 827 |
| 1980 | 2,499 | 41.0 | 3,595 | 59.0 | 6,094 | 954 | 1,817 | 2,771 | 1,545 | 1,778 | 3,323 | | | 0 |
| 1981 | 6,144 | 56.0 | 4,826 | 44.0 | 10,970 | 3,486 | 1,995 | 5,481 | 1,994 | 2,529 | 4,523 | 664 | 302 | 966 |
| 1982 | 2,021 | 17.5 | 9,508 | 82.5 | 11,529 | 1,158 | 5,097 | 6,255 | 823 | 3,975 | 4,798 | 40 | 436 | 476 |
| 1983 | 536 | 27.2 | 1,435 | 72.8 | 1,971 | 295 | 788 | 1,083 | 192 | 514 | 706 | 49 | 133 | 182 |
| 1984 | 15,208 | 77.2 | 4,486 | 22.8 | 19,694 | 6,188 | 2,971 | 9,159 | 7,727 | 1,134 | 8,861 | 1,293 | 381 | 1,674 |
| 1985 | 9,216 | 23.7 | 29,717 | 76.3 | 38,933 | 4,798 | 21,586 | 26,384 | 4,237 | 7,549 | 11,786 | 181 | 582 b/ | 763 |
| 1986 | 18,909 | 67.6 | 9,063 | 32.4 | 27,972 | 13,034 | 6,247 | 19,281 | 5,402 | 2,589 | 7,991 | 473 | 227 | 700 |
| 1987 | 7,253 | 12.3 | 51,826 | 87.7 | 59,079 | 3,975 | 28,398 | 32,373 | 2,865 | 20,473 | 23,338 | 413 | 2,955 | 3,368 |
| 1988 | 2,731 | 7.0 | 36,173 | 93.0 | 38,904 | 1,850 | 22,277 | 24,127 | 743 | 12,073 | 12,816 | 138 | 1,823 | 1,961 |
| 1989 | 290 | 1.5 | 18,462 | 98.5 | 18,752 | 208 | 13,274 | 13,482 | 77 | 4,893 | 4,970 | 5 | 295 | 300 |
| 1990 | 412 | 10.6 | 3,485 | 89.4 | 3,897 | 234 | 1,981 | 2,215 | 173 | 1,462 | 1,635 | 5 | 42 | 47 |
| 1991 | 265 | 2.9 | 8,859 | 97.1 | 9,124 | 164 | 6,163 | 6,327 | 98 | 2,590 | 2,688 | 3 | 106 | 109 |
| 1992 | 2,378 | 23.0 | 7,961 | 77.0 | 10,339 | 1,168 | 5,565 | 6,733 | 1,210 | 2,372 | 3,582 | 0 | 24 | 24 |
| 1993 | 573 | 10.2 | 5,048 | 89.8 | 5,621 | 416 | 3,024 | 3,440 | 93 | 2,024 | 2,117 | 64 | 0 | 64 |
| 1994 | 613 | 71.9 | 239 | 28.1 | 852 | 453 | 105 | 558 | 160 | 134 | 294 | 0 | 0 | 0 |
| 1995 | 634 | 3.9 | 15,477 | 96.1 | 16,111 | 370 | 10,680 | 11,050 | 264 | 4,503 | 4,767 | 0 | 294 | 294 |
| 1996 | 1,269 | 3.5 | 35,391 | 96.5 | 36,660 | 1,149 | 25,308 | 26,457 | 120 | 9,835 | 9,955 | 0 | 248 | 248 c/ |
| 1997 | 5,951 | 75.0 | 1,984 | 25.0 | 7,935 | 5,038 | 1,097 | 6,135 | 871 | 887 | 1,758 | 42 | 0 | 42 c/ |
| 1998 | 2,471 | 19.8 | 10,009 | 80.2 | 12,480 | 1,494 | 5,995 | 7,489 | 977 | 4,014 | 4,991 | 0 | 0 | 0 c/ |
| 1999 | 623 | 11.3 | 4,912 | 88.7 | 5,535 | 234 | 1,696 | 1,930 | 389 | 3,118 | 3,507 | 0 | 98 | 98 c/ |
| 2000 | 5,486 | 35.3 | 10,046 | 64.7 | 15,532 | 4,560 | 6,585 | 11,145 | 926 | 3,461 | 4,387 | 0 | 0 | 0 c/ |
| 2001 | 3,670 | 11.4 | 28,470 | 88.6 | 32,140 | 2,644 | 18,715 | 21,359 | 1,026 | 9,755 | 10,781 | 0 | 0 | 0 c/ |
| 2002 | 1,709 | 10.7 | 14,307 | 89.3 | 16,016 | 1,006 | 7,812 | 8,818 | 703 | 6,495 | 7,198 | 0 | 0 | 0 c/ |
| 2003 | 3,501 | 12.4 | 24,651 | 87.6 | 28,152 | 2,038 | 14,255 | 16,293 | 1,463 | 10,396 | 11,859 | 0 | 0 | 0 c/ |
| 2004 | 5,819 | 15.0 | 33,063 | 85.0 | 38,882 | 4,742 | 23,117 | 27,859 | 1,077 | 9,906 | 10,983 | 0 | 40 | 40 c/ |
| 2005 | 3,093 | 9.8 | 28,326 | 90.2 | 31,419 | 1,341 | 11,702 | 13,043 | 1,731 | 16,624 | 18,355 | 21 | 0 | 21 c/ |




a/ The 1978 sport harvest of coho was essentially eliminated by a salmon fishing closure beginning 25 August 1978.
b/ The 1985 sport harvest of adult coho was limited by a closure for the taking salmon greater than or equal to 56 cm total length beginning 22 September 1985.
c/ The 1996-'05 sport fishery was closed to the take of coho salmon.
d/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

Appendix 20. Coho salmon run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Junction City Weir from 1977 through 2005.

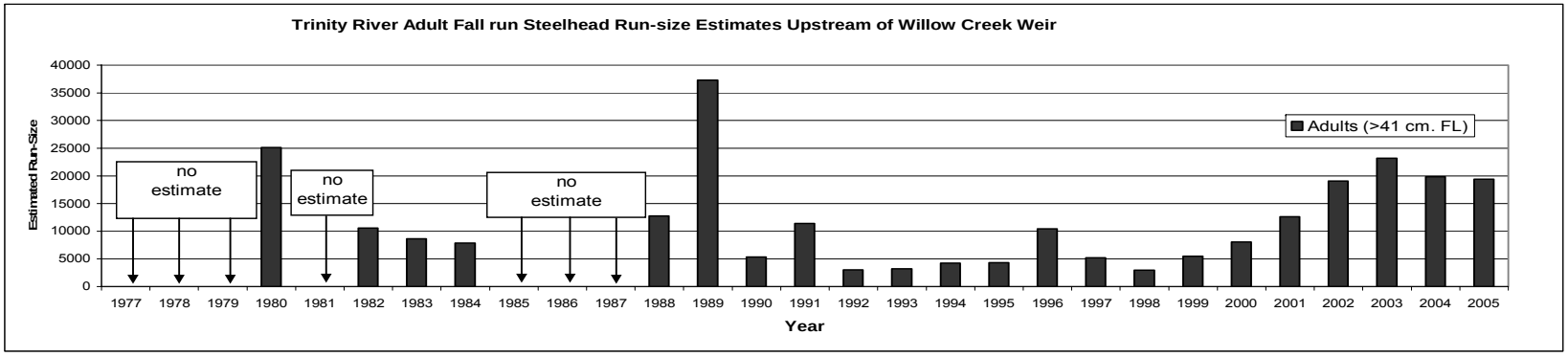
| | Run-size estimate | | | | | Spawner escapements | | | | | | Angler harvest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Natural Area Spawners d/ | | | Trinity River Hatchery | | | | | |
| | Grilse | | Adults | | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total |
| Year | Number | Percent | Number | Percent | | | | | | | | | | |
| 1977 | | | no estimates | | | | no estimates | | 1,230 | 698 | 1,928 | | no estimates | |
| 1978 | 5,324 | 72.3 | 2,036 | 27.7 | 7,360 | 2,948 | 757 | 3,705 | 2,376 | 1,279 | 3,655 | | Fishing closure a/ | |
| 1979 | | | no estimates | | | | no estimates | | 2,793 | 742 | 3,535 | | no estimates | |
| 1980 | | | " | | | | " | | 1,545 | 1,778 | 3,323 | | " | |
| 1981 | | | " | | | | " | | 1,994 | 2,529 | 4,523 | | " | |
| 1982 | | | " | | | | " | | 823 | 3,975 | 4,798 | | " | |
| 1983 | | | " | | | | " | | 192 | 514 | 706 | | " | |
| 1984 | 10,488 | 85.4 | 1,797 | 14.6 | 12,285 | 2,761 | 663 | 3,424 b/ | 7,727 | 1,134 | 8,861 | | " | |
| 1985 | 8,064 | 35.9 | 14,398 | 64.1 | 22,462 | 3,827 | 6,849 | 10,676 b/ | 4,237 | 7,549 | 11,786 | | " | |
| 1986 | 13,168 | 67.6 | 6,312 | 32.4 | 19,480 | 7,766 | 3,723 | 11,489 b/ | 5,402 | 2,589 | 7,991 | | " | |
| 1987 | | | no estimates | | | | no estimates | | 2,865 | 20,473 | 23,338 | | " | |
| 1988 | 1,529 | 5.8 | 24,841 | 94.2 | 26,370 | 723 | 11,929 | 12,652 | 743 | 12,073 | 12,816 | 63 | 839 | 902 |
| 1989 | 196 | 1.6 | 12,429 | 98.4 | 12,625 | 118 | 7,461 | 7,579 | 77 | 4,893 | 4,970 | 1 | 75 | 76 |
| 1990 | 230 | 10.6 | 1,947 | 89.4 | 2,177 | 57 | 485 | 542 | 173 | 1,462 | 1,635 | 0 | 0 | 0 |
| 1991 | 131 | 3.3 | 3,865 | 96.7 | 3,996 | 32 | 1,252 | 1,284 | 98 | 2,590 | 2,688 | 1 | 23 | 24 |
| 1992 | 1,539 | 27.1 | 4,144 | 72.9 | 5,683 | 329 | 1,772 | 2,101 | 1,210 | 2,372 | 3,582 | 0 | 0 | 0 |
| 1993 | 124 | 4.0 | 2,974 | 96.0 | 3,098 | 31 | 950 | 981 | 93 | 2,024 | 2,117 | 0 | 0 | 0 |
| 1994 | | | no estimates | | | | no estimates | | 160 | 134 | 294 | | no estimates | |
| 1995 | | | " | | | | " | | 264 | 4,503 | 4,767 | | " | c/ |
| 1996 | | | " | | | | " | | 120 | 9,835 | 9,955 | | " | c/ |
| 1997 | | | " | | | | " | | 871 | 887 | 1,758 | | " | c/ |
| 1998 | | | " | | | | " | | 977 | 4,014 | 4,991 | | " | c/ |
| 1999 | | | " | | | | " | | 389 | 3,118 | 3,507 | | " | c/ |
| 2000 | | | " | | | | " | | 926 | 3,461 | 4,387 | | " | c/ |
| 2001 | | | " | | | | " | | 1,026 | 9,755 | 10,781 | | " | c/ |
| 2002 | | | " | | | | " | | 703 | 6,495 | 7,198 | | " | c/ |
| 2003 | | | " | | | | " | | 1,463 | 10,396 | 11,859 | | " | c/ |
| 2004 | | | " | | | | " | | 1,077 | 9,906 | 10,983 | | " | c/ |
| 2005 | 2,535 | 10.3 | 22,080 | 89.7 | 24,615 | 804 | 5,456 | 6,260 | 1,731 | 16,624 | 18,355 | 0 | 0 | 0 c/ |




a/ The 1978 sport harvest of fall run Chinook was essentially eliminated by a salmon fishing closure beginning 25 August 1978.
b/ The natural spawner escapemant reflects an overestimate due th the unknown number of fish harvested by anglers upstream of the Junction City Weir.
c/ The 1996-2005 sport fishery was closed to the take of coho salmon.
d/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

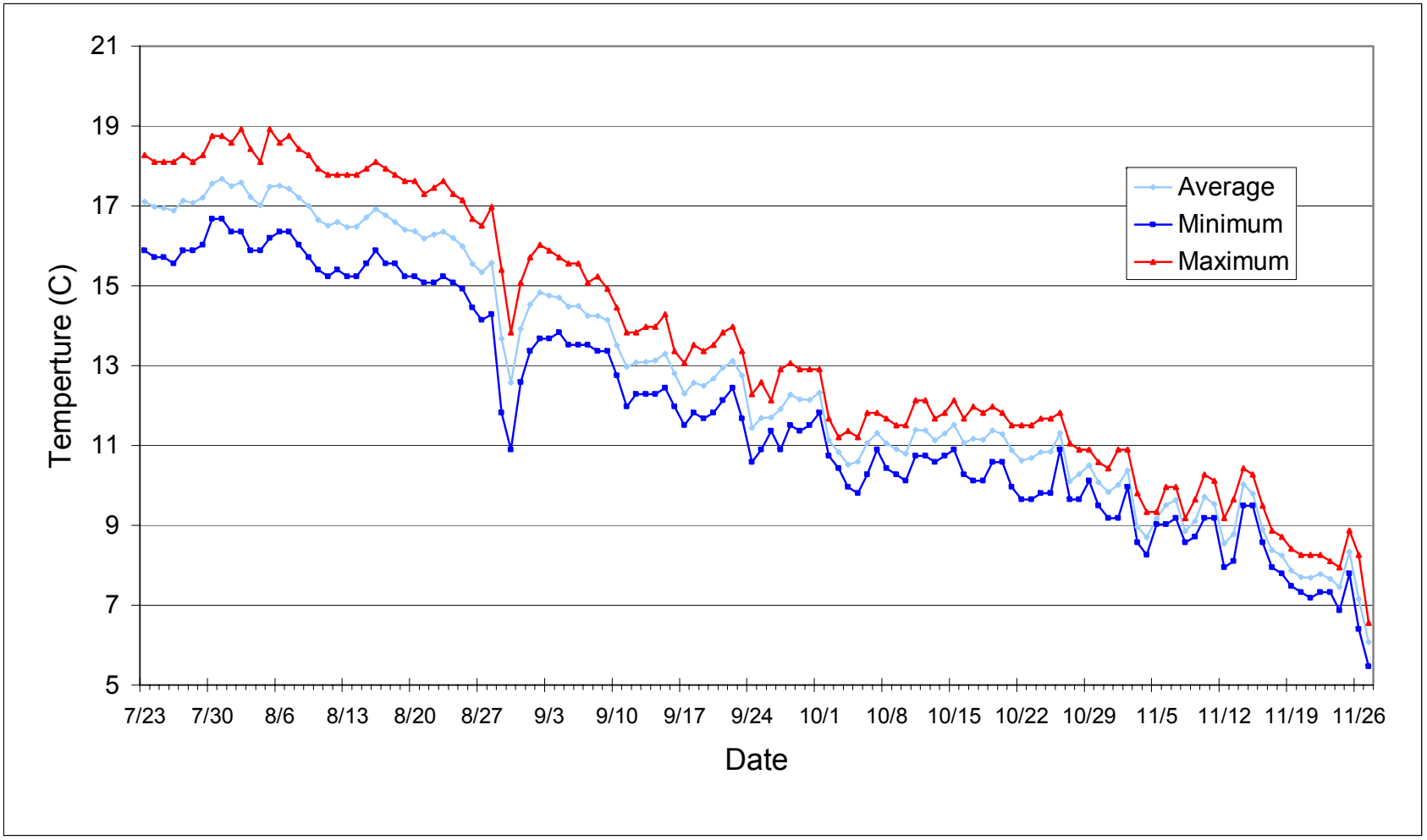
Appendix 21. Fall run adult steelhead run-size, spawner escapement and angler harvest estimates for the Trinity River upstream of Willow Creek Weir from 1977 through 2005.

| | Run-size estimate | | | | | Spawner escapement | | | | | | Angler harvest | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hatchery b/ | | Wild c/ | | | Natural Area Spawners f/ | | | Trinity River Hatchery | | | | | |
| | | | | | | Hatchery | Wild | Total | Hatchery | Wild | Total | Hatchery | Wild | Total |
| Year | Number | Percent | Number | Percent | Total | | | | | | | | | |
| 1977 | | | No estimates | | | | No estimates | | 269 | 16 | 285 | | No estimates | |
| 1978 | | | " | | | | " | | 628 | 55 | 683 | | " | |
| 1979 | | | " | | | | " | | 329 | 53 | 382 | | " | |
| 1980 | 8,449 | 33.7 | 16,645 | 66.3 | 25,094 | 5,101 | 14,462 | 19,563 | 1,903 | 102 | 2,005 | 1,445 | 2,081 | 3,526 |
| 1981 | No estimates | | | | | | No estimates | | 892 | 112 | 1,004 | | No estimates | |
| 1982 | 2,106 | 20.0 | 8,426 | 80.0 | 10,532 | 971 | 6,889 | 7,860 | 634 | 79 | 713 | 501 | 1,458 | 1,959 |
| 1983 | No estimates for hatchery/wild components | | | | 8,605 | | | 6,661 | | | 599 | | | 1,345 |
| 1984 | | | " | | 7,833 | | | 6,430 | | | 142 | | | 1,261 |
| 1985 | | | No estimates | | | | No estimates | | | | 461 | | No estimates | |
| 1986 | | | " | | | | " | | | | 3,780 | | " | |
| 1987 | | | " | | | | " | | | | 3,007 | | " | |
| 1988 | No estimates for hatchery/wild components | | | | 12,743 | | | 11,926 d/ | | | 817 | | " | |
| 1989 | | | " | | 37,276 | | | 28,933 | | | 4,765 | | | 3,578 |
| 1990 | | | " | | 5,348 | | | 3,188 | | | 930 | | | 1,230 |
| 1991 | | | " | | 11,417 | | | 8,631 | | | 446 | | | 2,340 |
| 1992 | 1,315 | 43.2 | 1,731 | 56.8 | 3,046 | 759 | 1,540 | 2,299 | 430 | 25 | 455 | 126 | 166 | 292 |
| 1993 | 1,894 | 58.4 | 1,349 | 41.6 | 3,243 | 801 | 1,176 | 1,977 | 875 | 10 | 885 | 218 | 163 | 381 |
| 1994 | 1,477 | 34.8 | 2,767 | 65.2 | 4,244 | 878 | 2,410 | 3,288 | 403 | 8 | 411 | 196 | 349 | 545 |
| 1995 | 1,595 | 37.2 | 2,693 | 62.8 | 4,288 | 1,424 | 1,867 | 3,291 | 24 | 681 | 705 | 147 | 145 | 292 |
| 1996 | 8,598 | 82.4 | 1,837 | 17.6 | 10,435 | 4,127 | 1,703 | 5,830 | 3,964 | 48 | 4,012 | 507 | 86 | 593 |
| 1997 | No estimates for hatchery/wild components | | | | 5,212 | No estimates | | 4,267 | No estimates | | 429 | No estimates | | 516 |
| 1998 | | | " | | 2,972 | " | | 2,463 | " | | 441 | " | | 68 e/ |
| 1999 | | | " | | 5,470 | " | | 3,817 | " | | 1,571 | " | | 82 e/ |
| 2000 | | | " | | 8,042 | " | | 7,097 | " | | 768 | " | | 177 e/ |
| 2001 | | | " | | 12,638 | " | | 9,938 | " | | 2,333 | " | | 367 e/ |
| 2002 | 14,408 | 75.6 | 4,650 | 24.4 | 19,058 | 7,730 | 4,566 | 12,296 | 5,966 | 42 | 6,008 | 697 | 57 | 754 e/ |
| 2003 | 19,245 | 83.0 | 3,947 | 17.0 | 23,192 | 8,717 | 3,837 | 12,554 | 10,182 | 42 | 10,224 | 346 | 68 | 414 e/ |
| 2004 | 15,038 | 75.7 | 4,817 | 24.3 | 19,855 | 8,937 | 4,732 | 13,669 | 5,688 | 37 | 5,725 | 413 | 48 | 461 e/ |
| 2005 | 14,049 | 72.4 | 5,363 | 27.6 | 19,412 | 5,782 | 5,280 | 11,062 | 8,080 | 63 | 8,143 | 187 | 20 | 207 e/ |

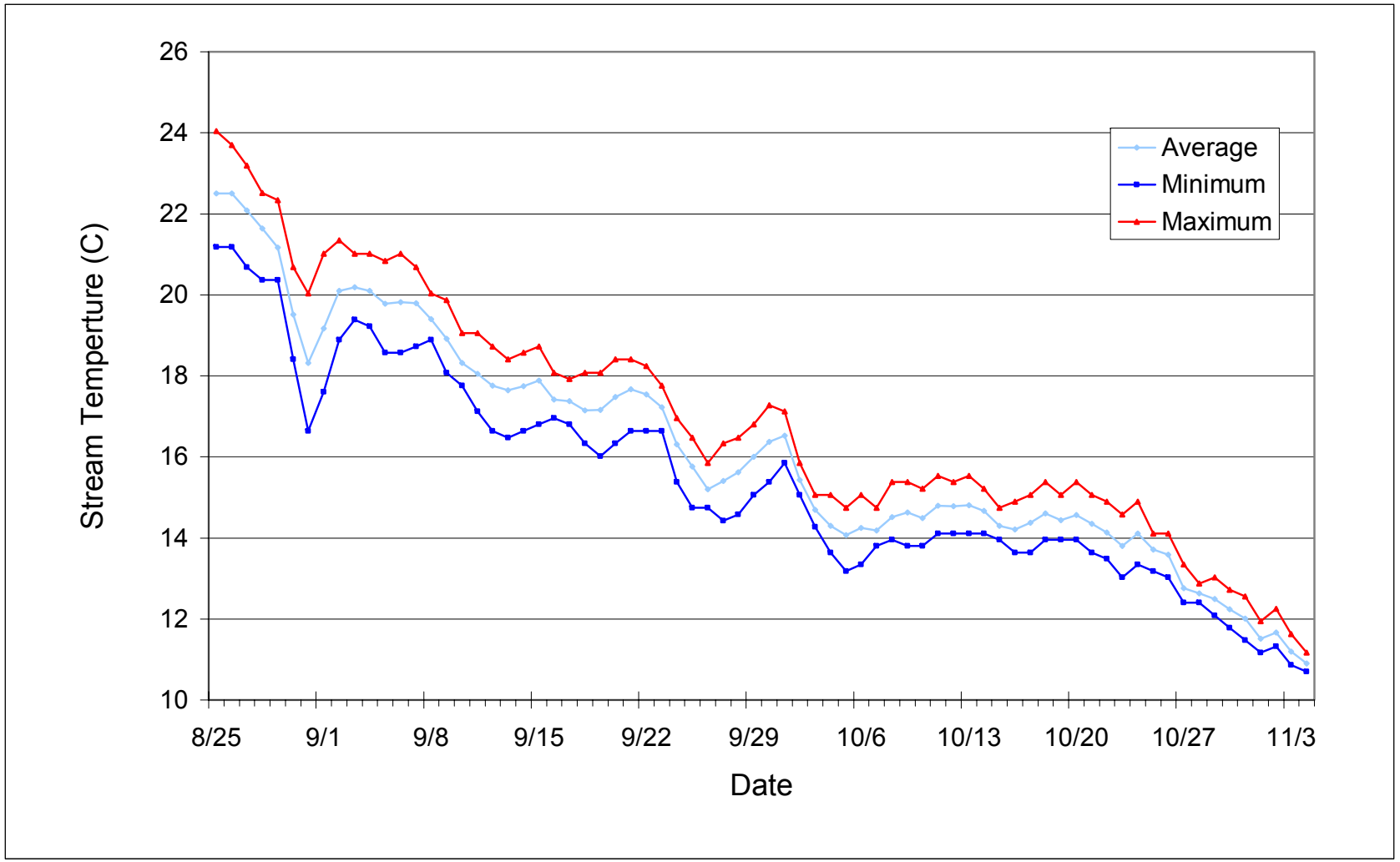



a/ Adult steelhead are greater than 41 centimeters, fork length.
b/ Trinity River Hatchery-produced steelhead.
c/ Naturally produced steelhead.
d/ The natural spawner escapement reflects an overestimate due to the unknown number of fish harvested by anglers upstream of Willow Creek Weir.
e/ Harvest was limited to hatchery produced fish only. Hatchery fish are those with an adipose fin-clip.
f/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

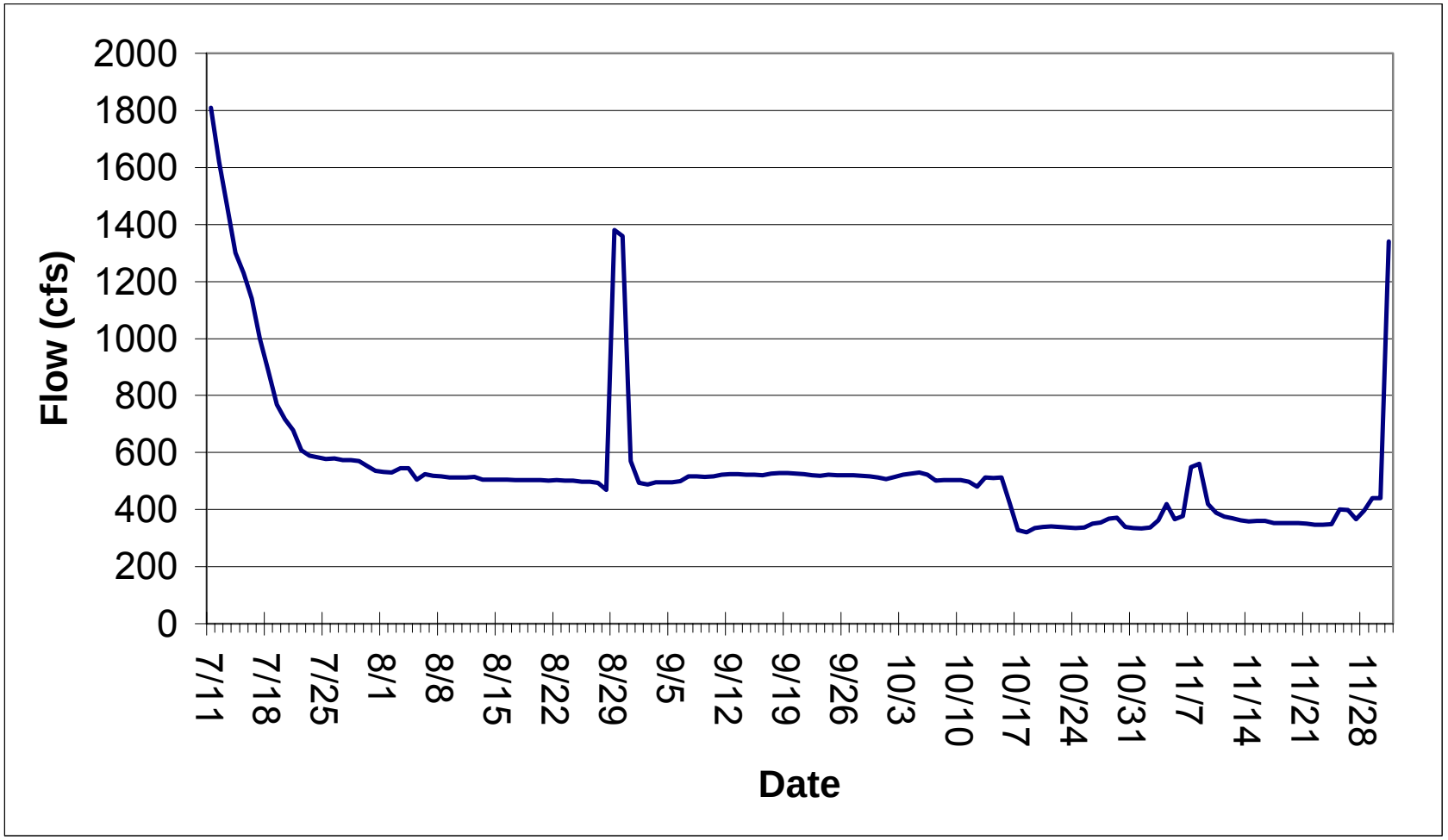
Appendix 22. Daily minimum, maximum, and average stream temperatures in degrees Celsius recorded at the Junction City Weir trapping site from July23rd through November 27th 2005.



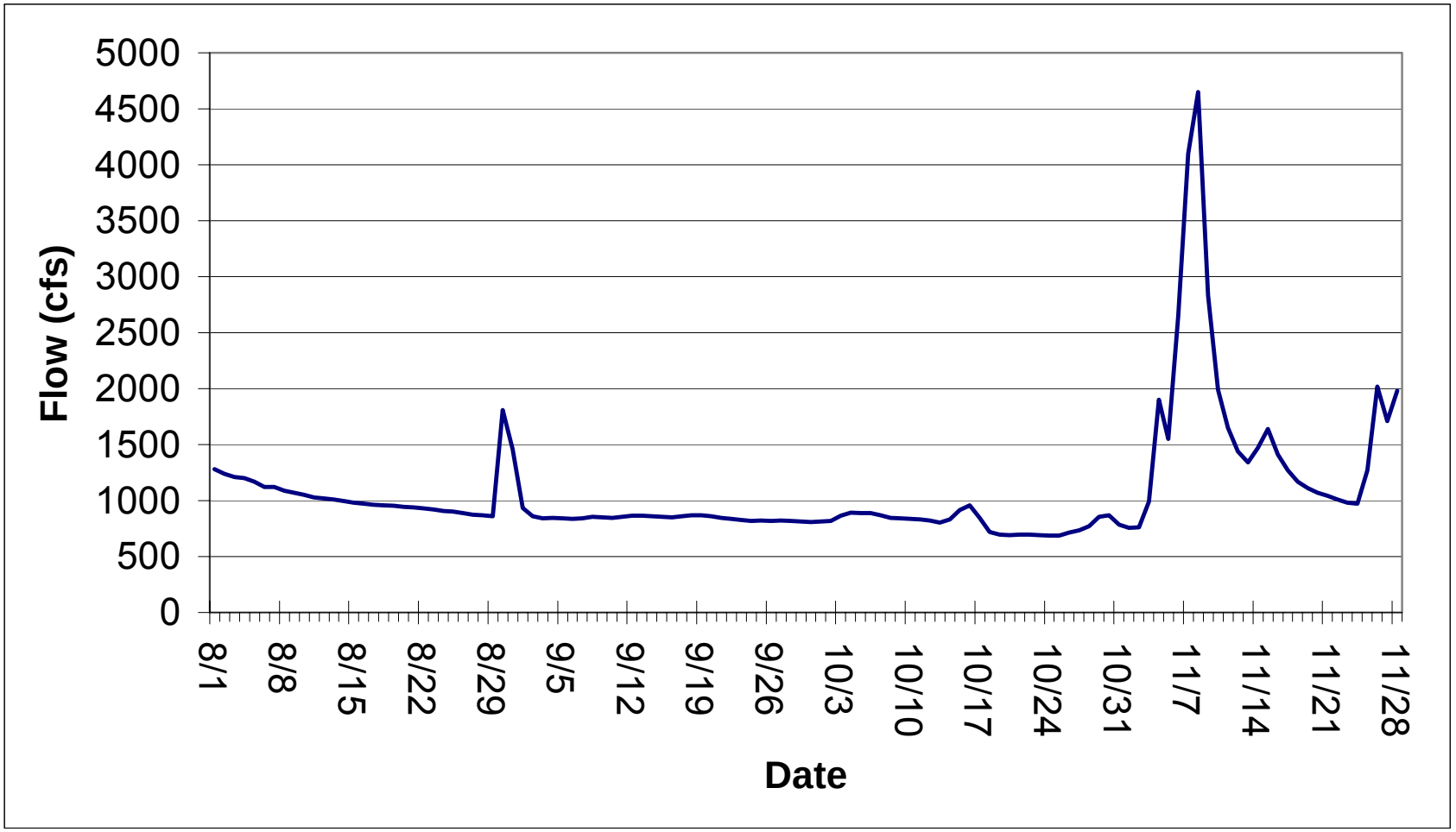
Appendix 23. Daily minimum, maximum, and average stream temperatures in degrees Celsius recorded at the Willow Creek Weir trapping site from August 25th through November 4th 2005.



