

State of California
The Resources Agency
DEPARTMENT OF FISH AND WILDLIFE

ANNUAL REPORT
TRINITY RIVER BASIN SALMON AND STEELHEAD MONITORING PROJECT:
CHINOOK AND COHO SALMON AND FALL-RUN STEELHEAD RUN-SIZE
ESTIMATES USING MARK-RECAPTURE METHODS
2013-14 SEASON



On the cover: Upper mainstem Trinity River, 2013.

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2013-14 SEASON

by

Mary Claire Kier, John Hileman,
and Steve Cannata

Northern Region
Trinity River Projects

601 Locust Street
Redding, CA 96001

AUGUST 2014

FOREWORD

This is the California Department of Fish and Wildlife's (CDFW) Trinity River Basin Salmon and Steelhead Monitoring Project's twenty-fifth annual report to the United States Bureau of Reclamation (Reclamation). The activities reported on occurred between April 2013 and March 2014, and were funded by CDFW/Reclamation Cooperative Agreement Number R13AC20027.

This report presents work performed on the main stem Trinity River and at Trinity River Hatchery. The necessity for performing our Klamath-Trinity basin monitoring activities are outlined in several Acts of Congress including Public Law 386 (69 Stat. 719), August 12, 1955; Public Law 98-541, October 24, 1984; the "Trinity River Basin Fish and Wildlife Management Reauthorization Act" of 1995; and the Trinity River "Record of Decision", 2000.

This report differs from the previous series of Annual Reports. At the request of the Trinity River Restoration Program, the report is specific to a single investigation plan/project rather than an assemblage of tasks. We refer readers to past reports for general methods and have increased the use of appendices to maintain the large amount of supporting documentation that enables the final analyses.

ACKNOWLEDGMENTS

The CDFW fisheries technicians on whom we relied during the 2013 field season include: Michael Bradford, Chris Hubler, Stephen Marten, Lauren Romero, Todd Newhouse, Eric Ojerholm, Laurel Osborne, Jane Sartori, Garth Savage, Ron Smith, Steven Strite, Ted Tillinghast, and Paula Whitten. We were once again very fortunate to have our entire field staff, as well as Eric Matilton and Loren Aubrey (Hoopa Valley Tribal Fisheries (HVTF)), return from the previous year, and know that our field projects are the better for it. We continue to benefit from our collegial relationship with the HVTF department and appreciate the help we get from everyone who works on our weir installation and pull days. We thank Brenda Tuel for her superlative office support as well.

We value the cooperation of the CDFW Trinity River Hatchery staff during salmonid recovery, and landowners Linda Allan, Doris Chase, Tom O'Gorman, and Pierre LeFuel, and the Bureau of Land Management and the U.S. Forest Service for access, off-season in-basin equipment storage and general project support.

The CDFW monitoring program was approved by the Trinity Management Council (TMC) and funded by Reclamation through the Trinity River Restoration Program (TRRP) office in Weaverville, CA. We thank Robin Schrock and the TRRP for their contract administration efforts.

Trinity River Basin Salmon and Steelhead Monitoring Project
Chinook and Coho Salmon and Fall-Run Steelhead Run-Size Estimates
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Trinity River Basin Salmon and Steelhead Monitoring Project
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ABSTRACT

The California Department of Fish and Wildlife's Trinity River Project conducted tagging and recapture operations from June 2013 through March 2014 to produce run-size, angler harvest, and spawner escapement estimates of spring-run (spring Chinook) and fall-run Chinook salmon [fall Chinook (*Oncorhynchus tshawytscha*)], coho salmon (*O. kisutch*), and fall steelhead (*O. mykiss*) in the Trinity River basin. This information is produced for the Trinity River Restoration Program (TRRP) to help evaluate progress toward program objectives outlined in the Integrated Assessment Plan (TRRP, 2009)

Utilizing a Petersen mark-recapture methodology, we estimate a run-size of 8,961 spring Chinook migrated into the Trinity River basin upstream of Junction City weir. Using tags returned by anglers we estimate 254 spring Chinook were harvested, yielding an escapement of 8,707 fish. The 2013 run of spring Chinook was comprised of an estimated 2,669 naturally-produced adults and 146 jacks and 6,011 hatchery-produced adults and 135 hatchery-produced jacks. The post-harvest escapement of 2,591 naturally-produced adult spring Chinook was 43.2% of the TRRP goal of 6,000 spring Chinook.

An estimated run-size of 36,989 fall Chinook migrated past Willow Creek weir (WCW), of which an estimated 880 were harvested by anglers, yielding and escapement of 36,109 fish. The 2013 run of fall Chinook was comprised of an estimated 17,104 naturally-produced adult and 6,514 jack salmon and 13,168 hatchery-produced adults and 6,514 hatchery-produced jacks. The post-harvest escapement of 16,689 naturally-produced adult fall Chinook was 27% of the 62,000 fish TRRP goal.

The coho run-size in the Trinity above Willow Creek was estimated at 21,906 fish, with no coho reported as harvested, leaving all 21,906 fish for potential spawning escapement. The coho escapement was comprised of an estimated 4,305 naturally-produced adult and 152 jack coho and 14,782 hatchery-produced adult and 2,667 hatchery-produced jacks. The escapement of 4,305 naturally-produced coho adults was three times the TRRP goal of 1,400 fish.

An estimated run-size of 16,594 adult fall steelhead returned to the Trinity River basin upstream of WCW. Anglers harvested an estimated 659 adult fall steelhead above the WCW, leaving 15,935 (9,119 naturally-produced and 6,816 hatchery-produced) fish as potential spawners. The post-harvest escapement of 9,119 naturally-produced adult steelhead was 22.8% of the 40,000 fish TRRP goal.

PROJECT OBJECTIVES

- To determine the run-size, composition, distribution, and timing of adult Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and steelhead (*O. mykiss*) in the Trinity River basin [Integrated Assessment Plan (IAP) assessment 13A – Monitor adult escapement of hatchery and naturally produced spring and fall Chinook, coho, and fall steelhead (TRRP, 2009)].
- To determine the in-river angler harvest and spawner escapements of Trinity River Chinook salmon and coho salmon, and steelhead (IAP assessments 16A, 17A, 18A, 19A – Monitor harvest (tribal, sport and commercial) of naturally produced spring Chinook, fall Chinook, coho salmon and steelhead).

INTRODUCTION

The California Department of Fish and Wildlife's (CDFW) Trinity River Project (TRP or Project) personnel annually estimate the run-size and spawner escapement of spring Chinook salmon (*Oncorhynchus tshawytscha*) in the Trinity River basin upstream of a weir near Junction City, California and the run-size and spawner escapement of fall Chinook salmon, coho salmon (*O. kisutch*), and fall-run steelhead (*O. mykiss*) in the Trinity River basin upstream of a weir near Willow Creek, California. The project is conducted in cooperation with the Hoopa Valley Tribal Fisheries Department (HVTF). Run size is the number of fish estimated to migrate from the ocean into the Trinity River basin, while spawner escapement is the number of fish that survive in-river harvest to spawn in natural areas or enter Trinity River Hatchery (TRH). A Peterson type mark-recapture analysis is used to make the estimations. This is a continuation of studies that began in 1977.

The information from this investigation is used by the Trinity River Restoration Program (TRRP) to help evaluate program objectives including naturally-produced salmonid escapement goals [13A, 17A, 16A, 18A and 19A] outlined in the Integrated Assessment Plan [IAP (TRRP 2009)]. The current Trinity River basin adult escapement goals set by the TRRP for naturally-produced adults are 6,000 spring Chinook; 62,000 fall Chinook; 1,400 coho; and 40,000 steelhead. Similar goals for hatchery adult escapement are 3,000 spring Chinook; 9,000 fall Chinook; 2,100 coho; and 10,000 steelhead. Investigation data are used to assess progress toward the goal of increasing harvest opportunity for dependent fisheries found in the Record of Decision (ROD) (Interior, 2000), and are used in the short term to inform management decisions and add to long term trend analysis in pre- and post-ROD fish populations. The data also serve as baseline for current and future cross-functional ecological and physical evaluations, the composition (race and proportion of hatchery-marked¹ or Project-tagged² fish), distribution, and timing of salmonid runs in the Trinity River basin.

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

² Spaghetti tags applied by CDFW personnel to salmonids on their up-river migration (spawning run).

METHODS

The following methods are specific to the 2013-14 season. For complete, standardized methods across years, please see CDFW, (2014), especially Tasks 1 – 3 (pages 1–87). For ease of navigation throughout the document, the notation of tables, figures and appendices are hyperlinked.

Trapping and Tagging

Trapping Locations and Periods

Trapping and tagging operations were conducted from June 7, 2013 through December 10, 2013 by TRP and HVTF personnel at two temporary weir sites located on the main stem Trinity River (Figure 1).

The Junction City weir (JCW) is located at approximately 132.7 river kilometers (rkm) (~river mile (rm) 84.4) upstream from the Klamath River confluence (40° 68' 34.56" N, 123° 02' 73.10" W), upstream of Junction City. In 2013 the JCW site was moved upstream about 900 feet to a cross section of river that is wider and shallower than its previous location. The JCW was operated June 7 through October 1, 2013, and is primarily operated to capture, measure, and tag spring-run Chinook salmon (spring Chinook).

The Willow Creek weir (WCW), is located 36.5 rkm (~rm 22.7) upstream from the Trinity River's confluence with the Klamath River (40° 58' 29.85" N, 123° 38' 8.61" W) and was operated August 30 through December 10, 2013. The WCW is primarily operated to capture, measure, and tag fall-run Chinook salmon (fall Chinook), coho salmon (coho), and steelhead.

Weir and Trap Design

The 2013 weir configuration at WCW consisted of two trap boxes bracketing a boat gate, while the JCW, though in its standard configuration, was about half again as wide as in previous years (Figure 2-4).

Processing of Fish at Weirs

The tagging scheme in 2013 was as follows: At WCW, tags with no reward value, \$10 rewards, and \$20 rewards were applied to the adult steelhead at a 1:1:1 ratio while fall Chinook were tagged 1:1:1 with \$0:\$20:\$50 tags. All Chinook tagged at JCW received \$20 tags, and all steelhead received \$10 tags. Coho at both weirs are tagged with non-reward tags only, and juvenile ("half-pounder") steelhead are not tagged at either weir.

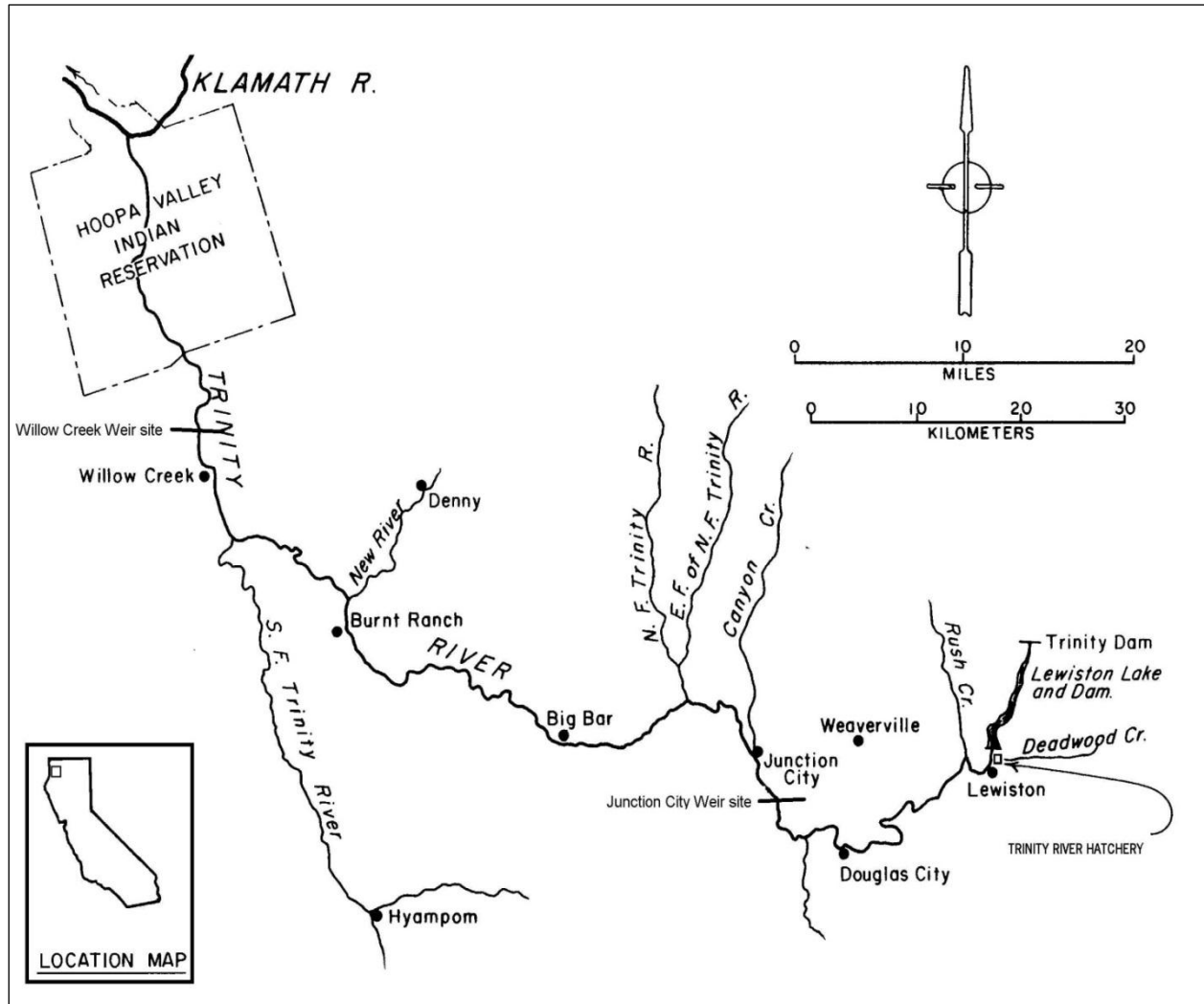


Figure 1. Location of trapping/tagging weirs near Willow Creek and Junction City, and Trinity River Hatchery, the the Trinity River basin, 2013.

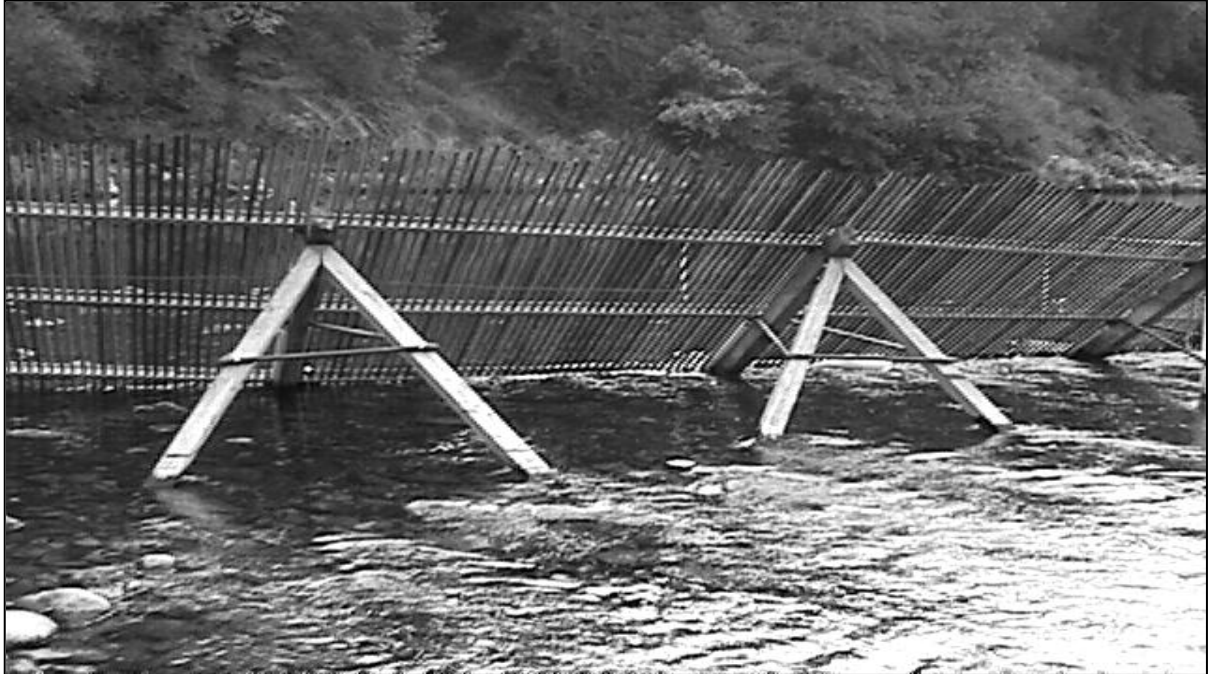


Figure 2. Photograph of Alaskan-style weir, tripods, support channels and conduit (looking upstream).



Figure 3. Set up of Willow Creek weir, 2013. Two trap boxes with a boat gate in between.



Figure 4. 2013 Junction City weir configuration (looking slightly upstream). Note the single trap box (on far side).

Recovery of Tagged Fish

Fish tagged at JCW and WCW were recovered from four different sources: Angler return of tags; tags gathered during upper Trinity River spawner surveys, tagging mortalities found on or near the tagging weirs, and from fish returning to Trinity River Hatchery.

Angler Tag Returns

Tags returned to the TRP Arcata field office through April 25, 2014 were included in assessing harvest and catch and release rates for the 2013 runs. All tags returned after that date were processed for payment but not used for analysis. Public service announcements distributed to press throughout the Northern California region, posted online in social media and in store-front windows throughout the Trinity basin encouraged the timely return of tags.

Trinity River Hatchery Recovery

The TRH fish ladder was opened August 30, 2013 and closed for the season on March 11, 2014. Recovery and spring Chinook spawning operations occurred from September 3 and occurred twice weekly through October 10, 2013, when the ladder was closed for the “spawning break”. Hatchery personnel annually close the fish ladder during the period historically associated with the arrival of the first fall Chinook to TRH. Closing the fish ladder is done to maintain temporal separation between spring and fall Chinook entering the hatchery and minimize inter-breeding of the two races. Spawning operations resumed on October 28, 2013, and typically occurred twice weekly for fall Chinook through December 5, and once a week through December 10 for coho. Steelhead spawning began on December 31 and ran once weekly through March 11, 2014.

Trinity River spring Chinook immigrate mainly between April and September while fall Chinook immigrate August through December. While CDFW acknowledges the temporal overlap of the runs, for analysis we designate a hard date for a spring/fall separation point, and we use a Julian week format, allowing inter-annual comparisons of identical weekly periods (Appendix 1).

Run-size, Angler Harvest and Spawner Escapement Estimates

Run-size Estimates

Run-size estimates in 2013 were calculated using Chapman's version³ of the Petersen Single Census Method [as modified by Ricker (1975)].

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

N = estimated run-size

M = the number of effectively tagged fish⁴

C = the number of fish examined at TRH

R = the number of Project-marked fish recovered in the hatchery sample.

In the 2013-14 spawning season there were not enough spring Chinook, fall Chinook, or coho salmon marked/recovered to stratify jack and adult salmon and obtain the 95% confidence interval on each of the stratified portions of the run, therefore the estimate we used in each case was for the total (un-stratified) run size. After arriving at the total population run-size estimate we used various methods to derive the jack and adult components of the run. For fall Chinook we used HVTF's scale/aging analysis performed for the Klamath River Technical Team (KRTT, 2014) and applied the scale-based age proportions to the run-size estimate to obtain the number of jack and adults.

³ Chapman, D. G. 1951. Some properties of the hyper-geometric distribution with applications to zoological census. Univ. CA Publ. Stat. 1:131-160, as cited in Ricker (1975).

⁴ Effectively tagged means the estimated number of tagged fish minus any tagging mortalities (fish having died within 30 days without spawning), and minus tagged fish anglers caught and released after removing the tag.

We used fork length distribution (using nadirs) to estimate the length which separates jacks from adults for spring Chinook and coho salmon.

We used the mixdist application within the R statistical environment to estimate proportions of jack and adult Chinook salmon and half-pounder and adult steelhead sampled at WCW in 2013. The results were used for comparison with proportions derived by inspection (using nadir) of length-frequency histograms of both species and fall Chinook scale analyses.

For all the equations used, full method details and analyses assumptions please refer to CDFW (2014).

RESULTS

Trapping, Tagging and Recovery

Spring/Fall Chinook Salmon Separation and Run Timing

We recovered 6,430 Chinook salmon at TRH in 2013, of which 1,580 (24.57%) had adipose clips. We recovered coded-wire tags (CWTs) from 578 known spring Chinook and from 954 known fall Chinook. Chinook with shed, lost, or unreadable CWTs were classified as either spring- or fall-run based on their date of entry into TRH. Spring Chinook CWTs were represented by 14 release (code) groups from the 2008 through 2011 BYs (Appendix 2). Fall Chinook CWTs were composed of 21 release groups representing the 2008 through 2011 BYs.

Trinity River Hatchery-origin spring Chinook (identified by CWT) passed through JCW from Julian week 23 through JW 37 (Figure 5). Eight of the 47 Chinook tagged at JCW during JW 38 arrived at TRH before JW 42 (one fish in JW 38), whereas only one reached TRH later than JW 42. Using CWT analysis we designated JW 38 as the last week of spring run at JCW, and included only those JCW-trapped Chinook through JW 38 in our mark-recapture analysis for spring Chinook estimates.

Only one Chinook tagged at WCW arrived at TRH before JW 42, and no TRH-origin spring CWTed fish were tagged at WCW and recovered at TRH during 2013. We therefore determined all Chinook trapped at WCW in 2013 to be fall run Chinook.

Spring Chinook Trapping and Tagging

California DFW and HVTF installed JCW June 6 (JW 23) and trapped the first night. The number of spring Chinook trapped peaked during JW 27, with 56 fish per night (Table 1, Figure 6). The weir conduit was pulled in JW 35 to accommodate increased flows released from Lewiston Dam for the HVT Ceremonial Boat Dance. After sustaining some damage from floating debris and being repaired, the weir was

reinstalled and resumed fishing during JW 36. The weir was removed for the season on October 1, 2013, JW 40.

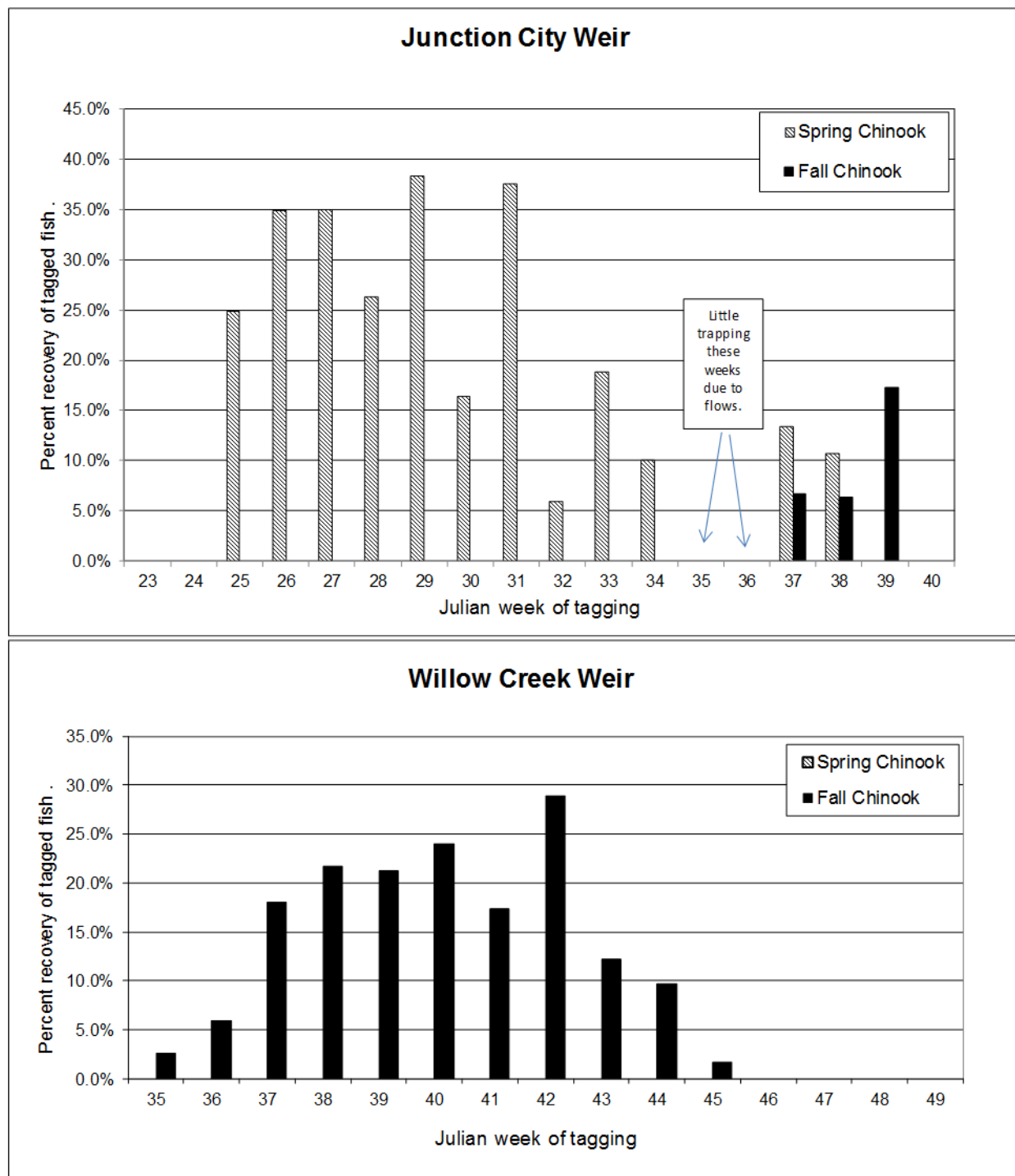


Figure 5. Percent recovery of Junction City weir and Willow Creek weir marked Chinook at Trinity River Hatchery during the 2013-14 season. Junction City weir trapped Julian weeks 23 - 40; Willow Creek Julian weeks 35 - 50.

Table 1. Weekly summary of Chinook trapped in the Trinity River at Junction City weir during 2013. ^a

Julian week	Inclusive dates	Nights Trapped	Number trapped							
			Jacks ^b	Ad-clip Jacks	Adults	Ad-clip Adults	Total	Ad-clip total	Fish/night	
Spring Chinook										
23	4-Jun - 10-Jun	2			1		1	0	0.5	
24	11-Jun - 17-Jun	4			6		6	0	1.5	
25	18-Jun - 24-Jun	7			104	19	104	19	14.9	
26	25-Jun - 1-Jul	4	2	1	180	29	182	30	45.5	
27	2-Jul - 8-Jul	4	1		223	38	224	38	56.0	
28	9-Jul - 15-Jul	5			42	7	42	7	8.4	
29	16-Jul - 22-Jul	5	1		34	4	35	4	7.0	
30	23-Jul - 29-Jul	5			43	9	43	9	8.6	
31	30-Jul - 5-Aug	5			8	3	8	3	1.6	
32	6-Aug - 12-Aug	5	2		15	3	17	3	3.4	
33	13-Aug - 19-Aug	5	2		30	4	32	4	6.4	
34	20-Aug - 26-Aug	4			10	1	10	1	2.5	
35	27-Aug - 2-Sep	0					0	0	--	
36	3-Sep - 9-Sep	3					0	0	0.0	
37	10-Sep - 16-Sep	5	1		14	3	15	3	3.0	
38	17-Sep - 23-Sep	5			47	10	47	10	9.4	
Fall Chinook										
39	24-Sep - 30-Sep	5	4		57	12	61	12	12.2	
40	1-Oct - 7-Oct	1	1		7	1	8	1	8.0	
Total:		74	14	1	821	143	835	144		
Mean:									11.3	

a/ Trapping at Junction City weir took place June 07 - October 01, 2013 (Julian weeks 23-40).

b/ Spring Chinook <54 cm FL were considered jacks in 2013.

c/ Adipose fin-clipped Chinook. Number shown is a subset of weekly jack and adult Chinook totals.

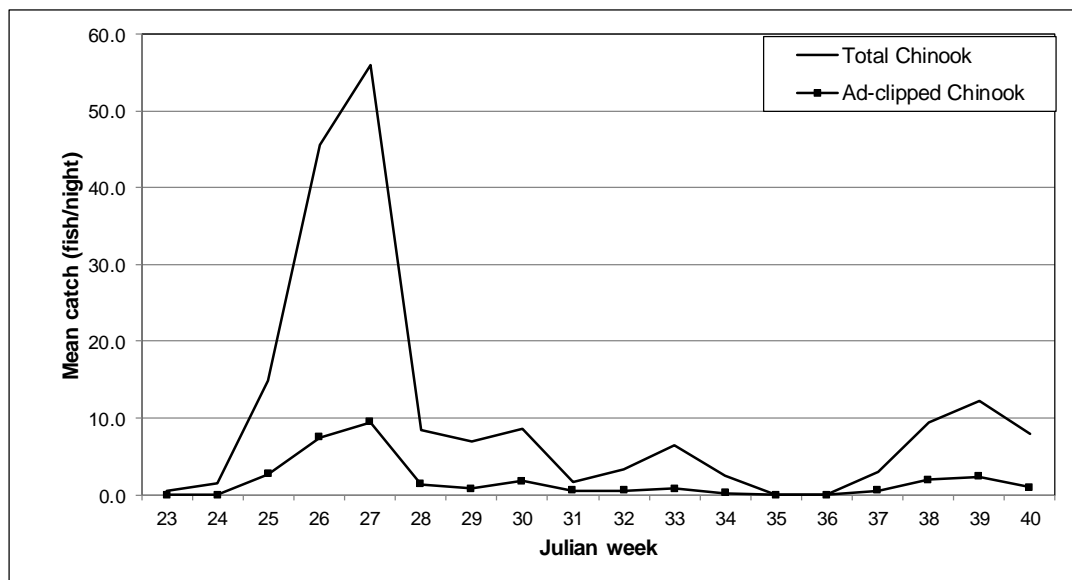


Figure 6. Mean catch of Chinook in the Trinity River at Junction City weir, 2013.

A total of 766 spring Chinook were trapped at JCW, of which 760 (nine jack and 751 adult) were effectively tagged (Appendix 3). There was one tagging mortality and five fish reported as caught and released by anglers. Ad-clipped fish comprised 17.1% of the spring Chinook captured (131 of 766) at JCW. The Chinook trapped and tagged later than JW 38 were determined to be fall Chinook so were not included in the numbers presented for JCW.

Size of Trapped Fish

Spring Chinook trapped at JCW and TRH averaged 72.4 and 71.1 cm FL, respectively, with a combined average 71.5 cm FL (Figure 7). By fork length distribution analysis alone, the nadir separating jack from adult spring Chinook was between 53 and 54 cm FL. Data from known age, hatchery-marked spring Chinook that entered TRH supported the minimum adult fork length of 54 cm. While there was some overlap between sizes of age 2 and age 3 fish (Appendix 4), the mean FL of those CWT brood years (BY) were distinctly different. Applying the minimum adult size of 54 cm FL to the observed population, an estimated 1.2% and 3.7% of the spring Chinook observed were jacks at JCW and TRH, respectively.

Spring Chinook Recovery

Angler Tag Recovery

There was no reported harvest of Project-tagged jack spring Chinook in 2013 (Appendix 3). The reported harvest of 22 Project-tagged adult spring Chinook represents an estimated harvest of 254 adults. The total harvest rate of Project-tagged spring Chinook upstream of JCW was 0% for jacks, 2.93% for adults. There were five tag returns from adults from the catch and release fishery, and six tags found and returned by anglers or other river enthusiasts.

Spawner Survey Recovery

Main stem Trinity spawner surveys were conducted by Project personnel in cooperation with YTFP, HVTF, USFS and the USFWS from September 5 to December 19, 2013 from TRH to Weitchpec. During the spawner surveys 42 Project-tagged spring Chinook were recovered.

Tagging Mortalities

Only one spring Chinook was identified as having died as a result of tagging at JCW in 2013.

Trinity River Hatchery Recovery

Spring Chinook began entering TRH on August 30 (during JW 35). They continued to enter TRH through JW 41 (Appendix 5). Recovery of spring Chinook peaked in JW 39 when 834 Chinook entered, although the peak week of CWTed fish was JW 36 (Table 2). Of the 760 spring Chinook effectively tagged at JCW, 218 (28.7%) were recovered at TRH. Based on run-timing (by CWT analysis) an estimated 2,578 (96 jack and 2,482 adult) spring Chinook were recovered at TRH, from which 578 readable CWTs were recovered.