Appendix 24. Daily mean flow in cubic feet per second in the Trinity River at USGS guage (11526250) in Junction City from July 11th through December 1st 2005.



Appendix 25. Daily mean flow in cubic feet per second in the Trinity River at USGS guage (11530000) in Hoopa from August 1st through November 28th 2005.



ANNUAL REPORT
TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT
2005-06 SEASON

TASK 2
SURVIVAL AND CONTRIBUTIONS TO THE FISHERIES AND SPAWNER ESCAPEMENTS MADE BY CHINOOK SALMON PRODUCED AT TRINITY RIVER HATCHERY

by

Wade Sinnen

## ABSTRACT

Recovery of marked spring-run (spring) and fall-run (fall) Chinook salmon (*Oncorhynchus tshawytscha)* at Trinity River Hatchery (TRH) was conducted between 8 September, 2005 and 14 March, 2006. Of the 20,797 Chinook salmon that entered TRH, we recovered 4,866 adipose fin-clipped (AD) Chinook salmon, 23.4% of the total. Of these, coded-wire tags (CWT) were recovered from 1,520 spring Chinook and 3,132 fall Chinook salmon.

We estimated that 2,687 marked (AD+CWT) spring Chinook returned to the Trinity River upstream of the Junction City Weir (JCW) and 4,850 marked fall Chinook returned to the Trinity River upstream of the Willow Creek Weir (WCW) during the 2005-06 season.

Estimated in-river run-size, angler harvest, and spawner escapements of marked TRH spring and fall Chinook salmon for the 2000 through 2003 brood years (BY's) are presented. Complete returns are only available for both runs of fish from the 2000 brood year. These fish have reached age five and are considered to have completed their life cycle. Chinook return rates (expressed as a percentage) for the completed 2000 BY ranged from 1.5% to 2.0% for spring Chinook fingerling CWT groups and 0.40% to 1.1% for fall Chinook fingerlings. Returns of spring Chinook released as yearlings was estimated at 2.0%, while fall Chinook yearlings returned at a rate of 2.4%.

Based on estimated total spring Chinook run-size above Junction City Weir and fall Chinook run-size above Willow Creek Weir, we estimate that the hatchery produced portion of these two runs was 78.4% and 69.7% respectively.

Returns of BY 2000 Trinity River Hatchery-produced fall Chinook were negatively impacted by a fish kill in the lower Klamath River that occurred in fall, 2002.

## TASK OBJECTIVES

To determine relative Trinity River specific return rates and the contribution to spawning escapement and the fisheries made by Chinook salmon produced at Trinity River Hatchery, and to evaluate experimental hatchery management practices aimed at increasing adult returns, while reducing competition among wild fish.

## INTRODUCTION

During the period of 9 September, 2005 through 14 March, 2006, the California Department of Fish and Game's (CDFG) Trinity River Project recaptured Chinook salmon returning to Trinity River Hatchery (TRH) from previously marked brood years (BY's). Marked Chinook (AD+CWT) were identified by an adipose fin-clip (AD). These fish were implanted with a binary coded-wire tag (CWT) prior to their release from TRH as either smolts or yearlings. Both spring-run (spring) and fall-run (fall) Chinook were representatively marked at a rate of approximately 25% by the Hoopa Valley Tribe. Our efforts are directed at the recovery of these coded-wire tagged fish and analyzing the information derived from their recovery. This study is a continuation of previous studies conducted by the CDFG and is reliant on data presented in Sinnen 2004a, 2004b, 2005, and 2006.

## METHODS

We examined all salmon entering TRH for fin-clips and Project tags (also part of TASK 1). The heads from AD-clipped salmon were removed and retained for later coded-wire tag retrieval 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) total run-size, 2) angler harvest rate, 3) proportion of the run comprised of marked fish, and 4) proportion of CWT groups recovered at TRH. Independent estimates of spring and fall Chinook run-size and angler harvest rates for each race of Chinook are required. Methods to determine total run-size and angler harvest rate estimates were presented in "TASK 1" of this report.

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

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

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 $N_{run\text{-}size\ estimate}$ = 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:

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

where, $F_{CWT\ group}$ = fraction of the salmon population with a specific CWT code; and $NH_{CWT\ group}$ = 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:

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

where, $N_{CWT\ group}$ = 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:

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

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

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

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

where, $N_{CWT\ escapement}$ = 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:

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

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

As stated above, estimating the total return of individual CWT groups depends on a basin run-size estimate. In evaluating the return of CWT hatchery Chinook, we normally report on the individual year's return along with a summary of each CWT group throughout their five-year life cycle.

Run size estimates for spring and fall Chinook are calculated for the Trinity River upstream of the JCW (river km [RKM] 137.1) and the WCW (RKM 36.4), respectively.

In this report, we present estimated contribution rates of TRH-produced Chinook salmon to total spring and fall Chinook run-sizes. This is accomplished by expanding each of the individual CWT estimated run-sizes, by its corresponding hatchery expansion factor (total releases represented by each CWT release group/CWT'ed fish released). In doing this, we assume that marked fish are representative of their unmarked counterparts.

## RESULTS

### Coded-wire tag recovery

We recovered 4,866 AD-clipped Chinook at TRH this season, from which we recovered CWT's from 1,520 spring Chinook and 3,132 fall Chinook (Table 1). The remaining 214 AD-clipped fish had either shed their CWT (160) or the CWT was lost or unreadable (54). Chinook without CWT's were classified as either spring- or fall-run based on their date of entry into TRH. Fish which entered the hatchery prior to 15 October were considered spring Chinook, while Chinook entering after 21 October were considered fall fish. Recovered spring Chinook CWT's were composed of 16 release groups from the 2000 through 2003 BY's. Recovered fall Chinook with CWT's were from 18 groups representing the 2000 through 2003 BY's (Table 1).

Table 1. Release and recovery data for adipose fin-clipped chinook recovered at Trinity River Hatchery (TRH) during the 2005-06 season.

| | Release data | | | | | | Recovery data | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Males | | Females | | |
| CWT a/ code | Egg source | Brood year | Date | Number | Size (No./lb) | Site | No. | FL b/ | No. | FL b/ | Total No. |
| ***Spring-run chinook salmon*** | | | | | | | | | | | |
| 065260 | TRH | 2000 | 06/6-13/01 | 33,049 | 33.3 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065261 | TRH | 2000 | 06/6-13/01 | 32,621 | 33.3 | TRH | 1 | 90.0 | 0 | ----- | 1 |
| 065262 | TRH | 2000 | 06/6-13/01 | 24,480 | 33.3 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065263 | TRH | 2000 | 06/6-13/01 | 34,385 | 33.3 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065264 | TRH | 2000 | 06/6-13/01 | 31,587 | 42.0 | TRH | 0 | ----- | 1 | 78.0 | 1 |
| 065269 | TRH | 2000 | 06/6-13/01 | 52,491 | 33.3 | TRH | 1 | 89.0 | 1 | 78.0 | 2 |
| 065270 | TRH | 2000 | 06/6-13/01 | 52,580 | 42.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065279 | TRH | 2000 | 10/1-10/01 | 99,304 | 7.9 | TRH | 15 | 84.0 | 7 | 78.1 | 22 |
| 065281 | TRH | 2001 | 06/3-10/02 | 89,482 | 39.0 | TRH | 10 | 82.1 | 15 | 71.3 | 25 |
| 065282 | TRH | 2001 | 06/3-10/02 | 89,978 | 39.0 | TRH | 6 | 83.0 | 12 | 75.0 | 18 |
| 065283 | TRH | 2001 | 06/3-10/02 | 73,788 | 45.0 | TRH | 5 | 81.8 | 8 | 74.8 | 13 |
| 065288 | TRH | 2001 | 10/10-16/02 | 104,627 | 8.3 | TRH | 159 | 78.1 | 249 | 71.4 | 408 |
| 065295 | TRH | 2002 | 06/3-9/03 | 89,284 | 44.5 | TRH | 151 | 67.3 | 183 | 63.6 | 334 |
| 065296 | TRH | 2002 | 06/3-9/03 | 84,568 | 44.5 | TRH | 127 | 68.6 | 161 | 64.2 | 288 |
| 065297 | TRH | 2002 | 06/3-9/03 | 70,902 | 44.5 | TRH | 112 | 69.4 | 133 | 65.3 | 245 |
| 065308 | TRH | 2002 | 10/1-7/03 | 106,139 | 11.4 | TRH | 98 | 61.1 | 56 | 59.8 | 154 |
| 065310 | TRH | 2003 | 06/4-10/04 | 94,182 | 54.0 | TRH | 2 | 43.5 | 0 | ----- | 2 |
| 065311 | TRH | 2003 | 06/4-10/04 | 78,663 | 54.0 | TRH | 5 | 48.2 | 0 | ----- | 5 |
| 065312 | TRH | 2003 | 06/4-10/04 | 92,711 | 60.0 | TRH | 1 | 50.0 | 0 | ----- | 1 |
| 065317 | TRH | 2003 | 10/20/04 | 104,974 | 11.4 | TRH | 1 | 41.0 | 0 | ----- | 1 |
| Lost CWT c/ e/ | | | | | | | 13 | 64.2 | 8 | 73.4 | 21 |
| No CWT d/ e/ | | | | | | | 26 | 67.5 | 32 | 66.5 | 58 |
| | | | | Spring-run chinook salmon totals: | | | 733 | | 866 | | 1,599 |
| ***Fall-run chinook salmon*** | | | | | | | | | | | |
| 065265 | TRH | 2000 | 06/6-06/13/01 | 32,795 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065266 | TRH | 2000 | 06/6-06/13/01 | 33,806 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065267 | TRH | 2000 | 06/6-06/13/01 | 34,852 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065268 | TRH | 2000 | 06/6-06/13/01 | 33,240 | 86.0 | TRH | 0 | ----- | 1 | 89.0 | 1 |
| 065271 | TRH | 2000 | 06/6-06/13/01 | 54,867 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065272 | TRH | 2000 | 06/6-06/13/01 | 36,035 | 56.5 | TRH | 0 | ----- | 1 | 89.0 | 1 |
| 065273 | TRH | 2000 | 06/6-06/13/01 | 57,444 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065274 | TRH | 2000 | 06/6-06/13/01 | 32,096 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065275 | TRH | 2000 | 06/6-06/13/01 | 64,250 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065276 | TRH | 2000 | 06/6-06/13/01 | 27,159 | 56.5 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065277 | TRH | 2000 | 06/6-06/13/01 | 56,582 | 86.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065278 | TRH | 2000 | 06/6-06/13/01 | 34,183 | 86.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065643 | TRH | 2000 | 06/6-06/13/01 | 25,007 | 86.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065280 | TRH | 2000 | 10/1-10/10/01 | 216,593 | 12.3 | TRH | 10 | 87.0 | 10 | 83.2 | 20 |
| 065284 | TRH | 2001 | 06/3-10/02 | 119,555 | 71.0 | TRH | 9 | 81.0 | 11 | 76.4 | 20 |
| 065285 | TRH | 2001 | 06/3-10/02 | 114,119 | 71.0 | TRH | 2 | 91.0 | 10 | 76.4 | 12 |
| 065286 | TRH | 2001 | 06/3-10/02 | 126,135 | 86.0 | TRH | 4 | 80.3 | 9 | 78.8 | 13 |
| 065287 | TRH | 2001 | 06/3-10/02 | 121,607 | 86.0 | TRH | 4 | 81.0 | 4 | 78.8 | 8 |
| 065289 | TRH | 2001 | 10/10-16/02 | 230,055 | 13.5 | TRH | 244 | 82.2 | 422 | 77.4 | 666 |
| 065290 | TRH | 2001 | 06/3-10/02 | 10,234 | 126.0 | TRH | 1 | 84.0 | 0 | ----- | 1 |
| 065291 | TRH | 2001 | 06/3-10/02 | 8,269 | 126.0 | TRH | 0 | ----- | 2 | 82.0 | 2 |
| 065292 | TRH | 2002 | 06/3-9/03 | 10,355 | 105.5 | TRH | 6 | 68.2 | 3 | 62.7 | 9 |
| 065298 | TRH | 2002 | 06/3-9/03 | 124,602 | 76.0 | TRH | 220 | 69.1 | 172 | 67.3 | 392 |
| 065299 | TRH | 2002 | 06/3-9/03 | 126,729 | 76.0 | TRH | 141 | 70.0 | 170 | 67.2 | 311 |
| 065306 | TRH | 2002 | 06/3-9/03 | 124,014 | 84.5 | TRH | 178 | 70.0 | 116 | 66.7 | 294 |
| 065307 | TRH | 2002 | 06/3-9/03 | 123,263 | 84.5 | TRH | 135 | 69.7 | 123 | 67.4 | 258 |
| 065309 | TRH | 2002 | 10/1-7/03 | 236,319 | 16.7 | TRH | 718 | 64.5 | 403 | 62.7 | 1,121 |
| 065293 | TRH | 2003 | 06/4-10/04 | 11,342 | 130.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065294 | TRH | 2003 | 06/4-10/04 | 5,230 | 130.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065313 | TRH | 2003 | 06/4-10/04 | 125,073 | 99.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065314 | TRH | 2003 | 06/4-10/04 | 132,044 | 99.0 | TRH | 1 | 46.0 | 0 | ----- | 1 |
| 065315 | TRH | 2003 | 06/4-10/04 | 131,548 | 105.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065316 | TRH | 2003 | 06/4-10/04 | 128,982 | 105.0 | TRH | 0 | ----- | 0 | ----- | 0 |
| 065318 | TRH | 2003 | 10/20/04 | 225,798 | 16.0 | TRH | 2 | 48.5 | 0 | ----- | 2 |
| Lost CWT c/ e/ | | | | | | | 17 | 68.4 | 16 | 69.7 | 33 |
| No CWT d/ e/ | | | | | | | 49 | 68.3 | 53 | 70.1 | 102 |
| | | | | Fall-run chinook salmon totals: | | | 1,741 | | 1,526 | | 3,267 |

a/ CWT = Coded-wire tag.
b/ FL = Mean fork length in cm.
c/ CWT lost or un-readable during recovery.
d/ No CWT was detected.
e/ Assigned as either spring-run or fall-run chinook based on entry date into Trinity River Hatchery.

Run-size, angler harvest, and escapement of coded-wire tagged salmon

Spring-run Chinook salmon

Based on estimated total Chinook run-size above JCW, the AD-clip rate of spring Chinook at JCW, the estimated angler harvest rate, and recovery of spring-run CWT fish at TRH, we estimated that 2,684 CWT'ed spring Chinook salmon returned to the Trinity River above JCW during the 2005-06 season. An estimated 184 of these fish were harvested by anglers during the season. Escapement of CWT'ed spring Chinook was divided between 1,520 fish recovered at TRH and 983 assumed to have spawned in natural areas (Table 2).

The year's run of CWT'd spring Chinook was composed of 17 (0.6%) age 2, 1,804 (67.1%) age 3, 819 (30.5%) age 4 and 47 (1.7%) age 5 fish (Table2).

2000 brood year

Eight spring Chinook CWT groups from the 2000 BY completed their life cycle this season, having reached the age of five. Estimated in-river age five returns occurred for four of the eight groups. Cumulative age two through five return rates, expressed as a percentage of the number of returns divided by the number released, ranged from 1.4% to 2.0% and averaged 1.7% for fingerling release groups. The one yearling release group, 065279, experienced a return rate of just over 2% (Table 3). Thus, yearlings returned at a rate only slightly higher than their fingerling released cohorts. All 2000 BY release groups experienced their best returns as age three fish.

2001 brood year

Spring Chinook from the 2001 brood year will complete their life cycle next year. To date, fish from this brood have returned through age four. Chinook released as fingerlings from this brood have experienced poor return rates thus far, having a having a mean return rate of only 0.16%. This is approximately 10% of last year's brood success. The yearling release group, 065288, has fared much better experiencing an in-river return rate of 1.4% through age four returns (Table 3). The fingerling groups had their highest return as age three, while the yearling group had its best return as age four. Age five returns are generally a very small component of the returning age structure, thus we do not expect much change in the return rates for all of the 2001 brood year spring Chinook.

2002 brood year

In contrast to the 2001 brood year fingerling releases, spring Chinook fingerlings from the 2002 brood year have experienced good returns through age three thus far. Fingerling releases have returned at a combined (three groups) rate of 0.78%. The yearling group, 065308, has only returned at a rate of 0.28% thus far (Table 3). Chinook from these groups will be returning as four- and five-year-olds during 2006 and 2007 respectively.

Table 2. Run-size, angler harvest, and spawner escapement estimates for Trinity River Hatchery produced, coded-wire tagged, spring and fall chinook salmon returning to the Trinity River during the 2005-06 season.

| Run-size estimates a/ | | Harvest rates b/ Grilse | Adults | TRH Ads With CWTs c/ | % Weir Ads d/ | Ad+CWT Run-size estimates e/ |
|---|---|---|---|---|---|---|
| Spring Chinook (JCW) | 16,147 | 8.0% | 4.9% | 0.95 | 17.95% | 2,761 |
| Fall Chinook (WCW) | 29,534 | 6.3% | 1.6% | 0.96 | 22.46% | 6,351 |

| CWT code | BY | Age | TRH Total No. | % of Total | Run-size | Angler harvest | Spawning escapement TRH | Natural | Total |
|---|---|---|---|---|---|---|---|---|---|
| ***Spring-run chinook salmon*** | | | | | | | | | |
| 065251 | 99 | 5 | 1 | 0.1% | 2 | 0 | 1 | 1 | 2 |
| 065252 | 99 | 5 | 1 | 0.1% | 2 | 0 | 1 | 1 | 2 |
| 065253 | 99 | 5 | 0 | 0.0% | 0 | 0 | 0 | 0 | 0 |
| 065258 | 99 | 5 | 14 | 1.0% | 28 | 1 | 14 | 13 | 27 |
| 065260 | 00 | 4 | 25 | 1.8% | 50 | 2 | 25 | 22 | 47 |
| 065261 | 00 | 4 | 35 | 2.5% | 70 | 3 | 35 | 31 | 66 |
| 065262 | 00 | 4 | 16 | 1.2% | 32 | 2 | 16 | 14 | 30 |
| 065263 | 00 | 4 | 40 | 2.9% | 80 | 4 | 40 | 36 | 76 |
| 065264 | 00 | 4 | 28 | 2.0% | 56 | 3 | 28 | 25 | 53 |
| 065269 | 00 | 4 | 65 | 4.7% | 130 | 6 | 65 | 58 | 123 |
| 065270 | 00 | 4 | 58 | 4.2% | 116 | 6 | 58 | 52 | 110 |
| 065279 | 00 | 4 | 411 | 29.7% | 819 | 40 | 411 | 368 | 779 |
| 065281 | 01 | 3 | 62 | 4.5% | 124 | 6 | 62 | 56 | 118 |
| 065282 | 01 | 3 | 42 | 3.0% | 84 | 4 | 42 | 38 | 80 |
| 065283 | 01 | 3 | 37 | 2.7% | 74 | 4 | 37 | 33 | 70 |
| 065288 | 01 | 3 | 347 | 25.1% | 692 | 34 | 347 | 311 | 658 |
| 065295 | 02 | 2 | 74 | 5.3% | 148 | 12 | 74 | 62 | 136 |
| 065296 | 02 | 2 | 57 | 4.1% | 114 | 9 | 57 | 48 | 105 |
| 065297 | 02 | 2 | 59 | 4.3% | 118 | 9 | 59 | 49 | 108 |
| 065308 | 02 | 2 | 13 | 0.9% | 26 | 2 | 13 | 11 | 24 |
| | | | 1,385 | 100% | 2,761 | 148 | 1,385 | 1,228 | 2,613 |
| ***Fall-run chinook salmon*** | | | | | | | | | |
| 065254 | 99 | 5 | 2 | 0.1% | 4 | 0 | 2 | 2 | 4 |
| 065255 | 99 | 5 | 1 | 0.0% | 2 | 0 | 1 | 1 | 2 |
| 065256 | 99 | 5 | 1 | 0.0% | 2 | 0 | 1 | 1 | 2 |
| 065257 | 99 | 5 | 1 | 0.0% | 2 | 0 | 1 | 1 | 2 |
| 065259 | 99 | 5 | 20 | 0.6% | 41 | 1 | 20 | 20 | 40 |
| 065265 | 00 | 4 | 8 | 0.3% | 16 | 0 | 8 | 8 | 16 |
| 065266 | 00 | 4 | 2 | 0.1% | 4 | 0 | 2 | 2 | 4 |
| 065267 | 00 | 4 | 4 | 0.1% | 8 | 0 | 4 | 4 | 8 |
| 065268 | 00 | 4 | 8 | 0.3% | 16 | 0 | 8 | 8 | 16 |
| 065271 | 00 | 4 | 13 | 0.4% | 26 | 0 | 13 | 13 | 26 |
| 065272 | 00 | 4 | 4 | 0.1% | 8 | 0 | 4 | 4 | 8 |
| 065273 | 00 | 4 | 9 | 0.3% | 18 | 0 | 9 | 9 | 18 |
| 065274 | 00 | 4 | 7 | 0.2% | 14 | 0 | 7 | 7 | 14 |
| 065275 | 00 | 4 | 8 | 0.3% | 16 | 0 | 8 | 8 | 16 |
| 065276 | 00 | 4 | 6 | 0.2% | 12 | 0 | 6 | 6 | 12 |
| 065277 | 00 | 4 | 12 | 0.4% | 24 | 0 | 12 | 12 | 24 |
| 065278 | 00 | 4 | 7 | 0.2% | 14 | 0 | 7 | 7 | 14 |
| 065280 | 00 | 4 | 327 | 10.5% | 664 | 11 | 327 | 326 | 653 |
| 065643 | 00 | 4 | 5 | 0.2% | 10 | 0 | 5 | 5 | 10 |
| 065284 | 01 | 3 | 27 | 0.9% | 55 | 1 | 27 | 27 | 54 |
| 065285 | 01 | 3 | 33 | 1.1% | 67 | 1 | 33 | 33 | 66 |
| 065286 | 01 | 3 | 41 | 1.3% | 83 | 1 | 41 | 41 | 82 |
| 065287 | 01 | 3 | 34 | 1.1% | 69 | 1 | 34 | 34 | 68 |
| 065289 | 01 | 3 | 2,303 | 73.6% | 4,676 | 75 | 2,303 | 2,298 | 4,601 |
| 065290 | 01 | 3 | 2 | 0.1% | 4 | 0 | 2 | 2 | 4 |
| 065291 | 01 | 3 | 1 | 0.0% | 2 | 0 | 1 | 1 | 2 |
| 065292 | 02 | 2 | 0 | 0.0% | 0 | 0 | 0 | 0 | 0 |
| 065298 | 02 | 2 | 63 | 2.0% | 128 | 8 | 63 | 57 | 120 |
| 065299 | 02 | 2 | 54 | 1.7% | 110 | 7 | 54 | 49 | 103 |
| 065306 | 02 | 2 | 54 | 1.7% | 110 | 7 | 54 | 49 | 103 |
| 065307 | 02 | 2 | 35 | 1.1% | 71 | 4 | 35 | 32 | 67 |
| 065309 | 02 | 2 | 36 | 1.2% | 73 | 5 | 36 | 32 | 68 |
| | | | 3,128 | 100% | 6,351 | 125 | 3,128 | 3,098 | 6,226 |

a/ Run-size estimates are upstream of either Willow Creek weir (WCW) or Junction City weir (JCW) and are inclusive of the entire run (hatchery produced and naturally produced).
b/ In-river angler harvest rates are based on the return of reward tags.
c/ A portion of all chinook released from Trinity River Hatchery (TRH) are coded-wire tagged and identified with an adipose (Ad) fin-clip. The fraction shown are those fish with an adipose fin-clip that also contained a coded-wire tag (CWT), including those lost during recovery.
d/ The observed percentage of Ad-clipped Chinook at respective weir sites.
e/ The estimated run of chinook that were coded-wire tagged.

Table 3. Run-size, percent return, in-river sport catch and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire-tagged spring-run chinook salmon returning to the Trinity River upstream of Junction City Weir during the period 2002 through 2005.

| Release data | | | | | Estimated returns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CWT a/ code | Brood year | Date b/ | Number | Site | Age | Run-size | % of release | River harvest | Spawning escapement TRH c/ | Spawning escapement Natural | Spawning escapement Total |
| 065260 | 2000 | 06/6-13/01 | 33,049 | TRH | 2 | 28 | 0.0847 | 1 | 11 | 16 | 27 |
| | | | | | 3 | 455 | 1.3767 | 20 | 179 | 256 | 435 |
| | | | | | 4 | 50 | 0.1513 | 2 | 25 | 22 | 47 |
| | | | | | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 533 | 1.613 | 23 | 215 | 294 | 509 |
| | | | | Total adults: e/ | | 505 | 1.528 | 22 | 204 | 278 | 482 |
| 065261 | 2000 | 06/6-13/01 | 32,621 | TRH | 2 | 43 | 0.1318 | 1 | 17 | 25 | 42 |
| | | | | | 3 | 473 | 1.45 | 21 | 186 | 266 | 452 |
| | | | | | 4 | 70 | 0.2146 | 3 | 35 | 31 | 66 |
| | | | | | 5 | 2 | 0.0061 | 0 | 1 | 1 | 2 |
| | | | | Totals: d/ | | 588 | 1.8025 | 25 | 239 | 323 | 562 |
| | | | | Total adults: e/ | | 545 | 1.6707 | 24 | 222 | 298 | 520 |
| 065262 | 2000 | 06/6-13/01 | 24,480 | TRH | 2 | 13 | 0.0531 | 0 | 5 | 8 | 13 |
| | | | | | 3 | 338 | 1.3807 | 15 | 133 | 190 | 323 |
| | | | | | 4 | 32 | 0.1307 | 2 | 16 | 14 | 30 |
| | | | | | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 383 | 1.5645 | 17 | 154 | 212 | 366 |
| | | | | Total adults: e/ | | 370 | 1.5114 | 17 | 149 | 204 | 353 |
| 065263 | 2000 | 06/6-13/01 | 34,385 | TRH | 2 | 38 | 0.1105 | 1 | 15 | 22 | 37 |
| | | | | | 3 | 554 | 1.6112 | 24 | 218 | 312 | 530 |
| | | | | | 4 | 80 | 0.2327 | 4 | 40 | 36 | 76 |
| | | | | | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 672 | 1.9543 | 29 | 273 | 370 | 643 |
| | | | | Total adults: e/ | | 634 | 1.8438 | 28 | 258 | 348 | 606 |
| 065264 | 2000 | 06/6-13/01 | 31,587 | TRH | 2 | 33 | 0.1045 | 1 | 13 | 19 | 32 |
| | | | | | 3 | 386 | 1.222 | 17 | 152 | 217 | 369 |
| | | | | | 4 | 56 | 0.1773 | 3 | 28 | 25 | 53 |
| | | | | | 5 | 2 | 0.0063 | 0 | 1 | 1 | 2 |
| | | | | Totals: d/ | | 477 | 1.5101 | 21 | 194 | 262 | 456 |
| | | | | Total adults: e/ | | 444 | 1.4056 | 20 | 181 | 243 | 424 |
| 065269 | 2000 | 06/6-13/01 | 52,491 | TRH | 2 | 73 | 0.1391 | 2 | 29 | 42 | 71 |
| | | | | | 3 | 834 | 1.5888 | 36 | 328 | 470 | 798 |
| | | | | | 4 | 130 | 0.2477 | 6 | 65 | 58 | 123 |
| | | | | | 5 | 4 | 0.0076 | 0 | 2 | 2 | 4 |
| | | | | Totals: d/ | | 1,041 | 1.983 | 44 | 424 | 572 | 996 |
| | | | | Total adults: e/ | | 968 | 1.8441 | 42 | 395 | 530 | 925 |
| 065270 | 2000 | 06/6-13/01 | 52,580 | TRH | 2 | 45 | 0.0856 | 1 | 18 | 26 | 44 |
| | | | | | 3 | 567 | 1.0784 | 25 | 223 | 319 | 542 |
| | | | | | 4 | 116 | 0.2206 | 6 | 58 | 52 | 110 |
| | | | | | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 728 | 1.3846 | 32 | 299 | 397 | 696 |
| | | | | Total adults: e/ | | 683 | 1.299 | 31 | 281 | 371 | 652 |
| 065279 | 2000 | 10/1-10/01 | 99,304 | TRH | 2 | 45 | 0.0453 | 1 | 18 | 26 | 44 |
| | | | | | 3 | 1,126 | 1.1339 | 49 | 443 | 634 | 1,077 |
| | | | | | 4 | 819 | 0.8247 | 40 | 411 | 368 | 779 |
| | | | | | 5 | 39 | 0.0393 | 3 | 22 | 14 | 36 |
| | | | | Totals: d/ | | 2,029 | 2.043 | 93 | 894 | 1,042 | 1,936 |
| | | | | Total adults: e/ | | 1,984 | 1.998 | 92 | 876 | 1,016 | 1,892 |

a/ CWT = coded-wire tag.
b/ Chinook salmon released during June were smolts, those released in October were yearlings.
c/ TRH = Trinity River Hatchery.
d/ Totals are presented only for brood year 1999. These fish have reached five years of age and are considered to have completed their life cycle.
e/ The term "adults" includes chinook aged three through five.

Table 3. (continued) Run-size, percent return, in-river sport catch and spawner escapement estimates for Trinity River Hatchery-produce coded-wire-tagged spring-run chinook salmon returning to the Trinity River upstream of Junction City Weir during the period 2002 through 2005.

| Release data | | | | | Estimated returns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CWT a/ code | Brood year | Date b/ | Number | Site | Age | Run-size | % of release | River harvest | Spawning escapement TRH c/ | Natural | Total |
| 065281 | 2001 | 06/3-10/02 | 89,482 | TRH | 2 | 5 | 0.0056 | 0 | 2 | 3 | 5 |
| | | | | | 3 | 124 | 0.1386 | 6 | 62 | 56 | 118 |
| | | | | | 4 | 44 | 0.0492 | 3 | 25 | 16 | 41 |
| 065282 | 2001 | 06/3-10/02 | 89,978 | TRH | 2 | 20 | 0.0222 | 0 | 8 | 12 | 20 |
| | | | | | 3 | 84 | 0.0934 | 4 | 42 | 38 | 80 |
| | | | | | 4 | 32 | 0.0356 | 2 | 18 | 12 | 30 |
| 065283 | 2001 | 06/3-10/02 | 73,788 | TRH | 2 | 5 | 0.0068 | 0 | 2 | 3 | 5 |
| | | | | | 3 | 74 | 0.1003 | 4 | 37 | 33 | 70 |
| | | | | | 4 | 23 | 0.0312 | 2 | 13 | 8 | 21 |
| 065288 | 2001 | 10/10-16/02 | 104,627 | TRH | 2 | 43 | 0.0411 | 0 | 17 | 26 | 43 |
| | | | | | 3 | 692 | 0.6614 | 34 | 347 | 311 | 658 |
| | | | | | 4 | 720 | 0.6882 | 50 | 408 | 262 | 670 |
| 065295 | 2002 | 06/3-9/03 | 89,284 | TRH | 2 | 148 | 0.1658 | 12 | 74 | 62 | 136 |
| | | | | | 3 | 590 | 0.6608 | 41 | 334 | 215 | 549 |
| 065296 | 2002 | 06/3-9/03 | 84,568 | TRH | 2 | 114 | 0.1348 | 9 | 57 | 48 | 105 |
| | | | | | 3 | 509 | 0.6019 | 35 | 288 | 186 | 474 |
| 065297 | 2002 | 06/3-9/03 | 70,902 | TRH | 2 | 118 | 0.1664 | 9 | 59 | 49 | 108 |
| | | | | | 3 | 433 | 0.6107 | 30 | 245 | 158 | 403 |
| 065308 | 2002 | 10/1-7/03 | 106,139 | TRH | 2 | 26 | 0.0245 | 2 | 13 | 11 | 24 |
| | | | | | 3 | 272 | 0.2563 | 19 | 154 | 99 | 253 |
| 065310 | 2003 | 06/4-10/04 | 94,182 | TRH | 2 | 4 | 0.0042 | 0 | 2 | 2 | 4 |
| 065311 | 2003 | 06/4-10/04 | 78,663 | TRH | 2 | 9 | 0.0114 | 0 | 5 | 4 | 9 |
| 065312 | 2003 | 06/4-10/04 | 92,711 | TRH | 2 | 2 | 0.0022 | 0 | 1 | 1 | 2 |
| 065317 | 2003 | 10/20/04 | 104,974 | TRH | 2 | 2 | 0.0019 | 0 | 1 | 1 | 2 |

a/ CWT = coded-wire tag.

b/ Chinook salmon released during June were smolts, those released in October were yearlings.

c/ TRH = Trinity River Hatchery.

d/ Totals are presented only for brood year 1999. These fish have reached five years of age and are considered to have completed their life cycle.

e/ The term "adults" includes chinook aged three through five.