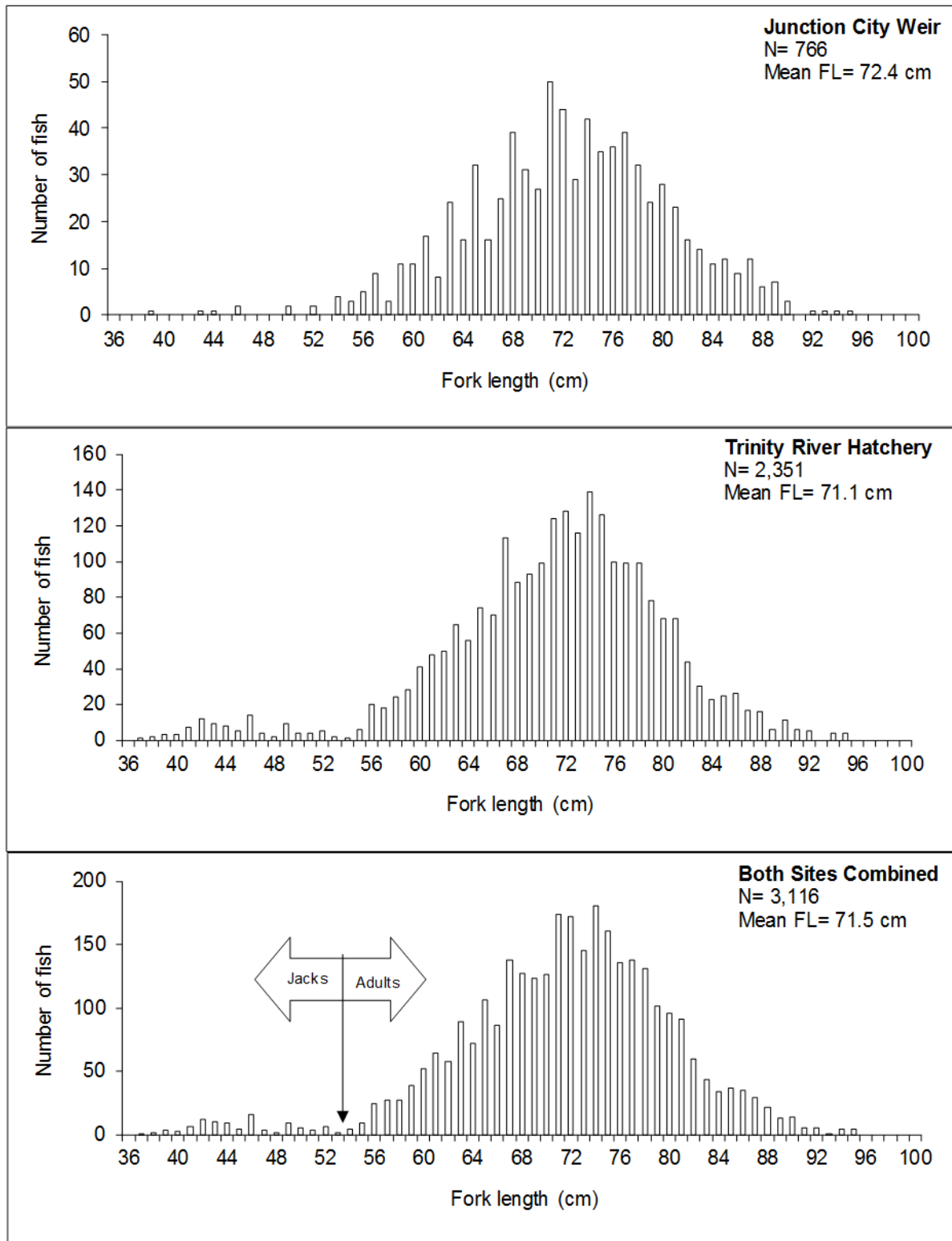


Figure 7. Spring Chinook fork lengths (cm) observed at Junction City weir, Trinity River Hatchery, and both sites combined during the 2013-14 season. The arrow denotes the size used to separate jacks and adults for analysis.

Table 2. Recoveries at Trinity River Hatchery, by Julian week, of TRH-origin coded-wire tagged spring Chinook during the 2013-14 season.

Coded-wire tag number and release type ^c	Brood year	Number of spring Chinook entering TRH, by Julian week ^{ab}							Totals
		36	37	38	39	40	41	42 ^d	
068819-y	2008				1				1
068821-f	2009	21	21	21	9				72
068822-f	2009	6	13	30	36	18	2		105
068831-f	2009	1			2	1			4
068832-f	2009	3	2	1	2				8
068836-y	2009	59	38	40	28	11			176
068773-f	2010	9	7	10	7	6			39
068774-f	2010	33	32	19	4				88
068775-f	2010	9	8	10	9	8			44
068776-y	2010	13	5	3	1	1	1		24
068838-f	2011	1		3					4
068839-f	2011		2						2
068840-f	2011			2	3	1			6
068846-y	2011	1	1	2	1				5
No CWT ^d		4	3	6	4	2			
Weekly totals:		160	132	147	107	48	3	0	578

a/ Trapping occurred at TRH September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

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

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

d/ No CWTs were recovered from these ad-clipped fish. Chinook with shed or lost tags recovered after JW 42 were considered fall run.

Run size, Angler Harvest and Escapement of Coded-wire Tagged Spring Chinook

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, 1,471 (30 jack and 1,441 adult) CWT spring Chinook returned to the Trinity River above JCW during the 2013 season (Table 3). We estimate zero jack and 42 adult CWT spring fish were harvested by anglers during the season. Escapement of CWT spring Chinook was divided between 585 fish recovered at TRH and 845 estimated available to spawn in natural areas. Based on CWTs, the known age composition of the 2013 hatchery-produced spring Chinook run was composed of 30 (2.05%) age 2; 500 (34.03%) age 3; 938 (63.74%) age 4; and 3 (0.18%) age 5 fish.

Table 3. Run-size, angler harvest, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire tagged, spring Chinook salmon, expanded for lost or unreadable tags, returning to the Trinity River during the 2013-14 season.

	Run-size estimate		Harvest rates		TRH Ad-clips with CWTs	Percentage of ad clips at weirs		Ad+CWT run-size estimates	
			Jacks	Adults		Jacks	Adults	Jacks	Adults
	Jacks	Adults							Total
Spring Chinook (JCW)	281	8,680	0.0%	2.9%	0.97	11.1%	17.2%	30	1,441
CWT code	BY	Age	TRH Total No.	% of total	Run-size	Angler harvest	Spawning escapement		
							TRH	Natural	Total
Adults									
068819	08	5	1.02	0.18%	2.59	0.08	1.02	1.49	2.51
068821	09	4	72.63	12.81%	184.55	5.41	72.63	106.51	179.14
068822	09	4	106.47	18.77%	270.53	7.93	106.47	156.14	262.61
068831	09	4	4.07	0.72%	10.35	0.30	4.07	5.98	10.05
068832	09	4	8.09	1.43%	20.55	0.60	8.09	11.86	19.95
068836	09	4	177.82	31.35%	451.86	13.24	177.82	260.79	438.61
068773	10	3	39.48	6.96%	100.32	2.94	39.48	57.90	97.38
068774	10	3	88.78	15.65%	225.59	6.61	88.78	130.20	218.98
068775	10	3	44.60	7.86%	113.32	3.32	44.60	65.40	110.00
068776	10	3	24.21	4.27%	61.52	1.80	24.21	35.50	59.71
Totals:			567.16	100.0%	1,441.17	42.23	567.16	831.77	1,398.93
Jacks									
068838	11	2	4.01	23.34%	7.04	0.00	4.01	3.04	7.05
068839	11	2	2.03	11.83%	3.57	0.00	2.03	1.54	3.57
068840	11	2	6.09	35.48%	10.71	0.00	6.09	4.62	10.71
068846	11	2	5.04	29.36%	8.86	0.00	5.04	3.82	8.86
Totals:			17.17	100.0%	30.19	0.00	17.17	13.02	30.19
Spring Totals:			584.33		1,471.36	42.23	584.33	844.79	1,429.12

2008 Brood Year

The 2013 spawning season was the last year for returns of the 2008 BY. The age 5 component of the run is historically very small for TRH Chinook stocks, but this BY returned at below average rates. The total contribution of the four (three fingerling and one yearling) 2008 BY tag code release groups that returned to the Trinity River ranged from 0.22% (the yearling group) to 0.61% (a fingerling group) (Appendix 6). The percent return of the 2008 BY fingerlings release type was 0.48%, and 0.22% for the yearlings, with a combined final total return rate for all 2008 BY spring Chinook release groups of approximately 0.401%, below the mean return rate of 0.665% since 1986 (Figure 8, Appendix 7).

Contribution of Hatchery-Produced Spring Chinook to Total Estimated Run-Size

The estimated contribution of TRH-origin spring Chinook to the total Trinity River run-size estimate upstream of JCW was 6,146 fish. This represents 61.9% (135/218) of the jacks, 69.3% (6,011/8,680) of the adult run, and 68.6% (6,146/8,961) overall (Table 4).

Of the 6,011 TRH-origin adult spring Chinook in the run-size estimate, 2,366 escaped to TRH, while 3,469 escaped to areas outside of the hatchery and 176 were estimated as harvested.

The contribution of TRH-produced spring Chinook (at 68.6%) to the total run-size is above the 23 year mean of 58% (Table 5 and Figure 9).

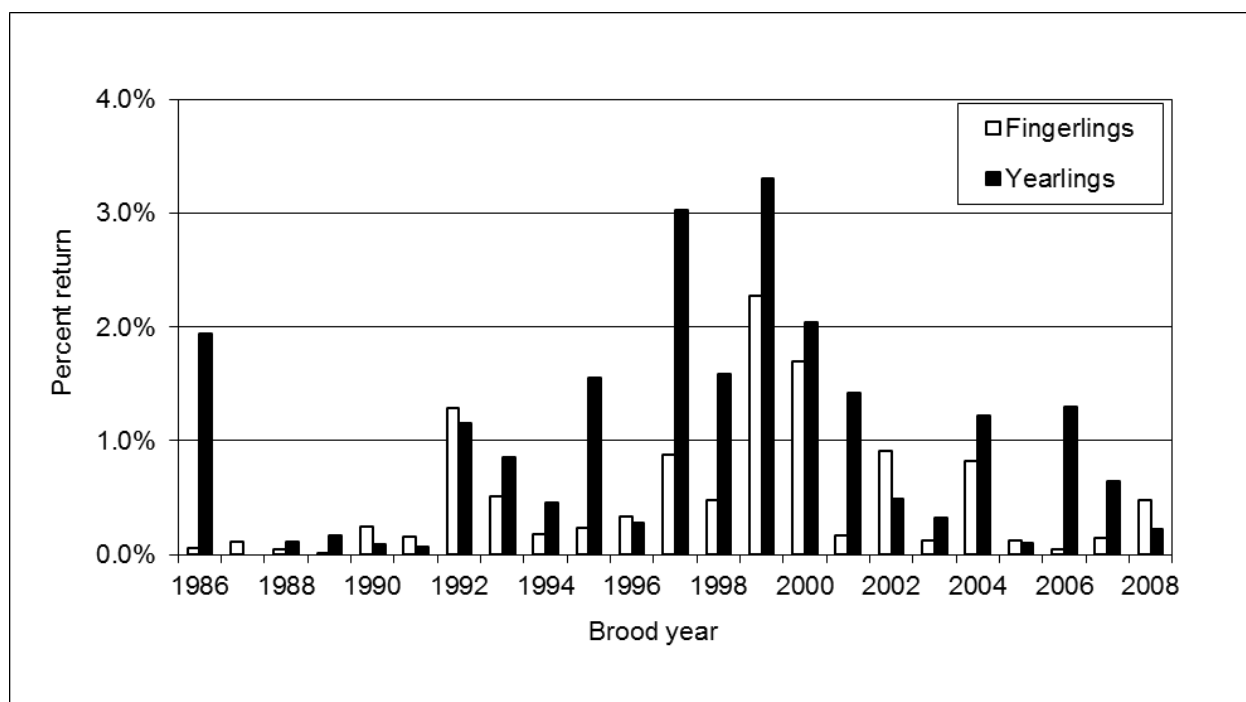


Figure 8. Percent return of Trinity River Hatchery produced, coded-wire tagged, spring Chinook salmon, brood years 1986-2008.

Table 4. Estimated run-size, angler harvest, and spawner escapement estimates for Trinity River Hatchery-produced, spring Chinook salmon expanded for unmarked releases (hatchery multiplier) returning to the Trinity River during the 2013-14 season.^a

Starting to the Trinity River during the 2016-17 season:													
TRH				Expanded				Spawning escapement					
CWT	expansion			Run-size	Expanded run-size e/	Angler harvest	Expanded angler harvest	Expanded		Expanded		Escapement Total	Expanded total
code b/	BY c/	Age	factor d/					TRH f/	TRH	River	River		
Spring Chinook													
Adults													
068819	08	5	4.09	2.59	10.6	0.1	0.3	1.02	4.17	1.49	6.09	2.51	10.27
068821	09	4	4.15	184.55	765.9	5.4	22.5	72.63	301.41	106.51	442.02	179.14	743.43
068822	09	4	4.18	270.53	1130.8	7.9	33.1	106.47	445.04	156.13	652.62	262.60	1,097.67
068831	09	4	4.21	10.35	43.6	0.3	1.3	4.07	17.13	5.98	25.18	10.05	42.31
068832	09	4	4.21	20.55	86.5	0.6	2.5	8.09	34.06	11.86	49.93	19.95	83.99
068836	09	4	4.09	451.86	1848.1	13.2	54.2	177.82	727.28	260.80	1,066.67	438.62	1,793.96
068773	10	3	4.21	100.32	422.3	2.9	12.4	39.48	166.21	57.90	243.76	97.38	409.97
068774	10	3	4.16	225.59	938.5	6.6	27.5	88.78	369.32	130.20	541.63	218.98	910.96
068775	10	3	4.49	113.32	508.8	3.3	14.9	44.60	200.25	65.40	293.65	110.00	493.90
068776	10	3	4.16	61.52	255.9	1.8	7.5	24.21	100.71	35.51	147.72	59.72	248.44
Total adult				1,441.18	6,011.02	42.2	176.1	567.17	2,365.61	831.78	3,469.27	1,398.95	5,834.88
Jacks													
068838	11	2	4.76	7.04	33.5	0.0	0.0	4.01	19.09	3.03	14.42	7.04	33.51
068839	11	2	4.42	3.57	15.8	0.0	0.0	2.03	8.96	1.54	6.80	3.57	15.76
068840	11	2	4.31	10.71	46.1	0.0	0.0	6.09	26.24	4.62	19.90	10.71	46.14
068846	11	2	4.51	8.86	39.9	0.0	0.0	5.04	22.71	3.82	17.21	8.86	39.93
Total jack				30.18	135.3	0.0	0.00	17.17	77.00	13.01	58.34	30.18	135.35
Total spring Chinook				1,471.36	6,146.37	42.23	176.14	584.34	2,442.62	844.79	3,527.61	1,429.13	5,970.23

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.

Table 5. Estimated contributions of Trinity River Hatchery (TRH)-produced spring Chinook to total estimated run-size above Junction City weir, 1991-2013 seasons.

Year	Run-size	TRH component	Natural component	% TRH composition
1991	2,381	1,016	1,365	42.7%
1992	4,030	1,794	2,236	44.5%
1993	5,232	3,206	2,026	61.3%
1994	6,788	2,659	4,129	39.2%
1995	No estimate	No estimate	No estimate	No estimate
1996	23,416	12,524	10,892	53.5%
1997	20,039	8,303	11,736	41.4%
1998	16,167	8,774	7,393	54.3%
1999	11,293	7,616	3,677	67.4%
2000	26,083	19,730	6,353	75.6%
2001	19,622	12,051	7,571	61.4%
2002	38,485	24,599	13,886	63.9%
2003	47,795	33,546	14,249	70.2%
2004	16,147	11,324	4,823	70.1%
2005	13,984	10,966	3,018	78.4%
2006	7,483	3,649	3,834	48.8%
2007	14,835	12,099	2,736	81.6%
2008	10,283	4,577	5,706	44.5%
2009	7,426	3,973	3,453	53.5%
2010	11,285	4,505	6,780	39.9%
2011	19,219	9,846	9,373	51.2%
2012	25,617	16,306	9,311	63.7%
2013	8,961	6,146	2,815	68.6%
Means:	16,208	9,964	6,244	58.0%

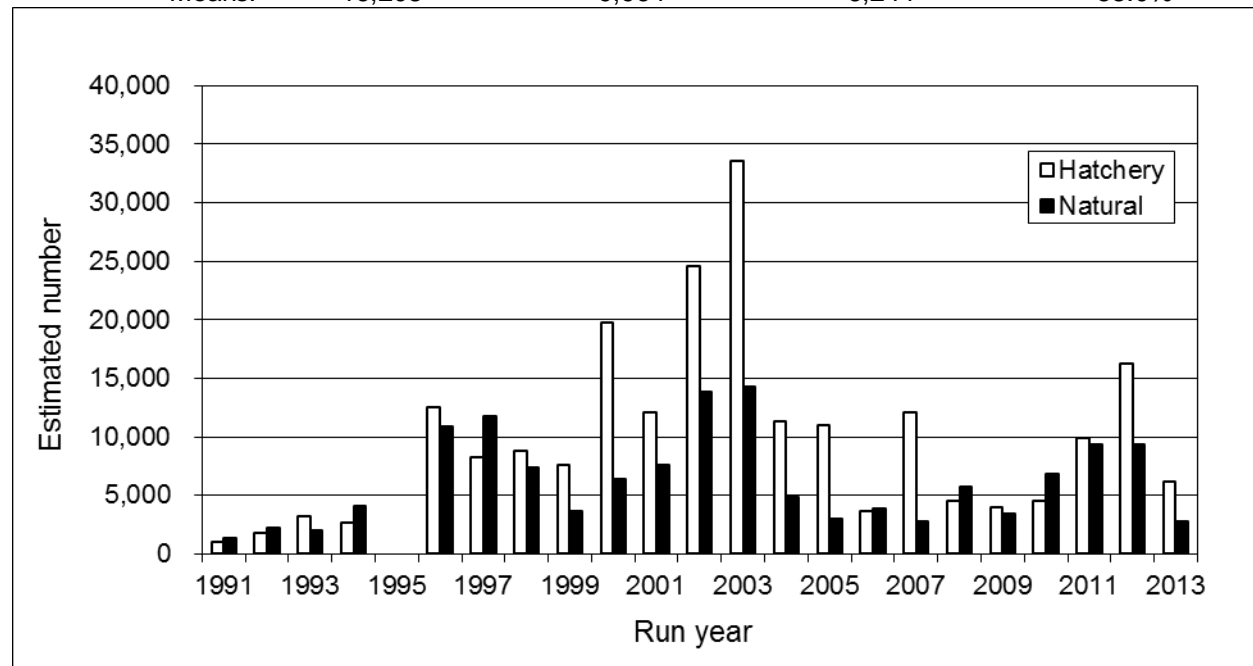


Figure 9. Hatchery and natural contributions to total spring Chinook run-size, upstream of Junction City weir, 1991 - 2013.

Spring Chinook Run-size, Angler Harvest and Spawner Escapement Estimates

An estimated run-size of 8,961 (8,680 adult and 281 jacks) spring Chinook migrated into the Trinity River basin upstream of JCW. Based on the Normal Approximation, the 95% confidence interval for the spring Chinook run-size estimate was 7,864 – 10,135 (Appendix 8). Based on expansion of the tags returned by anglers, we estimate anglers harvested no jacks, and 254 adult spring Chinook during the 2013 season. Spawning escapement above JCW was an estimated 8,707 fish, including the 2,578 spring Chinook that entered TRH and 6,129 natural area spawners (Appendix 9). The escapement of 2,591 naturally-produced adult spring Chinook was 43.2% of the TRRP goal of 6,000 spring Chinook (Appendix 10). This year's run-size estimate is approximately 51% of the 34 year average spring Chinook run-size of 17,402. Estimated spring Chinook run-size has ranged from 2,381 fish in 1991 to 62,692 fish in 1988 (Appendix 11- 13).

Fall Chinook Trapping and Tagging

Willow Creek weir fished beginning August 29 (JW 35). The number of fall Chinook trapped peaked during JW 37, with 23.2 fish per night (Table 6, Figure 10). Trinity River Project personnel pulled conduit to accommodate storm flows during JW 39/40 but were able to reinstall and trap over the next weekend, missing one day of effort. The last day of trapping was December 10, 2013.

A total of 822 fall Chinook were trapped at WCW, of which 767 (137 jack and 630 adult) were effectively tagged (Appendix 14). There were four tagging mortalities and nine fish reported as caught and released (their tags removed) by anglers. Ad-clipped fish comprised 9.0% of the fall Chinook captured (74 of 822) at WCW. All of the Chinook trapped and tagged at WCW in 2013 were determined to be fall Chinook.

Size of Trapped Fish

Fall Chinook trapped at WCW and TRH averaged 71.8 and 73.3 cm FL, respectively, with a combined average 73.1 cm FL (Figure 11). Using fork length distribution analysis, the nadir separating jack from adult fall Chinook was between 54 and 55 cm FL. Data from known age, hatchery-marked fall Chinook that entered TRH supported the minimum adult fork length of 55 cm. As with the spring Chinook, there was minimal overlap between sizes of age 2 and age 3 fish (Appendix 15), and the mean FL of those CWT brood years (BY) was distinctly different. For this year's report we used scale analyses to estimate numbers of jack and adult fall-Chinook. Scales collected and aged by the HVTF estimated proportions of jacks at 18.2% and 3.5% at WCW and TRH, respectively. The results from the mixdist analyses estimated the proportion of jacks sampled WCW at 18.2%, age 3 composed 13.6% and age 4 were 68.2% of the population. Mixdist did not detect any 5 year-old Chinook.

Table 6. Weekly summary of Chinook trapped in the Trinity River at Willow Creek weir during 2013.^a

			Number trapped						
Julian week	Inclusive dates	Nights trapped	Ad-clip ^c		Ad-clip			Ad-clip total	Fish/night
			Jacks ^b	Jacks	Adults	Adults	Total		
35	27-Aug - 2-Sep	4	12		30		42	0	10.5
36	3-Sep - 9-Sep	5	13		76	4	89	4	17.8
37	10-Sep - 16-Sep	5	16		100	12	116	12	23.2
38	17-Sep - 23-Sep	5	6		43	3	49	3	9.8
39	24-Sep - 30-Sep	4	13		26	4	39	4	9.8
40	1-Oct - 7-Oct	5	4		22	6	26	6	5.2
41	8-Oct - 14-Oct	5	10	1	40	8	50	9	10.0
42	15-Oct - 21-Oct	5	12		40	5	52	5	10.4
43	22-Oct - 28-Oct	5	3		46	6	49	6	9.8
44	29-Oct - 4-Nov	5	5		29	3	34	3	6.8
45	5-Nov - 11-Nov	5	11		50	9	61	9	12.2
46	12-Nov - 18-Nov	5	25		78	6	103	6	20.6
47	19-Nov - 25-Nov	5	13		82	7	95	7	19.0
48	26-Nov - 2-Dec	4	4		7		11	0	2.8
49	3-Dec - 9-Dec	5	1		5		6	0	1.2
50	10-Dec - 16-Dec	1					0	0	0.0
Total:		73	148	1	674	73	822	74	
Mean:									11.3

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50).

b/ Fall Chinook <55 cm FL were considered jacks in 2013.

c/ Adipose fin-clipped Chinook. Number shown is a subset of weekly jack and adult Chinook totals.

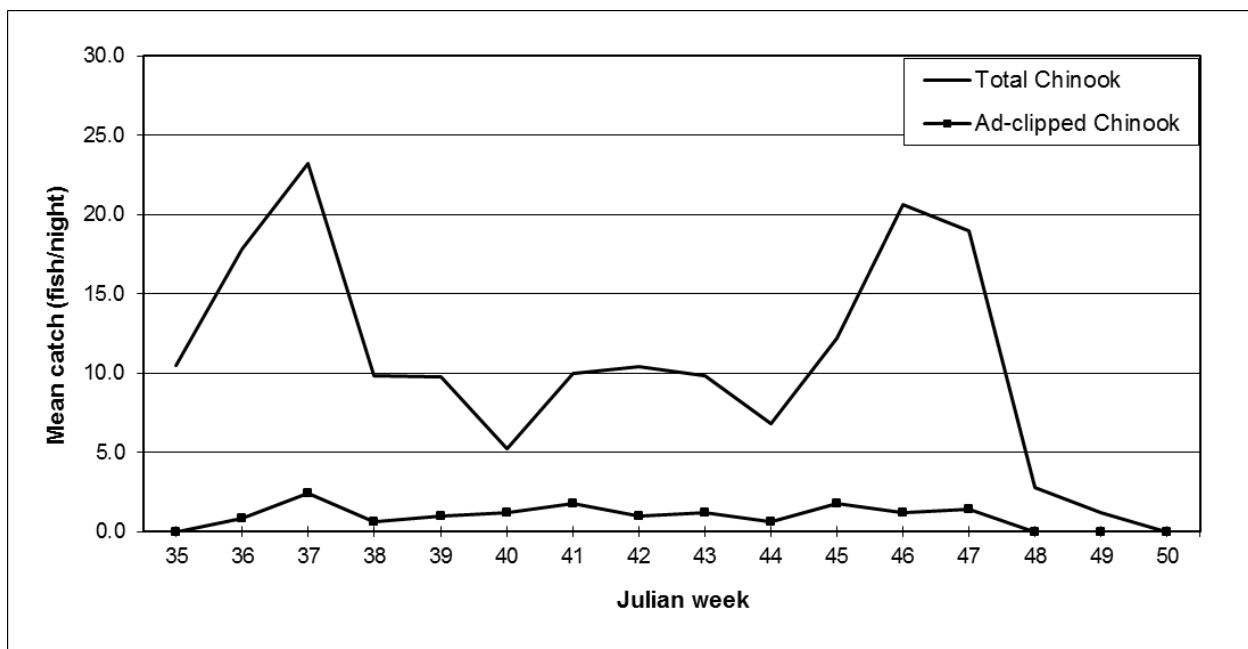


Figure 10. Mean catch of fall Chinook in the Trinity River at Willow Creek weir, 2013.

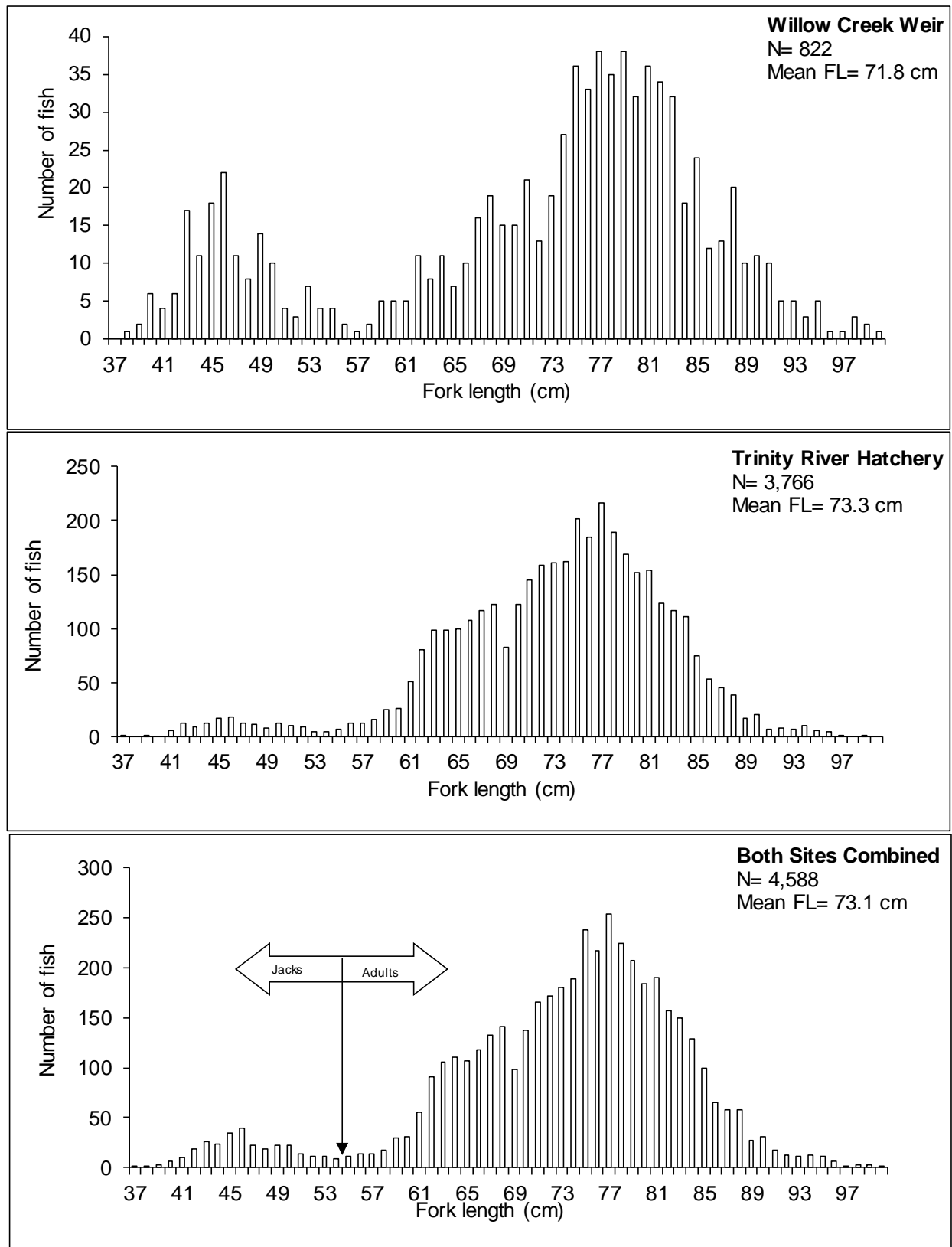


Figure 11. Fork length frequency distribution of fall Chinook at Willow Creek weir and Trinity River Hatchery, 2013.

Fall Chinook Recovery

Angler Tag Recovery

There was no reported harvest of Project-tagged jack fall Chinook in 2013 (Appendix 14). The reported harvest of 14 Project-tagged adult fall Chinook represents an estimated harvest of 880 adults. The total harvest rate of Project-tagged fall Chinook upstream of WCW was 0% for jacks, 2.90% for adults. There were nine tag returns from adult fish from the catch and release fishery, and eight tags found and returned by anglers or other river users.

Spawner Survey Recovery

During the 2013 spawner surveys 37 Project-tagged fall Chinook were recovered.

Tagging Mortalities

Four fall Chinook were identified as tagging mortalities at WCW in 2013.

Trinity River Hatchery Recovery

A few CWTed fall Chinook entered TRH during the first week of spawning operations (JW 36), though the majority arrived later in the season, from JW 42 through JW 50 (Table 7). Recovery of fall Chinook peaked in JW 46 when 1,120 Chinook entered (Appendix 5), although the peak week for CWTed fish was JW 44. Of the 767 fall Chinook effectively tagged at WCW, 79 (10.3%) were recovered at TRH. Based on run-timing (from CWT analysis) an estimated 3,852 (135 jack and 3,717 adult) fall Chinook were recovered at TRH, from which 954 readable CWTs were recovered.

Run size, Angler Harvest and Escapement of Coded-wire Tagged Fall Chinook

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 estimate 3,290 (45 jack and 3,245 adult) CWT fall Chinook returned to the Trinity River above WCW during the 2013 season (Table 8) and zero jack and 94 adult CWT fall fish were harvested by anglers during the season. Escapement of CWT fall Chinook was divided between 967 fish recovered at TRH and 2,229 estimated available to spawn in natural areas. Based on CWTs, the known age composition of the 2013 hatchery-produced fall Chinook run was composed of 45 (1.37%) age 2; 812 (24.67%) age 3; 2,422 (73.63%) age 4; and 11 (0.32%) age 5 fish.

Table 7. Recoveries at Trinity River Hatchery, by Julian week, of TRH-origin coded-wire tagged fall Chinook during the 2013-14 season.

CWT number and release type ^c	Brood year	Number of fall Chinook entering TRH, by Julian week ^{ab}															Totals
		36	37	38	39	40	41	42 ^d	43	44	45	46	47	48	49	50	
068814-f	2008								1								1
068820-y	2008								1				1				2
068823-f	2009						1		7	9	5	2		1			25
068824-f	2009				1				5	9	4	6	1				26
068825-f	2009								6	3	3	7	1	2			22
068826-f	2009								3	7	1	5	2	2			20
068827-f	2009								3	5	2	8	2			2	22
068828-f	2009					1			4	3	1	4	2				15
068833-f	2009								1								1
068837-y	2009	2			3	15	8		147	165	97	87	29	4	1	1	559
068777-f	2010								6	10	3	5	1				25
068778-f	2010					1	1		5	9	2	5	3				26
068779-f	2010								1	2	3	9	2	1	1		19
068780-f	2010								1		4	4	1	2			12
068781-y	2010					1			30	34	16	45	16	6			148
068835-f	2010								1								1
068841-f	2011										5						5
068842-f	2011									1	2						3
068844-f	2011									1		4	1				6
068845-f	2011											2					2
068847-y	2011					1			2	6	2	2	1				14
No CWT ^e									3			5	1	1			10
Weekly totals:					4	19	10	0	227	264	150	200	64	19	2	3	964

a/ Trapping occurred at TRH September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

b/ Entry week was the week that fish were initially 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 CWTs were recovered from these ad-clipped fish. Chinook with shed or lost tags recovered after Julian week 42 were considered fall Chinook.

2008 Brood Year

The 2013 spawning season was the last year for returns of the 2008 BY. This BY returned at below average rates for each adult year-class. The total contribution of the twelve (ten fingerling and two yearling) 2008 BY tag code release groups that returned to the Trinity River ranged from 0.48%⁵ (a fingerling group) to 1.62% (a yearling group) (Appendix 16). The percent return of the 2008 BY fingerlings release type was 0.69%, and 1.62% for the yearlings, with a combined final total return rate for all 2008 BY fall Chinook release groups of approximately 1.00%, which is above the mean return rate of 0.834% since 1986 (Figure 8, Appendix 17).

⁵ There were two additional fingerling groups used to test juvenile rotary screw trap efficiency (that were released far downstream of TRH) which returned to TRH at lower rates (0.37 and 0.41%).

Table 8. Run-size, angler harvest and spawner escapement estimates for Trinity River Hatchery-produced coded-wire tagged fall Chinook returning to the Trinity River during the 2013-14 season.