2003 brood year

Four 2003 BY release groups (3 fingerling and 1 yearling returned as two-year-olds this season. Return rates for all these groups, through age 2, were very poor. Only 17 age two spring Chinook were estimated to have returned to the Trinity River upstream of Junction City weir this year (Table 3). Spring Chinook from this BY are expected to return as three through five-year-olds during the next three years.

## Fall-run Chinook salmon

Based on estimated total Chinook run-size above WCW, the ad-clip rate of fall Chinook at WCW, the estimated angler harvest rate, and recovery of fall-run CWT fish at TRH, we estimated that 4,849 CWT'ed fall Chinook salmon returned to the Trinity River above WCW during the 2005-06 season. We estimated that anglers harvested 151 CWT'ed fall Chinook. Escapement of CWT'ed fall Chinook was divided between 3,132 fish recovered at TRH and 1,567 assumed to have spawned naturally this season (Table 2).

The fall Chinook CWT run was composed of 5 (0.1%) age 2, 3,678 (75.8%) age 3, 1,132 (23.3%) age 4 fish, and 35 (0.7%) age 5 fish (Table 2).

2000 brood year

The BY 2000 releases were composed of thirteen fingerling and one yearling group and have completed their life cycle this season, having reached the age of five. Return rates for fingerling releases ranged between 0.35 and 1.1% and averaged 0.75% for all groups combined (Table 4). The yearling group, 065280 returned at a rate of 2.42%, which is approximately 3.2 times that of the fingerling group average. All Chinook from the 2000 BY experienced their highest returns as three-year-old fish (Table 4). It must be noted that a large adult fish kill in the Lower Klamath River in 2002 may have severely limited the returning number of age two fall Chinook upstream of Willow Creek weir (CDFG, 2003).

2001 brood year

The 2001 BY is represented by seven CWT groups, of which six are fingerling groups and one a yearling group. Through age four returns, the yearling group, 065280 has returned at a rate of 2.5%, approximately 25 times that of the fingerling return groups (Table 4). The fingerling groups have returned at a rate less than 0.1% thus far. Returns of both release types were greatest last year as age three fish. Fish released from this BY are expected to return as five-year-olds during the 2006 season.

2002 brood year

Six release groups (6 fingerling and 1 yearling) have returned to date as two and three-year-old fish (Table 4). The yearling group, 065309, has experienced the best returns to date, over 0.7% through age 3. The fingerling groups have not returned in significant numbers through age 3, none have surpassed 0.6% returns to date. Fish from both release groups should return as four

Table 4. Run-size, percent return, in-river sport catch, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire-tagged fall-run chinook salmon returning to the Trinity River upstream of Willow Creek Weir during the period 2002 through 2005.

| Release data | | | | | Estimated returns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CWT a/ code | Brood year | Date b/ | Number | Site | Age | Run-size | % of release | River harvest | Spawning escapement TRH c/ | Spawning escapement Natural | Spawning escapement Total |
| 065265 | 2000 | 06/06-13/01 | 32,795 | TRH | 2 | 43 | 0.131 | 2 | 18 | 23 | 41 |
| | | | | | 3 | 239 | 0.729 | 7 | 131 | 101 | 232 |
| | | | | | 4 | 16 | 0.049 | 0 | 8 | 8 | 16 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 298 | 0.91 | 9 | 157 | 132 | 289 |
| | | | | Total adults: e/ | | 255 | 0.78 | 7 | 139 | 109 | 248 |
| 065266 | 2000 | 06/06-13/01 | 33,806 | TRH | 2 | 43 | 0.127 | 2 | 18 | 23 | 41 |
| | | | | | 3 | 210 | 0.621 | 6 | 115 | 89 | 204 |
| | | | | | 4 | 4 | 0.012 | 0 | 2 | 2 | 4 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 257 | 0.76 | 8 | 135 | 114 | 249 |
| | | | | Total adults: e/ | | 214 | 0.63 | 6 | 117 | 91 | 208 |
| 065267 | 2000 | 06/06-13/01 | 34,852 | TRH | 2 | 19 | 0.055 | 1 | 8 | 10 | 18 |
| | | | | | 3 | 246 | 0.706 | 7 | 135 | 104 | 239 |
| | | | | | 4 | 8 | 0.023 | 0 | 4 | 4 | 8 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 273 | 0.78 | 8 | 147 | 118 | 265 |
| | | | | Total adults: e/ | | 254 | 0.73 | 7 | 139 | 108 | 247 |
| 065268 | 2000 | 06/06-13/01 | 33,240 | TRH | 2 | 14 | 0.042 | 1 | 6 | 7 | 13 |
| | | | | | 3 | 109 | 0.328 | 3 | 60 | 46 | 106 |
| | | | | | 4 | 16 | 0.048 | 0 | 8 | 8 | 16 |
| | | | | | 5 | 2 | 0.006 | 0 | 1 | 1 | 2 |
| | | | | Totals: d/ | | 141 | 0.42 | 4 | 75 | 62 | 137 |
| | | | | Total adults: e/ | | 127 | 0.38 | 3 | 69 | 55 | 124 |
| 065271 | 2000 | 06/06-13/01 | 54,867 | TRH | 2 | 111 | 0.202 | 5 | 47 | 59 | 106 |
| | | | | | 3 | 472 | 0.860 | 14 | 259 | 199 | 458 |
| | | | | | 4 | 26 | 0.047 | 0 | 13 | 13 | 26 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 609 | 1.11 | 19 | 319 | 271 | 590 |
| | | | | Total adults: e/ | | 498 | 0.91 | 14 | 272 | 212 | 484 |
| 065272 | 2000 | 06/06-13/01 | 36,035 | TRH | 2 | 43 | 0.119 | 2 | 18 | 23 | 41 |
| | | | | | 3 | 301 | 0.835 | 9 | 165 | 127 | 292 |
| | | | | | 4 | 8 | 0.022 | 0 | 4 | 4 | 8 |
| | | | | | 5 | 2 | 0.006 | 0 | 1 | 1 | 2 |
| | | | | Totals: d/ | | 354 | 0.98 | 11 | 188 | 155 | 343 |
| | | | | Total adults: e/ | | 311 | 0.86 | 9 | 170 | 132 | 302 |
| 065273 | 2000 | 06/06-13/01 | 57,444 | TRH | 2 | 50 | 0.087 | 2 | 21 | 27 | 48 |
| | | | | | 3 | 414 | 0.721 | 12 | 227 | 175 | 402 |
| | | | | | 4 | 18 | 0.031 | 0 | 9 | 9 | 18 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 482 | 0.84 | 14 | 257 | 211 | 468 |
| | | | | Total adults: e/ | | 432 | 0.75 | 12 | 236 | 184 | 420 |
| 065274 | 2000 | 06/06-13/01 | 32,096 | TRH | 2 | 33 | 0.103 | 1 | 14 | 18 | 32 |
| | | | | | 3 | 213 | 0.664 | 6 | 117 | 90 | 207 |
| | | | | | 4 | 14 | 0.044 | 0 | 7 | 7 | 14 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 260 | 0.81 | 7 | 138 | 115 | 253 |
| | | | | Total adults: e/ | | 227 | 0.71 | 6 | 124 | 97 | 221 |
| 065275 | 2000 | 06/06-13/01 | 64,250 | TRH | 2 | 55 | 0.086 | 2 | 23 | 29 | 52 |
| | | | | | 3 | 385 | 0.599 | 11 | 211 | 163 | 374 |
| | | | | | 4 | 16 | 0.025 | 0 | 8 | 8 | 16 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 456 | 0.71 | 13 | 242 | 200 | 442 |
| | | | | Total adults: e/ | | 401 | 0.62 | 11 | 219 | 171 | 390 |
| 065276 | 2000 | 06/06-13/01 | 27,159 | TRH | 2 | 26 | 0.096 | 1 | 11 | 14 | 25 |
| | | | | | 3 | 228 | 0.840 | 7 | 125 | 96 | 221 |
| | | | | | 4 | 12 | 0.044 | 0 | 6 | 6 | 12 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 266 | 0.98 | 8 | 142 | 116 | 258 |
| | | | | Total adults: e/ | | 240 | 0.88 | 7 | 131 | 102 | 233 |
| 065277 | 2000 | 06/06-13/01 | 56,582 | TRH | 2 | 12 | 0.021 | 1 | 5 | 6 | 11 |
| | | | | | 3 | 162 | 0.286 | 5 | 89 | 68 | 157 |
| | | | | | 4 | 24 | 0.042 | 0 | 12 | 12 | 24 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 198 | 0.35 | 6 | 106 | 86 | 192 |
| | | | | Total adults: e/ | | 186 | 0.33 | 5 | 101 | 80 | 181 |

a/ CWT = coded-wire tag.
b/ Chinook salmon released during June were smolts, those released in October were yearlings.
c/ TRH = Trinity River Hatchery.
d/ Totals are presented only for brood year 2000. These fish have reached five years of age and are considered to have completed their life cycle.
e/ The term "adults" includes chinook aged three through five.

Table 4. (continued) Run-size, percent return, in-river sport catch, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire-tagged fall-run chinook salmon returning to the Trinity River upstream of Willow Creek Weir during the period 2002 through 2005.

| Release data | | | | | Estimated returns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CWT a/ code | Brood year | Date b/ | Number | Site | Age | Run-size | % of release | River harvest | Spawning escapement TRH c/ | Natural | Total |
| 065278 | 2000 | 06/06-13/01 | 34,183 | TRH | 2 | 24 | 0.070 | 1 | 13 | 13 | 26 |
| | | | | | 3 | 111 | 0.325 | 3 | 61 | 47 | 108 |
| | | | | | 4 | 14 | 0.041 | 0 | 7 | 7 | 14 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 149 | 0.436 | 4 | 81 | 67 | 148 |
| | | | | Total adults: e/ | | 125 | 0.366 | 3 | 68 | 54 | 122 |
| 065643 | 2000 | 06/06-13/01 | 25,007 | TRH | 2 | 7 | 0.028 | 0 | 3 | 4 | 7 |
| | | | | | 3 | 149 | 0.596 | 4 | 82 | 63 | 145 |
| | | | | | 4 | 10 | 0.040 | 0 | 5 | 5 | 10 |
| | | | | | 5 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | Totals: d/ | | 166 | 0.664 | 4 | 90 | 72 | 162 |
| | | | | Total adults: e/ | | 159 | 0.636 | 4 | 87 | 68 | 155 |
| 065280 | 2000 | 10/01-10/01 | 216,593 | TRH | 2 | 130 | 0.060 | 6 | 55 | 69 | 124 |
| | | | | | 3 | 4,420 | 2.041 | 131 | 2,424 | 1,865 | 4,289 |
| | | | | | 4 | 664 | 0.307 | 11 | 327 | 328 | 655 |
| | | | | | 5 | 31 | 0.014 | 1 | 20 | 10 | 30 |
| | | | | Totals: d/ | | 5,245 | 2.422 | 149 | 2,826 | 2,272 | 5,098 |
| | | | | Total adults: e/ | | 5,115 | 2.362 | 143 | 2,771 | 2,203 | 4,974 |
| 065284 | 2001 | 06/03-10/02 | 119,555 | TRH | 2 | 24 | 0.020 | 2 | 13 | 9 | 22 |
| | | | | | 3 | 55 | 0.046 | 1 | 27 | 27 | 54 |
| | | | | | 4 | 31 | 0.026 | 1 | 20 | 10 | 30 |
| 065285 | 2001 | 06/03-10/02 | 114,119 | TRH | 2 | 24 | 0.021 | 2 | 13 | 9 | 22 |
| | | | | | 3 | 67 | 0.059 | 1 | 33 | 33 | 66 |
| | | | | | 4 | 19 | 0.017 | 1 | 12 | 6 | 18 |
| 065286 | 2001 | 06/03-10/02 | 126,135 | TRH | 2 | 24 | 0.019 | 2 | 13 | 9 | 22 |
| | | | | | 3 | 83 | 0.066 | 1 | 41 | 41 | 82 |
| | | | | | 4 | 20 | 0.016 | 1 | 13 | 6 | 19 |
| 065287 | 2001 | 06/03-10/02 | 121,607 | TRH | 2 | 27 | 0.022 | 3 | 15 | 9 | 24 |
| | | | | | 3 | 69 | 0.057 | 1 | 34 | 34 | 68 |
| | | | | | 4 | 12 | 0.010 | 0 | 8 | 4 | 12 |
| 065289 | 2001 | 10/10-16/02 | 230,055 | TRH | 2 | 137 | 0.060 | 14 | 75 | 48 | 123 |
| | | | | | 3 | 4,676 | 2.033 | 75 | 2,303 | 2,312 | 4,615 |
| | | | | | 4 | 1,031 | 0.448 | 32 | 666 | 333 | 999 |
| 065290 | 2001 | 06/03-10/02 | 10,234 | TRH | 2 | 2 | 0.020 | 0 | 1 | 1 | 2 |
| | | | | | 3 | 4 | 0.039 | 0 | 2 | 2 | 4 |
| | | | | | 4 | 2 | 0.020 | 0 | 1 | 1 | 2 |
| 065291 | 2001 | 06/03-10/02 | 8,269 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | | 3 | 2 | 0.024 | 0 | 1 | 1 | 2 |
| | | | | | 4 | 3 | 0.036 | 0 | 2 | 1 | 3 |
| 065292 | 2002 | 06/3-9/03 | 10,355 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| | | | | | 3 | 14 | 0.135 | 0 | 9 | 5 | 14 |
| 065298 | 2002 | 06/3-9/03 | 124,602 | TRH | 2 | 128 | 0.103 | 8 | 63 | 57 | 120 |
| | | | | | 3 | 607 | 0.487 | 19 | 392 | 196 | 588 |
| 065299 | 2002 | 06/3-9/03 | 126,729 | TRH | 2 | 110 | 0.087 | 7 | 54 | 49 | 103 |
| | | | | | 3 | 481 | 0.380 | 15 | 311 | 155 | 466 |
| 065306 | 2002 | 06/3-9/03 | 124,014 | TRH | 2 | 110 | 0.089 | 7 | 54 | 49 | 103 |
| | | | | | 3 | 455 | 0.367 | 14 | 294 | 147 | 441 |
| 065307 | 2002 | 06/3-9/03 | 123,263 | TRH | 2 | 71 | 0.058 | 4 | 35 | 32 | 67 |
| | | | | | 3 | 399 | 0.324 | 12 | 258 | 129 | 387 |
| 065309 | 2002 | 10/1-7/03 | 236,319 | TRH | 2 | 73 | 0.031 | 5 | 36 | 33 | 69 |
| | | | | | 3 | 1,735 | 0.734 | 54 | 1,121 | 561 | 1,682 |
| 065293 | 2003 | 06/4-10/04 | 11,342 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| 065294 | 2003 | 06/4-10/04 | 5,230 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| 065313 | 2003 | 06/4-10/04 | 125,073 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| 065314 | 2003 | 06/4-10/04 | 132,044 | TRH | 2 | 2 | 0.002 | 0 | 1 | 1 | 2 |
| 065315 | 2003 | 06/4-10/04 | 131,548 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| 065316 | 2003 | 06/4-10/04 | 128,982 | TRH | 2 | 0 | 0.000 | 0 | 0 | 0 | 0 |
| 065318 | 2003 | 10/20/04 | 225,798 | TRH | 2 | 3 | 0.001 | 0 | 2 | 1 | 3 |

a/ CWT = coded-wire tag.
b/ Chinook salmon released during June were smolts, those released in October were yearlings.
c/ TRH = Trinity River Hatchery.
d/ Totals are presented only for brood year 2000. These fish have reached five years of age and are considered to have completed their life cycle.
e/ The term "adults" includes chinook aged three through five.

and five-year-old fish in 2005 and 2006, respectively.

2003 brood year

Seven CWT groups (6 fingerling and 1 yearling) from the 2003 BY returned as two-year-olds during the 2005 season (Table 4). Age two return rates have been dismal for all release groups, only 5 CWT returns were estimated for all the groups combined. Chinook from this Brood will be returning as adults the next three years.

The contribution of hatchery produced Chinook to total estimated run-size

The contribution of hatchery-produced spring and fall Chinook to the overall Trinity River basin run-size estimates for the two races of Chinook are presented in Table 5. We estimate that the 2005-06 run of spring Chinook was composed of the 10,966 Chinook of TRH origin. This represents 78.4% (10,966/13,984) of the total estimated run upstream of JCW. The fall run, upstream of WCW, was estimated to be composed of 19,674 TRH-produced Chinook, which represents 69.7%(19,674/28,231) of the total estimated run.

## DISCUSSION

Since CWT estimates are based, in part, on the overall run-size estimates for each race of Chinook, CWT estimates are subject to the precision and potential biases associated with the mark-recapture estimates performed under Task 1 of this report. The potential impact of this would be most relevant in regard to the number of fish estimated to have spawned in "natural" areas. This is due to the fact that hatchery recoveries are actual counts, while CWT'd fish estimated to have spawned naturally are the remaining estimated number of fish after hatchery CWT's and angler harvest are subtracted from the overall CWT estimate. Return rates are also affected by ocean and in-river harvest below the weir sites, which is not included in our estimates. Thus, harvest rates in these sectors can greatly affect river returns in any given year.

Two other potential biases that could distort CWT run-size estimates are vulnerability of capture and run-timing. Assumptions of our CWT estimates include equal probability of capture for hatchery and wild fish and capture of Chinook throughout the entire run. The second assumption, due to trapping constraints at JCW which preclude operating our weir there until late June, may affect our spring-run Chinook CWT estimates.

In-river return rates for the completed 2000 BY were higher than average for both spring and fall Chinook fingerling and yearling releases. Spring Chinook return rates for 2000 BY releases were the second and third highest observed during the past 15 years for fingerling and yearling release types respectively (Appendix 1). Fall Chinook return rates for 2000 BY releases were above average for both release types (Appendix 2).

The overall contribution of hatchery-produced Chinook to total run-sizes (Table 5) was very

high this year. Hatchery-produced spring Chinook composed an estimated 78.4% of the run upstream of Junction City weir. The contribution of hatchery-produced fall Chinook was slightly less, composing 69.7% of the run upstream of Willow Creek weir. Thus, of the total 42,215 spring and fall Chinook combined runs estimated above respective weir sites, only 11,575 of these were estimated to be of natural origin.

The estimated hatchery contribution rates to overall spring and fall Chinook run-sizes are relatively high. As mentioned previously, run-size estimates may have potential bias (see TASK I), which under most scenarios would tend to be positive. However, this bias should not affect hatchery contribution rates since total CWT run-size is based on AD clip rates observed at either JCW or WCW, times total estimated runs above these sites. Thus, even if total run-size was adjusted lower, the AD clip rate would remain the same, resulting in the same hatchery contribution rates. If, however, hatchery produced fish are more vulnerable to capture or their run-timing coincides with dates of weir operations (i.e spring Chinook at JCW) more than their wild counterparts at the weirs, the estimated contribution of hatchery fish could be biased.

Another rough method to validate hatchery-produced Chinook contribution rates is to examine AD clip rates at TRH and the weirs. If it is assumed that the AD clip rate at TRH is representative of the hatchery population, then the AD clip rates observed at the weirs would theoretically represent a fraction of the TRH population. Therefore, simple division of the AD clip rates observed at both weir sites by the AD rate at TRH would produce a hatchery contribution rate. The AD clip rates observed at the weirs and TRH during the 2005-06 season are the following: spring Chinook (JCW) 19.9%; fall Chinook (WCW) 17.7%; TRH springs 22.8%; TRH falls 22.5%. Performing the calculations results in a contribution rate of 87.3% for spring Chinook and 78.7% for fall Chinook. These are slightly higher than our reported rates, but within 12%.

Table 5. Estimated run-size, angler harvest, and spawner escapement estimates for Trinity River Hatchery-produced, spring and fall chinook salmon expanded for unmarked releases (hatchery multiplier) returning to the Trinity River during the 2005-06 season. a/

| CWT code b/ | BY c/ | Age | TRH expansion factor d/ | Run size | Expanded run-size e/ | Angler harvest | Expanded angler harvest | Spawning escapement: TRH f/ | Expanded TRH | Natural | Expanded natural | Total | Expanded total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 065261 | 00 | 5 | 4.21 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065264 | 00 | 5 | 4.51 | 2 | 9 | 0 | 0 | 1 | 5 | 1 | 5 | 2 | 9 |
| 065269 | 00 | 5 | 4.05 | 4 | 16 | 0 | 0 | 2 | 8 | 2 | 8 | 4 | 16 |
| 065279 | 00 | 5 | 4.05 | 39 | 158 | 3 | 12 | 22 | 89 | 14 | 57 | 36 | 146 |
| 065281 | 01 | 4 | 4.09 | 44 | 180 | 3 | 12 | 25 | 102 | 16 | 65 | 41 | 168 |
| 065282 | 01 | 4 | 4.18 | 32 | 134 | 2 | 8 | 18 | 75 | 12 | 50 | 30 | 125 |
| 065283 | 01 | 4 | 4.09 | 23 | 94 | 2 | 8 | 13 | 53 | 8 | 33 | 21 | 86 |
| 065288 | 01 | 4 | 4.06 | 720 | 2,923 | 50 | 203 | 408 | 1,656 | 262 | 1,064 | 670 | 2,720 |
| 065295 | 02 | 3 | 4.10 | 590 | 2,419 | 41 | 168 | 334 | 1,369 | 215 | 882 | 549 | 2,251 |
| 065296 | 02 | 3 | 4.10 | 509 | 2,087 | 35 | 144 | 288 | 1,181 | 186 | 763 | 474 | 1,943 |
| 065297 | 02 | 3 | 4.10 | 433 | 1,775 | 30 | 123 | 245 | 1,005 | 158 | 648 | 403 | 1,652 |
| 065308 | 02 | 3 | 4.02 | 272 | 1,093 | 19 | 76 | 154 | 619 | 99 | 398 | 253 | 1,017 |
| 065310 | 03 | 2 | 4.00 | 4 | 16 | 0 | 0 | 2 | 8 | 2 | 8 | 4 | 16 |
| 065311 | 03 | 2 | 4.03 | 9 | 36 | 0 | 0 | 5 | 20 | 4 | 16 | 9 | 36 |
| 065312 | 03 | 2 | 4.05 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065317 | 03 | 2 | 4.16 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| | | | | 2,687 | 10,966 | 185 | 755 | 1,520 | 6,203 | 982 | 4,008 | 2,502 | 3,279 |
| ***Fall-run chinook salmon*** | | | | | | | | | | | | | |
| 065268 | 00 | 5 | 4.12 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065272 | 00 | 5 | 4.17 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065280 | 00 | 5 | 4.03 | 31 | 125 | 1 | 4 | 20 | 81 | 10 | 40 | 30 | 121 |
| 065284 | 01 | 4 | 4.08 | 31 | 126 | 1 | 4 | 20 | 82 | 10 | 41 | 30 | 122 |
| 065285 | 01 | 4 | 4.32 | 19 | 82 | 1 | 4 | 12 | 52 | 6 | 26 | 18 | 78 |
| 065286 | 01 | 4 | 4.04 | 20 | 81 | 1 | 4 | 13 | 53 | 6 | 24 | 19 | 77 |
| 065287 | 01 | 4 | 4.10 | 12 | 49 | 0 | 0 | 8 | 33 | 4 | 16 | 12 | 49 |
| 065289 | 01 | 4 | 4.02 | 1,031 | 4,145 | 32 | 129 | 666 | 2,677 | 333 | 1,339 | 999 | 4,016 |
| 065290 | 01 | 4 | 4.06 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065291 | 01 | 4 | 4.01 | 3 | 12 | 0 | 0 | 2 | 8 | 1 | 4 | 3 | 12 |
| 065292 | 02 | 3 | 3.90 | 14 | 55 | 0 | 0 | 9 | 35 | 5 | 20 | 14 | 55 |
| 065298 | 02 | 3 | 4.10 | 607 | 2,489 | 19 | 78 | 392 | 1,607 | 196 | 804 | 588 | 2,411 |
| 065299 | 02 | 3 | 4.02 | 481 | 1,934 | 15 | 60 | 311 | 1,250 | 155 | 623 | 466 | 1,873 |
| 065306 | 02 | 3 | 4.15 | 455 | 1,888 | 14 | 58 | 294 | 1,220 | 147 | 610 | 441 | 1,830 |
| 065307 | 02 | 3 | 4.13 | 399 | 1,648 | 12 | 50 | 258 | 1,066 | 129 | 533 | 387 | 1,598 |
| 065309 | 02 | 3 | 4.03 | 1,736 | 6,996 | 54 | 218 | 1,121 | 4,518 | 561 | 2,261 | 1,682 | 6,778 |
| 065314 | 03 | 2 | 4.01 | 2 | 8 | 0 | 0 | 1 | 4 | 1 | 4 | 2 | 8 |
| 065318 | 03 | 2 | 4.01 | 3 | 12 | 0 | 0 | 2 | 8 | 1 | 4 | 3 | 12.03 |
| | | | | 4,850 | 19,674 | 150 | 609 | 3,132 | 12,705 | 1,568 | 6,361 | 4,700 | 19,065 |

a/ Estimates are upstream of Junction City and Willow Creek weirs for spring and fall estimates respectively.

b/ CWT=coded-wire tag code. Fish are of the same race and release type (smolt or yearling).

c/ BY=brood year.

d/ Expansion factor used to account for untagged releases of the same BY and release type for each CWT group.

e/ Run-size times TRH expansion factor.

f/ TRH=Trinity River Hatchery.

## RECOMMENDATIONS

1. Coded-wire tagging and release of smolt and yearling Chinook salmon, and the monitoring of adult salmon returns at Trinity River Hatchery should be continued in 2005-06.

2. Monitor the annual TRH-produced Chinook salmon contribution rates to the overall runs to determine the relative status of naturally produced Chinook salmon in the Trinity basin.

3. Continue spawner carcass surveys (Task IV) in the upper Trinity River to evaluate straying of TRH produced fish.

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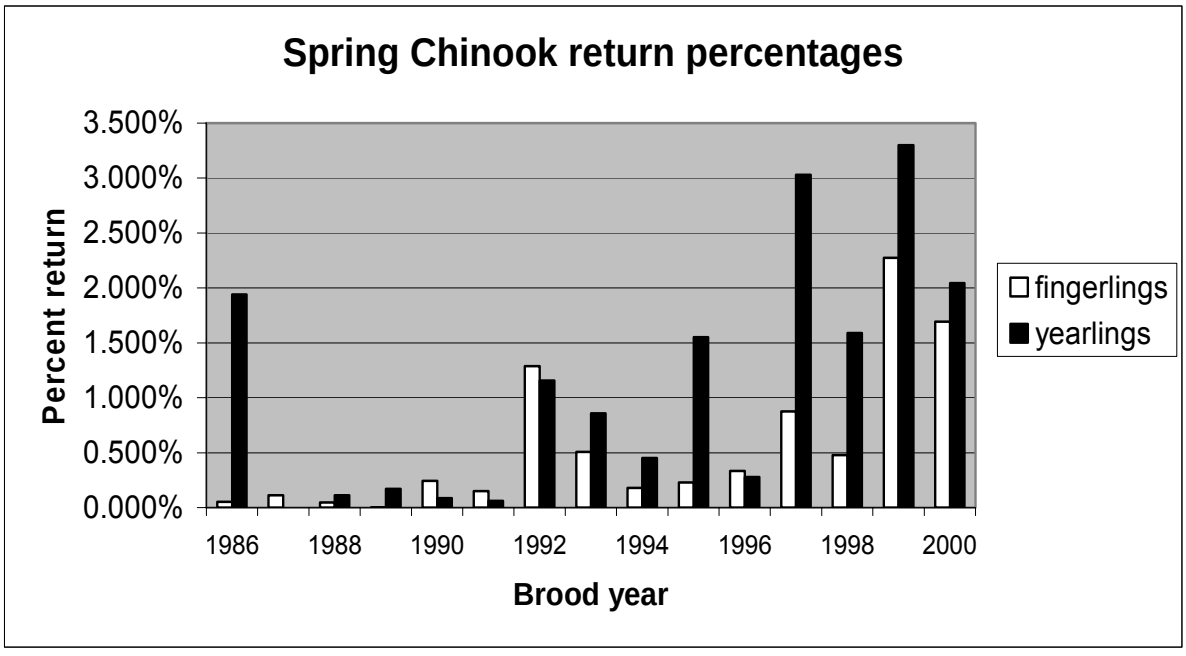
Appendix 1. Percent return of Trinity River Hatchery produced, coded-wire tagged, spring-run Chinook salmon, brood years 1986-2000. a/

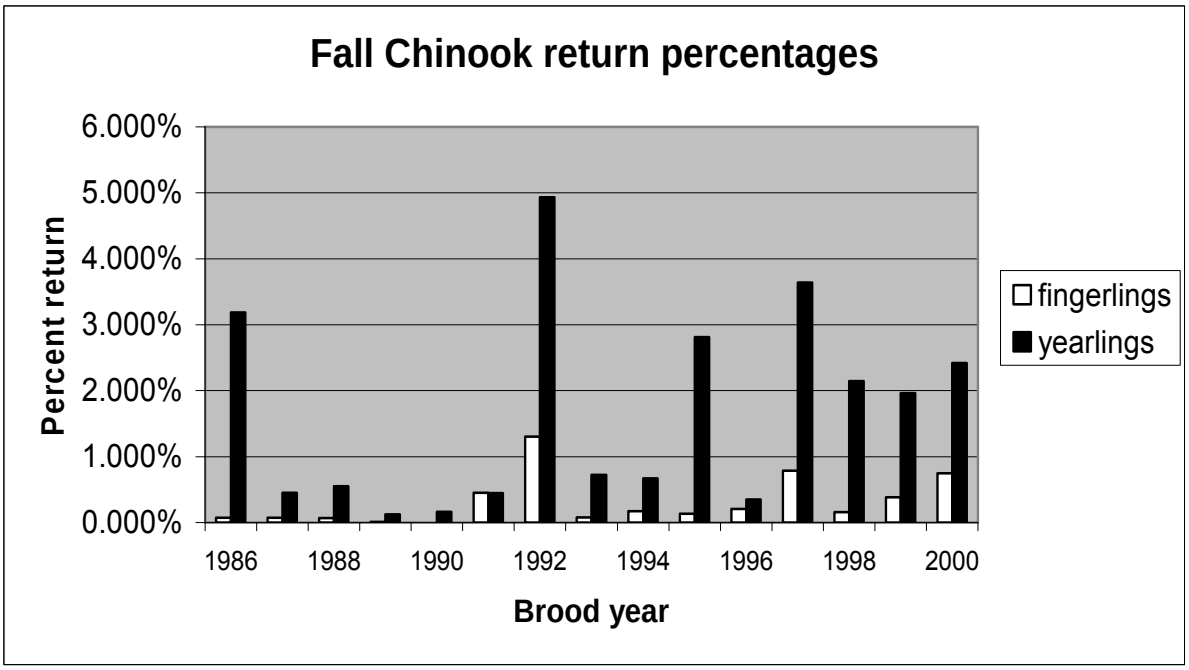
| | Fingerling releases | | | Yearling releases | | |
|---|---|---|---|---|---|---|
| Brood year | Number released | Number of returns | Percent return | Number released | Number of returns | Percent return |
| 1986 | 197,113 | 103 | 0.052% | 101,030 | 1,960 | 1.940% |
| 1987 | 185,718 | 208 | 0.112% | --- | --- | --- |
| 1988 | 181,698 | 84 | 0.046% | 98,820 | 112 | 0.113% |
| 1989 | 186,413 | 7 | 0.004% | 102,555 | 176 | 0.172% |
| 1990 | 196,908 | 479 | 0.243% | 94,639 | 82 | 0.087% |
| 1991 | 198,277 | 297 | 0.150% | 110,797 | 68 | 0.061% |
| 1992 | 215,038 | 2,766 | 1.286% | 109,856 | 1,272 | 1.158% |
| 1993 | 222,056 | 1,125 | 0.507% | 111,525 | 958 | 0.859% |
| 1994 | 113,236 | 202 | 0.178% | 113,491 | 513 | 0.452% |
| 1995 | 196,211 | 450 | 0.229% | 101,934 | 1,581 | 1.551% |
| 1996 | 222,950 | 743 | 0.333% | 112,464 | 312 | 0.277% |
| 1997 | 209,155 | 1,834 | 0.877% | 147,507 | 4,471 | 3.031% |
| 1998 | 176,968 | 845 | 0.477% | 137,602 | 2,186 | 1.589% |
| 1999 | 148,380 | 3,372 | 2.273% | 129,919 | 4,288 | 3.301% |
| 2000 | 261,193 | 4,422 | 1.693% | 99,304 | 2,029 | 2.043% |
| Means: | 194,088 | 1,129 | 0.56% | 112,246 | 1,429 | 1.19% |




a/ Based on estimated returns upstream of Junction City Weir. No estimate was produced in 1995, therefore returns of age 2 through 5 chinook from that year are hatchery returns only. Does not include ocean harvest or in-river harvest below Junction City Weir.