	Run-size estimate		Harvest rates		TRH	Percentage of ad clips at weirs		Ad+CWT run-size estimates		
					Ad-clips with					
	Jacks	Adults	Jacks	Adults	CWTs	Jacks	Adults	Jacks	Adults	Total
Fall Chinook (WCW)	6,717	30,272	0.0%	2.91%	98.98%	0.68%	10.83%	45	3,245	3,290

CWT code	BY	Age	TRH Total No.	% of total	Run-size	Angler harvest	Spawning escapement		
							TRH	Natural	Total
Adults									
068814	08	5	1.03	0.11%	3.57	0.10	1.03	2.44	3.47
068820	08	5	2.04	0.22%	7.07	0.21	2.04	4.82	6.86
068823	09	4	25.33	2.71%	87.78	2.55	25.33	59.90	85.23
068824	09	4	26.30	2.81%	91.14	2.65	26.30	62.19	88.49
068825	09	4	22.38	2.39%	77.56	2.25	22.38	52.92	75.30
068826	09	4	20.33	2.17%	70.45	2.05	20.33	48.07	68.40
068827	09	4	22.23	2.37%	77.04	2.24	22.23	52.57	74.80
068828	09	4	15.23	1.63%	52.78	1.53	15.23	36.01	51.24
068833	09	4	1.03	0.11%	3.57	0.10	1.03	2.44	3.47
068837	09	4	566.29	60.48%	1,962.43	57.02	566.29	1,339.12	1,905.41
068777	10	3	25.30	2.70%	87.68	2.55	25.30	59.83	85.13
068778	10	3	26.33	2.81%	91.24	2.65	26.33	62.26	88.59
068779	10	3	19.22	2.05%	66.61	1.94	19.22	45.45	64.67
068780	10	3	12.19	1.30%	42.24	1.23	12.19	28.83	41.02
068781	10	3	150.14	16.03%	520.30	15.12	150.14	355.04	505.18
068835	10	3	1.03	0.11%	3.57	0.10	1.03	2.44	3.47
Totals:			936.40	100.00%	3,245.02	94.29	936.40	2,214.33	3,150.73
Jacks									
068841	11	2	5.00	16.52%	7.47	0.00	5.00	2.47	7.47
068842	11	2	3.01	9.94%	4.49	0.00	3.01	1.49	4.49
068844	11	2	6.06	20.04%	9.06	0.00	6.06	3.00	9.06
068845	11	2	2.02	6.68%	3.02	0.00	2.02	1.00	3.02
068847	11	2	14.17	46.82%	21.17	0.00	14.17	7.00	21.17
Totals:			30.26	100.00%	45.21	0.000	30.26	14.95	45.21
Fall Totals:			966.66		3,290.23	94.29	966.66	2,229.28	3,195.94

Contribution of Hatchery-Produced Fall Chinook to Total Estimated Run-Size

The estimated contribution of TRH-origin fall Chinook to the total Trinity River run-size estimate upstream of WCW was 13,371 fish. This represents 3.0% (203/6,717) of the jacks, 43.5% (13,168/30,272) of the adult run, and 36.1% (13,371/36,989) overall (Table 9).

Of the 13,168 TRH-origin adult fall Chinook in the run-size estimate 3,799 escaped to TRH, while 8,986 escaped to natural areas and 382 were estimated as harvested.

The contribution of TRH-produced fall Chinook (at 36.1%) to the total run-size is below the 23 year mean of 50.6% (Table 10 and Figure 13).

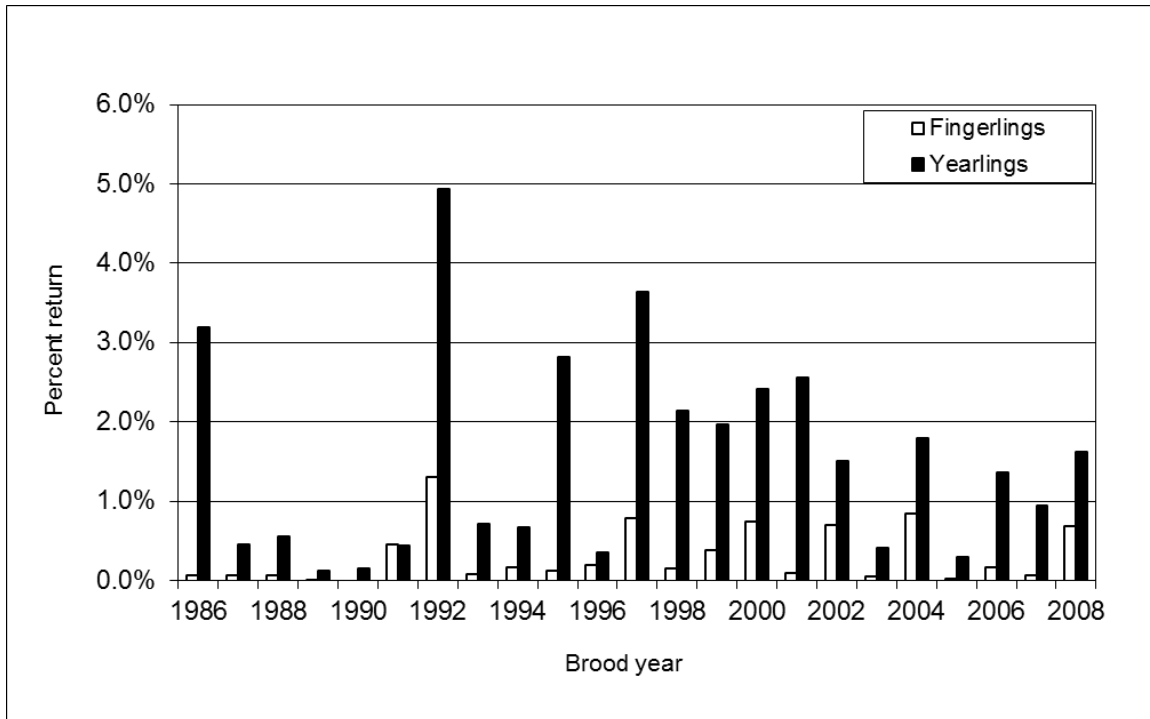


Figure 12. Percent return of Trinity River Hatchery produced, coded-wire tagged, fall Chinook salmon, brood years 1986-2008.

Table 9. Estimated run-size, angler harvest, and spawner escapement estimates for Trinity River Hatchery-produced fall Chinook salmon expanded for unmarked releases (hatchery multiplier) returning to the Trinity River during the 2013-14 season.^a

TRH				Expanded				Spawning escapement					
CWT code b/	BY c/	Age	expansion factor d/	Run- size	Expanded run-size e/	Angler harvest	angler harvest	TRH f/	Expanded TRH	River	Expanded River	Escapement Total	Expanded total
Fall Chinook													
Adults													
068814	08	5	4.08	3.57	14.6	0.10	0.41	1.03	4.19	2.44	9.97	3.47	14.16
068820	08	5	4.02	7.07	28.5	0.21	0.85	2.04	8.22	4.82	19.39	6.86	27.61
068823	09	4	4.19	87.80	367.8	2.55	10.68	25.33	106.11	59.92	250.98	85.25	357.09
068824	09	4	4.09	91.16	373.3	2.65	10.85	26.30	107.68	62.21	254.73	88.51	362.42
068825	09	4	4.07	77.57	316.1	2.25	9.17	22.38	91.20	52.94	215.70	75.32	306.89
068826	09	4	4.11	70.47	289.9	2.05	8.43	20.33	83.61	48.09	197.81	68.42	281.42
068827	09	4	4.06	77.05	312.8	2.24	9.09	22.23	90.26	52.58	213.47	74.81	303.73
068828	09	4	4.03	52.79	212.9	1.53	6.17	15.23	61.43	36.03	145.27	51.26	206.70
068833	09	4	4.53	3.57	16.2	0.10	0.45	1.03	4.66	2.44	11.07	3.47	15.73
068837	09	4	4.03	1,962.83	7905.0	57.02	229.64	566.30	2,280.68	1,339.51	5,394.64	1,905.81	7,675.33
068777	10	3	4.20	87.69	368.6	2.55	10.72	25.30	106.37	59.84	251.54	85.14	357.92
068778	10	3	4.08	91.26	372.3	2.65	10.81	26.33	107.43	62.28	254.08	88.61	361.51
068779	10	3	4.07	66.62	270.9	1.94	7.89	19.22	78.15	45.46	184.83	64.68	262.98
068780	10	3	4.23	42.25	178.9	1.23	5.21	12.19	51.60	28.83	122.04	41.02	173.65
068781	10	3	4.08	520.40	2125.2	15.12	61.75	150.14	613.13	355.14	1,450.28	505.28	2,063.41
068835	10	3	4.29	3.57	15.3	0.10	0.43	1.03	4.41	2.44	10.49	3.47	14.90
Total adult				3,245.67	13,167.98	94.29	382.54	936.42	3,799.14	2,214.96	8,986.29	3,151.38	12,785.44
Jacks													
068841	11	2	4.99	7.47	37.3	0.00	0.00	5.00	24.93	2.47	12.33	7.47	37.26
068842	11	2	4.74	4.49	21.3	0.00	0.00	3.01	14.27	1.48	7.04	4.49	21.31
068844	11	2	4.30	9.06	39.0	0.00	0.00	6.06	26.08	3.00	12.92	9.06	39.00
068845	11	2	4.48	3.02	13.5	0.00	0.00	2.02	9.05	1.00	4.48	3.02	13.52
068847	11	2	4.32	21.17	91.4	0.00	0.00	14.17	61.20	7.00	30.24	21.17	91.44
Total jack				45.22	202.5	0.00	0.00	30.26	135.53	14.96	67.00	45.22	202.53
Total fall Chinook				3,290.89	13,370.51	94.29	382.54	966.68	3,934.67	2,229.92	9,053.29	3,196.60	12,987.97

a/ Estimate is for upstream of Willow Creek weir.

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.

Table 10. Estimated contributions of Trinity River Hatchery (TRH)-produced fall Chinook to total estimated run-size above Willow Creek weir, 1991 - 2013.

Year	Run-size	TRH component	Natural component	% TRH composition
1991	9,207	5,597	3,610	60.8%
1992	14,164	4,651	9,513	32.8%
1993	10,485	1,499	8,986	14.3%
1994	21,924	11,880	10,044	54.2%
1995	105,725	53,263	52,462	50.4%
1996	55,646	20,824	34,822	37.4%
1997	21,347	9,977	11,370	46.7%
1998	43,189	23,536	19,653	54.5%
1999	18,516	13,081	5,435	70.6%
2000	55,473	38,881	16,592	70.1%
2001	57,109	33,984	23,125	59.5%
2002	18,156	6,884	11,272	37.9%
2003	64,362	52,944	11,418	82.3%
2004	29,534	25,956	3,578	87.9%
2005	28,231	19,674	8,557	69.7%
2006	34,912	21,768	13,144	62.4%
2007	58,873	24,633	34,240	41.8%
2008	22,997	8,585	14,412	37.3%
2009	29,593	10,072	19,521	34.0%
2010	40,792	15,853	24,939	38.9%
2011	80,818	32,875	47,943	40.7%
2012	73,666	32,735	40,931	44.4%
2013	36,989	13,371	23,618	36.1%
Means:	40,509	20,979	19,530	50.6%

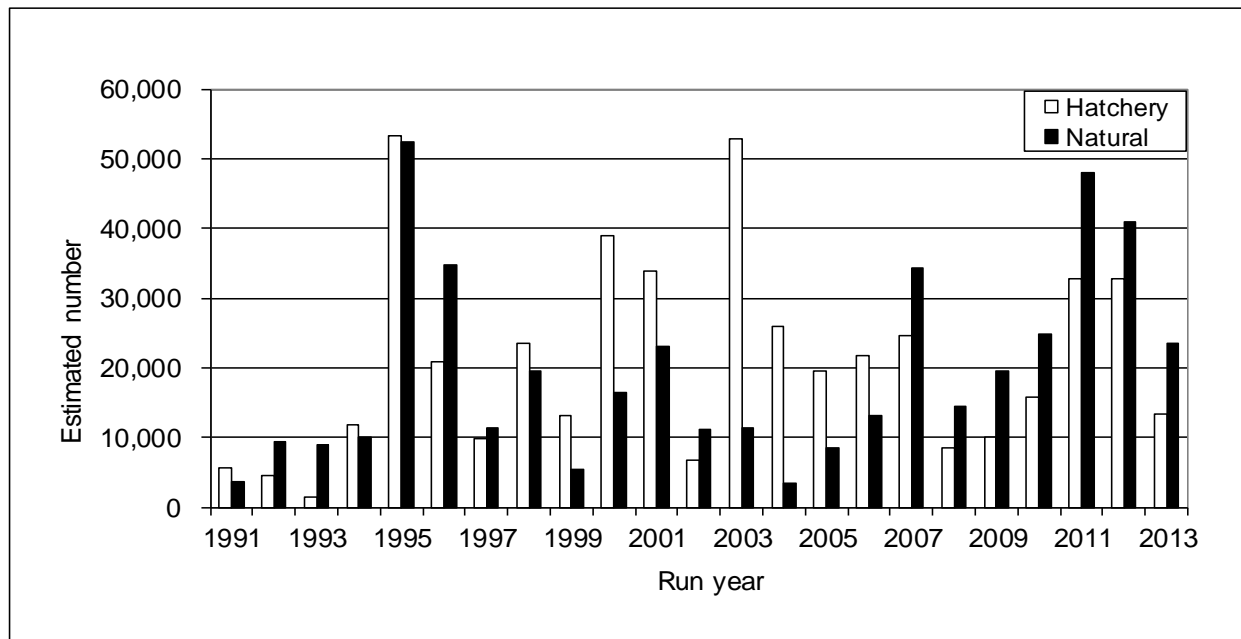


Figure 13. Hatchery and natural contributions to total fall Chinook run-size, upstream of Willow Creek weir, 1991 - 2013.

Fall Chinook Run-size, Angler Harvest and Spawner Escapement Estimates

An estimated run-size of 36,989 (30,272 adults and 6,717 jack) 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 30,035 – 46,663 (Appendix 8). Trinity River fall Chinook spawner escapement, upstream of WCW, was estimated at 36,109 (6,717 jack, 29,392 adult) fish, including 3,852 fall Chinook that entered TRH and 32,257 natural area spawners (Appendix 9). Harvest rates generated from tags applied at WCW were used to estimate zero jack and 880 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 18- 20). This year's fall Chinook estimated run-size of 36,989 is approximately 84.5% of the 43,762 mean run-size for the years since 1977. The 16,689 naturally-produced adult fall Chinook component of the spawning escapement was 26.8% of the 62,000 TRRP goal (Appendix 10).

Coho Salmon Trapping and Tagging

A total of 575 coho were trapped during the 2013 season. We applied tags to 544 (71 jacks and 473 adult) of the trapped fish (Appendix 20). We chose not to tag 31 fish to minimize stress that may lead to tagging mortality. Only one coho was trapped (not tagged) at JCW in 2013. Coho were trapped during all weeks of the sampling season at WCW, except JWs 36 and 50. The number of trapped coho peaked in JW 43 with 24.6/night, with lessor peaks at JW 47 and JW 40 (Table 11, Figure 14). Peaks of right-maxillary clipped [RM (TRH-origin)] coho occurred concurrent to those peaks, and non-right maxillary clipped (natural-origin) coho peaked in JW 47 when 26 (3.7/night) were trapped. Hatchery-origin fish comprised 79.7% (458 of 575) of the total coho captured at WCW.

Size of Trapped Fish

Coho trapped at WCW and TRH averaged 63.6 and 65.5 cm FL, respectively, with a combined average of 65.3 cm FL (Figure 15). Using fork length distribution analysis, the nadir separating jack from adult coho salmon was between 52 and 53 cm FL. Based on the nadir, jacks comprised 12.9% of the coho sampled at WCW, and 6.4% at TRH. The mixdist application estimated the proportion of jacks at the TRH at 6.9% which is very similar to the estimate produced by using the nadir in length-frequency histograms.

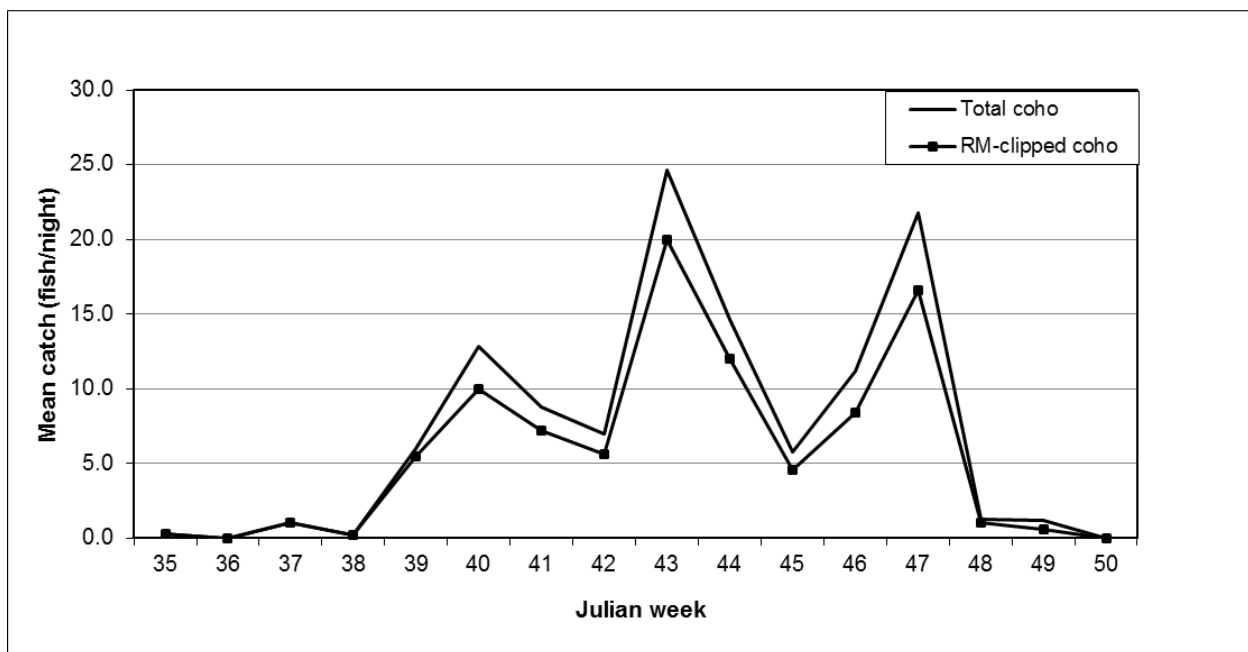
Table 11. Weekly summary of coho trapped in the Trinity River at Willow Creek weir during 2013.^a

Julian week	Inclusive dates	Nights trapped	Number trapped						Fish / night
			Jacks ^b	RM clip ^c Jacks	Adults	RM clip Adults	Total trapped	Total RM clips	
35	27-Aug - 2-Sep	4	1	1			1	1	0.3
36	3-Sep - 9-Sep	5					0	0	0.0
37	10-Sep - 16-Sep	5	2	2	3	3	5	5	1.0
38	17-Sep - 23-Sep	5	1	1			1	1	0.2
39	24-Sep - 30-Sep	4	11	11	13	11	24	22	6.0
40	1-Oct - 7-Oct	5	19	17	45	33	64	50	12.8
41	8-Oct - 14-Oct	5	12	12	32	24	44	36	8.8
42	15-Oct - 21-Oct	5	7	7	28	21	35	28	7.0
43	22-Oct - 28-Oct	5	13	13	110	87	123	100	24.6
44	29-Oct - 4-Nov	5	4	3	69	57	73	60	14.6
45	5-Nov - 11-Nov	5	1	1	28	22	29	23	5.8
46	12-Nov - 18-Nov	5	2	2	54	40	56	42	11.2
47	19-Nov - 25-Nov	5	1		108	83	109	83	21.8
48	26-Nov - 2-Dec	4			5	4	5	4	1.3
49	3-Dec - 9-Dec	5			6	3	6	3	1.2
50	10-Dec - 16-Dec	1					0	0	0.0
Total		Total:	73	74	70	501	388	575	458
Mean:		Mean:							7.9

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50).

b/ Coho <53cm FL were considered jacks in 2013.

c/ Right maxillary clipped coho. Number shown is a subset of weekly jack and adult coho totals.

**Figure 14. Mean catch of coho trapped in the Trinity River at Willow Creek weir, 2013.**

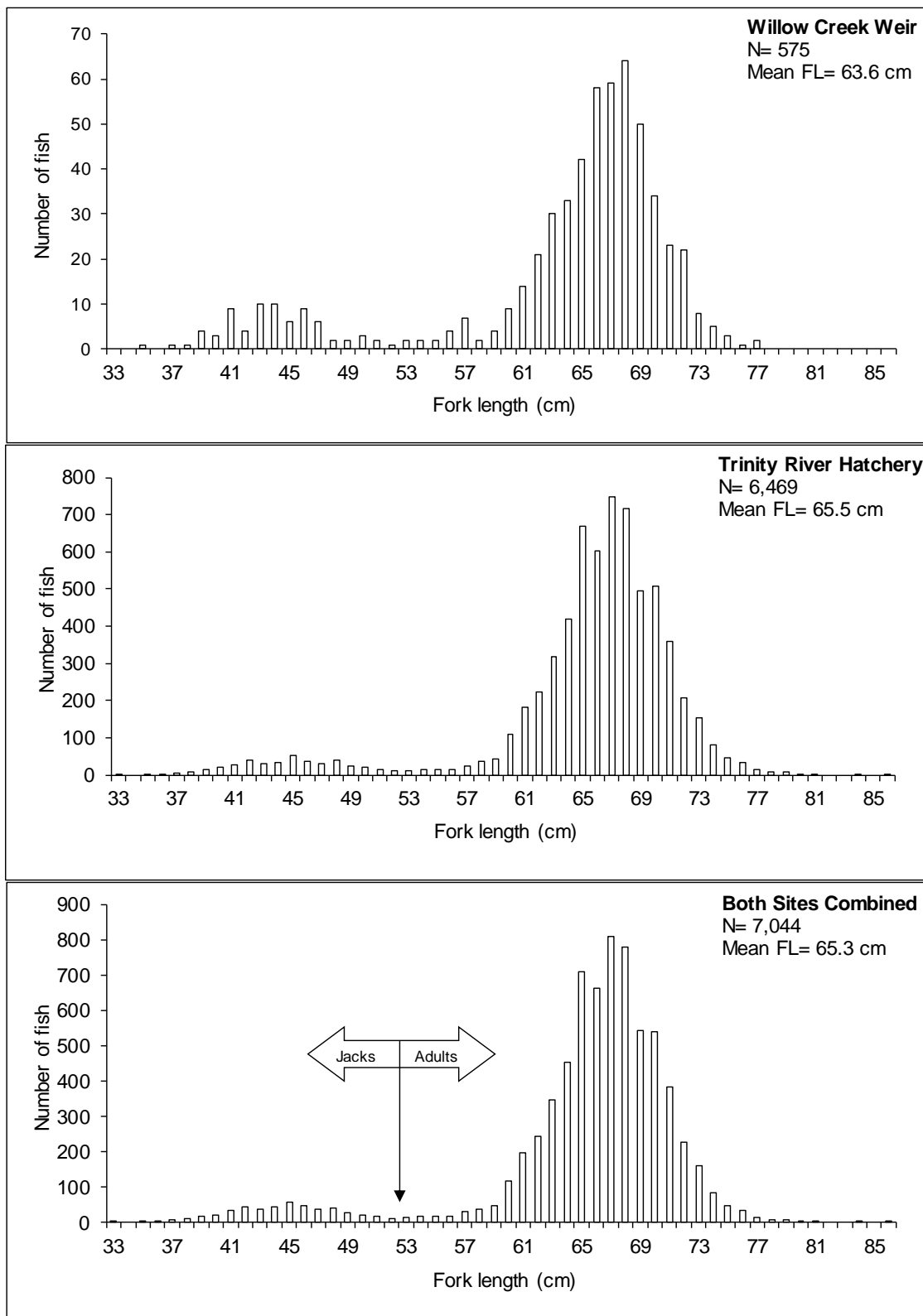


Figure 15. Coho salmon fork lengths (cm) observed at Willow Creek weir, Trinity River Hatchery and both sites combined during the 2013-14 season. The arrow denotes the size used to separate jacks and adults for analysis.

Coho Salmon Recovery

Angler Tag Recovery

There was no reported harvest of Project-tagged coho in 2013 (Appendix 20). There were three tags returned from the catch and release fishery.

Spawner Survey Recovery

During the spawner surveys 14 (one jack and 13 adult) Project-tagged coho were recovered.

Tagging Mortalities

We observed one coho mortality, a result of tagging stress, at WCW in 2013.

Trinity River Hatchery Recovery

The first coho entered TRH during JW 40 and coho continued returning through JW 3 of 2014 (Appendix 5). The run peaked in JW 47 when 2,334 coho entered TRH. A total of 6,631 coho (427 jack and 6,204 adults) were recovered at TRH during the season. One hundred sixty four (30.1%) of the 544 coho effectively tagged at WCW were recaptured at TRH.

Of the 6,631 coho that entered TRH in 2013, we observed 6,271 (94.6%) with right-maxillary (RM) clips, indicating TRH-origin; 360 (5.4%) had no clip. The unclipped fish are assumed to be either naturally-produced coho salmon which entered the hatchery, or TRH-produced fish which received no or poor clips prior to release from the hatchery.

Based on length frequency analysis, TRH-produced RM-clipped coho salmon were assigned into two brood years (Table 12). The 424 coho measuring less than 53 cm FL were considered jacks (age 2, from the 2011 BY), while the 5,847 greater than 52 cm FL were considered adults (age 3, from the 2010 BY). The 360 coho without RM clips which entered the hatchery were also considered jacks or adults based on those lengths.

Table 12. Release and recovery data for right maxillary-clipped coho recovered at Trinity River Hatchery (TRH) during the 2013-14 season.

	Release data						TRH Recovery data				Number recovered	
	Egg source	Brood year	Date	Number	Size (# / lb)	Site	Males		Females		Total No.	Tagging site
							No.	FL ^a	No.	FL ^a		
Coho												
RM ^b	TRH	2010	03/15-26/12	489,429		TRH	2,579	67.5	3,268	66.2	5,847	146 --
RM ^b	TRH	2011	03/15-20/12	511,618		TRH	372	44.3	52	48.6	424	18 --
Total coho:							2,951		3,320		6,271	164 0

a/ FL = Mean fork length in cm.

b/ Since 1996, all coho produced at TRH have received a right maxillary clip (RM). Coho <53 cm FL were classified as brood year 2011 and coho >52 cm FL were classified as brood year 2010. Age cutoff based on fork length distribution.

Coho Salmon Run-size, Angler Harvest and Spawner Escapement Estimates

An estimated run-size of 21,906 (19,087 adult and 2,819 jack) coho migrated into the Trinity River basin upstream of the WCW in 2013. Based on the Poisson Approximation, the 95% confidence interval for the coho run-size estimate upstream of WCW was 18,885 – 25,644 fish (Appendix 8). A count of 6,631 entered TRH (Appendix 9), and we estimate 15,275 were natural area spawners. The 2013 coho escapement was comprised of an estimated 4,305 naturally-produced adults and 152 jack coho in addition to 14,782 hatchery-produced adults and 2,667 hatchery-produced jacks (Appendix 21 and 22). There were no project tags returned by anglers therefore we assume no coho harvest for 2013. The escapement of 4,305 naturally-produced coho adults was three times the TRRP goal of 1,400 fish (Appendix 10). Estimated coho run-size, upstream of WCW, has ranged from 852 fish in 1994 to 59,079 fish in 1987 (Appendix 23 and 24). This year's run-size of 21,906 is ranked 10th of the 37 years on record, and is 27.6% above the 17,161 fish average.

Coho Brood Year Performance

Coho salmon of the Trinity River typically have a three year life-cycle with juveniles rearing in freshwater during their first year, then migrating to the ocean. After approximately one year at sea, jacks (mostly males) return to the river as two year olds and a year later the three year-old adults return. Coho salmon jacks (age 2) returning during the 2013-14 season were born in BY 2011. Coho salmon adults (age 3) returning to the Trinity River in 2013-14 are of BY 2010. The total percent return for TRH produced coho from BY 2010 was 3.1% (Table 13). The first year of returns for BY 2010 was 2012-13 when 3,198 TRH-produced jacks escaped above WCW. Since 1994 the BY total return rate has ranged from 1 to 6 % (Appendix 25 and 26). In 2013-14 adult escapement of TRH BY 2010 was estimated at 14,782 fish. These consisted of 5,847 that entered TRH and an estimated 8,935 that spawned in natural areas. The total adult run-size estimate (17,448) for 2013-14 consisted of 78% TRH-produced fish. The TRH-produced jack escapement in 2013-14 from BY 2011 was estimated at 2,667 fish or 0.52% of the TRH total coho release.

Table 13. 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 2013- 14 season.

Release Data						Estimated Returns				
Clip a/	Brood Year	Date	Number b/	Site	Age c/	Run-size	% of release	River harvest	Spawning Escapement	
									TRH d/	Natural
RM	2010	3/15/2012	489,429	TRH	2	3,198	0.65	0	871	2,327
					3	14,782	3.01	0	5,847	8,935
					Totals:	17,980	3.66	0	6,718	11,262
RM	2011	3/15/2013	511,618	TRH	2	2,667	0.52	0	424	2,243

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, actual count.

Juvenile Coho Marking at Trinity River Hatchery

The RM clipping of all BY 2012 coho salmon (age 1) at TRH was completed by February 20, 2014. Approximately 2% of these individuals (10,565) were sampled for RM clip quality and fork length measurement (FL) prior to the start of their volitional release. We estimate 528,029 of the 528,468 yearling coho released from the TRH were effectively marked with a RM clip (Table 14).

The pre-release fork length measurements of BY 2012 production ranged from 72mm to 284mm with a mean across all raceways of 151.4mm, which is 8.7mm longer compared to BY 2011.

Based on the quality control sampling, an estimated 99.9% of the BY 2012 production was effectively RM clipped. Factoring in post-marking losses, a total of 528,468 (528,029 marked and 439 unmarked) individuals were volitionally released beginning March 15, 2014.

Table 14. Production, marking totals, and quality control data for BY 2012 TRH coho salmon volitionally released March 15, 2014.

Raceway	Net marked	2% check	Effectively marked ^a	Percent unmarked	Estimated unmarked releases	Marked releases	Total release
L1-L2	50,791	1,017	50,793	0.19%	97	50,790	50,887
L3-L4	66,412	1,329	66,415	0.22%	149	66,414	66,563
M3-M4	67,757	1,356	67,757	0.00%	0	67,755	67,755
M1-M2	66,333	1,327	66,336	0.22%	145	66,334	66,479
N3-N4	72,905	1,459	72,905	0.00%	0	72,903	72,903
N1-N2	70,665	1,414	70,665	0.00%	0	70,664	70,664
O3-O4	63,271	1,266	63,271	0.00%	0	63,268	63,268
O1-O2	69,904	1,399	69,905	0.07%	49	69,901	69,954
Total	528,038	10,565	528,047	0.08%	439	528,029	528,468

a/ Effectively marked = Net marked + QC re-clipped

Fall Adult Steelhead Trapping and Tagging

Eighty four adult steelhead were trapped at JCW in 2013; 31 were ad-clipped, indicating TRH-origin. The majority of them were trapped during JWs 39 and 40. The ad-clipped fish were tagged, but because the run-size estimate for steelhead is above WCW, the results of this particular tagging are purely qualitative in nature and not included in run-size estimates.

We trapped 2,140 fall-run steelhead at WCW in 2013 (Table 15, Figure 16); 112 half-pounders (<42 cm FL) and 2,028 adults. The proportions of half-pounders predicted by mixdist analysis and inspection of histograms (nadir = 42 cm) were similar. The mixdist statistical procedure estimates 5.65% (121 fish) of the steelhead were half-pounders and inspection of histograms estimate 5.3% of the sample population respectively.

There were two peaks in the steelhead run, one during JW 37 when we trapped 70.0/night, followed by a slightly higher peak during JW 47 when we averaged 73.6 steelhead per night (though we trapped 209 of those in a single night). Julian week 40 yielded the highest number of ad-clipped (hatchery-origin) steelhead 152 (30.4/night) whereas non-ad clipped (natural-origin) steelhead peaked in JW 47 when 235 (47/night) were trapped.

Of the 2,140 steelhead trapped during the season, 1,759 (all adult) were effectively tagged (Appendix 27). There was one tagging mortality, and 237 reported as caught and released (their tags removed) by anglers. Hatchery-origin fish comprised 46.9% (1,004 of 2,140) of the steelhead captured at WCW, and 96.6% of the adult steelhead at TRH.

Size of Trapped Fish

Steelhead trapped at WCW and TRH averaged 58.7 and 59.7 cm FL, respectively, with a combined average of 59.2 cm FL (Figure 17). Adult steelhead (>41 cm FL) made up 94.8% and 98.2% of the steelhead trapped at WCW and TRH respectively.

Table 15. Weekly summary of fall-run steelhead trapped in the Trinity River at Willow Creek weir during 2013.^a

			Number trapped							
Julian			Nights trapped	Ad-clipped		Ad-clipped			Ad-clip	Fish/ night
week	Inclusive dates			1/2 lbers	1/2 lbers ^c	Adults	Adults	Total	total	
35	27-Aug	2-Sep	4	7	2	224	63	231	103	57.8
36	3-Sep	9-Sep	5	7	4	138	60	145	64	29.0
37	10-Sep -	16-Sep	5	7	3	210	103	217	106	43.4
38	17-Sep -	23-Sep	5	5	3	143	79	148	82	29.6
39	24-Sep -	30-Sep	4	20	11	260	105	280	116	70.0
40	1-Oct	7-Oct	5	30	20	266	133	296	153	59.2
41	8-Oct	14-Oct	5	3	1	201	108	204	109	40.8
42	15-Oct	21-Oct	5	3	2	59	33	62	35	12.4
43	22-Oct	28-Oct	5	3	3	67	38	70	41	14.0
44	29-Oct	4-Nov	5	3	3	30	19	33	22	6.6
45	5-Nov	11-Nov	5	6	5	23	14	29	19	5.8
46	12-Nov	18-Nov	5	3		29	14	32	14	6.4
47	19-Nov	25-Nov	5	3	1	365	132	368	133	73.6
48	26-Nov	2-Dec	4	10	4	2		12	4	3.0
49	3-Dec	9-Dec	5	2	1	11	2	13	3	2.6
50	10-Dec	16-Dec	1					0	0	0.0
Total:			73	112	63	2,028	903	2,140	1,004	
Mean:										29.3

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50).

b/ Steelhead <42 cm FL were considered 1/2 lbers (half-pounders).

c/ Adipose fin-clipped steelhead. Number shown is a subset of weekly half-pounder and adult steelhead totals.