Appendix 2. Percent return of Trinity River Hatchery produced, coded-wire tagged, fall-run Chinook salmon, brood years 1986-2000. a/

| Brood year | Fingerling releases | | | Yearling releases | | |
|---|---|---|---|---|---|---|
| | Number released | Number of returns | Percent return | Number released | Number of returns | Percent return |
| 1986 | 393,955 | 292 | 0.074% | 153,700 | 4,899 | 3.187% |
| 1987 | 172,980 | 129 | 0.075% | 92,300 | 418 | 0.453% |
| 1988 | 194,197 | 138 | 0.071% | 143,934 | 796 | 0.553% |
| 1989 | 201,622 | 21 | 0.010% | 143,978 | 174 | 0.121% |
| 1990 | --- | --- | --- | 103,040 | 166 | 0.161% |
| 1991 | 206,416 | 937 | 0.454% | 115,300 | 517 | 0.448% |
| 1992 | 192,032 | 2,503 | 1.303% | 108,894 | 5,369 | 4.930% |
| 1993 | 201,032 | 158 | 0.079% | 110,336 | 798 | 0.723% |
| 1994 | 216,563 | 374 | 0.173% | 113,124 | 756 | 0.668% |
| 1995 | 216,051 | 285 | 0.132% | 110,327 | 3,106 | 2.815% |
| 1996 | 217,981 | 445 | 0.204% | 112,746 | 394 | 0.349% |
| 1997 | 216,772 | 1,707 | 0.787% | 313,080 | 11,396 | 3.640% |
| 1998 | 184,781 | 292 | 0.158% | 334,726 | 7,173 | 2.143% |
| 1999 | 181,301 | 693 | 0.382% | 296,892 | 5,833 | 1.965% |
| 2000 | 522,316 | 3,909 | 0.748% | 216,593 | 5,245 | 2.422% |
| Means: | 235,525 | 1,130 | 0.442% | 183,202 | 4,059 | 2.010% |




a/ Based on estimated returns upstream of Willow Creek Weir. Does not include ocean harvest or in-river harvest below Willow Creek Weir.

ANNUAL REPORT
TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT
2005-2006 SEASON

TASK 3
SURVIVAL AND SPAWNER ESCAPEMENTS MADE BY COHO SALMON PRODUCED AT TRINITY RIVER HATCHERY

by

Wade Sinnen

## ABSTRACT

Project personnel marked 520,847 coho salmon (*Oncorhynchus kisutch)* from the 2003 brood year with a right maxillary (RM) clip prior to their release from Trinity River Hatchery (TRH) in March of 2004. These fish are expected to return as two and three-year-old fish during the 2005-06 and 2006-07 seasons respectively.

An estimated 38,882 coho returned to the Trinity River, upstream of the Willow Creek Weir (WCW), during the 2004-05 season. We estimated the TRH-produced component of this run to be 29,827 (76.7%) fish. An estimated 40 adult hatchery-produced coho were harvested by sport anglers this season. Spawning escapement of TRH-produced coho was divided between 9,903 fish which entered TRH and 19,884 fish estimated to have spawned outside of the hatchery facility.

TRH-produced coho from the 2001 brood year are considered to have completed their life cycle this year. An estimated 27,500 coho from the 2001 brood year returned to the Trinity River basin, upstream of Willow Creek weir, the past two seasons. This represents 6.61% of the 416,201 marked coho yearlings released from TRH in March of 2003. Estimated TRH-produced coho returns from the 2002 brood year are complete for age two returns only. An estimated 5,665 coho have returned thus far, representing 1.10% of the number released.

## TASK OBJECTIVES

To determine Trinity River specific relative return rates and contributions to spawning escapement and the fisheries made by naturally and hatchery-produced coho in the Trinity River basin.

## INTRODUCTION

Coho salmon are propagated at Trinity River Hatchery (TRH) by the California Department of Fish and Game (CDFG) as mitigation for lost habitat/coho production upstream of Lewiston Dam. The Trinity River Project, an element of CDFG, is responsible for marking coho prior to their release from the TRH and estimation of the naturally- and hatchery-produced components of coho salmon returning to the Trinity River basin, upstream of Willow Creek Weir (WCW). Beginning with the 1994 brood year, all coho salmon reared at TRH have received a right maxillary (RM) clip prior to release. Prior to the 1994 brood year, a portion of the coho production was coded-wire tagged similar to the Chinook marking program at TRH. With the advent of coho becoming listed as a threatened species pursuant to the Endangered Species Act (ESA) in 1994, the CDFG began a program to mark 100% of the hatchery production so that a more thorough analysis of hatchery and natural stocks could be accomplished.

## METHODS

There are two phases involved in this task; marking all coho produced at TRH and estimating coho run-size, harvest, and escapement of TRH- and naturally-produced coho salmon returning to the Trinity basin. The latter phase is partially accomplished under TASK 1 of this report. In this section we present release and recovery data that is used to estimate the hatchery- and naturally-produced component of the 2004-05 coho run above WCW. Data compilation and analysis is reliant upon previously reported data in Sinnen and Null, 2002, Sinnen and Moore, 2000, and Sinnen, 2004a, 2004b, 2005.

### Marking at Trinity River Hatchery

Marking of coho is performed by CDFG personnel in marking sheds which are placed on top of the raceways at TRH. The sheds are moved along raceways with a fork lift. Raceways are segregated with removable barriers to isolate clipped coho from un-marked fish.

Coho are anaesthetized with carbon dioxide and their have their right maxillary (RM) bone removed with a pair of sharp surgical scissors. Marked fish are tallied with a manual counter and returned to hatchery ponds. Observed mortalities of marked coho are counted and subtracted from the daily effectively tagged total.

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

TRH-produced coho run-size, escapement, and in-river harvest

To estimate the contribution of TRH-produced coho to run-size, escapement and in-river angler harvest above Willow Creek Weir (WCW), the following information is required:

1. Marking of coho production released from TRH.
2. Recovery totals of marked and unmarked coho returning to TRH.
3. Total coho run-size above WCW.
4. The percentage of marked coho salmon observed at WCW.
5. In-river angler harvest rates on coho above WCW.
6. Specific age class determinations.

The assumptions underlying the validity of run-size estimates are discussed under TASK 1 of this report. Additionally, we assume that coho right-maxillary-marks do not regenerate and that the mark is recognizable.

To estimate the TRH-produced component of the run above WCW, we used the equation:

$$N_{RM} = \frac{NW_{RM}}{NW} \times N_{Cohorun}$$

where $N_{RM}$ = The estimated number of coho salmon above Willow Creek weir with a right maxillary clip; $NW_{RM}$ = The number of coho salmon observed at Willow creek weir that were right-maxillary clipped; NW = The total number of coho salmon observed at Willow creek weir; $N_{Cohorun}$ = Total estimated run of coho salmon above Willow Creek weir. To estimate the number of un-marked coho salmon above the weir we used the equation:

$$N_N = N_{Cohorun} - N_{RM}$$

where, $N_N$ = The estimated number of naturally produced coho above Willow Creek weir.

The size separating grilse and adult coho is determined using length frequency analysis using WCW and TRH data sets. The number of grilse and adults in the coho run was determined by multiplying the proportion of each observed at WCW times the total run-size estimate. The number of right maxillary-clipped coho for each age strata is estimated by multiplying the ratio

of marked to unmarked coho observed at Willow Creek weir times the total age stratified run-size estimate. The remaining coho are considered naturally produced. Coho harvest rate estimates are developed using angler tag return data presented in Task 1. Harvest rates are applied to the age stratified coho run to produce a harvest estimate. The estimate is apportioned to either RM clipped or naturally produced coho based on tag returns. Coho escapement is determined by the following equation:

$$N_{escapement} = N_{Cohorun} - H_{coho}$$

where, $H_{coho}$ = The estimated number of coho salmon harvested by anglers upstream of Willow Creek weir. Escapement is divided into Trinity River Hatchery escapement and natural escapement. Hatchery escapement is a direct count of RM clipped and unmarked coho that entered TRH, while natural escapement is estimated by the following equation:

$$N_{Naturalescapement} = N_{escapement} - N_{TRHescapement}$$

where $N_{Naturalescapement}$ = The estimated number of coho salmon above Willow Creek weir estimated to have spawned in natural areas; $N_{TRHescapement}$ = the number of coho salmon that entered TRH. All estimates are stratified by grilse and adults and by RM marked and unmarked coho salmon.

## RESULTS

### Marking

Staff personnel marked (RM clips) approximately 545,851 2004 BY coho, representing the entire production at TRH. We began marking coho in late December, 2005 and finished in early March, 2006.

We performed a quality control check to determine our clipping effectiveness for coho in each raceway on March 4-5, 2006. We measured and examined approximately 2% of the coho in each raceway . The percentage of coho with proper clips ranged from 99.6% to 100% and averaged 99.9% for the 11,850 fish examined. We also recorded 307 post clip mortalities. Therefore, we estimate that 545,199 coho were effectively clipped and released (Table 1). These fish ranged in size from 80 to 314 mm, fork length (FL), with a range of mean lengths from 145 to 167 mm, FL. All BY 2004 coho were volitionally released from TRH March 15- 20, 2006.

Table 1. Clipping totals and quality control data for 2004 brood year coho salmon reared at Trinity River Hatchery and released March 15-20, 2006.

| Pond number | Number counted/ clipped | Clipping/QC mortalities | TRH post clip Mortalities | Live release Total | QC % un-clip | number effectively clipped | FL (mm) range | FL (mm) Mean |
|---|---|---|---|---|---|---|---|---|
| G1&2 | 64,094 | 76 | 32 | 63,986 | 0.36% | 63,756 | 80mm-269mm | 166.65 |
| G3&4 | 64,947 | 110 | 47 | 64,790 | 0.07% | 64,745 | 110mm-273mm | 160.95 |
| H1&H2 | 70,373 | 30 | 25 | 70,318 | 0.00% | 70,318 | 107mm-205mm | 147.6 |
| H3&H4 | 72,545 | 36 | 61 | 72,448 | 0.14% | 72,347 | 103mm-248mm | 144.71 |
| I 1& I 2 | 72,500 | 57 | 14 | 72,429 | 0.00% | 72,429 | 100mm-289mm | 157.09 |
| I 3 & I 4 | 68,507 | 42 | 38 | 68,427 | 0.06% | 68,386 | 110mm-269mm | 149.48 |
| J1&J2 | 67,657 | 110 | 41 | 67,506 | 0.20% | 67,371 | 100mm-281mm | 159.03 |
| J3&4 | 66,120 | 124 | 49 | 65,947 | 0.15% | 65,848 | 110mm-314mm | 161.57 |
| Totals: | 546,743 | 585 | 307 | 545,851 | | 545,199 | | |
| | | | | | | | Mean FL: | 155.9 |

Contribution of TRH-produced coho salmon to escapement and in-river sport fisheries

Total (natural and TRH-produced) coho run-size for the 2005-06 season, above WCW, was estimated at 31,419 fish (TASK 1), of which 3,093 were grilse (age 2) and 28,326 were adults (age 3). Age classes were determined using length frequency analysis. The size separating grilse and adults was 50 cm, FL (TASK 1). Therefore all coho $\leq$ 50 cm, FL were considered grilse and larger fish adults.

The percentage of right maxillary-clipped (RM) coho observed at WCW was 97.4% (148/152) for grilse salmon and 90.6% (562/620) for adults. The overall marked coho total observed at WCW for the 2005-06 season was 92.0% (710/772). Therefore, we estimate that the 2005-06 coho run was composed of 2,729 naturally-produced fish and 28,690 TRH-produced fish (Table 2.).

Based on one angler tag return, we estimated that 21 grilse RM clipped coho were harvested by anglers upstream of Willow Creek weir this year. The sport take of coho, a state and federally listed threatened species on the Trinity River, has been prohibited since 1995; however, some fish are occasionally harvested by unknowledgeable anglers due to mistaken identity or a lack of knowledge concerning the closure.

Table 2. Run-size, in-river sport catch, and spawner escapement estimates for naturally- and TRH-produced coho salmon, upstream of Willow Creek Weir for the 2005-06 return year.

| | | | | | Spawning escapement | |
|---|---|---|---|---|---|---|
| Strata | BY a/ | Age b/ | Run-size | Angler harvest | TRH c/ | Natural |
| Naturally | 03 | 2 | 81 | 0 | 10 | 71 |
| Produced | 02 | 3 | 2,648 | 0 | 920 | 1,728 |
| | | Totals: | 2,729 | 0 | 930 | 1,799 |
| | | | | | | |
| TRH | 03 | 2 | 3,012 | 21 | 1,721 | 1,270 |
| Produced | 02 | 3 | 25,678 | 0 | 15,704 | 9,974 |
| | | Totals: | 28,690 | 21 | 17,425 | 11,244 |
| | | | | | | |
| | | Grand totals: | 31,419 | 21 | 18,355 | 13,043 |

a/ BY=Brood year
b/ Age classes are determined using fork length frequency analysis.
c/ TRH=Trinity River Hatchery

Based on age three coho run-size estimates presented above (Table 2) and age two estimates provided last year, the percent return for BY 2002, TRH-produced coho was 6.07% (Table 3). Coho from the 2002 BY have reached three years of age and are considered to have completed their life cycle. The estimated return of two- year-old 2003 BY coho was 0.58%. These fish will return during the 2006-07 season as three-year-olds.

Spawning escapement of 2002 BY, TRH-produced coho, consisted of 16,772 (53.5%) fish that entered TRH and 14,571 (46.5%) fish estimated to have spawned in natural areas (Table 3).

Estimated escapement of TRH-produced, two-year-old coho from the 2003 brood year was 1,721 (57.5%) hatchery spawners and 1,270 (42.5%) fish estimated to have spawned in natural areas (Table 3).

Table 3. Run-size, percent return, in-river angler harvest and spawner escapement estimates for

Trinity River Hatchery-produced coho salmon returning to the Trinity River upstream of the Willow Creek Weir during the period 2004 through 2005.

| Release Data | | | | | Estimated Returns | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Spawning Escapement | | |
| Clip a/ | Brood Year | Date | Number b/ | Site | Age c/ | Run-size | % of release | River harvest | TRH d/ | Natural | Total |
| RM | 02 | 3/15-18/04 | 516,906 | TRH | 2 | 5,665 | 1.10 | 0 | 1,068 | 4,597 | 5,665 |
| | | | | | 3 | 25,678 | 4.97 | 0 | 15,704 | 9,974 | 25,678 |
| | | | | | Totals: | 31,343 | 6.07 | 0 | 16,772 | 14,571 | 31,343 |
| RM | 03 | 3/14-18/05 | 520,847 | TRH | 2 | 3,012 | 0.58 | 21 | 1,721 | 1,270 | 2,991 |

a/ Identifying clip. Beginning with the 1994 brood year, all coho salmon released from Trinity River Hatchery received right maxillary (RM) clips.
b/ Number of marked (RM) coho estimated released.
c/ Age classes are determined using length frequency analysis.
d/ TRH= Trinity River Hatchery.

## DISCUSSION

Since estimation of TRH-produced contribution rates to overall coho run-size, escapement and harvest are directly related to the total coho run-size estimates produced under Task 1 of this report, it must be noted that the information presented under Task 3 is generally only moderately rigorous, statistically speaking, due to low numbers of coho marked at WCW. This season we trapped 772 coho. The total coho run-size estimate of 31419 fish, produced under task 1 of this report, had confidence intervals (1-p=0.95) within 10%, which is substantially better than previous years estimates which had confidence intervals ranging from 20 to 35%. Another source of potential bias, not trapping through the entire run, may have been a factor this season. Trapping CPUE (Task 1. Table 4, Figure 10) at WCW indicated that the run of coho was declining, but not completely over, prior to its removal in early November. Since our efforts represent the majority of work to quantify the hatchery vs. wild runs and survival and contribution rates of returning coho, we feel it is important to present the best available information. It must be noted that any bias in coho run-size estimates would be reflected in natural areas since the number entering the hatchery are actual counts.

The percent return of 2002 BY coho, estimated at 6.06%, is the third highest return rate over the

last nine coho cohort cycles (Appendix 1). Return rates have ranged from a low of 1.30% for BY 1996 coho to 6.61% for BY 2001 coho. Since coho are raised to slightly larger than yearling size (spawned in late November through early January and released in March of the following year) it would seem reasonable that survival rates could potentially be high. Return rates of coho to the Trinity basin, unlike Chinook salmon, are in theory minimally affected by ocean and in-river commercial and sport harvest, since the take of coho has been prohibited in these fisheries since 1994. The Native American gill-net fisheries may harvest substantial numbers of coho, but it is doubtful that this harvest rate approaches historical harvest rates for all combined fisheries (ocean, commercial, in-river and gill-net).

In all but two years of the DFG data set estimated the number of hatchery-produced coho that have spawned in natural areas has surpassed those that entered TRH (Appendix 1). This indicates that TRH-produced coho stray at substantial rates. Mainstem carcass surveys (Task 4) have demonstrated that, similar to TRH-produced Chinook, TRH-produced coho spawn outside of the facility and coho carcass recoveries are greatest in areas near TRH. This season 961 coho carcasses were recovered in the mainstem Trinity River. Of these, 536 (55.8%) were RM clipped.

Despite potential run estimate biases, coho trends, based on trapping data at Willow Creek weir, indicate that coho runs returning to the upper Trinity basin are heavily supported by TRH production. The past nine seasons of trapping data (years in which all TRH-produced coho have been 100% marked) have consistently shown that the marked percentage of coho observed at the weir has been substantial, 77 to 94% of the total observed (appendix 2). This season we estimated that approximately 91.3% of the run was composed of TRH-produced coho.

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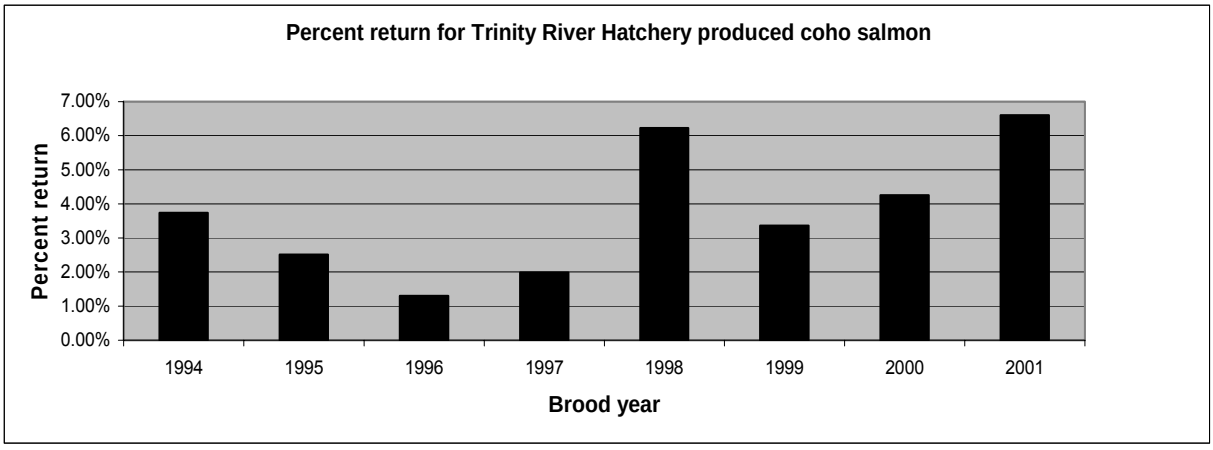
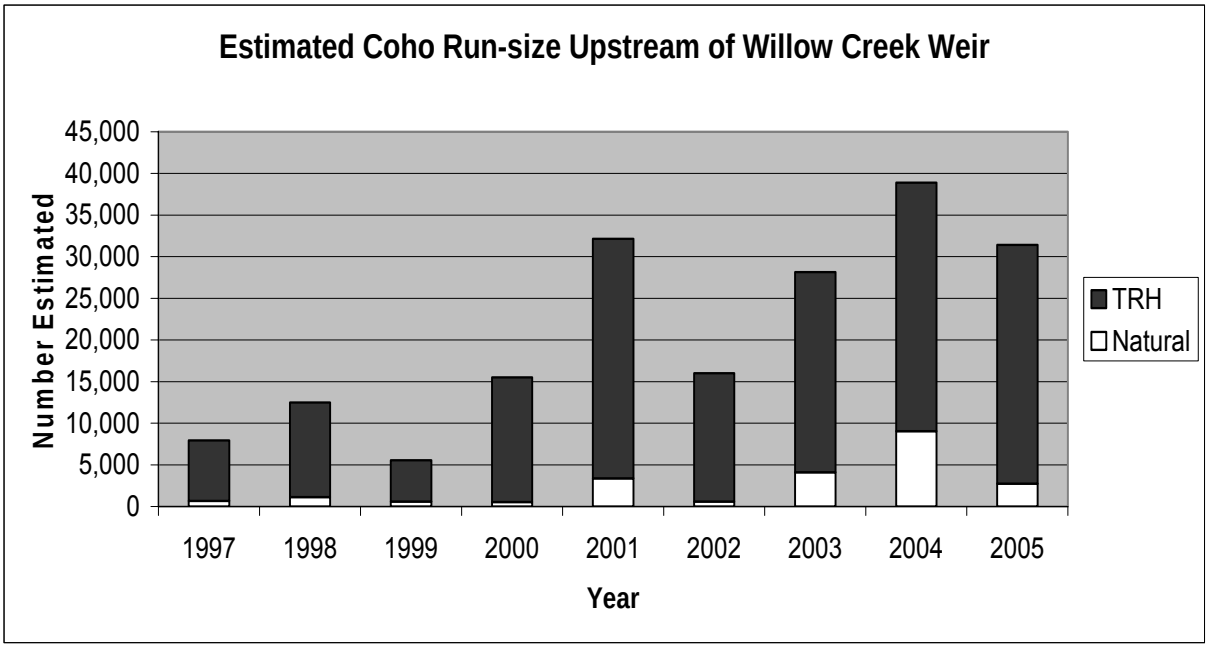
Appendix 1. Run-size, harvest and spawner escapement estimates for right maxillary clipped, Trinity River Hatchery-produced coho salmon returning to the Trinity River, upstream of Willow Creek weir, brood years 1994-2001.

| Release data | | | | Return data | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Brood year | Date | Effective Number | Site | Age | Run-size | % of release | In-river harvest | Spawner Escapement TRH | Natural | Total |
| 1994 | 3/17-21/96 | 72,311 | TRH | 2 | 970 | 1.34% | 0 | 105 | 865 | 970 |
| | | | TRH | 3 | 1,732 | 2.40% | 0 | 867 | 865 | 1,732 |
| | | | | Totals: | 2,702 | 3.74% | 0 | 972 | 1,730 | 2,702 |
| 1995 | 3/17-21/97 | 580,880 | TRH | 2 | 5,552 | 0.96% | 39 | 858 | 4,655 | 5,513 |
| | | | TRH | 3 | 9,008 | 1.55% | 0 | 3,899 | 5,109 | 9,008 |
| | | | | Totals: | 14,560 | 2.51% | 39 | 4,757 | 9,764 | 14,521 |
| 1996 | 3/16-20/98 | 513,663 | TRH | 2 | 2,340 | 0.46% | 0 | 969 | 1,371 | 2,340 |
| | | | TRH | 3 | 4,357 | 0.85% | 86 | 3,015 | 1,256 | 4,271 |
| | | | | Totals: | 6,697 | 1.30% | 86 | 3,984 | 2,627 | 6,611 |
| 1997 | 3/15-22/99 | 517,196 | TRH | 2 | 592 | 0.11% | 0 | 381 | 211 | 592 |
| | | | TRH | 3 | 9,704 | 1.88% | 0 | 3,407 | 6,297 | 9,704 |
| | | | | Totals: | 10,296 | 1.99% | 0 | 3,788 | 6,508 | 10,296 |
| 1998 | 3/15-20/00 | 493,233 | TRH | 2 | 5,289 | 1.07% | 0 | 916 | 4,373 | 5,289 |
| | | | TRH | 3 | 25,395 | 5.15% | 0 | 9,625 | 15,770 | 25,395 |
| | | | | Totals: | 30,684 | 6.22% | 0 | 10,541 | 20,143 | 30,684 |
| 1999 | 3/15-22/01 | 512,986 | TRH | 2 | 3,373 | 0.66% | 0 | 1,024 | 2,349 | 3,373 |
| | | | TRH | 3 | 13,849 | 2.70% | 0 | 6,409 | 7,440 | 13,849 |
| | | | | Totals: | 17,222 | 3.36% | 0 | 7,433 | 9,789 | 17,222 |
| 2000 | 3/17-19/02 | 524,238 | TRH | 2 | 1,571 | 0.30% | 0 | 688 | 883 | 1,571 |
| | | | TRH | 3 | 20,721 | 3.95% | 0 | 9,730 | 10,991 | 20,721 |
| | | | | Totals: | 22,292 | 4.25% | 0 | 10,418 | 11,874 | 22,292 |
| 2001 | 3/17-19/03 | 416,201 | TRH | 2 | 3,338 | 0.80% | 0 | 1,449 | 1,889 | 3,338 |
| | | | TRH | 3 | 24,162 | 5.80% | 40 | 8,835 | 15,287 | 24,122 |
| | | | | Totals: | 27,500 | 6.60% | 40 | 10,284 | 17,176 | 27,460 |



Appendix 2. Naturally and Trinity River Hatchery-produced coho salmon run-size, in-river angler harvest and spawner escapment estimates for the Trinity River upstream of Willow Creek Weir for 1997-2005.

| | | | | | Spawner Escapement | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Run-size Estimate | | | Natural | | | Trinity River Hatchery | | | Angler harvest | | |
| Year | Strata | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total | Grilse | Adults | Total |
| 1997 | Natural | 399 | 252 | 651 | 383 | 232 | 615 | 13 | 20 | 33 | 3 | 0 | 3 |
| | TRH | 5,552 | 1,732 | 7,284 | 4655 | 865 | 5520 | 858 | 867 | 1725 | 39 | 0 | 39 |
| 1998 | Natural | 131 | 1,001 | 1,132 | 123 | 886 | 1,009 | 8 | 115 | 223 | 0 | 0 | 0 |
| | TRH | 2,340 | 9,008 | 11,348 | 1,371 | 5,109 | 6,480 | 969 | 3,899 | 4,868 | 0 | 0 | 0 |
| 1999 | Natural | 31 | 555 | 586 | 23 | 440 | 463 | 8 | 103 | 111 | 0 | 12 | 12 |
| | TRH | 592 | 4,357 | 4,949 | 211 | 1,266 | 1,477 | 381 | 3,015 | 3,396 | 0 | 86 | 86 |
| 2000 | Natural | 197 | 342 | 539 | 187 | 288 | 475 | 10 | 54 | 64 | 0 | 0 | 0 |
| | TRH | 5,289 | 9,704 | 14,993 | 4,373 | 6,297 | 10,670 | 916 | 3,407 | 4,323 | 0 | 0 | 0 |
| 2001 | Natural | 298 | 3,075 | 3,373 | 296 | 2,945 | 3,241 | 2 | 130 | 132 | 0 | 0 | 0 |
| | TRH | 3,373 | 25,395 | 28,768 | 2,349 | 15,770 | 18,119 | 1,024 | 9,625 | 10,649 | 0 | 0 | 0 |
| 2002 | Natural | 138 | 458 | 596 | 123 | 372 | 495 | 15 | 86 | 101 | 0 | 0 | 0 |
| | TRH | 1,571 | 13,849 | 15,420 | 883 | 7,440 | 8,323 | 688 | 6,409 | 7,097 | 0 | 0 | 0 |
| 2003 | Natural | 163 | 3,930 | 4,093 | 149 | 3,264 | 3,413 | 14 | 666 | 680 | 0 | 0 | 0 |
| | TRH | 3,338 | 20,721 | 24,059 | 1,889 | 10,991 | 12,880 | 1,449 | 9,730 | 11,179 | 0 | 0 | 0 |
| 2004 | Natural | 154 | 8,901 | 9,055 | 145 | 7,830 | 7,975 | 9 | 1,071 | 1,080 | 0 | 0 | 0 |
| | TRH | 5,665 | 24,162 | 29,827 | 4,597 | 15,287 | 19,884 | 1,068 | 8,835 | 9,903 | 0 | 40 | 40 |
| 2005 | Natural | 81 | 2,648 | 2,729 | 70 | 1,740 | 1,810 | 10 | 920 | 930 | 0 | 0 | 0 |
| | TRH | 3,012 | 25,678 | 28,690 | 1,269 | 9,964 | 11,233 | 1,721 | 15,704 | 17,425 | 21 | 0 | 21 |



ANNUAL REPORT
TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT
2005-06 SEASON

TASK 4
SALMON SPAWNER SURVEYS IN THE UPPER TRINITY RIVER

by Patrick Garrison

ABSTRACT

A spawner survey monitoring the escapement of Chinook salmon and coho salmon was conducted on the Upper Trinity River from September 19th, 2005 through December 20th, 2005. This survey was a joint-agency effort including staff from the California Department of Fish and Game's (CDFG) Trinity River Project (TRP), the Yurok Tribe, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Forest Service (USFS). The survey focused on the main-stem Trinity River from the uppermost available anadromous spawning habitat below Lewiston Dam (Reach 1) and continued downstream to the Cedar Flat recreation area (Reach 10), a total of 101.6 Rkm. The survey did not include any tributaries. Over the course of the survey, 3,320 Chinook (*Oncorhynchus tshawytscha*) and 961 Coho salmon (*O. kisutch*) carcasses were initially recovered. Carcass numbers and density were the most numerous in the uppermost reach. Carcass numbers and density generally decreased from Lewiston Dam downstream to Cedar Flat.

Chinook salmon carcasses were recovered throughout the spawning season. Recovery of spring-run Chinook carcasses outnumbered fall-run Chinook carcasses until Julian week 45 (November 5th). After this time, fall Chinook became the dominate run recovered during the survey. Coho salmon were recovered starting on October 15th (Julian week 42) and peaked during Julian week 50 (December 10th-December 16th).

All fresh Chinook carcasses (condition-1) were marked with a weekly color coded jaw tag and returned to the water. Over the course of the survey, 1,086 Chinook carcasses were marked, of which 484 (44.5%) were subsequently recaptured. A pooled Petersen mark-recapture model produced an in-river escapement estimate of 8,565 Chinook salmon (3,158 spring-run and 5,407 fall-run) above Cedar Flat. A modified Schaefer mark-recapture model produced a slightly lower estimate of 7,745 Chinook salmon (2,855 spring-run and 4,890 fall-run).

Chinook fork length averaged 70.2 cm (range: 32-115 cm) for spring-run and 71.7 cm (range: 37-105 cm) for fall-run fish. Adult Chinook made up 97.6% of the spring and 98.9 % of the fall Chinook observed. Coho salmon fork length averaged 66.5 cm (range: 34-85 cm). Coho adults represented 96.9 % of all coho recovered during the survey.

Male to female ratios of recovered carcasses were 0.73:1 for spring Chinook, 0.85:1 for fall Chinook and 0.87:1 for coho salmon. Estimated female pre-spawn mortality of spring Chinook

was 7.37%, compared to 6.52% for fall Chinook. Coho female pre-spawn mortality was estimated at 15.85%.

Based on the recovery of adipose-fin-clipped Chinook, an estimated 25.7% of the spring-run and 42.8 % of the fall-run carcasses observed in the main-stem survey were of hatchery origin. Based on the recovery of right-maxillary clipped coho, an estimated 55.8 % of the recovered coho carcasses were of hatchery origin.

## OBJECTIVES

1. To determine the size, sex composition, and hatchery component of in-river spawning populations in the main-stem Trinity River.

2. To determine the incidence of pre-spawning mortality among naturally spawning Chinook and coho salmon in the main-stem Trinity River.

3. To estimate in-river escapement of spring-run Chinook salmon and fall-run Chinook salmon upstream of Cedar Flat and Junction City utilizing a mark-recapture methodology and multiple estimators.

4. To determine the temporal and spatial distribution of the naturally spawning populations of Chinook and coho salmon within the main-stem Trinity River.

## INTRODUCTION

During the fall of 2005, the California Department of Fish & Game's (CDFG) Trinity River Project (TRP) in cooperation with the Yurok Tribe (YT) and the U.S. Fish and Wildlife Service (USWFS) conducted a carcass and redd survey in the main-stem Trinity River. The survey was funded through the Trinity River Restoration Program (TRRP). The U.S. Forest Service (USFS) also participated in the survey using internal funding. USFS participation was limited to enumerating redds in the uppermost reach (Reach 1).

Reporting responsibilities for the project were divided into two parts: 1) CDFG was responsible for reporting on the carcass survey portion of the study and, 2) the USFWS for the redd enumeration part of the study. Redd survey information included in this report was summarized by the USFWS.

Spawner surveys have been conducted intermittently on the Trinity River since 1955. Spawning surveys prior to 1964 included river sections located above river mile 111.9 (RKM 180.1), the site of present day Lewiston dam.

Results from spawner surveys can be utilized to improve our understanding of the pre- and post-

treatment effectiveness of flow and habitat manipulations being implemented by the TRRP to improve salmon spawning conditions. Pertinent metrics to be analyzed over time include spawner density, spawner distribution, and prespawn mortality rates hatchery contribution rates in the upper main-stem Trinity River. Additionally, estimates produced from the mark-recapture carcass survey can be used to validate and refine estimates produced by Task 1.

## METHODS

The study area included the main-stem Trinity River from its upstream limit of anadromy at Lewiston Dam downstream to the Cedar Flat Recreational Area. The study area was divided into 10 reaches (Table 1, Figure 1). Reaches were surveyed between September 19, 2005 and December 20, 2005. Two rafting teams consisting of CDFG and Yurok tribal crews attempted to survey reaches 1-5 weekly by starting at reaches one and working downstream through reach five. USFWS crews also attempted to survey reaches six and seven weekly, while reaches 8-10 were surveyed on a bi-weekly basis. However, logistical constraints caused some reaches to be occasionally excluded (Table 2).

**Table 1. Main-stem Trinity Carcass/redd survey reach descriptions.**

| Reach | Start | End |
|---|---|---|
| 1 | Lewiston Dam (RKM 180.1) | Old Lewiston Bridge (RKM 176.9) |
| 2 | Old Lewiston Bridge (RKM 176.9) | Bucktail Launch (RKM 169.0) |
| 3 | Bucktail launch (RKM 169.0) | Steel Bridge (RKM 158.8) |
| 4 | Steel Bridge (RKM 158.8) | Douglas City Campground (RKM 148.4) |
| 5 | Douglas City Campground (RKM 148.4) | Roundhouse Launch (RKM 132.7) |
| 6 | Roundhouse Launch (RKM 132.7) | Junction City Campground (RKM 125.5) |
| 7 | Junction City Campground (RKM 125.5) | North Fork Trinity Confluence (RKM 116.7) |
| 8 | N.F. Trinity Confluence (RKM 116.7) | Big Flat Launch (RKM 107.0) |
| 9 | Big Flat Launch (RKM 107.0) | Del Loma Access (RKM 92.2) |
| 10 | Del Loma Access (RKM 92.2) | Cedar Flat Recreation Area (RKM 78.5) |

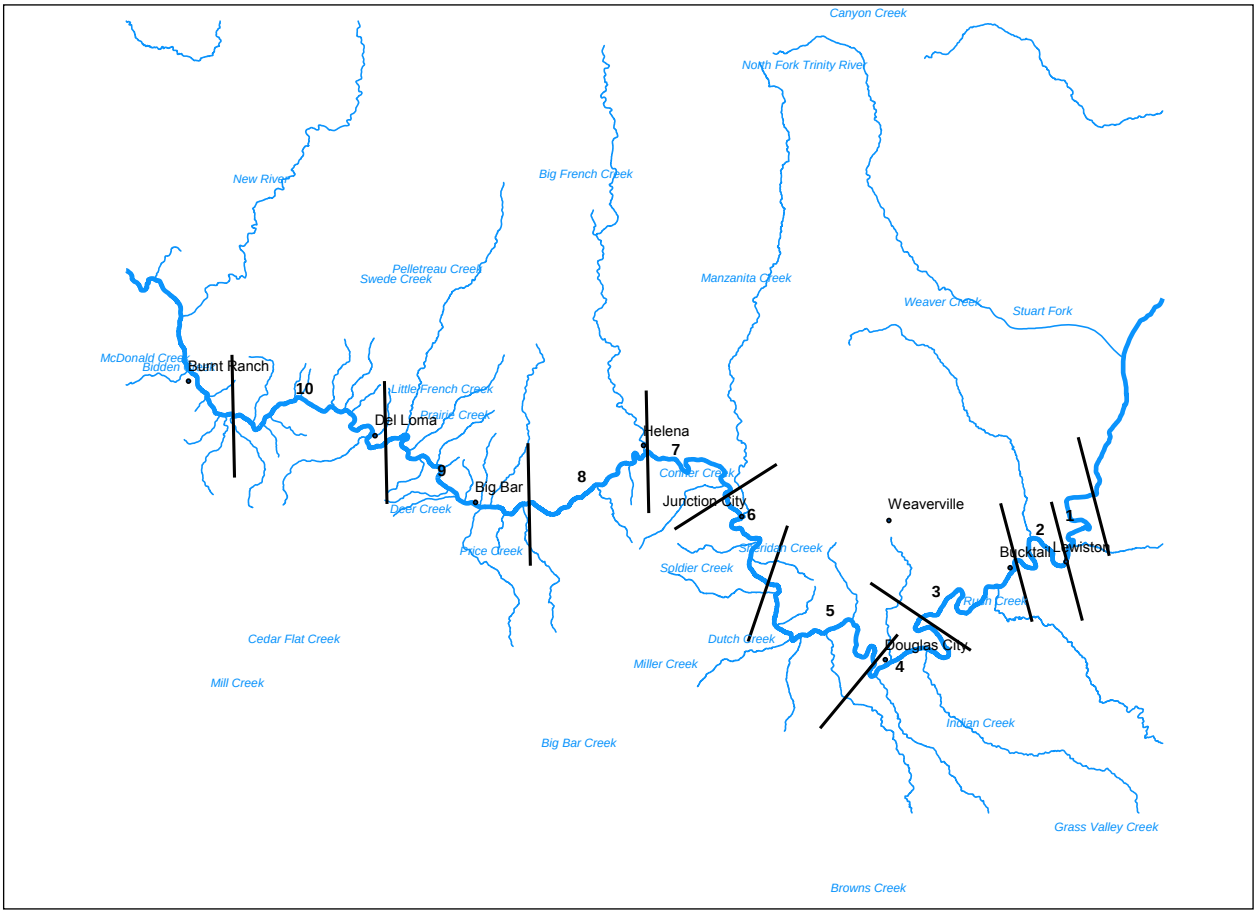



**Figure 1. Survey reaches for 2005 Trinity River main-stem spawner survey. Map courtesy of Knechtle and Sinnen (2005).**

Surveys were conducted using 12-ft Avon™ and 13-ft Otter™ inflatable rafts equipped with rowing frames. Each raft was staffed by two crew members, one rower-recorder and one technician responsible for recovering carcasses and enumerating redds. Each rafting crew covers one side of the river (right bank to middle and left bank to middle) as the surveys proceeded down stream. Additionally, all side channels were walked by the crew covering the bank of origin. Carcasses were recovered from all accessible areas in the river and along the shoreline. Fish in deeper areas were recovered using telescoping poles with attached gigs.

In the Trinity River, there is a temporal and spatial overlap in the spring and fall Chinook runs. Since there is annual variation in spring and fall run timing, a date separating the two races is determined based on two factors. First, some of the Chinook carcasses recovered during the survey contained Coded Wire Tags (CWT's), which are implanted in their snouts prior to release from Trinity River Hatchery (TRH). CWT's are race and brood year specific and are currently implanted in approximately 25% of all TRH Chinook as juveniles. Second, a portion of the carcasses recovered were marked with spaghetti tags placed on fish at CDFG fish trapping weirs located near the towns of Junction City (JCW) and Willow Creek (WCW). Race was assigned to

each fish tagged based on the time they were captured and tagged at the weirs. The week separating spring and fall Chinook in the carcass survey was established when the percentage of fall Chinook recoveries (based on CWT and run timing at the weirs) was greater than spring Chinook.

Carcasses encountered in the survey were given a condition rating in order to describe their stage or degree of decomposition. During the survey, carcasses were separated into one of three categories: 1) condition 1, was a carcass with at least one clear eye, 2) condition 2 was a carcass with both eyes cloudy, and 3) condition 3 was skeletal remains. All condition 1 Chinook carcasses were marked with a weekly color coded jaw tag and returned to moving water. These carcasses were then available for recapture providing the means to estimate an in-river escapement using several mark-recapture estimators. Estimators used to calculate the estimate include a pooled Petersen (Chapman, 1951), a weekly stratified Petersen, the Schaefer (Ricker, 1965) and a modified Schaefer (Law, 1994).

Carcasses recovered during the survey were identified to species, gender and examined for hatchery clips and program tags (spaghetti tags). Carcasses were measured to the nearest cm fork length (FL). Trinity River Hatchery (TRH) marks included adipose-fin clips (Ad) on Chinook salmon and steelhead and right maxillary clips (RM) on coho salmon. Twenty five percent of TRH Ad-clipped Chinook salmon are implanted with a CWT and 100% of coho salmon and steelhead are marked prior to release. Heads of all recovered Ad-clipped Chinook were removed and retained for later CWT tag recovery. The CWT's are extracted and read by the Department's Trinity River Project staff. All project (spaghetti) tags, applied at the two main stem weirs, were removed and recorded.

Field crews examined all condition-1 and condition-2 female salmon for spawning condition by direct observation of ovaries. Fish were classified as either spawned or un-spawned based upon percent egg retention. Females retaining the majority of their eggs were classified as un-spawned; conversely females retaining very few eggs were determined to have spawned. Due to the difficulty in accurately determining if a male has successfully spawned, male spawning condition was not assessed. All condition 1 Chinook carcasses were marked with a weekly color coded jaw tag and returned to moving water. All condition 2 and 3 Chinook, marked recaptures, coho, and brown trout carcasses encountered during the survey were cut in half with a machete to prevent recounting the same fish on later surveys.

To estimate in-river escapement above Cedar Flat, two generally accepted mark-recapture models were employed. The simplest of these models used is the Petersen mark-recapture estimator as described by Ricker (1975). The Petersen estimator calculates a seasonal escapement, incorporating data from the entirety of the survey period. We also employed a weekly stratified Petersen to further analyze weekly population substructure. The second model used was a variation of the Schaefer estimator as described by Taylor (1974). We also employed a modified Schaefer estimator as described by Law (1994). This model differs from the original Schaefer in that the number of tags applied after the first week is subtracted from the population estimate to account for sampling with replacement. Schaefer's original model was based on

sampling without replacement, while in salmon carcass surveying condition, sampling with replacement occurs.

The Petersen model as described by Ricker (1975):

$N = ((M+1)(C+1)/(R+1))-1$

Where: N = estimated spawning population,
M = number of carcasses marked during the survey,
C = total number of carcasses examined during the survey,
R = number of marked carcasses recovered during the survey.

The Schaefer model as modified by Law (1994):

$N_{ij}=R_{ij}(T_iC_j/R_iR_j)-T_i$

Where: $N_{ij}$ = population size in tagging period *i* recovery period *j*,
$R_{ij}$ = number of carcasses tagged in the *i*th spawning period and recaptured in the *j*th recovery period,
$T_i$ = number of carcasses tagged in the *i*th tagging period,
$C_j$ = number of carcasses recovered in the *j*th recovery period,
$R_i$ = total recapture of carcasses tagged in the *i*th tagging period, and
$R_j$ = total recapture of carcasses tagged in the *j*th tagging period.

## RESULTS

### Temporal Carcass distribution

We collected 3,320 unmarked Chinook salmon carcasses during a 16 week period in the 10 survey reaches. Of the 3,320 unmarked Chinook salmon carcasses encountered, 2,643 (79.6%) were found in reaches 1- 2. Recovery of Chinook carcasses peaked during Julian week 47 (Nov.19 - Nov.25) during which 524 unmarked carcasses were recovered. It should be noted that temporal coverage of the coho run was incomplete because survey efforts ended prior to peak spawning. To fully enumerate coho spawners, survey efforts would need to continue through at least late January. Given an incomplete coverage with an unknown bias, recovery of Coho carcasses peaked during Julian week 50 (Dec 10 – Dec 16) during which 378 carcasses were recovered. Numbers of recovered carcasses in Julian week 51 falsely portrayed a sharp decrease in spawners due in part to spatial coverage, in Julian week 51 only reach 1 was surveyed (Figure 2, Table 2).

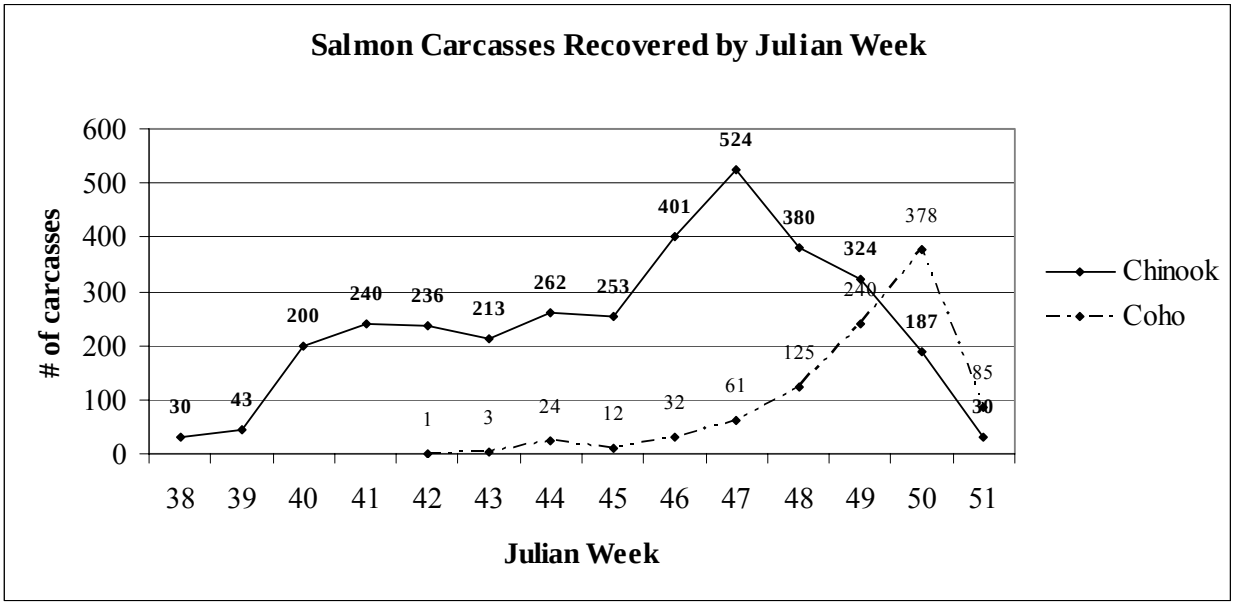



**Figure 2. Chinook and coho salmon carcasses collected (by Julian week) during 2005 Trinity River spawner survey.**

**Table 2. Main-stem Trinity River reach survey coverage and preliminary redd data. (Summary data provided by Arcata Fish and Wildlife Service Office, 2005)**

| Reach | Julian Week | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **36** | **37** | **38** | **39** | **40** | **41** | **42** | **43** | **44** | **45** | **46** | **47** | **48** | **49** | **50** | **51** | **Total** |
| **1** | 11 | 36 | 86 | 126 | 166 | 110 | 130 | 93 | 131 | 174 | 245 | 207 | 234 | 72 | 195 | 0 | 2017 |
| **2** | NS | NS | 8 | 38 | 78 | 43 | 63 | 42 | 43 | 63 | 77 | 43 | 52 | 87 | 61 | NS | 700 |
| **3** | NS | NS | 3 | 27 | 23 | 25 | 31 | 32 | 35 | 5 | 78 | 94 | 25 | 3 | 65 | NS | 449 |
| **4** | NS | NS | 0 | 10 | 14 | 24 | 27 | 39 | 37 | 29 | 18 | 9 | NS | 9 | 6 | NS | 226 |
| **5** | NS | NS | 2 | 7 | 41 | 58 | 38 | 58 | 15 | 27 | 35 | 9 | NS | 30 | 16 | NS | 341 |
| **6** | NS | NS | 0 | 2 | 12 | 16 | 20 | 8 | 8 | 1 | 5 | 4 | 3 | 0 | 0 | NS | 85 |
| **7** | NS | NS | 0 | 2 | 3 | 17 | 20 | 16 | 6 | 2 | 6 | 0 | 0 | 0 | 0 | NS | 79 |
| **8** | NS | NS | 0 | NS | 2 | NS | 9 | NS | 8 | NS | 1 | NS | 6 | NS | 0 | NS | 34 |
| **9** | NS | NS | 0 | NS | 7 | NS | 47 | NS | 38 | NS | 9 | NS | 4 | NS | 0 | NS | 114 |
| **10** | NS | NS | 0 | NS | 1 | NS | 12 | NS | 22 | NS | 7 | NS | 8 | NS | 0 | NS | 60 |
| **Total** | 11 | 36 | 99 | 212 | 347 | 293 | 397 | 288 | 343 | 301 | 481 | 366 | 332 | 201 | 343 | 0 | **4105** |

**NS- No survey conducted that week.**

Spring-run Chinook / Fall-run Chinook separation

Overlap of spring-run and fall-run Chinook occurred primarily during Julian weeks 43 – 45 (Oct 15th-Nov 11th). Spring Chinook carcass recoveries were predominant through Julian week 44 (Oct.29 - Nov 4th), after which, fall Chinook recoveries were most numerous. For the purpose of analysis, all Chinook recoveries prior to Julian week 45 (Nov 5th) were classified as spring-run.

Spring-run Chinook

A total of 1,224 Chinook carcasses were classified as spring-run during the survey, of which 593 were classified as condition-one (Table 3). Spring Chinook carcass recovery by reach ranged from 566 in reach 1 to seven in reach 10. Spring Chinook carcass density was greatest in reach 1 at 176.88 fish/km and dropped considerably to 33.8 fish/km in reach 2.

**Table 3. Number, Density and Tag Composition of Spring-run Chinook Salmon collected during the 2005 Trinity River Spawning Survey.**

| Reach | **Length (km)** | **Number observed[1]** | **Density (fish/km)** | **C- 1[2]** | **C-2[3]** | **ADIPOSE CLIPS[4]** | | **PROJECT TAGS[5]** | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Total** | **C-1** | **Total** | C-1 |
| 1 | 3.2 | 566 | 177.9 | 262 | 284 | 71 | 53 | 11 | 7 |
| 2 | 7.9 | 267 | 33.8 | 110 | 137 | 18 | 12 | 9 | 4 |
| 3 | 10.2 | 119 | 11.7 | 53 | 60 | 0 | 0 | 4 | 2 |
| 4 | 10.4 | 93 | 8.9 | 58 | 31 | 3 | 3 | 6 | 3 |
| 5 | 15.7 | 75 | 4.8 | 49 | 24 | 0 | 0 | 4 | 1 |
| 6 | 7.2 | 36 | 5.0 | 19 | 11 | 0 | 0 | 1 | 0 |
| 7 | 8.8 | 31 | 3.5 | 20 | 11 | 7 | 0 | 0 | 0 |
| 8 | 9.7 | 8 | 0.8 | 6 | 2 | 0 | 0 | 0 | 0 |
| 9 | 14.8 | 22 | 1.5 | 12 | 8 | 0 | 0 | 0 | 0 |
| 10 | 13.7 | 7 | 0.5 | 4 | 3 | 0 | 0 | 0 | 0 |
| Total | 101.6 | 1224 | 12.1 | 593 | 571 | 99 | 68 | 35 | 17 |

1/All Chinook recovered prior to Julian week 45 (Nov 5) were considered spring-run Chinook.
2/Condition-1 fish are those with at least one clear eye and considered to have died within one week.
3/Condition-2 fish are those with both eyes cloudy and considered to have died more than one week prior to recovery.
4/Adipose clipped Chinook salmon presumed to contain CWT.
5/Spaghetti tags applied at Junction City weir.

Fall-run Chinook

A total of 2,096 Chinook carcasses were classified as fall-run during the survey, of which 706 were classified as condition-one (Table 4). Fall-run Chinook carcass recovery by reach ranged from 1,370 in reach 1 to one in reach 8. Fall Chinook carcass density was greatest in reach 1 at 428.1 fish/km and dropped considerably to 55.7 fish/km in reach 2. Below reach 2 carcass density steadily dropped by reach with the exception of reach 8, where only one fall-Chinook carcass was recovered.

**Table 4. Number, Density and Tag Composition of Fall-run Chinook Salmon collected during the 2005 Trinity River Spawning Survey.**

| | | | | | | **ADIPOSE CLIPS[4]** | | **PROJECT TAGS[5]** | |
|---|---|---|---|---|---|---|---|---|---|
| Reach | **Length (km)** | **Number observed[1]** | **Density (fish/km)** | **C- 1[2]** | **C-2[3]** | **Total** | **C-1** | **Total** | C-1 |
| 1 | 3.2 | 1370 | 428.13 | 460 | 851 | 186 | 94 | 60 | **23** |
| 2 | 7.9 | 440 | 55.70 | 134 | 292 | 21 | 40 | 14 | **4** |
| 3 | 10.2 | 104 | 10.20 | 37 | 60 | 9 | 5 | 7 | **2** |
| 4 | 10.4 | 67 | 6.44 | 28 | 34 | 5 | 2 | 2 | **2** |
| 5 | 15.7 | 44 | 2.80 | 20 | 16 | 4 | 2 | 1 | **0** |
| 6 | 7.2 | 20 | 2.78 | 9 | 9 | 3 | 2 | 2 | **1** |
| 7 | 8.8 | 17 | 1.93 | 6 | 7 | 0 | 0 | 1 | **1** |
| 8 | 9.7 | 1 | 0.10 | 0 | 1 | 1 | 0 | 0 | **0** |
| 9 | 14.8 | 18 | 1.22 | 6 | 9 | 1 | 1 | 2 | **2** |
| 10 | 13.7 | 15 | 1.09 | 9 | 5 | 0 | 0 | 0 | **0** |
| Total | 101.6 | 2096 | 20.63 | 709 | 1284 | 230 | 146 | 89 | 35 |

1/All Chinook recovered after Julian week 44 (ending Nov 4) were considered Fall-run Chinook.
2/Condition-1 fish are those with at least one clear eye and considered to have died within one week.
3/Condition-2 fish are those with both eyes cloudy and considered to have died more than one week prior to recovery.
4/Adipose clipped Chinook salmon presumed to contain CWT.
5/Spaghetti tags applied at Junction City and Willow Creek weirs.

Coho Salmon

A total of 961 coho salmon carcasses were recovered during the survey, of which 574 were classified as condition-one (Table 5). Coho carcass recovery by reach ranged from 572 in reach 1
to zero in reach 10. Coho carcass density was greatest in reach 1 with 363.1 fish/km and dropped considerably to 70.3 fish/km in reach 2. Coho carcass density downstream of reach 4 was less than 1.39 fish/km.

**Table 5. Number, Density and Tag Composition of Coho Salmon collected during the 2005 Trinity River Spawning Survey.**

| | | | | | | Right Maxillary[3] | | Project tags[4] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Reach | Length (km) | Number observed | Density (fish/km) | C- 1[1] | C-2[2] | Total | C-1 | Total | C-1 | Hatchery[5] |
| 1 | 3.2 | 572 | 178.75 | 334 | 235 | 310 | 192 | 24 | 16 | 91 |
| 2 | 7.9 | 237 | 30.00 | 150 | 85 | 134 | 89 | 12 | 7 | 27 |
| 3 | 10.2 | 72 | 7.06 | 44 | 24 | 44 | 29 | 5 | 3 | 7 |
| 4 | 10.4 | 28 | 2.69 | 19 | 7 | 15 | 10 | 2 | 1 | 3 |
| 5 | 15.7 | 20 | 1.27 | 7 | 13 | 13 | 6 | 0 | 0 | 1 |
| 6 | 7.2 | 10 | 1.39 | 7 | 3 | 2 | 2 | 2 | 1 | 0 |
| 7 | 8.8 | 6 | 0.68 | 6 | 0 | 4 | 4 | 0 | 0 | 0 |
| 8 | 9.7 | 6 | 0.62 | 3 | 3 | 5 | 3 | 1 | 1 | 0 |
| 9 | 14.8 | 10 | 0.68 | 4 | 6 | 9 | 4 | 0 | 0 | 0 |
| 10 | 13.7 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **101.6** | **961** | **9.46** | **574** | **376** | **536** | **339** | **46** | **29** | **129** |

1/ Condition-1 fish are those with at least one clear eye and considered to have died within one week.
2/ Condition-2 fish are those with both eyes cloudy and considered to have died more than one week prior to recovery.
3/Right maxillary clipped fish are presumed to originate from Trinity River Hatchery, where all coho are right maxillary clipped.
4/ Spaghetti tags applied at Junction City and Willow Creek weirs or tags applied at Hatchery.
5/Fish entering hatchery and later returned to river received either a coded jaw tag or floy tag.

## Size composition

Only condition-1 and condition-2 fish that were measured were included in the size composition analysis. Condition-3 fish were assumed to have decomposed to a point where length measurements were no longer accurate. The size separating grilse and adults for spring-run and fall-run Chinook salmon and coho salmon was determined using length frequency analysis of fish trapped at WCW, JCW and TRH. For additional information regarding grilse and adult fork length separation see Task 1 of this report.

### Spring-run Chinook

Fork lengths of Spring-run Chinook (n = 1,167) averaged 70.2 cm. and ranged between 32-115 cm. (Figure 3). Grilse (FL < 49 cm) accounted for 2.4 % (28/1,167) of the measured Spring-run Chinook.

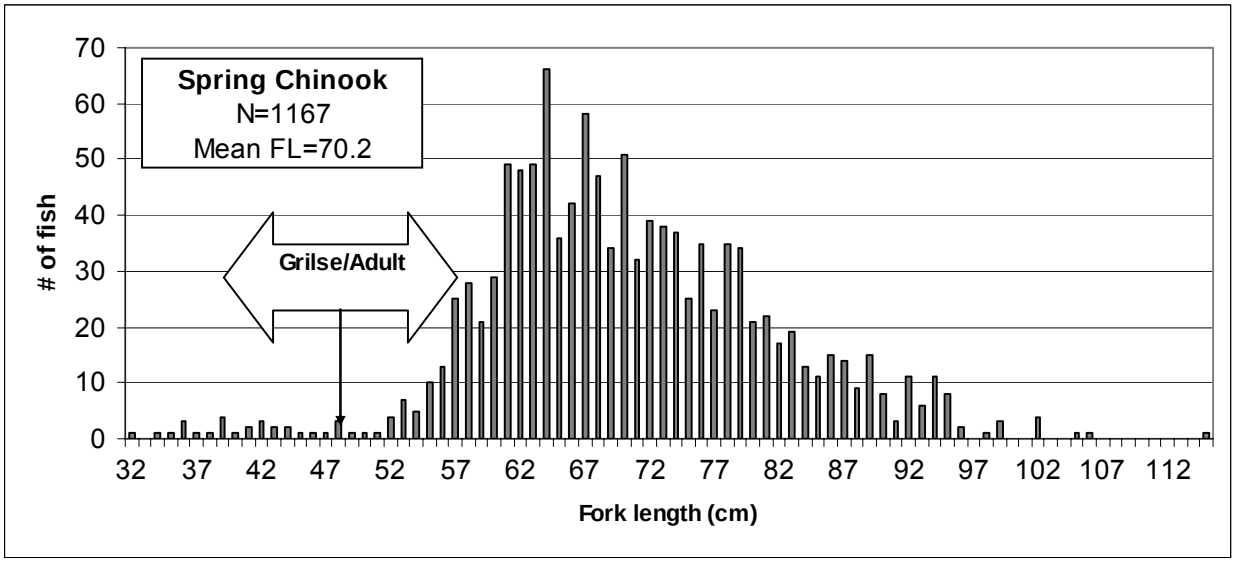



**Figure 3. Length frequency histogram for all condition 1 and 2 spring-run Chinook measured during the 2005 main-stem Trinity carcass survey.**

Fall-run Chinook

Fork lengths obtained from Fall Chinook (n = 2,007) averaged 71.6 cm and ranged between 37-105 cm. (Figure 4). Grilse (FL < 50 cm) accounted for 1.05% (21/3,511) of measured fall Chinook.

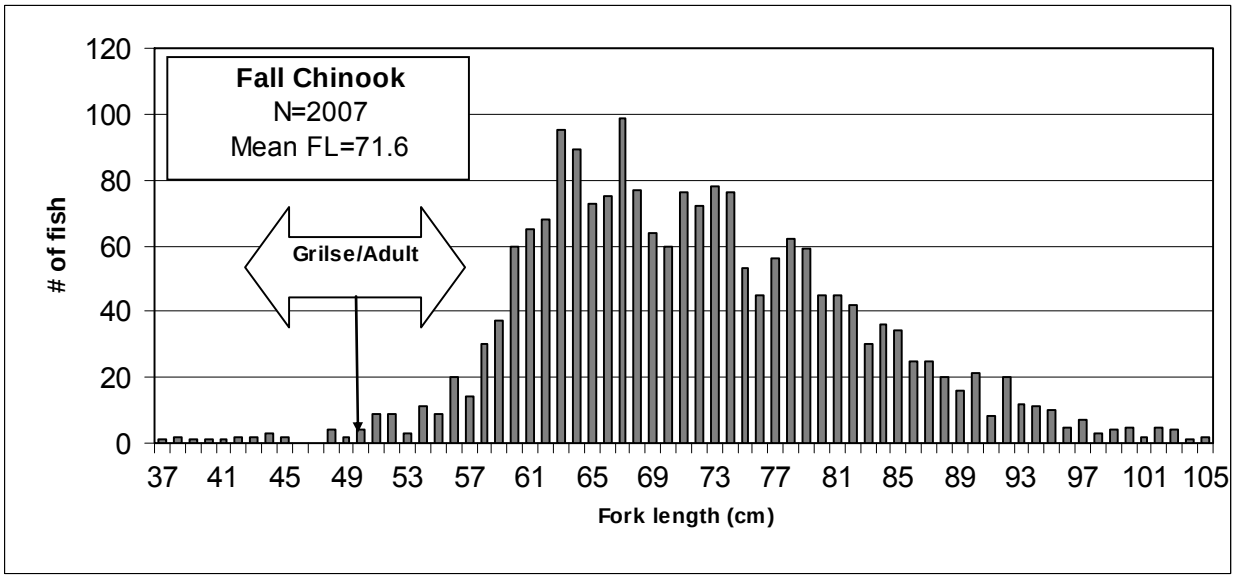



**Figure 4. Length frequency histogram for all condition 1 and 2 Fall-run Chinook measured during the 2005 main-stem Trinity carcass survey.**

Coho salmon

Fork lengths of coho salmon (n = 932) averaged 66.5 cm and ranged from 34-85 cm. (Figure 5). Grilse (FL < 51 cm) accounted for 3.1% (29/932) of measured coho.