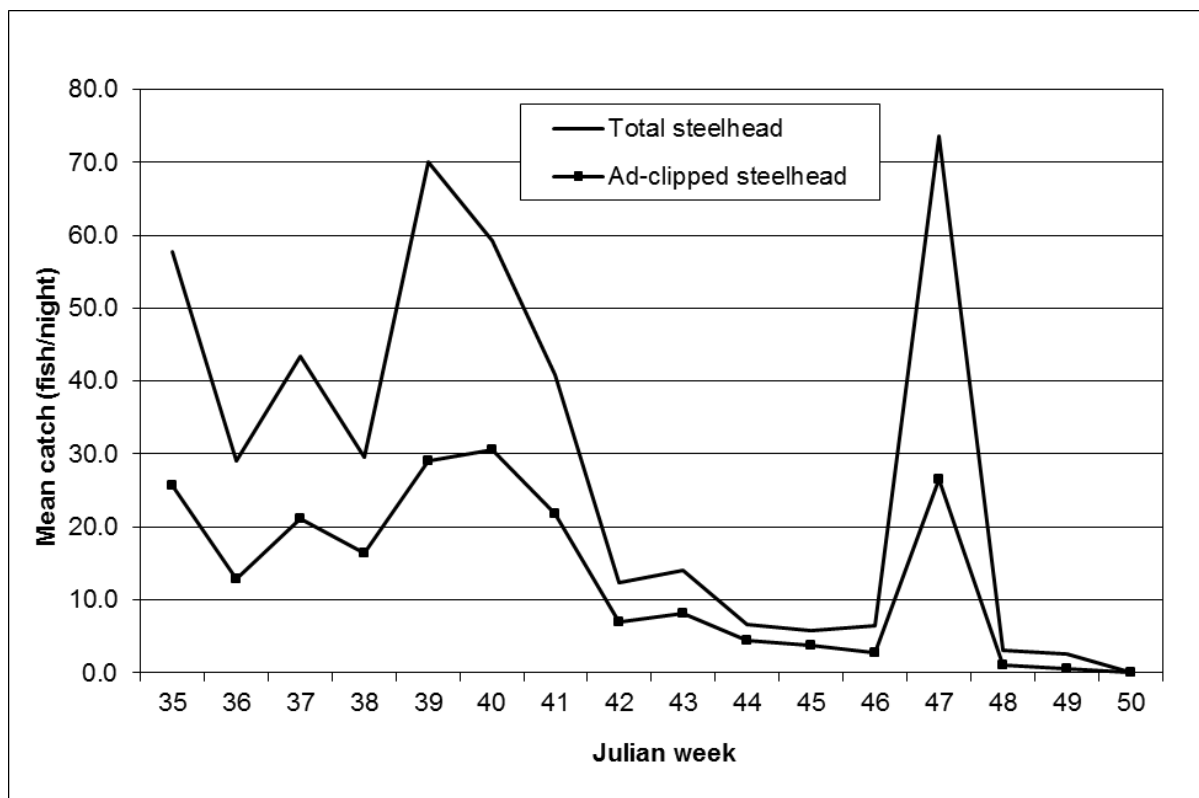


Figure 16. Mean catch of fall-run steelhead in the Trinity River at Willow Creek weir, 2013.

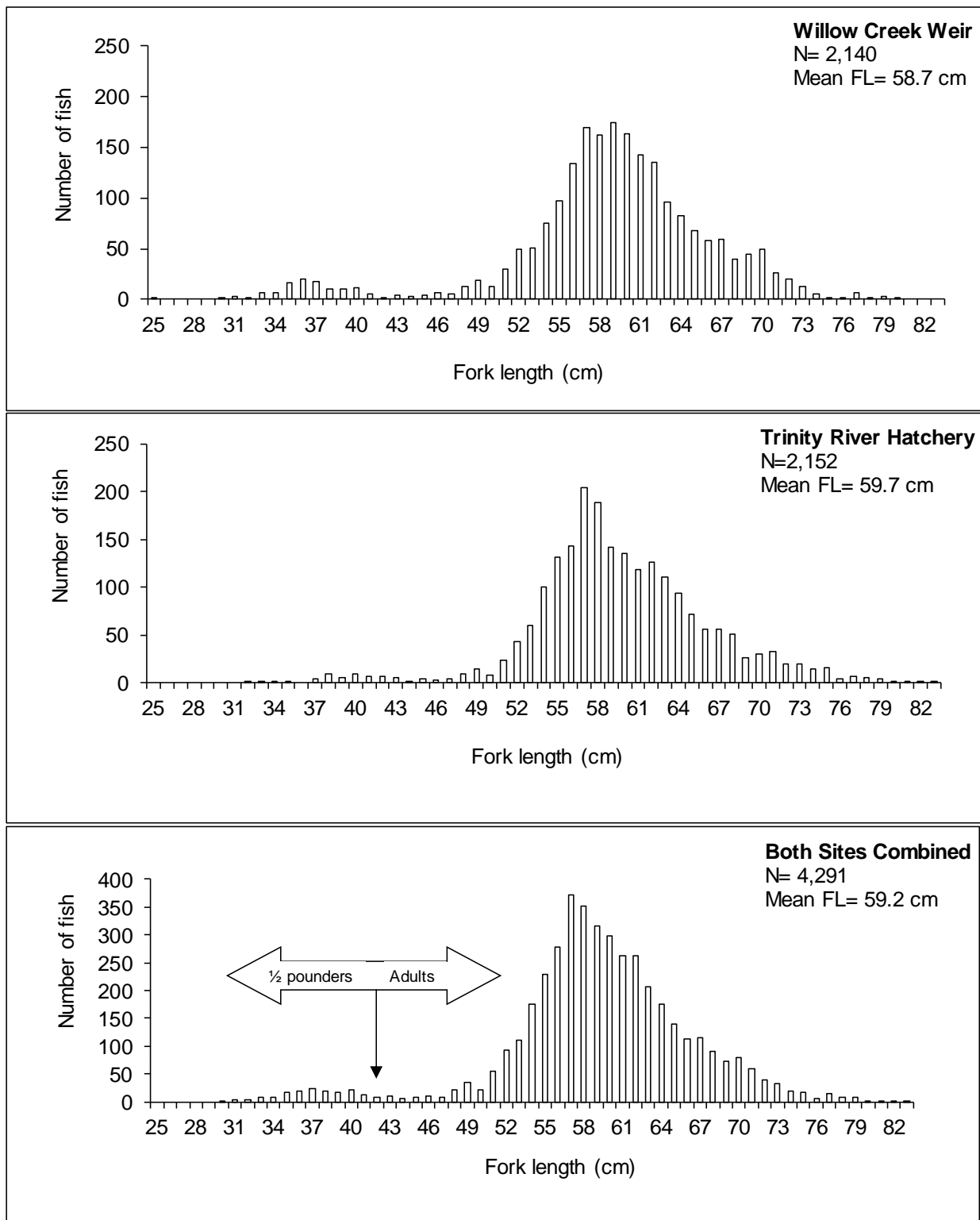


Figure 17. Steelhead fork lengths (cm) observed at Willow Creek weir, Trinity River Hatchery and both sites combined during the 2013-14 season. The arrow denotes the size used to separate ½ pounders (sub-adults) and adults for analysis..

Fall Steelhead Recovery

Angler Tag Recovery

There were 60 Project-tagged steelhead reported as harvested in 2013 (Appendix 27), and four tags found on the riverbank and returned by anglers or other river users. There were 237 tags returned from the catch and release fishery.

Spawner Survey Recovery

There were no Project-tagged steelhead recovered during the spawner surveys in 2013.

Tagging Mortalities

One steelhead mortality was identified as a result of tagging stress at WCW in 2013.

Trinity River Hatchery Recovery

Steelhead entered TRH during every week the fish ladder was open (Appendix 28). The largest number entered in JW2 when 427 steelhead entered TRH. A total of 2,375 adult steelhead (plus 44 half pounders) were recovered at TRH during the season. Two hundred fifty one (10.6%) of the 1,759 steelhead effectively tagged at WCW were recaptured at TRH.

Adult Fall Steelhead Run-size, Angler Harvest and Spawner Escapement Estimates

An estimated run-size of 16,594 adult fall steelhead migrated upstream of WCW this season. The 95% confidence interval for the estimate, based on the Normal Approximation, was 14,717 – 18,593 adult steelhead (Appendix 8). An estimated 83 naturally-produced and 576 TRH-produced steelhead were harvested by anglers above WCW (Appendix 9), leaving an estimated 15,935 adult fish, of which 2,375 (80 natural-origin and 2,295 hatchery-origin) entered TRH. Of the remaining 13,560 natural area spawners, 9,039 were of natural origin, and 4,521 were of hatchery origin.

In the 29 years for which we have data since 1980, run-size estimates have ranged from 2,972 in 1998 to 53,885 in 2007 (Appendix 29 - 30). The mean estimated run-size for fall adult steelhead in the Trinity River above WCW across the period of record is 15,305 fish. This year's run was 8.4% above the average. The natural origin spawner escapement above WCW of 9,119 is 22.8% of the TRRP goal of 40,000 natural-origin steelhead (Appendix 10).

DISCUSSION

Spring Chinook

Results from the 2013 mark-recapture studies indicate the total run-size of 8,961 spring Chinook is a decline of approximately 35% from the 2012 estimate, ending a recent year-over-year increasing trend (Figure 18). The estimate of 2,591 naturally-produced adult spring salmon is below the TRRP goal of 6,000 fish and is a 30% decline from 2012 escapement. The 2013 naturally-produced adult escapement also ended a three year increasing trend. Approximately 31% of the adult spring Chinook escapement was composed of naturally-produced fish. In natural areas alone, we estimate 42% of the spring Chinook adults were naturally-produced.

In a recent note Kinzinger (2014 written communication) suggests that preservation of the spring Chinook life history strategy in the upper Trinity is largely due to TRH hatchery practices. The spawning practices at TRH have helped to maintain separate spring and fall Chinook runs, while competition for spawning area and interbreeding in the upper river contributes to mixing of the two Chinook races.

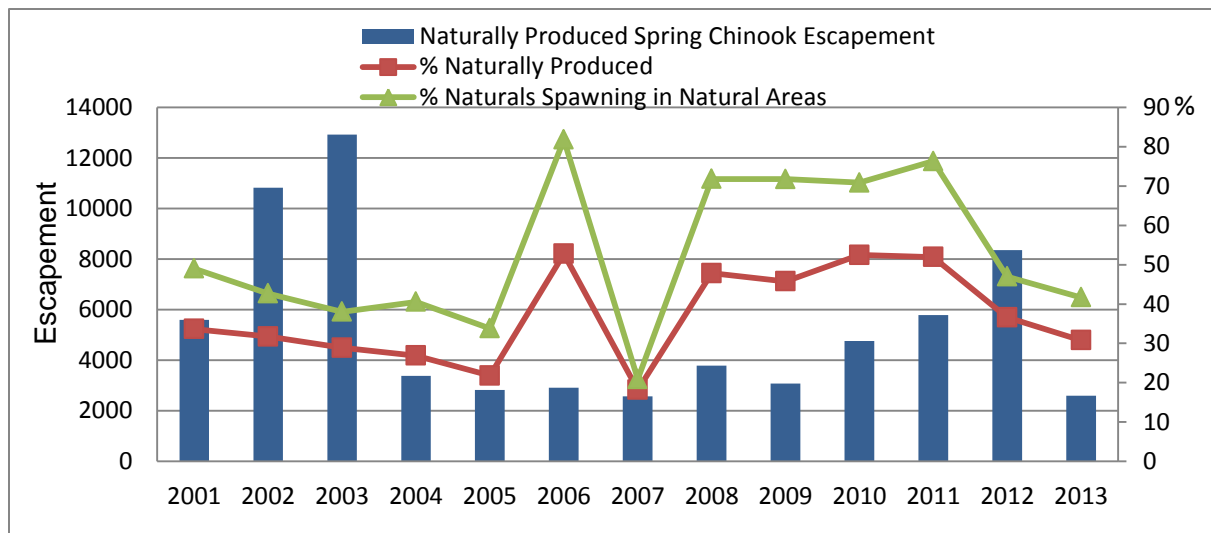


Figure 18. Adult escapement of naturally produced spring Chinook to the Trinity River above Junction City weir 2001-2013. The 2013 escapement is below the TRRP production goal of 6,000 adult fish. The total percent and percent spawners in natural areas of naturally-produced fish are shown.

Fall Chinook

The 2013 run-size estimate for fall Chinook of 36,989 is a decline of 50% from 2012 estimates, ending a recent year-over-year increasing trend (Figure 19). The 2013 escapement of 16,689 naturally-produced adult fall Chinook returning to natural areas is below the 62,000 TRRP goal, a decline of approximately 47% from the 2012 estimate. The 2013 escapement also ended a year-over-year increasing escapement trend. The estimate of naturally-produced adult fall Chinook is approximately 57% of the combined escapement to natural areas and TRH. In natural areas alone, 65% of the fall Chinook adults were naturally produced.

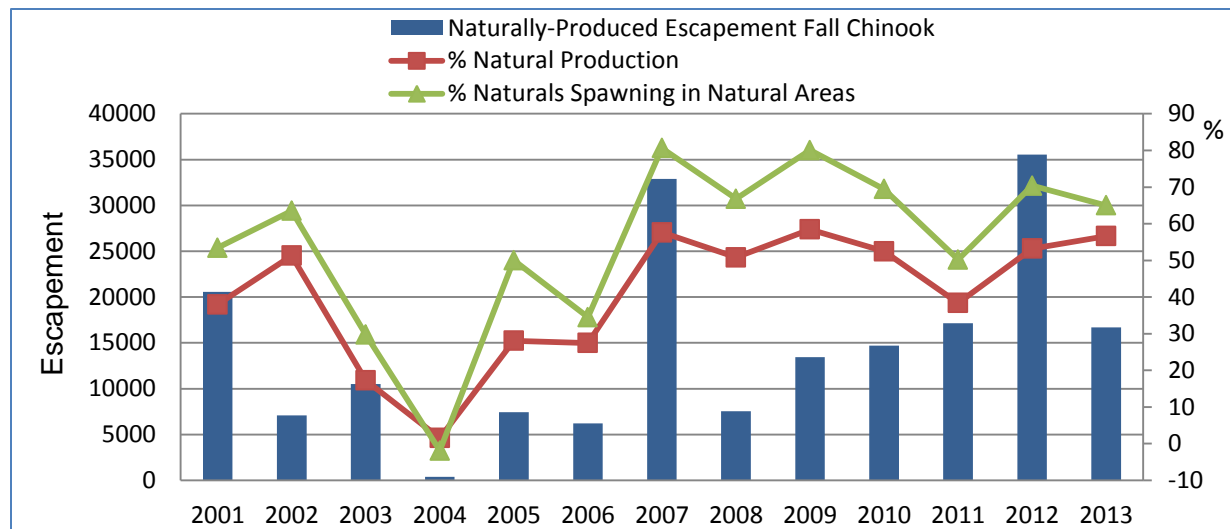


Figure 19. Adult escapement of naturally produced fall Chinook to the Trinity River above Willow Creek weir 2001-2013. The 2013 escapement is below the TRRP production goal of 62,000 adult fish. The total percent (escapement to TRH and natural areas) and percent spawners in natural areas of naturally-produced fish are shown.

Coho Salmon

In contrast to Chinook, the 2013 coho run-size of 21,906 is a 15% increase over the 2012 estimate and continues a recent year-over-year increasing trend. Escapement of naturally-produced coho increased by approximately 50% from the 2012 estimate extending a year-over-year increasing trend. The estimate of naturally-produced adult coho is approximately 20% of the total escapement to natural areas and TRH (Figure 20). In natural areas alone, 31% of the coho adults were naturally produced.

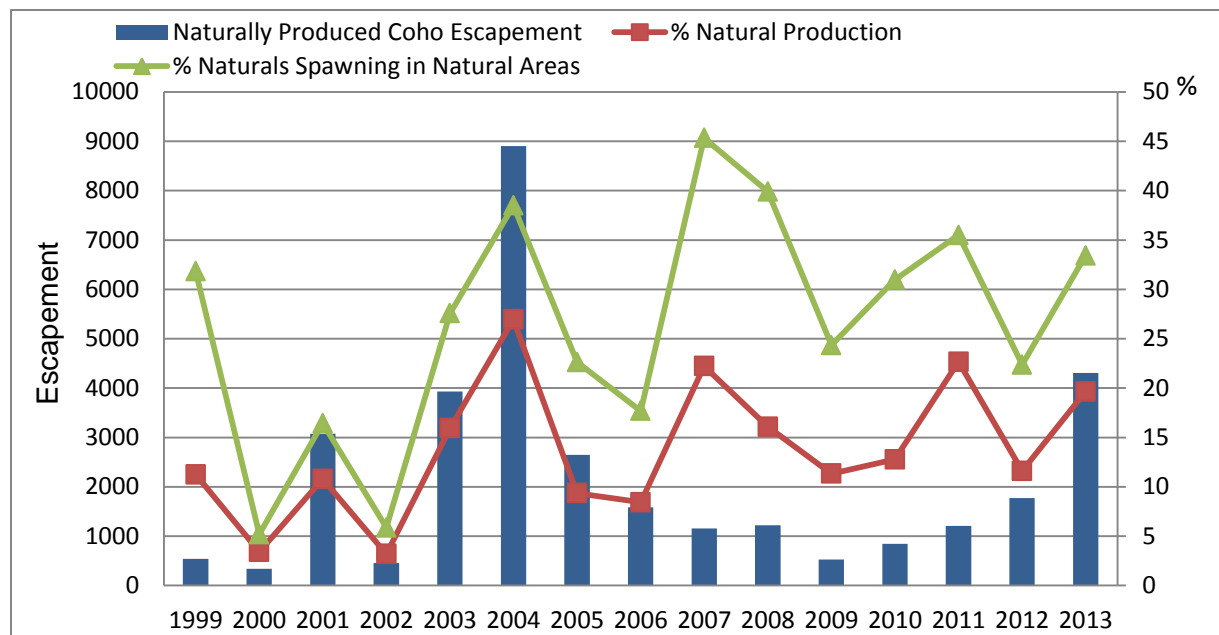


Figure 20. Adult escapement of naturally produced coho salmon to the Trinity River above Willow Creek weir 2001-2013. The 2013 escapement is above the TRRP production goal of 1,400 adult fish. The total percent (adult escapement to TRH and natural areas) and percent spawners in natural areas of naturally-produced fish are shown.