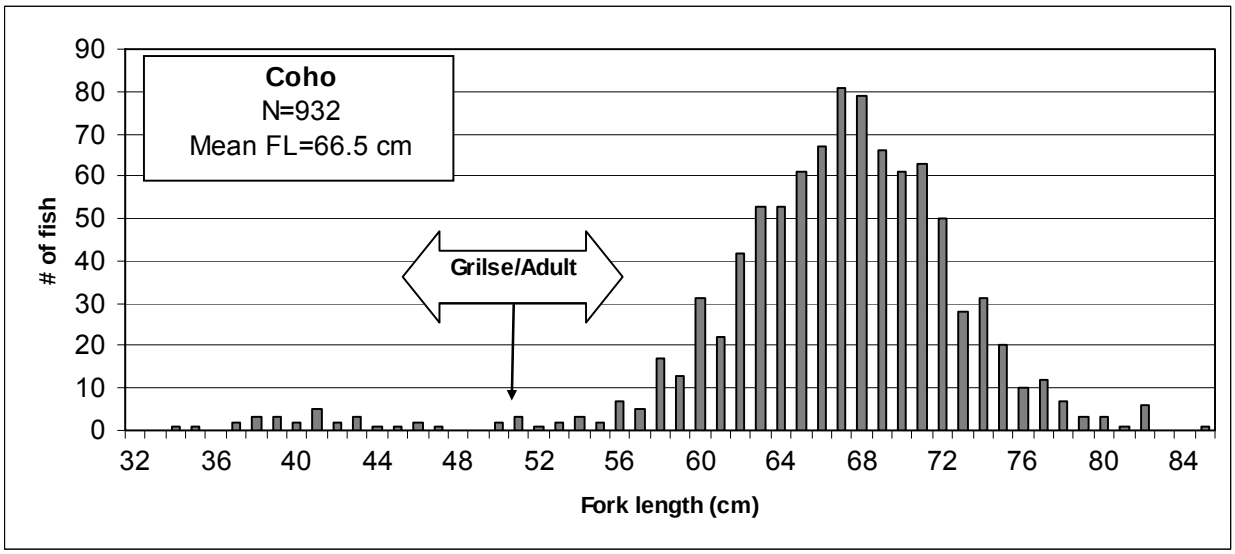



**Figure 5. Length frequency histogram for all condition 1 and 2 coho samon measured during the 2005 main-stem Trinity carcass survey.**

Adult Sex Composition and Female Pre-spawn Mortality

Spring Chinook

Of the adult spring-run Chinook recovered that were sexed, 502 were sexed as males and 686 as females, a male to female ratio of 0.73 : 1. Gender was indiscernible on 36 fish due to advanced decomposition. Forty-eight (7.37%) of the 686 female spring-run Chinook carcasses evaluated were determined to be pre-spawn mortalities.

**Table 6. Male to Female Ratio and Prespawn Mortality of Spring-run Chinook on 2005 Upper Trinity River Carcass Survey by Reach.**

| Reach | Total Chinook | Males | Females | Unknown Gender | Males per Female | Prespawn Mortality (Females) |
|---|---|---|---|---|---|---|
| 1 | 566 | 206 | 343 | 17 | 0.60 | 7.21% |
| 2 | 267 | 110 | 147 | 10 | 0.75 | 7.75% |
| 3 | 119 | 60 | 57 | 2 | 1.05 | 10.91% |
| 4 | 93 | 44 | 46 | 3 | 0.96 | 4.44% |
| 5 | 75 | 34 | 40 | 1 | 0.85 | 7.50% |
| 6 | 36 | 17 | 18 | 1 | 0.94 | 0.00% |
| 7 | 31 | 9 | 20 | 2 | 0.45 | 6.25% |
| 8 | 8 | 4 | 4 | 0 | 1.00 | 0.00% |
| 9 | 22 | 11 | 11 | 0 | 1.00 | 14.29% |
| 10 | 7 | 7 | 0 | 0 | 0.00 | 0.00% |
| **Total** | **1224** | **502** | **686** | **36** | **0.73** | **7.37%** |

Fall-run Chinook

Of the 2,096 adult fall-run Chinook that were sexed, 941 were sexed as males and 1102 were sexed as females, for a male: female ratio of 0.85 : 1. Gender was indiscernible on 53 fish due to advanced decomposition. Seventy (6.52%) of the 1,102 adult female fall Chinook carcasses examined were determined to be pre-spawn mortalities.

**Table 7. Male to Female Ratio and Prespawn Mortality of Fall-run Chinook on 2005 Upper Trinity River Carcass Survey by Reach.**

| Reach | Total Chinook | Males | Females | Unknown Gender | Males per Female | Prespawn Mortality (Females) |
|---|---|---|---|---|---|---|
| 1 | 1370 | 569 | 763 | 38 | 0.75 | 5.34% |
| 2 | 440 | 236 | 200 | 4 | 1.18 | 7.73% |
| 3 | 104 | 61 | 40 | 3 | 1.53 | 20.51% |
| 4 | 67 | 28 | 38 | 1 | 0.74 | 5.71% |
| 5 | 44 | 18 | 24 | 2 | 0.75 | 22.73% |
| 6 | 20 | 4 | 15 | 1 | 0.27 | 0.00% |
| 7 | 17 | 8 | 6 | 3 | 1.33 | 0.00% |
| 8 | 1 | 0 | 1 | 0 | 0.00 | 0.00% |
| 9 | 18 | 10 | 7 | 1 | 1.43 | 0.00% |
| 10 | 15 | 7 | 8 | 0 | 0.88 | 0.00% |
| **Total** | **2096** | **941** | **1102** | **53** | **0.85** | **6.52%** |

Coho salmon

Of the 961 adult coho salmon that were sexed, 444 were sexed as males and 508 were sexed as females, for a male: female ratio of 0.87 : 1. Gender was indiscernible on nine fish due to advanced decomposition. Seventy-eight (15.85%) of 961 adult coho carcasses examined were determined to be pre-spawn mortalities.

**Table 8. Male to Female Ratio and Prespawn Mortality of Coho Salmon on 2005 Upper Trinity River Carcass Survey by Reach.**

| Reach | Total Chinook | Males | Females | Unknown Gender | Males per Female | Prespawn Mortality (Females) |
|---|---|---|---|---|---|---|
| 1 | 572 | 252 | 318 | 2 | 0.79 | 11.25% |
| 2 | 237 | 115 | 121 | 1 | 0.95 | 18.64% |
| 3 | 72 | 38 | 30 | 4 | 1.27 | 25.00% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 28 | 16 | 11 | 1 | 1.45 | 30.00% |
| 5 | 20 | 7 | 13 | 0 | 0.54 | 35.71% |
| 6 | 10 | 3 | 7 | 0 | 0.43 | 25.00% |
| 7 | 6 | 3 | 2 | 1 | 1.50 | 0.00% |
| 8 | 6 | 5 | 1 | 0 | 5.00 | 100.00% |
| 9 | 10 | 5 | 5 | 0 | 1.00 | 66.67% |
| 10 | 0 | 0 | 0 | 0 | 0.00 | 0.00% |
| **Total** | **961** | **444** | **508** | **9** | **0.87** | **15.85%** |

Brown Trout

Sixty-one (61) brown trout, *Salmo trutta*, were recovered during the course of the carcass survey. Of those recovered, 31 were determined to be male and 26 were determined to be female, for a male/female ratio of 1.19:1. Brown trout are iteroparous; therefore, they do not necessarily die at the completion of spawning. However, 82.6% of the females died prior to spawning. The majority of brown trout carcasses were collected in reaches 3 and 4 in close proximity to Poker Bar and Indian Creek.

**Table 9. Male to Female Ratio and Prespawn Mortality of Brown Trout on 2005 Upper Trinity River Carcass Survey by Reach.**

| Reach | Number Observed | Male | Female | Male per Female | Prespawn Mortality (Females) |
|---|---|---|---|---|---|
| **1** | 0 | 0 | 0 | 0 | 0.00% |
| **2** | 4 | 1 | 3 | 0.333 | 100.00% |
| **3** | 29 | 16 | 12 | 1.333 | 72.73% |
| **4** | 13 | 7 | 6 | 1.667 | 80.00% |
| **5** | 8 | 4 | 2 | 2 | 100.00% |
| **6** | 0 | 0 | 0 | 0 | 0.00% |
| **7** | 1 | 1 | 0 | 1 | 0.00% |
| **8** | 2 | 0 | 2 | 0 | 100.00% |
| **9** | 4 | 2 | 1 | 2 | 100.00% |
| **10** | 0 | 0 | 0 | 0 | 0.00% |
| **Total** | **61** | **31** | **26** | **1.19** | **82.61%** |

In-river Escapement Estimates

This season, a mark-recapture methodology was employed on the upper Trinity River to estimate in-river escapement of Chinook salmon. Mark-recapture techniques were historically used on the Trinity, but have not been employed since. During the 2005 survey, crews marked all condition-1 Chinook salmon with a weekly color coded jaw tag. Fish are subsequently recaptured to produce a weekly efficiency. During the course of the survey, 28.4% of Chinook salmon carcasses encountered were marked, and 44.6% of those fish were subsequently recaptured. The upper sections (reaches 1-5) had a slightly higher recapture rate (50.74%) than

the survey as a whole. The lower sections (reaches 6-10) were not treated as a separate strata. These reaches exhibited an excessively poor capture rate; only three fish were recaptured in reaches 6-10, this was considered anomalous due to small sample size and less than perfect temporal coverage. To estimate escapement in the lower section, estimates for the upper section are subtracted from estimates from the entire survey, with the assumption that capture probability of carcasses was actually equal between the upper and lower sections.

**Table 10. In-River escapement estimates for Chinook salmon collected during 2005 Trinity River spawner survey.**

| | Above Junction City (Reach 1-5) | Entire survey (Reach 1-10) | Entire survey minus Above J.C. (Reach 6-10) | Reach 1-5 95% confidence interval (+ or -) | Entire survey 95% confidence interval (+ or -) |
|---|---|---|---|---|---|
| **Petersen** | 7181 | 8565 | 1384 | 420 | 531 |
| **Weekly stratified Petersen** | 7968 | 9600 | 1631 | 635 | 824 |
| **Schaefer** | 7288 | 8831 | 1543 | 473 | 659 |
| **Schaefer w/ Law's adjustment** | 6340 | 7745 | 1405 | 473 | 659 |

**Table 11. In-river escapement estimates for Spring and Fall Chinook collected during 2005 Trinity River spawner survey.**

| Above J.C. (Reach 1-5) | Spring | Fall | Ratio of Spring to Fall Chinook |
|---|---|---|---|
| **Petersen** | 2557 | 4624 | 0.55:1 |
| **Weekly Stratified Petersen** | 2838 | 5130 | |
| **Schaefer** | 2596 | 4693 | |
| **Schaefer w/ Law's adjustment** | 2258 | 4082 | |
| | | | |
| **Entire Survey (Reach 1-10)** | **Spring** | **Fall** | **Ratio of Spring to Fall Chinook** |
| **Petersen** | 3158 | 5407 | 0.58:1 |
| **Weekly Stratified Petersen** | 3539 | 6060 | |
| **Schaefer** | 3256 | 5574 | |
| **Schaefer w/ Law's adjustment** | 2855 | 4890 | |

Incidence of Hatchery Produced Chinook salmon and Coho salmon

Spring-run Chinook

During the spring-run period, 11.5% (n = 68) of condition-one and 8.1 % (n = 99) of all spring-run Chinook recovered bore Ad-clips. Observed ad-clip rates in reaches 1 and 2 for spring-run Chinook were 12.5% and 6.7% respectively. Downstream of reach 2, ad-clipped salmon were only found in two other reaches; 3.2% of spring-run in reach 4 and 22% of spring-run in reach 7 bore ad-clips (Table 4). CWT's were recovered from 84 Chinook salmon encountered during the

spring Chinook recovery period, of which all but two were determined to be spring-run fish. During the period associated with the spring run seven ad-clipped Chinook were recovered in which no CWTs were found. The majority of CWT's (70.2%) were represented by three release groups. Two release groups were age-3 fingerlings (065295 and 065297), which comprised 44% of the total spring CWT recovery. The other predominant release group consisted of age-4 yearlings (065288), which comprised 26.1% of the total spring CWT recovery.

Based on expansion of all CWT codes recovered during the spring-run period, an estimated 340 (25.7%) of the total 1,224 fish recovered were of TRH origin (Table 3). Based on expansions of all spring-run CWT groups, an estimated age structure of TRH spring Chinook recovered in the main-stem Trinity River carcass survey was 1.2% age 2, 58.5% age 3, 30.4% age 4, and 1.2% age 5.

Fall-run Chinook

During the fall-run period 20.5% (n = 146) of the condition one and 10.9% (n = 230) of all fall Chinook bore ad-clips. Observed ad-clip rates in reach 1 and 2 for fall-run Chinook were 13.5% and 4.7% respectively. Reaches 3-6 had surprisingly higher than expected ad-clip rates at 8.7%, 7.4%, 9.0%, and 15% respectively. CWT's were recovered from 230 of the total Chinook encountered during the fall Chinook recovery period, of which all but nine were determined to be fall-run fish. During the period associated with the fall-run, 22 ad-clipped Chinook were recovered in which no CWTs were found. The majority of CWT's during the fall-run recovery period was represented by six release groups: one age-4 yearling release group (23.5%), one age-3 yearling release group (12.8%), and four age-3 fingerling release groups (49.1%).

Based on expansion of all CWT codes recovered during the fall-run period, an estimated 898 (42.8%) of the total 2,096 fish recovered were of TRH origin (Table 4). Based on expansions of all fall CWT groups, the estimated age structure of TRH fall-run Chinook recovered in the main-stem Trinity River carcass survey was 1.3% age 2, 62.0% age 3, 25.2% age 4, and 2.6% age 5.

Coho salmon

During the course of the survey, 59.1% (n = 339) of condition-1 and 55.8% (n = 536) of all coho salmon recovered bore RM clips (Table 5). Coho salmon RM clip rates for condition-1

carcasses were high throughout all reaches. Based on a 100% clip rate of TRH produced juvenile coho salmon, an estimated 55.8% of adults recovered during the survey were of TRH origin.

**Table 12. Release and recovery data for coded-were tagged, Trinity River Hatchery produced Chinook salmon, recovered during 2005 Trinity River spawner survey.**

| Release data | | | | | Recovery data | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Recovery period[3] | | | | |
| CWT code | Brood year | Age | Release type[1] | Production multiplier[2] | Spring | Fall | Total | % of sub-total | Expanded total |
| ***Spring Chinook*** | | | | | | | | | |
| 065270 | 00 | 5 | Sf | 4.51173 | 1 | 0 | 1 | 1.190 | 5 |
| 065283 | 01 | 4 | Sf | 4.08644 | 3 | 0 | 3 | 3.571 | 12 |
| 065288 | 01 | 4 | Sy | 4.05589 | 22 | 0 | 22 | 26.190 | 89 |
| 065295 | 02 | 3 | Sf | 4.09809 | 20 | 0 | 20 | 23.810 | 82 |
| 065296 | 02 | 3 | Sf | 4.10148 | 8 | 1 | 9 | 10.714 | 37 |
| 065297 | 02 | 3 | Sf | 4.09912 | 17 | 0 | 17 | 20.238 | 70 |
| 065308 | 02 | 3 | Sy | 4.0199 | 3 | 1 | 4 | 4.762 | 16 |
| 065317 | 03 | 2 | Sy | 4.1616 | 1 | 0 | 1 | 1.190 | 4 |
| No CWT recovered[4] | | | | | 7 | 0 | 7 | 8.333 | 0 |
| | | | | Subtotal: | 82 | 2 | 84 | 100 | 315 |
| ***Fall Chinook*** | | | | | | | | | |
| 065265 | 00 | 5 | Ff | 4.1657 | 1 | 0 | 1 | 0.412 | 4 |
| 065643 | 00 | 5 | Ff | 4.49046 | 0 | 1 | 1 | 0.412 | 4 |
| 065268 | 00 | 5 | Ff | 4.11655 | 0 | 1 | 1 | 0.412 | 4 |
| 065280 | 00 | 5 | Fy | 4.02905 | 1 | 3 | 4 | 1.646 | 16 |
| 065284 | 01 | 4 | Ff | 4.07891 | 0 | 2 | 2 | 0.823 | 8 |
| 065285 | 01 | 4 | Ff | 4.32641 | 1 | 0 | 1 | 0.412 | 4 |
| 065286 | 01 | 4 | Ff | 4.04537 | 0 | 2 | 2 | 0.823 | 8 |
| 065289 | 01 | 4 | Fy | 4.02148 | 0 | 55 | 55 | 22.634 | 221 |
| 065298 | 02 | 3 | Ff | 4.09915 | 5 | 37 | 42 | 17.284 | 172 |
| 065299 | 02 | 3 | Ff | 4.01554 | 0 | 36 | 36 | 14.815 | 145 |
| 065306 | 02 | 3 | Ff | 4.1468 | 1 | 19 | 20 | 8.230 | 83 |
| 065307 | 02 | 3 | Ff | 4.12867 | 0 | 23 | 23 | 9.465 | 95 |
| 065309 | 02 | 3 | Fy | 4.03352 | 0 | 30 | 30 | 12.346 | 121 |
| 065314 | 03 | 2 | Ff | 4.01362 | 0 | 2 | 2 | 0.823 | 8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 065316 | 03 | 2 | Ff | 3.9997 | 0 | 1 | 1 | 0.412 | 4 |
| No CWT recovered[4] | | | | | 0 | 22 | 22 | 9.053 | 0 |
| | | | | Subtotal: | 9 | 234 | 243 | 100 | 898 |
| | | | | Grand Totals | 89 | 236 | 327 | | 1,213 |

1 Release types: Sf-Spring Chinook fingerling, Sy-Spring Chinook yearling; Ff-Fall Chinook fingerling, Fy-Fall Chinook yearling.
2 Hatchery production multiplier used to account for untagged releases of the same brood year, race and release type.
3 Spring Chinook recovery period was September 19- November 4. Later recoveries were all considered Fall Chinook.
4 CWT was not present or was lost during recovery.

## DISCUSSION

When looking at the Chinook salmon runs as a whole, year to year variation in numbers of salmon carcasses recovered on the upper Trinity River is fairly minimal when examined as an order of magnitude (with the exception of the 2003 Chinook season) and normally tracks well with the number of fish recovered at Trinity River Hatchery (see Task 1). During the 2005 season, crews recovered a similar number of spring-run Chinook and less fall-run Chinook than the previous season (Appendix 1). Coho salmon carcass numbers were also slightly lower than the 2004 season. When comparing yearly data, it is important to acknowledge differences in survey timing and periodicity, as well as climatic events and budgetary constraints that inhibit survey timing and periodicity. In some years, surveys were conducted into January, covering a greater proportion of the coho salmon run. Additionally, in some years weekly survey periodicity was lower due to poor weather and high flows.

Prior to 1996, CDFG conducted mark recapture carcass recovery surveys which allowed for estimation of the total numbers of spawners in each survey reach. Due to inclusion of redd data collection and other crew constraints during the 1996-2004 seasons, carcass totals were then solely based on total numbers of carcasses recovered. With the reintroduction of a mark recapture methodology in 2005, we will continue to display the number of carcasses observed per reach, independent of mark recapture, for comparison with past years. Current mark recapture efforts do not produce reach escapement estimates, as weekly efficiencies by reach are sporadic and highly variable.

### Carcass Distribution

As in past years, Chinook salmon and coho salmon carcass densities were highest in the uppermost reaches and were negatively associated with increased distance from Lewiston Dam and TRH (Appendix 1). Salmon imprint upon the waters in which they rear, and subsequently home on those waters when returning to spawn. If more spawners utilize upper reaches and their progeny rear in those reaches, then it is logical to speculate that the majority of returning salmon would then subsequently spawn in those same upper reaches. Other potential factors contributing to the observed high densities in the upper reaches include straying of hatchery fish, blockage of anadromy by Lewiston Dam and availability of suitable spawning habitat.

## Adult Sex Composition and Female Pre-spawn Mortality

For all races and species of salmon carcasses recovered on the upper Trinity, female adults out numbered male adults. Previous studies on the Trinity River presented in Aguilar (1996), suggest this is common for Chinook salmon. If a portion of males return as grilse (two year olds), then adult females would then make up a higher percentage of adults. Another factor that could possibly skew male to female ratios is unequal capture probability by sex. Zhou (2002) modeled and analyzed 12 years of Salmon River, Oregon fall-run Chinook salmon carcass data and found that male Chinook were underestimated by 8%, while female Chinook were overestimated by 12%. Assuming similar bias in Trinity River carcass composition results, a 1:1 male to female ratio would be portrayed as 0.82:1, which is similar to ratio observed in 2005.

Trinity River Chinook salmon pre-spawn mortalities for years when more than 100 females were examined have ranged from 1.0 to 63% for spring-run Chinook, and 0.7 to 43.7% for fall-run Chinook (Appendix 2). Pre-spawn mortality rates observed this year were 7.4 % for spring-run Chinook and 6.5 % for fall-run Chinook. For years in which more than 100 female coho salmon were examined pre-spawn mortality rates have ranged from 8.5 to 15.7%. The coho salmon pre-spawn mortality rate observed this season was 15.2%. It is unclear how this rate is influenced by a truncated survey season, although if pre-spawn mortalities die sooner than successful spawners, this rate would most likely be overestimated. It has also been noted, most recently by Zuspan (1998), that pre-spawn mortality may be density dependent and is positively related to run-size in the Trinity River. A regression analysis of the last six years of carcass recovery numbers vs. prespawn mortalities for each of the three runs only detected this correlation in fall-run Chinook. For the 2000-2005 seasons, prespawn mortality of fall-run Chinook was positively related to the number of carcass recoveries ($R^2$=0.73, $p<0.03$).

## Mark Recapture Estimators

Carcass mark recapture or capture recapture estimators are commonly used by the CDFG to estimate in-river escapement of salmon; these estimators have been used in Central Valley tributaries including the American River and Sacramento River since the early 1970's (Snider, Reavis and Hill, 1999). In the Klamath basin, CDFG currently utilizes both the Petersen and Schaefer estimators to produce in-river escapements from carcass survey data (S. Borok, pers comm, 2005). It is important to acknowledge the limitations and potential biases associated with these estimators. If basic assumptions are violated, or bias is excessively high, options should be pursued to refine these estimators or another estimator should be selected.

The Petersen estimator is the most popularly used mark recapture model in fisheries management but is often portrayed as a crude application as it is a closed population model and assumptions concerning zero births or death (immigration and survival) are rarely met. With respect to salmon carcass surveys, the Petersen model has been found to consistently overestimate population estimates, sometimes exceeding 250% of the true population (Law, 1994). Stratifying

Petersen estimates by week can minimize some of the bias created by births and deaths; however, its use in this study showed it to be even more positively biased than the pooled Petersen.

The Schaefer estimator is commonly used as an alternative to the simple pooled Petersen when the assumptions of equal mixing, homogenous capture, or homogenous recapture probabilities will not hold (Schwarz et al, 2002). When these assumptions are violated, stratifying capture and recaptures by time or location and using either a stratified Petersen or Schaefer estimator may be appropriate. Law (1994) found the Schaefer estimator to be less positively biased than the Petersen estimator, but cautioned that it also overestimates populations, especially at low survival and low catch rates. Law (1994) suggests the use of the Jolly-Seber open population mark recapture model for use in salmon carcass population estimates, but recognized that on larger rivers, the Jolly-Seber may produce estimates that are consistently low. It is possible that the basic assumption of equal mixing of tagged carcasses with all carcasses may be violated, in which case, recaptured carcasses may constitute a different sub-population.

## Other Possible Sources of Bias

Problems or biases associated with salmon carcass surveys should be identified and subsequently minimized in order to produce more accurate and precise estimates. Some problems are inherent to survey design or human nature, while others are specific to situations or crews working on the Trinity River.

Inter-observer variation is a source of bias affecting all types of fish surveying methods. During this survey an attempt was made to minimize this variation by maintaining the same rower/observer teams and rotating sides of the river by week. By rotating banks weekly, bias concerning memory of where marked carcasses were released was minimized. Maintaining the same crew throughout the season was also important to minimize variation in data collection methods and ensure data consistency between weeks and sections.

Weather is an uncontrollable factor and most likely has a great affect on consistency of survey methods. High flow events reduce carcass capture efficiency due to higher in-stream velocities and increased turbidity. Extreme high flow events may also cause exclusion of weekly surveying efforts on dropped reaches. During the 2005 season, no survey days were dropped due to high flow events. Capture efficiency can also possibly be reduced by excessive cloud cover or glare

Sufficient survey periodicity is necessary to ensure proper temporal coverage in recovery of salmon carcasses. Weekly survey periodicity is most convenient when surveying ten long sections, necessitating the use of four crews. In reaches 8-10, bi-weekly surveys were conducted due to logistical constraints. Fresh carcasses were available for recapture for four to five weeks following initial capture, thus only fresh carcasses were tagged and used to calculate capture

efficiency. An additional problem which may necessitate more frequent surveying is predation of carcasses by scavengers. No direct evidence of carcass removal by predation was observed during the 2005 season, but we assume that some predation does exist. If predation rates are found to be inversely proportional to run size (ie predators remove a higher ratio of carcasses when less carcasses exist) then survey periodicity should be increased in lower run-size seasons. Conversely, there could be a density dependent relationship between run-size and attraction of predators, which would also necessitate increased survey periodicity.

Hatchery contribution estimates may possibly be underestimated due to problems associated with identification of hatchery fish. Poor detection of marks applied at TRH or errors in recording those marks can negatively skew hatchery contribution rates. The right maxillary clip exhibited by TRH released coho is very easy to miss if special attention is not paid to detecting that mark. Advanced decomposition of salmon carcasses may also inhibit the ability to detect hatchery marks. Poor detection or loss of adipose clipped salmon heads or loss of CWTs extracted from those heads also could negatively skew hatchery contribution rates.

## RECOMMENDATIONS

1.) Annual spawners surveys incorporating a mark-recapture methodology should be continued for future seasons, facilitating future comparisons of mark recapture escapement estimates.

2.) Mark recapture estimators should be statistically evaluated for bias, and the Jolly-Seber model should be considered if bias is found to be excessive, thus minimizing the potential of producing unacceptable estimates.

3.) In future years, the entire survey area, reaches one through ten, should be surveyed on a consistent temporal basis (e.g. once each week) if possible.

4.) Redd survey protocols and datasheets should be simplified, in order to concentrate crew efforts on carcass and redd detection.

5.) If recovery of coho salmon becomes a high priority, the temporal coverage of the surveys will need to be extended into January. If surveys are extended into January, a mark-recapture methodology should be initiated for coho salmon.

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## APPENDICES

**Appendix 1. Total carcasses recovered by species and race (Spring-run Chinook, Fall-run Chinook and Coho) by reach during Upper Trinity Carcass Survey 2000-2005.**

| **Spring Chinook** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Reach** | | | | | | | | | | |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** |
| **2000** | 695 | 368 | 101 | 52 | 11 | 5 | 4 | 1 | 2 | 2 | 1,241 |
| **2001** | 383 | 331 | 137 | 113 | 8 | 12 | 19 | 3 | 2 | 2 | 1,010 |
| **2002** | 951 | 641 | 311 | 214 | 169 | 245 | 124 | 20 | 46 | 8 | 2,729 |
| **2003** | 2,643 | 1,139 | 551 | 285 | 267 | 239 | 93 | 9 | 21 | 4 | 5,251 |
| **2004** | 431 | 345 | 172 | 96 | 83 | 37 | 20 | 1 | 0 | 2 | 1,187 |
| **2005** | 566 | 267 | 119 | 93 | 75 | 36 | 31 | 8 | 22 | 7 | 1,224 |
| | | | | | | | | | | | |
| **Fall Chinook** | | | | | | | | | | | |
| | **Reach** | | | | | | | | | | |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** |
| **2000** | 3,644 | 979 | 174 | 50 | 25 | 10 | 1 | 7 | 13 | 6 | 4,909 |
| **2001** | 3,217 | 872 | 136 | 118 | 23 | 14 | 75 | 12 | 32 | 6 | 4,505 |
| **2002** | 569 | 462 | 89 | 100 | 46 | 66 | 84 | 25 | 32 | 13 | 1,486 |
| **2003** | 6,050 | 2,656 | 886 | 385 | 84 | 91 | 50 | 23 | 72 | 24 | 10,321 |
| **2004** | 2,319 | 714 | 188 | 178 | 58 | 40 | 64 | 17 | 44 | 16 | 3,638 |
| **2005** | 1370 | 440 | 104 | 67 | 44 | 20 | 17 | 1 | 18 | 15 | 2,096 |
| | | | | | | | | | | | |
| **Coho Salmon** | | | | | | | | | | | |
| | **Reach** | | | | | | | | | | |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** |
| **2000** | 291 | 112 | 8 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 417 |
| **2001** | 465 | 211 | 11 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 692 |
| **2002** | 125 | 29 | 8 | 7 | 4 | 1 | 0 | 1 | 1 | 1 | 177 |
| **2003** | 304 | 106 | 37 | 8 | 2 | 0 | 1 | 0 | 4 | 6 | 468 |
| **2004** | 1,162 | 55 | 147 | 58 | 52 | 14 | 19 | 10 | 6 | 6 | 2,029 |
| **2005** | 572 | 237 | 72 | 28 | 20 | 10 | 6 | 6 | 10 | 0 | 961 |

**Appendix 2. Female salmon prespawn mortality rates observed in the Trinity River Carcass Survey 1955 through 2005.**

| | | Spring Chinook | | | Fall Chinook | | | Total Chinook | | | Coho | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Study Year** | Literature Source | Spawned | Not spawned | % Not spawned | Spawned | Not spawned | % Not spawned | Spawned | Not spawned | % Not spawned | Spawned | Not spawned | % Not spawned |
| **1955** | Gibbs (1956) | | | | | | | 2,076 | 32 | 1.5 | | | |
| **1956** | Weber (1965) | | | | | | | 3,438 | 219 | 6.0 | | | |
| **1963** | LaFaunce (1965) | | | | | | | 4,953 | 328 | 6.2 | | | |
| **1968** | Rogers (1970) | | | | | | | 1,494 | 124 | 7.7 | | | |
| **1969** | Smith (1975) | | | | | | | 1,889 | 23 | 1.2 | | | |
| **1970** | Rogers (1973) | | | | | | | 632 | 34 | 5.1 | | | |
| **1972** | Miller (1972) | | | | | | | 791 | 110 | 12.2 | | | |
| **1987** | Stempel (1988) | | | 49.9 | | | 18.8 | | | | | | |
| **1988** | Zuspan (1991) | 11 | 27 | 71.1 | 479 | 372 | 43.7 | 490 | 399 | 44.9 | | | |
| **1989** | Zuspan (1992a) | 194 | 327 | 62.8 | 1,546 | 464 | 23.1 | 1,740 | 791 | 31.3 | | | |
| **1990** | Zuspan (1992b) | 76 | 21 | 21.6 | 104 | 6 | 5.5 | 180 | 27 | 13.0 | | | |
| **1991** | Zuspan (1994) | 22 | 0 | 0.0 | 162 | 2 | 1.2 | 184 | 2 | 1.1 | | | |
| **1992** | Aguilar/Zuspan (1995) | 48 | 3 | 5.9 | 133 | 1 | 0.7 | 181 | 4 | 2.2 | | | |
| **1993** | Aguilar (1995) | 115 | 5 | 4.2 | 180 | 12 | 6.3 | 295 | 17 | 5.4 | | | |
| **1994** | Aguilar/Davis (1995) | 202 | 2 | 1.0 | 380 | 12 | 3.1 | 582 | 14 | 2.3 | | | |
| **1995** | Zuspan (1997) | 2,711 | 517 | 16.0 | 8,502 | 3,188 | 27.3 | 11,213 | 3,705 | 24.8 | | | |
| **1996** | Zuspan (1997) | 1,243 | 42 | 3.3 | 1,058 | 90 | 7.8 | 2,301 | 132 | 5.4 | | | |
| **1997** | Zuspan (1998) | 1,263 | 34 | 2.6 | 491 | 28 | 5.4 | 1,754 | 62 | 3.4 | | | |
| **2000** | Sinnen/Null (2002) | 559 | 17 | 3.0 | 1,940 | 146 | 7.0 | 2,499 | 163 | 6.1 | 89 | 13 | 12.7 |
| **2001** | Sinnen (2004) | 327 | 22 | 6.3 | 963 | 98 | 9.2 | 1,290 | 120 | 8.5 | 236 | 22 | 8.5 |
| **2002** | Sinnen/Currier (2004) | 1,117 | 67 | 5.7 | 625 | 11 | 1.7 | 1,742 | 77 | 4.2 | 56 | 8 | 12.5 |
| **2003** | Sinnen/Currier (2005) | 3,173 | 220 | 6.5 | 5,526 | 730 | 11.7 | 8,699 | 950 | 9.8 | 210 | 39 | 15.7 |
| **2004** | Sinnen/Knechtle (2006) | 646 | 60 | 8.5 | 1,864 | 100 | 5.1 | 2,510 | 160 | 6.0 | 1,042 | 187 | 15.2 |
| **2005** | Current study | 603 | 48 | 7.4 | 1,003 | 70 | 6.5 | 1,606 | 118 | 6.8 | 414 | 78 | 15.9 |

**Appendix 3. Upper Trinity above J.C. (Reach 1-5) Expansion Matrix for Chinook Weekly Stratified Petersen Estimator.**

| Week | Captured | Marked | Recaptures | Estimate | Marking Rate (%) | Recapture Rate (%) |
|---|---|---|---|---|---|---|
| **38** | 46 | 15 | | | | |
| **39** | 47 | 25 | 4 | 191 | 53.19% | 16.00% |
| **40** | 205 | 77 | 9 | 594 | 37.56% | 11.69% |
| **41** | 261 | 88 | 27 | 756 | 33.72% | 30.68% |
| **42** | 264 | 75 | 46 | 512 | 28.41% | 61.33% |
| **43** | 223 | 77 | 30 | 566 | 34.53% | 38.96% |
| **44** | 235 | 87 | 26 | 707 | 37.02% | 29.89% |
| **45** | 273 | 90 | 27 | 892 | 32.97% | 30.00% |
| **46** | 403 | 126 | 40 | 918 | 31.27% | 31.75% |
| **47** | 596 | 140 | 77 | 984 | 23.49% | 55.00% |
| **48** | 421 | 59 | 52 | 1143 | 14.01% | 88.14% |
| **49** | 389 | 62 | 75 | 311 | 15.94% | 120.97% |
| **50** | 246 | 27 | 60 | 258 | 10.98% | 222.22% |
| **51** | 38 | 0 | 8 | 136 | 0.00% | 0.00% |
| **Total** | 3647 | 948 | 481 | 7968 | 25.99% | 50.74% |

**Appendix 4. Trinity River complete survey above Cedar Flat (Reach 1-10) Expansion Matrix for Chinook Weekly Stratified Petersen Estimator.**

| Week | Captured | Marked | Recaptures | Estimate | Marking Rate (%) | Recapture Rate (%) |
|---|---|---|---|---|---|---|
| **38** | 49 | 17 | | | | |
| **39** | 47 | 25 | 4 | 215 | 53.19% | 16.00% |
| **40** | 209 | 79 | 9 | 606 | 37.80% | 11.39% |
| **41** | 267 | 94 | 27 | 793 | 35.21% | 28.72% |
| **42** | 282 | 90 | 47 | 571 | 31.91% | 52.22% |
| **43** | 243 | 97 | 30 | 739 | 39.92% | 30.93% |
| **44** | 288 | 131 | 26 | 1088 | 45.49% | 19.85% |
| **45** | 280 | 96 | 27 | 1373 | 34.29% | 28.13% |
| **46** | 441 | 156 | 41 | 1045 | 35.37% | 26.28% |
| **47** | 601 | 144 | 78 | 1211 | 23.96% | 54.17% |
| **48** | 430 | 65 | 52 | 1201 | 15.12% | 80.00% |
| **49** | 399 | 65 | 75 | 351 | 16.29% | 115.38% |
| **50** | 247 | 27 | 60 | 272 | 10.93% | 222.22% |
| **51** | 38 | 0 | 8 | 136 | 0.00% | 0.00% |
| **Total** | 3821 | 1086 | 484 | 9600 | 28.42% | 44.57% |

ANNUA L REPORT
2005-06 SEASON

Task 5
# ANGLER CREEL SURVEYS IN THE LOWER KLAMATH RIVER

By

Sara Borok

## ABSTRACT

During August 6th through November 4th, 2005 the Department of Fish and Game (CDFG) conducted a creel census in the lower Klamath River (Mouth to Hwy 96 Bridge in Weitchpec) to determine numbers of migrating Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*) harvested by sport anglers. The adult fall-run Chinook salmon lower river harvest sub-quota of 631 (1,262 for the basin) was met this season on September 9, 2005. A total of 1,670 Chinook salmon (811 adults and 859 grilse) and 152 steelhead (152 adults and 0 half-pounders) were harvested. Numbers of Chinook salmon harvested prior to August 15 were not applied to the fall-run Chinook sub-basin quota. During the first week of the creel anglers harvested an estimated 92 (83 adult and 9 grilse) spring-run Chinook salmon were harvested. The total number of fall-run Chinook harvested was 1,578 (728 adults and 850 grilse) fish. In this report, I present seasonal summaries and comparisons of angler effort and catch, catch timing, length frequencies, species composition, hatchery marks observed and tag recoveries are presented.

## INTRODUCTION

The Klamath River system is the second largest river system in California (the Sacramento system is the largest). It drains over 40,000 sq km in northern California and southern Oregon. The Trinity River is its largest tributary and empties into the Klamath River at Weitchpec (river kilometer (rkm) 68.8). Other major tributaries of the Klamath River are the Salmon River (rkm 105.6), Scott (rkm 228.8) and the Shasta River (rkm 283.2).

The upper limit of anadromy in the main Klamath River is Iron Gate Dam (rkm 304.2). Iron Gate Hatchery, at the base of the dam, mitigates for loss of historic anadromous fish habitat above the dam. The upper limit of anadromy in the Trinity River is at Lewiston Dam (rkm 177.8). Trinity River Hatchery is located at the base of Lewiston Dam and mitigates for loss of historic anadromous fish habitat above the dam. Both hatcheries are operated by California Department of Fish and Game (CDFG).

The Klamath River system is one of the state's primary producers of Chinook salmon and steelhead trout. These two species support popular sport fisheries throughout the Klamath River

system with most of the concentrated effort and catch occurring in the lower 50 kilometers of the mainstem Klamath River.

Although sport angling has been popular throughout the Klamath River for many decades, angler harvest data of anadromous salmonids within the Klamath River system prior to 1978 is limited. The earliest report found that mentions angling in the Klamath River is by Snyder (1931) where he briefly describes methods, mean length and sex of a two day creel sample at the mouth of the Klamath River in August 1921. Coots (1952) reports on angler harvest of anadromous salmonids during a year long creel census from the mouth of Salmon River (rkm 105.6 to Copco Dam (rkm 314) during 1949 and 1950. Gibbs and Kimsey (1955) provide angler effort and harvest estimates for the boat fishery in the Klamath River estuary during 1951. Bailey (1952) reported on a creel census of the fishery in the lower Klamath River above the Highway 101 Bridge conducted during the fall 1951 adult steelhead and Chinook salmon immigration.

Other earlier creel census reports on the mainstem Klamath River conducted upstream of the Salmon River (rkm 105.6) deal with angler catches during the summer trout season. Some adult steelhead and juvenile coho salmon are reported in the catches (Coots 1950, 1951, 1953, 1954; Wales 1948; Wales and Coots 1949). More harvest data was reported by Lanse (1970) in an area of the upper Klamath River between Dutch Creek to Iron Gate (rkm 147 to rkm 304) and by Miller (1971) working in an area of the middle Klamath River from Johnsons to the Salmon River (rkm 40 to rkm 105.6). Steelhead comprised the majority of the sampled catches.

Creel census studies prior to 1978 consisted primarily of angler effort, species composition and catch per hour information. Some provided harvest and effort estimates within the sampled area. However, not until 1978 was an attempt made to estimate Chinook harvest by anglers throughout the Klamath River basin (Boydstun, 1979).

The Fishery Conservation and Management Act of 1976 declared a fishery conservation zone off the west coast of the United States. This was later modified into an Exclusive Economic Zone in 1977 and then amended and renamed the Magneson-Stevenson Act in 1996. They managed ocean waters surrounding the United States from 3 to 200 miles. As a result the Pacific Fisheries Management Council (PFMC) was established in 1976. The PFMC soon recognized the need for salmon resource management and implemented the Fishery Management Plan (FMP) in 1977 for commercial and recreational salmon fisheries off the coasts of Washington, Oregon and California. The Klamath River is regarded as one of the more important producers of fall-run Chinook salmon in California's commercial and sport fisheries. PFMC management objectives include measures to rebuild and protect depressed Klamath River fall Chinook stocks (PFMC 1983). PFMC management practices have focused on harvest restrictions for commercial and recreational fisheries that were impacting Klamath River Chinook stocks. The State of California, with management jurisdiction of fisheries in coastal waters from shore out 5 kilometers (3 miles) and in-river sport fisheries, has implemented Chinook salmon management practices and regulations supporting PFMC objectives. Thus, Klamath River adult fall Chinook run-size data has been a critical management component of the fall-run Chinook resource and its

fisheries in northern California and southern Oregon.

The numbers of fall-run Chinook salmon entering the Klamath Basin (run-size) is determined by accumulating the numbers harvested in-river, numbers returning to the two basin hatcheries and the numbers of naturally spawning fish. Angler harvest of Klamath River fall-run Chinook has been monitored by CDFG to provide data for fall Chinook run-size estimates since 1978. Annual reports summarizing these activities have been written through the 2004 season (Boydstun 1979, 1980; Lee 1984a,1984b, 1985, Lau 1992-1997; Pisano 1998; Borok 1999-2004).

This report covers the period from July 1, 2005 through June 30, 2006. It provides data and a description of the CDFG fall-run Chinook angler harvest monitoring program in the mainstem Klamath River from the mouth to the Highway 96 Bridge at Weitchpec (formerly to the falls at Coon Creek) excluding the Trinity River.

The CDFG's Klamath River Project (KRP) divides the Klamath River into three areas, and on the Trinity River into two areas, to determine angling effort and catch for the entire river. The CDFG needs this information to determine when sport anglers have reached the in-river sport harvest quota of fall-run adult Chinook salmon for the entire river . This report only covers the two lower sections of the Klamath River from the Hwy 96 Bridge in Weitchepec to the ocean.

The Klamath River Chinook quota works in the following manner: One half the total in-river quota is dedicated to the lower river (rkm 0 to 40). The other half is dedicated to the upper river (rkm 40 to 306) and Trinity River. We monitor or model each of the areas for the fall-run Chinook harvest and determine when the quota of each portion has been met. Once met, an adult Chinook salmon harvest closure goes into effect in the river. Anglers are still permitted to fish, but must release any adult Chinook salmon caught. Meanwhile, anglers in the other portions of the river are still permitted to harvest adult Chinook. After all sub-quotas are met, fishing for grilse Chinook and other legal species is still permitted but the entire river is closed to the harvest of any adult Chinook. However, once the hatcheries (Iron Gate Hatchery and Trinity River Hatchery) have received enough adult salmon for an egg take, special fisheries for adult Chinook are permitted from Iron Gate Dam to where Interstate 5 crosses the Klamath River and downstream of Old Lewiston Bridge to the mouth of Indian Creek Bridge on the Trinity.

The Fish and Game Commission (Commission) establishes all angling regulations and quotas for the Klamath River. These regulations are enforced by the CDFG. The Commission adopts the quota recommendations made by the Pacific Fishery Management Council. Typically, the in-river sport Chinook quota is 7.5% of the overall allowable harvest, or 15% of the non- tribal fisheries harvest. In abundant seasons this portion may be adjusted. This year the in-river recreational allocation received the 15% of the non-tribal harvest allocation or 1,262 fish.

Starting in 1999 CDFG implemented an "impact quota" for the Klamath and Trinity Rivers. From this impact quota a ten percent hooking mortality factor was accounted for within the quota

and this number was used as the trigger quota. This trigger closure was to account for increased hook and release mortalities when the quota was met early in the season. The impact quota was further divided among the areas in the following manner: 50% Lower Klamath River, 17 % going to the Upper Klamath and 16.5% to each of the two sections on the Trinity River (upper Trinity; above Cedar Flat to Trinity Hatchery and lower Trinity; confluence with Klamath to below Cedar Flat). For the 2005 season these percentages worked out to 631 fish for the Lower Klamath River, 214 fish for the upper Klamath River, and 208 total harvestable fish for each section on the Trinity River (416 total for Trinity River).

In the 2005 season, fishing regulations allowed anglers to harvest three Chinook salmon per day (no more than 1 fish greater than 22 inches) and one hatchery trout or one hatchery steelhead per day in the Klamath and Trinity Rivers. Twenty two inches total length was used in the regulations to determine the adult/grilse cutoff. No harvest of Coho salmon was permitted. Regulations stated that one "hatchery" trout or one "hatchery" steelhead could be harvested. (Hatchery steelhead are identified by missing an adipose fin and a healed scar in the location of the missing fin.) There are no facilities raising cutthroat trout in the Klamath Trinity Basin so this eliminated the hatchery trout. To extend the season as long as possible for local businesses, anglers were only allowed to harvest adult Chinook five (Thursday through Monday) of the seven days of the week and to only keep two adult Chinook in seven consecutive days.

## METHODS

### Description of the Fishery and Creel Sample Area

To estimate angler catch and effort, CDFG divides the mainstem Klamath River from the mouth to Iron Gate Dam into three areas. The mouth of the river to the HWY 96 bridge in Weitchepec (Areas 1 and 2) are included in this report. From upstream of the HWY 96 bridge in Weitchepec to Iron Gate Dam (Area 3) was not surveyed by CDFG this season.

Area 1: This area consisted of 4.5 rkm (2.8 mi) of river from the mouth of the Klamath to the Highway 101 bridge and is referred to as the estuary. All shore angling effort in this area took place at the mouth of the river in 2005. River mouth configuration, which changes annually, determines which side (north or south) affords better angling. A creel sample of shore anglers was conducted at the mouth location. During the 2005 season fishing the mouth was not closed at any time. The 15% of the basin quota caught below the HWY 101 bridge (189 adult fall-run Chinook salmon) which could have closed the spit to fishing was not met. Angling effort at the mouth was not as high as on Area 2 this season.

All boat angling effort in the estuary originated from ten resort boat docks in the estuary area. Two resort docks (Chinook RV Park and Riverside RV Park) and the public launch ramp (Old Townsite Boat Ramp) were sampled this season for angler effort and catch.

Area 2: This area extended from the Highway 96 Bridge (rkm 68) in Weitchepec downstream to the Highway 101 at Klamath (rkm 5) The division was formerly the falls at Coon Creek (54.4 rkm) near the community of Johnson's riffle (Pecwan Creek), but to make the distinction clearer for anglers it was changed this season. Shore angling effort was generally confined to two popular riffles (Lower Klamath Glen and Blakes) located in the lower 5 km of this area and were easily accessible to the shore angler. One resort boat dock (Klamath Glen) and a public boat launch (Roy Rook), also located in the lower 5 km, were the principal boat facilities in the area. Creel sampling occurred at these locations.

Shore angling access above Blakes Riffle was limited to three access points: the mouth of Blue Creek (rkm 26.3,), Ah Pah Creek ( rkm 27.5), and Bear Riffle (rkm 29.8). These points are all accessible by vehicle but accounted for an estimated less than one percent of angling effort in the survey.

Angler access routes at Lower Klamath Glen and Blakes riffles were limited to specific routes in and out enabling a complete accounting of angler effort and catch during a sample day at these locations. Boat anglers were also confined to access at the launching ramp or resort boat dock enabling a complete sample of angler effort and catch for each sample day.

Creel Census Methods

Study methods and procedures used in the Lower Klamath Creel (Area 1 and 2) during the 2005 season were essentially the same as those described for the 1983 -1987 seasons (Hopelain 2001). Data is presented in Standard Julian Week (JW) format throughout this report (Appendix 1).

The weekly sampling schedule in the Lower Klamath River was sampling each site three days per Julian week and in the Upper Klamath each site was sampled twice per Julian week. For weeks that were sampled other than above, the data is expanded accordingly. Each angling access site is sampled throughout the day to account for total catch and effort for that particular site. Scientific aids interviewed anglers as they departed the fishing site and recorded the following information:

1) Was the angler finished fishing for the day at this time?
2) Total hours spent fishing (to the nearest half hour).
3) The first three numbers of their Zip Code (to find their general area of residence).
4) Fish harvested are examined (species, fork length, marks, external tags, and unusual conditions were recorded, and a scale sample was collected).
5) If the Chinook salmon had a missing adipose fin, (possessed a CWT) the head was removed and retained by staff.
6) The number and kind of fish caught and released (actually released not lost) by the angler (recorded as juveniles, grilse or adults).
7) In Area 1 only, where was the angler fishing: mouth or from boat and

upstream of bridge or down stream?

Harvest and Effort Estimating Procedures

Data was stratified for each creel census location by Julian week (Appendix 1). Angler catch and effort estimates are calculated for each week. The catch-effort estimate formula used was:

$$\text{Estimate total} = \sum_{I=1}^{n} \text{Daily total } (N/n)$$

where: Estimate total = estimates of catch or effort
Daily total = Daily counts of catch or effort
N = Number of fishing days in week
n = number of sample days

Regulations for the 2005 season allowed anglers to harvest adult Chinook only five of the seven days of the week. Adult fall Chinook numbers were adjusted for the number of days sampled divided by five instead of seven.

Area 2: Harvest estimates for the area above Highway 101 to the HWY 96 Bridge at Weitchepec is calculated by multiplying the observed catch and effort by a sampling ratio. This ratio is the weekly expansion value. This value is a simple ratio of the number of days sampled during that Julian week for the site over the number of legal fishing days within the week (7 days week / 3 days sampled = 2.33). All sites are totaled for the week to obtain the weekly harvest estimate for Area 2. This procedure applies to both boat and shore harvest. No additional expansion for the boat harvest in Area 2 is needed since total boat catch and effort were accounted for in the creel sampling.

Area 1: The procedure for the area below 101 is identical with Area 2 except for the addition of a boat expansion factor. The boat expansion factor accounts for the harvest by boat anglers we missed in sampling. Since we sample only a portion of the boat anglers, we need to account for the unsampled portion. The boat expansion formula is:

$$\frac{\text{(Boats at the non-sampled docks + Boats at sampled docks)}}{\text{Boats at Sampled docks}}$$

This formula expands the catch and effort from sampled sites by a percentage determined from the number of sampled and non-sampled boats. This percentage is obtained by counting the number of boats at all the docks (both sampled and non-sampled) below Hwy 101. This count occurs during a slow time of the day, usually, between 1100 to 1500. At this time, anglers often return to the docks. Although not all the boats will be at their docks at this time the assumption

that the percentage of boats that do not return to their docks is the same between both the unsampled and sampled docks. It is also assumed that the effort and catch are equal between the non-sampled boats and sampled boats.

A boat count is made every day Area 1 is sampled. This count does not include any boats used in the Indian gill-net fishery. An average of these daily values is used to arrive at the average boat expansion value for the week. The closer the expansion value is to one, the greater the total coverage we have in the estuary.

Daily Real Time Harvest Estimates and Projections

As in previous seasons, the KRP thought it necessary to compute harvest and effort estimates daily (real time) as we neared the quota to help prevent any over-harvesting. In addition, we estimated one, two, and three day harvest projections to allow lead time of any adult Chinook fishery closure.

## CREEL RESULTS

The creel census for the lower Klamath River began on August 6 and ran through November 4 (JWs 32 through 44) of 2005. Chinook salmon harvested in the creel fishery ranged in size from 34 cm to 98 cm in fork length (FL) and averaged 57 cm FL (Figure 1). From the fork length frequency in the creel survey sample, the grilse-adult separation was calculated to be 51 cm (20 inches) FL (Figure 1). Scale samples were aged to determine the adult grilse separation for the Klamath Megatable.

The grilse component of the angler harvest ranged in size from 34 to 50 cm FL and averaged 46.5 cm FL. The adult Chinook salmon component of the harvest ranged in size from 51 to 98 cm FL and averaged 72.7cm FL (Figure 1). This separation was slightly larger than what was used on the Trinity river this season. They made the separation at 49 cm FL (personnel communication Wade Sinnen). This separation at 50/51 cm in the sport fishery is the same as Iron Gate Hatchery (Figure 2).

Steelhead ranged in size from 34 to 77 cm FL and averaged 58.8 cm FL (Figure 3). Any fish less than 42 cm FL is considered to be a half-pounder, all steelhead larger were considered to be adults. Any steelhead less than 23 cm FL is considered a resident trout and not anadromous. The half-pounder steelhead ranged in size from 34 to 41 cm FL. The adult steelhead ranged in size from 42 to 76 cm FL and averaged 59.5 cm FL. This is slightly smaller than the 2004 season.

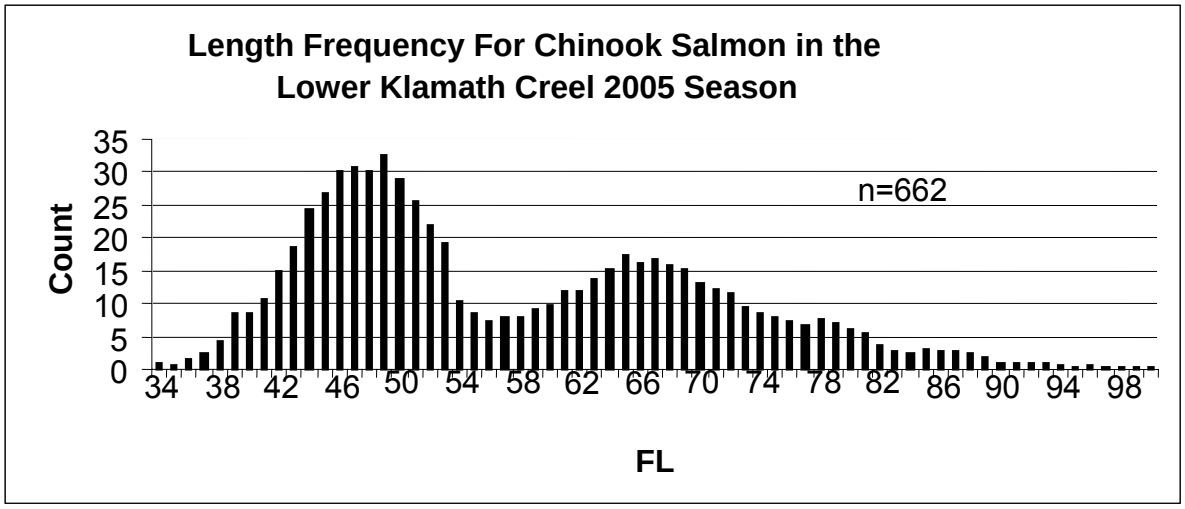


Figure 1. Length Frequency (FL) of Chinook Salmon Harvested in the Lower Klamath River Creel During the 2005 Season.

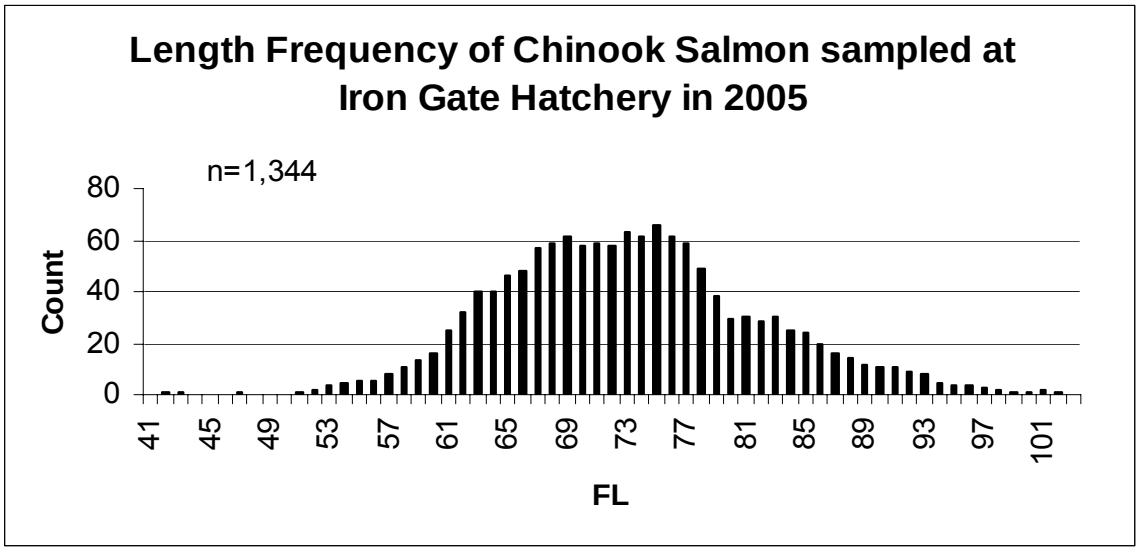


Figure 2. Length Frequency (FL) of Chinook Salmon Sampled at Iron Gate Hatchery During the 2005 Season.

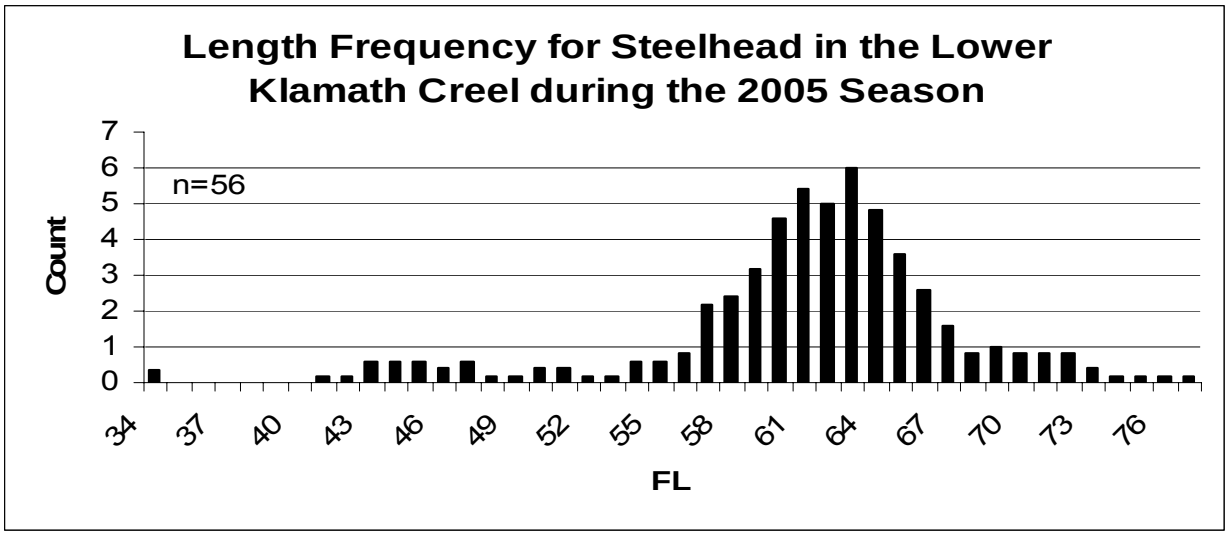


Figure 3. Length Frequency (FL) of Steelhead Caught in the Lower Klamath River Creel during the 2005 Season.

Estimated Angler Effort and Harvest

During the 2005 season, anglers made an estimated 12,629 daily trips in both Areas. Of the 12,629 trips; 5,571 were in Area 1, and 7,059 were in Area 2 (Table 1). The angling effort of these trips totaled 61,000 fishing hours. As in previous seasons, boat anglers out-numbered shore anglers in both Areas (Table 1). Anglers harvested a total of 1,670 (811 adults and 859 grilse) Chinook salmon and 152 (152 adults and 0 half-pounders) steelhead. During the first weeks of the creel 92 (83 adult and 9 grilse) spring-run Chinook salmon were harvested, but were not applied to the fall-run Chinook salmon quota. The total angler harvest of fall-run Chinook salmon was 1,578 (728 adults and 850 grilse) fish. Adults composed 46.1 % (728/1,578) of the estimated fall-run Chinook harvest. Adult steelhead trout composed 100 % (152/152; Table 1) of the steelhead harvest. In addition, anglers harvested 2 (2 adult and 0 grilse) coho salmon this season.

2005 Harvest and Effort Patterns

The average angler trip length was 4.8 hours, up slightly compared to the last two seasons (Table 2). It is our hypothesis that the smaller harvest quotas kept the anglers away from participating in the Klamath River fishery this year (Table 2). The daily bag limit of one adult and two grilse was the same as in 2004. For the 2005 season the weekly possession limit was lowered from 4 adults in seven consecutive days down to only two adults in seven consecutive days. A big difference this season was anglers were only allowed to keep adult fish on five of the seven legal

fishing days; no adult fish could be taken on Tuesdays and Wednesdays starting August 15th through November 30th for the 2005 season.

In 2005, Area 2 anglers harvested more fish than Area 1 anglers (Table 1). Anglers (boat and shore) in Area 2 accounted for 63.3% (1,058/1,670) of the total Chinook salmon and 87.5% (133/152) of the steelhead harvested. Anglers in Area 1 harvested the remaining 13% of steelhead. Area 1 anglers accounted for 44.1% (5571/12,629) of angler trips and only 38.5% of the angler hours (23,493/ 61,000). Of the total Chinook harvest, 0.13 % occurred in Area 1 at the mouth this season (Table 1). A portion of the fish recorded for Area 1 were actually caught in Area 2 later in the season. This occurred when anglers launched their boats from the Old Townsite Boat Ramp in Area 1 and fished upstream in Area 2. These fish were not counted against the quota allocated to Area 1.

Table 1. Summary of Estimated Angler Effort and Harvest During the 2005 Lower Klamath River Creel Census.

| Site | Angler | | Steelhead | | Chinook Salmon | |
|---|---|---|---|---|---|---|
| Location | Trips | Hours | ½ lbers | Adults | Grilse | Adults |
| Area 1 -Mouth to Highway 101 Bridge | | | | | | |
| Shore | 743 | 2,040 | 0 | 2 | 2 | 20 |
| Boats | 4,828 | 21,453 | 0 | 17 | 236 | 355 |
| Total | 5,571 | 23,493 | 0 | 19 | 238 | 375 |
| Area 2 - Highway 101 to HWY 96 | | | | | | |
| Shore | 1,952 | 6,875 | 0 | 21 | 10 | 51 |
| Boats | 5,107 | 30,633 | 0 | 112 | 611 | 386 |
| Total | 7,059 | 37,507 | 0 | 133 | 621 | 437 |
| Grand Total | 12,629 | 61,000 | 0 | 152 | 859 | 811 |
| 2004 | 15,180 | 71,397 | 25 | 272 | 2,018 | 2,421 |
| 2003 | 16,514 | 79,228 | 27 | 162 | 736 | 4,812 |

Table 2. The Number of Angler Trips, Hours, and Average Length of Trip in the Lower Klamath River Sport Fishery for the Last Fourteen Seasons, 1992-2005

| Year | Total Trips | Total Hours | Average Trip |
|---|---|---|---|
| 1992 | 11,190 | 33,080 | 3.0 |
| 1993 | 16,081 | 51,889 | 3.2 |
| 1994 | 15,100 | 54,748 | 3.6 |
| 1995 | 19,881 | 63,369 | 3.2 |
| 1996 | 27,929 | 91,019 | 3.3 |
| 1997 | 18,402 | 67,154 | 3.6 |
| 1998 | 17,606 | 52,145 | 3.0 |
| 1999 | 11,852 | 45,109 | 3.8 |
| 2000 | 14,150 | 57,184 | 4.0 |
| 2001 | 20,116 | 88,053 | 4.3 |
| 2002 | 18,376 | 85,925 | 4.6 |
| 2003 | 16,514 | 79,228 | 4.6 |
| 2004 | 15,180 | 71,397 | 4.7 |
| 2005 | 12,629 | 61,000 | 4.8 |

The 2005 harvest rate of adult Chinook salmon was slightly over the estimated average for the last 25 years. The harvest of grilse Chinook in the 2005 season was well over the 25 year average (Figure 4). Regulations on the harvest of grilse has remained constant for the last four years. Anglers contacted during the surveys reported seeing more grilse present in the river this season. The fall-run Chinook salmon quota was met right after Labor Day Weekend on September 10$^{th}$, 2005, which is traditionally the historic peak of adult Chinook migration. Anglers remaining in this area after the closure targeted grilse Chinook.

Catch and Release

Catch and release numbers were recorded as part of the creel interview. Anglers were specifically asked if these fish were released rather than lost. These numbers should only be used as a trend estimation as they can be highly subjective. Anglers released an estimated 3,678 half-pounders, 1,159 adult steelhead, 657 grilse, and 1,394 adult Chinook salmon (Tables 3 and

4). In addition, 11 grilse and 157 adult coho salmon were released this season. The majority of coho salmon harvested and released occurred in Area 2. Anglers tend to fish later into the season in Area 2, when coho salmon are present. As in other years, when the quota is met early the number of adult Chinook released goes up.

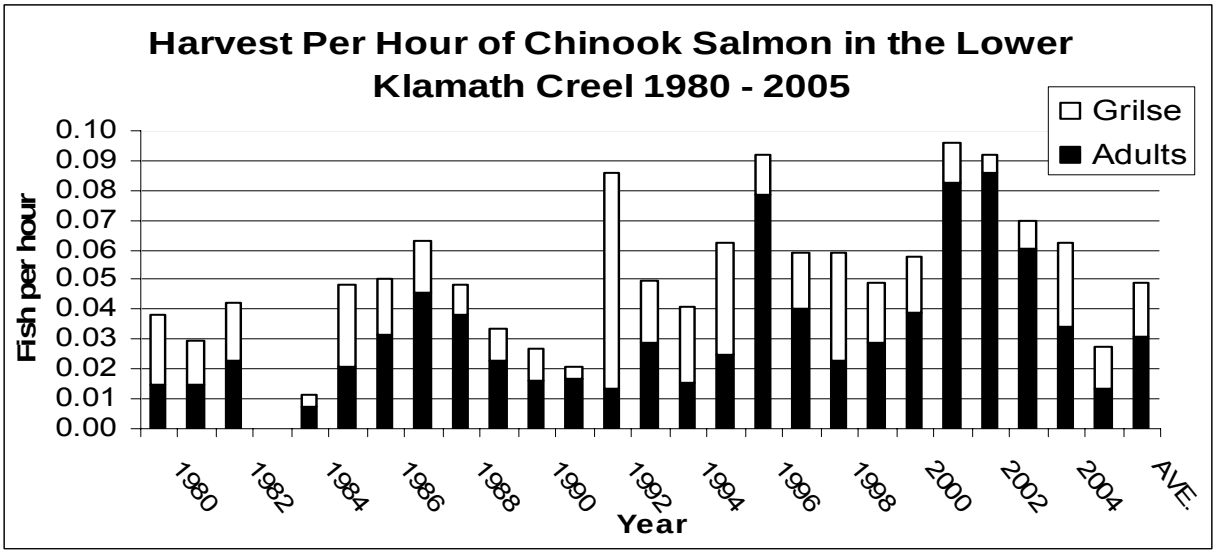


Figure 4. Harvest Per Hour of Chinook Salmon from the Sport Harvest on the Lower Klamath River Creel 1980 – 2005.

Table 3 Number of Chinook and Coho Salmon and Steelhead Caught and Released from the Lower Klamath River Creel for the Last Twelve Seasons 1994-2005.

| Year | Chinook | | Steelhead | | Coho | |
|---|---|---|---|---|---|---|
| | Grilse | Adults | <42 | >41 | Grilse | Adults |
| 1994 | 290 | 2,571 | 4,044 | 198 | 0 | 0 |
| 1995 | 175 | 14,408 | 1,049 | 259 | 0 | 33 |
| 1996 | 521 | 1,438 | 1,944 | 256 | 7 | 11 |
| 1997 | 34 | 1,015 | 1,479 | 516 | 0 | 0 |
| 1998 | 330 | 1,317 | 1,738 | 460 | 10 | 19 |
| 1999 | 1,897 | 1,164 | 1,189 | 346 | 2 | 5 |
| 2000 | 757 | 6,253 | 8,103 | 1,129 | 17 | 43 |
| 2001 | 464 | 1,720 | 11,892 | 2,997 | 12 | 242 |
| 2002 | 405 | 2,985 | 4,783 | 6,036 | 12 | 243 |
| 2003 | 303 | 3,970 | 3,791 | 1,553 | 4 | 130 |
| 2004 | 509 | 688 | 6,223 | 1,577 | 29 | 135 |
| 2005 | 657 | 1,394 | 3,678 | 1,159 | 11 | 157 |

Table 4. Summary of Estimated Catch and Releases During the 2005 Lower Klamath River Creel Census.

| Site | Angler | | Steelhead | | Chinook Salmon | |
|---|---|---|---|---|---|---|
| Location | Trips | Hours | ½ lbers | Adults | Grilse | Adults |
| Area 1 -Mouth to Highway 101 Bridge | | | | | | |
| Shore | 743 | 2,040 | 16 | 11 | 0 | 6 |
| Boats | 4,828 | 21,453 | 446 | 335 | 107 | 481 |
| Total | 5,571 | 23,493 | 462 | 346 | 107 | 487 |
| Area 2 - Highway 101 to HWY 96 Bridge | | | | | | |
| Shore | 1,952 | 6,875 | 1,516 | 240 | 19 | 21 |
| Boats | 5,107 | 30,633 | 1,700 | 573 | 531 | 886 |
| Total | 7,059 | 37,507 | 3,216 | 813 | 550 | 907 |
| Grand Total | 12,629 | 61,000 | 3,678 | 1,159 | 657 | 1,394 |
| 2004 | 15,180 | 71,397 | 3,791 | 1,553 | 303 | 3,970 |
| 2003 | 16,514 | 79,228 | 4,783 | 6,036 | 405 | 2,985 |

**Run Timing**

Adult fall-run Chinook salmon harvest below the Highway 96 Bridge at Weitchepec (Areas 1 and 2) peaked during Julian week 37 (Figure 5). This was the same as the 2003 season and a week later than both the 2002 and 2001 season. For grilse Chinook the peak harvest also occurred during Julian week 37 for both Areas (Figure 5). Grilse harvest composed 45.5% of total Chinook harvest. This is up considerably from the 13.2 % in the 2003 season

The Labor Day holiday occured in Julian week 36 in 2005 coienciding with the peak week of adult Chinook harvested. Peak release of adult Chinook salmon released was during Julian week 39 (Figure 6). The quota was met in Julian week 36 or Sept 10, 2005. For grilse Chinook salmon, peak harvest occurred during Julian week 38 and releases occurred in Julian week 39 (Figure 6).

Only adult steelhead (152) were harvested this season. The peak of the adult steelhead harvest was during Julian week 35 (Figure 7). The peak for release of half-pounders was during Julian week 35 and adult steelhead during Julian week 36 (Figure 8). Anglers typically start fishing for steelhead in July, and the creel surveys start (Julian week 32) at the beginning of August, therefore we miss the early portion of the steelhead run.

Current Sport Fishing Regulations allow anglers to keep only hatchery origin steelhead. Large numbers of steelhead were caught and released this year. Anglers released 1,159 adult and 3,678 half-pounders this season (Table 5) This was about 40% less than the previous season. Most steelhead angling effort, harvest, and release is in Area 2.

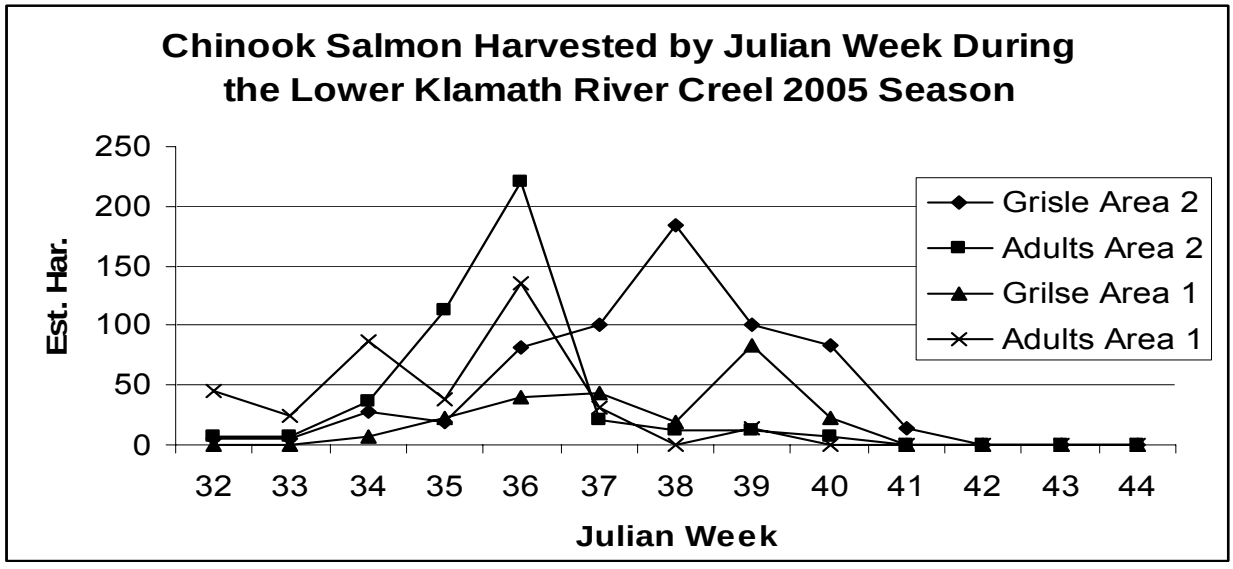


Figure 5. Chinook Salmon Harvest By Julian Week in Lower Klamath River for the 2005 Creel Season.

Table 5. Fish Harvested and Released by Julian Week During the 2005 Lower Klamath River Creel Census.

| JW | | | Harvested | | | | Released | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Steelhead | | Chinook | | Steelhead | | Chinook | |
| | Trips | Hours | ½ lb | Adult | Grilse | Adult | ½ lb | Adult | Grilse | Adult |
| 32 | 670 | 2,399 | 0 | 14 | 5 | 53 | 67 | 26 | 12 | 2 |
| 33 | 900 | 3,384 | 0 | 12 | 5 | 31 | 75 | 168 | 7 | 10 |
| 34 | 1,515 | 5,831 | 0 | 12 | 34 | 123 | 629 | 112 | 0 | 17 |
| 35 | 2,095 | 8,636 | 0 | 16 | 41 | 151 | 1,320 | 206 | 14 | 79 |
| 36 | 3,075 | 15,174 | 0 | 40 | 123 | 356 | 1,002 | 321 | 39 | 60 |
| 37 | 2,125 | 12,477 | 0 | 33 | 143 | 52 | 228 | 82 | 89 | 440 |
| 38 | 846 | 5,287 | 0 | 9 | 203 | 13 | 79 | 106 | 98 | 169 |
| 39 | 673 | 4,287 | 0 | 16 | 184 | 26 | 114 | 63 | 196 | 449 |
| 40 | 364 | 1,964 | 0 | 0 | 107 | 7 | 77 | 14 | 32 | 140 |
| 41 | 214 | 856 | 0 | 0 | 14 | 0 | 42 | 25 | 77 | 11 |
| 42 | 74 | 305 | 0 | 0 | 0 | 0 | 32 | 14 | 25 | 7 |
| 43 | 81 | 401 | 0 | 0 | 0 | 0 | 14 | 25 | 70 | 11 |
| 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 12,629 | 61,000 | 0 | 152 | 859 | 811 | 3,678 | 1,159 | 657 | 1,394 |

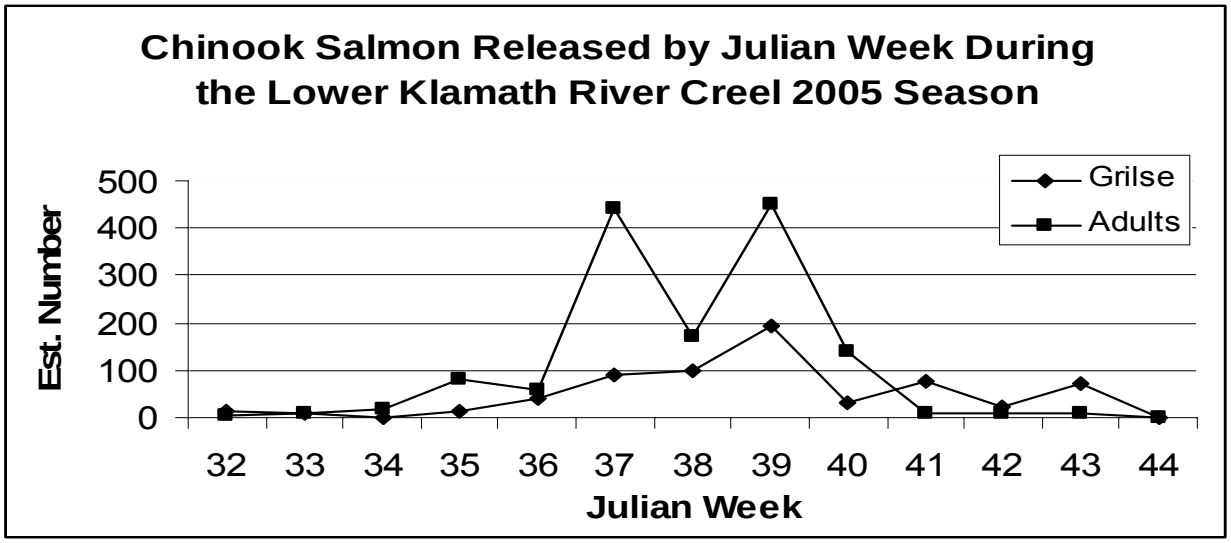


Figure 6. Chinook Salmon Released By Julian Week in the Lower Klamath River for the 2005 Creel Season.

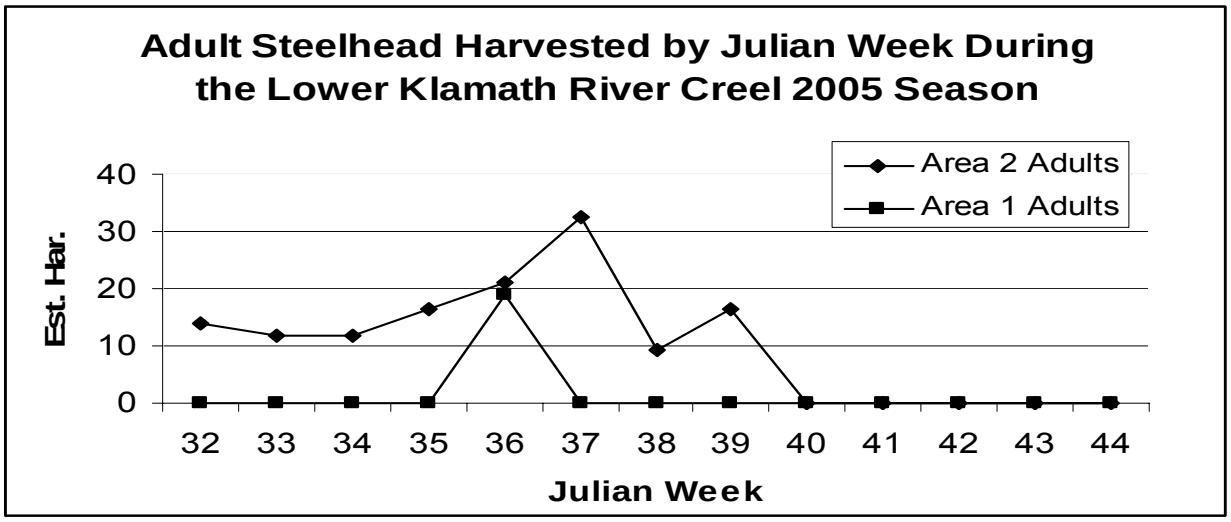


Figure 7. Adult Steelhead Harvested During the 2005 Lower Klamath River Creel Season. No 1/2lbers were harvested.

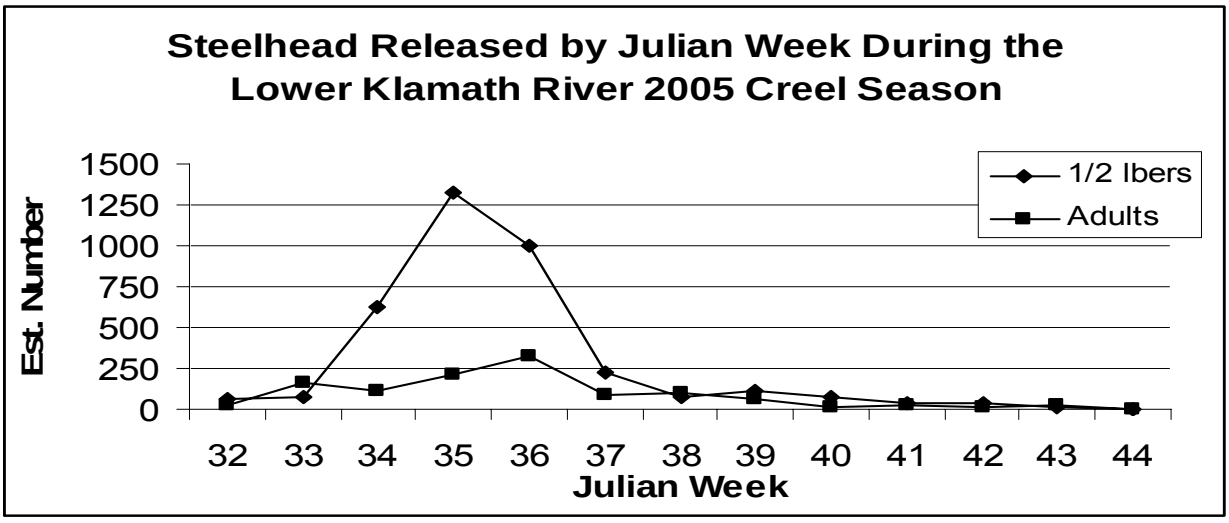


Figure 8. Steelhead Released By Julian Week During the Lower Klamath River 2005 Creel Season.

Coded-Wire Tag Recovery

KRP staff recovered 31 heads of adipose fin-clipped (Ad+CWT) Chinook salmon during Julian weeks 32 through 38 of the 2005 season. There were no non-random recoveries (NRR), wherein anglers and or resort owners saved their fish heads for our staff. NRR's are not used to estimate the harvest of marked hatchery origin (Ad+CWT) Chinook salmon (Table 6), however, they are used to calculate run timing (Figure 9). Of the 31 recovered Ad + CWT tags, 28 were adult salmon while 3 were grilse salmon. While 31 tags were recovered only 26 of these tags were read and used . We saw, but were not able to obtain two heads, and three of the tags were not readable.

Fin-clipped fall-run Chinook grilse ranged in size from 39 to 56 cm. Fin-clipped fall-run Chinook adults ranged in size from 56 to 86 cm. All fin-clipped fish observed in the angler survey were assigned an individual head tag number which allowed tracking of each head through the CWT extraction and decoding process.

Hatchery Contribution

Randomly recovered, marked Chinook salmon composed 4.4 % (31/706) of the harvest. With expansions made for sampling and production, an estimated 641 hatchery fish were harvested (Table 7) in 2005. Hatchery fish represented an estimated 38.4% (641/1,670) of the entire sport harvest in the lower Klamath River. All 26 random recovered tags were from Klamath and Trinity Basin origin Chinook. There were no NRR tags turned in this season.

IGH Origin Chinook Salmon

We decoded 10 random recovered tags from IGH origin Chinook salmon (0 five-year-old, 4 four-year-olds, 5 three-year-olds and 1 two-year-old). These Chinook represent five marked groups from IGH (Table 6). When expanded by sampling and by production Iron Gate Hatchery origin fish account for 20.1% (336/1,670) of the sport harvest (Table 7).

The peak for IGH origin Chinook harvest was Julian week 36. Personnel recovered Klamath River coded-wire-tagged fish between Julian week 35 and Julian week 38 (Figure 9).

TRH Origin Chinook Salmon

We decoded a total of 16 random recovered tags from TRH origin fall-run Chinook (0 five-year-olds, 1 four-year-olds, 13 three-year-olds and 2 two-year-olds). Of the 16 tags, four were spring-run TRH origin Chinook (0 five-year-olds, 0 four-year-olds, 4 three-year-old and 0 two-year-old, Table 6). Of the remaining tags 9 fall-run and 2 spring-run TRH mark groups were represented. TRH origin fish represented 18.26% (305/1670) of the sport harvest (15.2% fall-run and 2.9% spring-run) (Table 7).

TRH spring-run Chinook tag recovery began during Julian week 32 and extended through Julian week 33. Fall-run Chinook salmon began to appear in tag recoveries during Julian week 35 and continued through Julian week 38. TRH fall-run tag recovery peaked during Julian week 36 (Figure 9).

During the 2005 season, sport in-river harvest by stock can be described as follows: Trinity River spring-run Chinook salmon were predominate in the harvest through Julian week 33. Klamath River fall-run Chinook salmon were present after Julian week 34 and peaked at Julian week 36. The bulk of the Trinity River fall-run tags were collected during Julian week 36, with another pulse occurring in Julian week 38. No coded-wire tagged Chinook salmon were recovered after Julian week 38 (Figure 9).

Table 6. Coded-Wire-Tag Information from Iron Gate Hatchery (IGH) and Trinity River Hatchery (TRH) for Chinook Salmon Obtained from the Lower Klamath River Creel 2005

Season.

| | Release Data | | | Recovery Data | | | |
|---|---|---|---|---|---|---|---|
| CWT Codes | Strain | BY | Site | Creel | NR R | FL- Range | Date - Range |
| Adult Chinook | | | | | | | |
| 06-52-89 | Fall | 01 | TRH | 1 | 0 | 81 | 9/3 |
| 06-63-55 | Fall | 01 | IGH | 1 | 0 | 77 | 9/9 |
| 06-63-57 | Fall | 01 | IGH | 3 | 0 | 58-86 | 9/2-9/4 |
| 06-52-92 | Fall | 02 | TRH | 1 | 0 | 71 | 9/5 |
| 06-52-96 | SPR | 02 | TRH | 2 | 0 | 66,71 | 8/8-8/12 |
| 06-52-97 | SPR | 02 | TRH | 2 | 0 | 63,67 | 8/11 |
| 06-52-98 | Fall | 02 | TRH | 2 | 0 | 58,78 | 9/4-9/10 |
| 06-53-06 | Fall | 02 | TRH | 2 | 0 | 70,75 | 9/5-9/8 |
| 06-53-07 | Fall | 02 | TRH | 1 | 0 | 58 | 9/8 |
| 06-53-09 | Fall | 02 | TRH | 2 | 0 | 57,67 | 9/3 |
| 06-63-58 | Fall | 02 | IGH | 1 | 0 | 59 | 9/3 |
| 06-63-59 | Fall | 02 | IGH | 2 | 0 | 64,66 | 9/5-9/9 |
| 06-63-60 | Fall | 02 | TRH | 1 | 0 | 56 | 8/28 |
| 0601020407 | Fall | 02 | IGH | 2 | 0 | 65,73 | 9/1-9/9 |
| 100000 | no tag found | | | 0 | 0 | | |
| 300000 | Head not recovered | | | 2 | 0 | 61,68 | 9/8-9/9 |
| 400000 | Tag un-readable | | | 3 | 0 | 69-86 | 9/4-9/10 |
| Total | | | | 28 | 0 | | |
| Grilse Chinook | | | | | | | |
| 06-53-13 | Fall | 03 | TRH | 2 | 0 | 45,48 | 9/19-9/20 |
| 0601020502 | Fall | 03 | TRH | 1 | 0 | 39 | 9/23 |
| 100000 | no tag found | | | 0 | 0 | | |
| 200000 | Tag lost | | | 0 | 0 | | |
| 400000 | Tag lost | | | 0 | 0 | | |
| Totals | | | | 3 | 0 | | |
| Grand Total | | | | 31 | 0 | | |

Table 7. Chinook Salmon Proportioned by Hatchery and Brood Year from Coded-Wire tagged Fish Harvested in the Lower Klamath River Sport Harvest for the 2005 Creel Season. Expanded

for sampling and by hatchery production multiplier.

| Hatchery Run | Estimated Total By Brood Year | | | Total | % by Hatchery Run | % of total harvest (1,087) |
|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | | | |
| TRH SPR | | 49.9 | | 50 | 7.8 | 7.8 |
| TRH Fall | 7 | 161 | 87 | 255 | 39.8 | 39.8 |
| IGH Fall | 128 | 174 | 34 | 336 | 52.4 | 52.4 |
| Total | 135 | 385 | 121 | 641 | | 58.9 |
| % by year | 21 | 60 | 18.8 | | | |

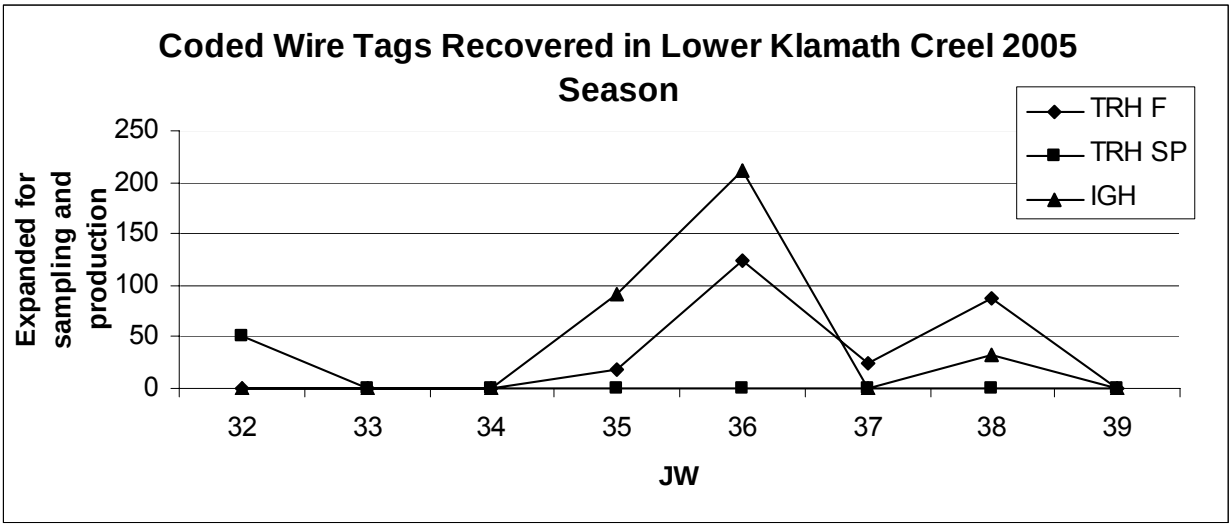


Figure 9. Timing by Julian Week of Coded Wire Tags, Expanded for Sampling and by Individual Tag Code, Recovered from Chinook Salmon in the Lower Klamath River 2005 Creel Season.

## DISCUSSION

The mouth configuration (far north) this season vastly reduced harvest on the mouth/spit of the river. Anglers were not happy with the bag limit of one adult per day and the Tuesday and Wednesday no-adult-harvest-days, but it did stretch the season out longer for local businesses. Had this regulation been increased to two adult fish per day, I believe the quota would have been met sometime earlier in September. Further consideration will be given to future regulations

with respect to the size of quota and mouth configuration.

Modeling based on past years' harvest data was used to predict the date the quota would be met. The 2 day no-adult take scenario was part of the modeling to make the quota last until at least Labor Day weekend. The predicted date was September 10th when the quota would be met. This modeling was an effective tool and will be used in the future.

Because of regulations there tends to be a bias towards grilse in the harvest numbers. When the quota is met early in the season (September 9th) and grilse are plentiful, as they were this season, the percentage of grilse increases in the angler harvest. Grilse made up 51.4% of the sport harvest in the lower Klamath Creel this season.

## CONCLUSIONS

The 2005 season resulted in the 11th lowest run-size for fall-run Chinook salmon in the Klamath Basin over the last 27 years.

Regulations are crafted each year based on the predicted run size and harvest quota. The local economy is very dependant on the fishery and efforts are made each year to both conserve the fish and to maximize business and angling opportunities.

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Appendix 1. List of Julian weeks and their calendar equivalents.

| Julian week | Inclusive dates | | | Julian week | Inclusive dates | | |
|---|---|---|---|---|---|---|---|
| 1 | 01-Jan | - | 07-Jan | 27 | 02-Jul | - | 08-Jul |
| 2 | 08-Jan | - | 14-Jan | 28 | 09-Jul | - | 15-Jul |
| 3 | 15-Jan | - | 21-Jan | 29 | 16-Jul | - | 22-Jul |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 22-Jan | - | 28-Jan | 30 | 23-Jul | - | 29-Jul |
| 5 | 29-Jan | - | 04-Feb | 31 | 30-Jul | - | 05-Aug |
| 6 | 05-Feb | - | 11-Feb | 32 | 06-Aug | - | 12-Aug |
| 7 | 12-Feb | - | 18-Feb | 33 | 13-Aug | - | 19-Aug |
| 8 | 19-Feb | - | 25-Feb | 34 | 20-Aug | - | 26-Aug |
| 9 a/ | 26-Feb | - | 04-Mar | 35 | 27-Aug | - | 02-Sep |
| 10 | 05-Mar | - | 11-Mar | 36 | 03-Sep | - | 09-Sep |
| 11 | 12-Mar | - | 18-Mar | 37 | 10-Sep | - | 16-Sep |
| 12 | 19-Mar | - | 25-Mar | 38 | 17-Sep | - | 23-Sep |
| 13 | 26-Mar | - | 01-Apr | 39 | 24-Sep | - | 30-Sep |
| 14 | 02-Apr | - | 08-Apr | 40 | 01-Oct | - | 07-Oct |
| 15 | 09-Apr | - | 15-Apr | 41 | 08-Oct | - | 14-Oct |
| 16 | 16-Apr | - | 22-Apr | 42 | 15-Oct | - | 21-Oct |
| 17 | 23-Apr | - | 29-Apr | 43 | 22-Oct | - | 28-Oct |
| 18 | 30-Apr | - | 06-May | 44 | 29-Oct | - | 04-Nov |
| 19 | 07-May | - | 13-May | 45 | 05-Nov | - | 11-Nov |
| 20 | 14-May | - | 20-May | 46 | 12-Nov | - | 18-Nov |
| 21 | 21-May | - | 27-May | 47 | 19-Nov | - | 25-Nov |
| 22 | 28-May | - | 03-Jun | 48 | 26-Nov | - | 02-Dec |
| 23 | 04-Jun | - | 10-Jun | 49 | 03-Dec | - | 09-Dec |
| 24 | 11-Jun | - | 17-Jun | 50 | 10-Dec | - | 16-Dec |
| 25 | 18-Jun | - | 24-Jun | 51 | 17-Dec | - | 23-Dec |
| 26 | 25-Jun | - | 01-Jul | 52 b/ | 24-Dec | - | 31-Dec |

a/ Eight-day week in each leap year (years divisible by 4).
b/ Eight-day week every year.