Fall Steelhead

The 2013 run-size estimate for adult fall steelhead of 16,594 is a decline of 20% from 2012 estimates (Appendix 10). However, the 2013 escapement of 9,119 naturally-produced adult steelhead continues a year-over year trend with an increase of 9% over the 2012 estimate. The estimate of naturally-produced adult fall steelhead is approximately 57% of the combined escapement to natural areas and TRH (Figure 21). In natural areas alone, 67% of the fall steelhead adults were naturally produced. Both proportions of naturally-produced adult steelhead for 2013 are the highest observed in recent years.

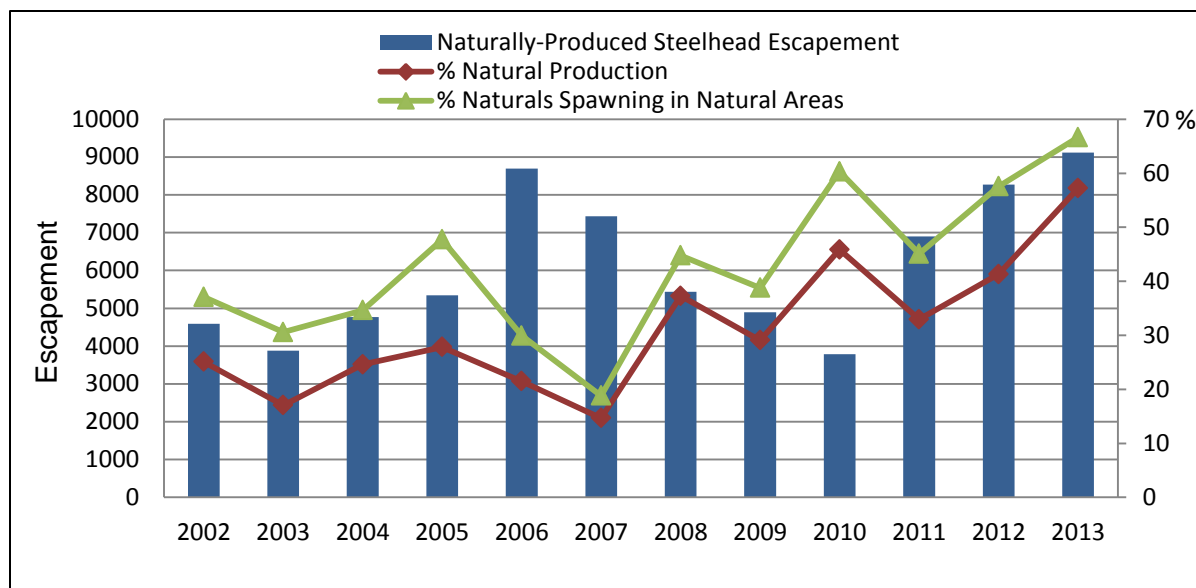


Figure 21. Adult escapement of naturally-produced steelhead to the Trinity River above Willow Creek weir 2001-2013. The 2013 escapement is below the TRRP production goal of 40,000 adult fish. The total percent (escapement to TRH and natural areas) and percent spawners in natural areas of naturally-produced fish are shown.

Factors Influencing Run-Size, Harvest and Escapement Estimates

The accuracy of mark-recapture studies to estimate run-size populations is reliant on a set of assumptions described in this and previous Annual Reports (CDFW, 2014). Estimator bias can occur if assumptions are violated, which under most scenarios would tend to over-estimate run-size populations. For example, unaccounted tagging mortality creates a positive bias in mark-recapture studies (Hankin, 2001). Hankin demonstrates the magnitude of potential bias in the following scenario: If 90% of untagged fish passing WCW survive to arrive at TRH, but only 75% of WCW tagged fish survive to arrive at TRH, then the approximate positive proportional bias would be almost 30%.

We have taken steps to minimize tagging associated mortality through our operations protocol at the weirs. Because most tagging mortalities from WCW are observed during the early part of the season when water temperatures are high (near 22° C), all trapping is suspended if water temperatures exceed 21°C. In addition, fish are not tagged if

deemed in poor condition or if they have already spawned. We account for tagging mortalities through recovery of tagged fish found dead during surveys conducted near the weir sites throughout the trapping season. Our reliance on experienced crew and adherence to protocol likely contributed to the relatively small number of tagging mortalities we observed in 2013. We believe that tagging mortality is not a constant rate and is a function most related to water temperature. This postulation leads to difficulty in applying a potential tagging mortality rate for the season.

Our harvest estimates are based on Project tags returned by anglers and other river users. Unreported angler harvest of tagged fish results in an under-estimate of harvest rate and a corresponding over-estimate in escapement. While the number of Project tags returned is sufficient to generate a harvest estimate, we would like to increase the rate of tag return, especially from Chinook anglers. Even when we tag similar numbers of Chinook and steelhead we receive tag returns from the steelhead fishery at a greater rate than the salmon fishery. Some reasons for the disproportion likely are the longer steelhead season, and the fact that emigrating steelhead are typically more active feeders than Chinook.

Hankin and Bradford (2012) in the TRRP adult review recommend TRP utilize a high-value tag to increase tag returns and lay the groundwork to test the assumptions on which our harvest estimate is based. We are currently conducting a study [based on a similar one reported in Heubach et al (1992)], to collect information on tag return rates. The study involves increasing the reward on a portion of Project tags to determine the reward level which produces the maximum return rate. Preliminary analyses show that anglers tend to return tags with greater rewards at higher rates than tags with lessor or no value.

Our tag study results (Table 16) from 2012 indicate that though there was no statistically significant difference (p of 95%) in return between the non-reward tags and the \$10 tags for either species [with chi-squares of 1.748 (steelhead) and 0.264 (Chinook)], nor a significant difference between the \$10 tags and the \$20 tags for either species (with chi-squares of 1.044 (steelhead) and 2.259 (Chinook)) there was significance between the return rate of the non-reward tags and the \$20 tags (with chi-squares of 5.487 (steelhead) and 4.012 (Chinook)).

In 2013, we repeated the study unchanged on the steelhead, but we increased the reward values of the Chinook tags. We found, again, no statistical significance between the non-reward tags and the \$10 tags for steelhead (chi-square of 0.287), but a definite difference (with chi-squares of 13.265 and 9.725, respectively) between both the non-rewards and \$20s and the \$10s and the \$20s. With the Chinook we observed no significant difference between the non-reward tags and the \$20 tags (chi-square of 0.509) nor between the non-rewards and the \$50 tags (chi-square of 0.895) which would have surprised us more had the sample sizes been bigger, but we were only able to tag 780 fall Chinook so were not anticipating much of a return. We plan on repeating this study in 2014, utilizing the same tagging protocol at each weir.

Table 16. Angler return rates of non-reward and reward tags applied to fall run Chinook and steelhead in the Trinity River at Willow Creek weir during the 2012-13 and 2013-14 seasons.

2012 Non-reward tag				2012 \$10 Reward tag			2012 \$20 Reward tag		
Species	Applied	Returned	%	Applied	Returned	%	Applied	Returned	%
Steelhead	1182	147	12.44	1178	170	14.43	1182	190	16.07
Chinook	852	25	2.93	859	29	3.38	845	41	4.85

2013 WCW Non-reward tag				2013 WCW \$10 Reward tag			2013 WCW \$20 Reward tag		
Species	Applied	Returned	%	Applied	Returned	%	Applied	Returned	%
Steelhead	668	82	12.28	668	89	13.32	664	135	20.33

2013 WCW Non-reward tag				2013 WCW \$20 Reward tag			2013 WCW \$50 Reward tag		
Species	Applied	Returned	%	Applied	Returned	%	Applied	Returned	%
Chinook	263	8	3.04	260	11	4.23	257	12	4.67

Another potential factor that may have affected this year's run-size and escapement estimates is the Lewiston Dam flow release schedule's effect on weir operations. In 2013, a designated "Dry" water year (Interior, 2000), the river was at a level TRP staff could build JCW (at a new location some 900 feet upstream of the previous site) on June 6 (Appendix 31), the earliest that weir had been installed in since 1994. The earlier start of trapping operations made it possible to sample a greater temporal extent of the spring Chinook run compared to past years. As a result we also increased the precision of 95% confidence interval for the Spring Chinook run-size estimate to within a relatively narrow $\pm 13\%$.

The release schedule would normally mean a late-summer release of 450 cfs, as prescribed in the Record of Decision (Interior, 2000), with a short flow augmentation to provide for the odd-year Ceremonial Boat Dance of the Hoopa Valley Tribe. Anticipating potential overcrowding from the large predicted run-size (272,400) of fall Chinook to the Klamath basin and the higher water temperature associated with low flows, Reclamation was prepared to release additional flows designed to maintain a target of 2,800 cfs in the lower Klamath River as a means to prevent a fall Chinook die off like that which occurred in 2002 (Reclamation, 2013).

Project staff and HVTF installed WCW earlier in August than normal, ahead of the anticipated increased flows that would make installation problematic. During the ensuing legal challenges to the Bureau's proposed fall-flow augmentation the water was too warm to trap, and as the legal issues resolved the Boat Dance flows were released, raising the river above safe operating conditions and preventing trapping at WCW until the end of August (Appendix 32). From the beginning of the trapping season, Chinook numbers at WCW seemed lower than anticipated.

In addition to the relatively warmer water in the river, the configuration of the mouth of the Klamath River might have altered the run-timing of the fall Chinook run. A long interior spit with a shallow chute leading from the mouth at the south end of the ocean/river nexus into the Klamath estuary which discouraged fall Chinook from entering the Klamath estuary [and led to increased catch per unit effort by recreational anglers (S. Borok, pers. comm.)].

Based on a recommendation by Hankin and Bradford (2012) we used the R computer application and mixdist statistical package to derive proportions of jack and adult salmon and half-pounder and adult steelhead within their run-size populations. Results from the mixdist analyses predicted age composition proportions very similar to those estimated by visual inspection of length-frequency histograms and those estimated by fall Chinook scale analyses. We will continue to integrate the mixdist analyses for our target species thereby evaluating or reducing potential bias associated with the visual estimates of the nadir.

Too few spring or fall Chinook or coho salmon jacks were tagged to generate independent estimates for adults and jacks, therefore we used numbers of adults and jacks combined to generate the total tagged, total recaptured and total recovered fish when calculating spawning escapement and run-size estimates for each species or race. We applied the combined TRH/JCW proportion of jacks/adults to derive the proportion of jacks/adults in the spring Chinook run, and the proportion from WCW only (fork-length frequency distribution) for the coho split. The steelhead estimates above WCW are for adults only, defined as those larger than the half-pounder cutoff of 41cm FL. Utilizing a hard point cutoff will have some fish assigned to the wrong age class, however, with the mixdist statistical procedure estimate of 5.65% half-pounders and the 41cm FL cut off yielding 5.3% half-pounders, we suggest bias associated with using the nadir appears insignificant.

Since CWT estimates are based, in part, on the overall run-size estimates for each race of Chinook, they are subject to the precision and potential biases associated with the mark-recapture estimates. The impact of this would be most relevant to the number of fish estimated spawned in “natural” areas, due to the fact that hatchery recoveries are actual counts, while CWT fish estimated to spawn naturally are the estimated number of fish remaining after hatchery CWTs and estimated angler harvest are subtracted from the overall CWT estimate. Return rates are also affected by ocean and in-river harvest and escapement below the weir sites, which is not included in our estimates. Harvest and stray rates in these sectors can greatly affect river returns upstream of respective weir sites in any given year. Assumptions of our CWT estimate include both equal probability of capture for hatchery or natural fish and equal probability of capture of Chinook throughout the entire run.

Run-size estimates have the potential for bias which under most scenarios would tend to be positive. This bias should not affect hatchery contribution rates, however, since total CWT run-sizes are based on ad-clip rates observed at either JCW or WCW times the estimated runs above these sites. 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 more so than their natural counterparts with dates of weir operations (i.e. spring Chinook at JCW), the estimated contribution of hatchery fish could be biased. So, another source of potential bias is vulnerability of capture.

Run-timing is also a potential source of bias. With the relocation of JCW upstream to an area with a shallower cross-section we were able to trap earlier in 2013 than any time since before 1994. We did miss some trapping days in JW 35 because of the Boat Dance flows, but the majority of the spring Chinook had passed up-river by then so it made little difference to those estimates. At WCW the conduit had to be pulled for a storm event at the end of September, and though we were trapping again a few days later (and trapped extra days over the weekend to keep our effort up) we may have missed an important segment of the fall Chinook run. We spent much of the season waiting for the big increase in numbers that would indicate the forecasted 272,400 pre-season Klamath basin run-size estimate (KRTT, 2014) was anywhere near correct, and that big increase never happened. The run seemed quite low, qualitatively speaking, and reports from both the up-river anglers and the down-river net fishery would indicate there were not big numbers of fall Chinook in the Trinity River in 2013. The post-season Klamath basin estimate was 165,100.

Though we had a number of CWTed fall Chinook return to TRH before what is normally considered the period to expect them, almost all of them were from a single CWT group (the 4 year old yearling group); it was the largest single group of returnees and there were only two weeks throughout the entire Chinook spawning season at TRH that they did not return.

We assume the CWT fish that enter the hatchery are representative of the entire CWT population, but if an age or release type of hatchery-produced Chinook is more likely to stray than others, the proportional CWT run estimate, based on fish recovered at TRH, will over- or under-estimate the true proportions of each CWT group. Recoveries of TRH-produced Chinook during the 2013 carcass surveys (Task 4) appeared generally consistent with TRH recoveries. The largest segment of (stray) returnees was the same 2009 fall yearling group (068837) that returned to TRH in the largest numbers of any other throughout the spawning season.

Estimated in-river 2008 BY spring Chinook return rates of TRH fingerlings (0.48%) were about as close to the 22 year data set average of 0.49% as you can get, while the yearlings (0.22%) fell far below the 1.02% average (Appendix 7). Estimated fall Chinook 2008 BY fingerling in-river returns at 0.69% were double the 0.33% mean, and the yearling releases at 1.62% returned above the 1.53% average as well (Appendix 21).

RECOMMENDATIONS

- Run-size and escapement estimates using tagging and recapture operations for adult spring and fall Chinook, coho salmon, and adult fall steelhead in the Trinity River basin should be continued on an annual basis to maintain short and long term baselines which help assess objectives stated in the IAP and ROD as well as helping to inform management decision making.
- We recommend spring Chinook management efforts should consider methods to reduce interbreeding with fall Chinook in the mainstem area below Lewiston Dam and at TRH.
- Continue educating the angling public and try to increase buy-in by the river guides to the angler tag return program. Continue to test assumption that higher tag rewards (incentives) will increase returns.
- Management and operations of TRRP and TRH should be coordinated to ensure that objectives for natural fish production and hatchery management goals are harmonized across restoration and mitigation programs.

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APPENDICES

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

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

* Eight day Julian week only during leap years

**Eight day Julian week every year

Appendix 2. Release and recovery data for adipose fin-clipped spring and fall Chinook recovered at Trinity River Hatchery (TRH) during the 2013-14 season.

Release data							TRH Recovery data					Number recovered	
CWT ^a code	Egg source	Brood year	Date	Number	Size (# / lb)	Site	Males		Females		Total	Tagging site	
							No.	FL ^b	No.	FL ^b	No.	WCW	JCW
SPRING CHINOOK													
068819	TRH	2008	10/01-15/09	104,078	8.1	TRH	1	88.0	--		1		
068821	TRH	2009	06/01-08/10	63,456	44.0	TRH	21	79.5	51	73.6	72		7
068822	TRH	2009	06/01-08/10	82,259	55.0	TRH	30	79.5	75	74.6	105		15
068831	TRH	2009	06/01-08/10	7,234	55.0	TRH	--		4	75.0	4		
068832	TRH	2009	06/01-08/10	8,104	55.0	TRH	2	73.0	6	77.2	8		
068836	TRH	2009	10/01-09/10	108,824	8.6	TRH	67	76.0	109	70.9	176		11
068773	TRH	2010	06/01-17/11	33,636	65.8	TRH	18	70.2	21	64.2	39		9
068774	TRH	2010	06/01-17/11	63,224	75.5	TRH	51	69.8	37	64.8	88		4
068775	TRH	2010	06/01-17/11	71,842	90.0	TRH	26	68.5	18	65.8	44		5
068776	TRH	2010	10/03-12/12	97,128	13.0	TRH	20	61.6	4	60.3	24		1
068838	TRH	2011	06/01-15/12	59,877	60.0	TRH	4	48.5	--		4		
068839	TRH	2011	06/01-15/12	35,222	71.0	TRH	2	42.5	--		2		
068840	TRH	2011	06/01-15/12	72,106	75.0	TRH	6	46.5	--		6		
068846	TRH	2011	10/01-17/12	97,771	12.7	TRH	5	43.6	--		5		
Lost CWT ^{c,e}							3	82.0	4	69.8	7		
No CWT ^{d,e}							8	67.1	11	72.6	19		
Spring Chinook totals:							264		340		604	0	52
FALL CHINOOK													
068814	TRH	2008	06/01-15/09	93,228	80.5	TRH	--		1	85.0	1		
068820	TRH	2008	10/01-15/09	253,073	11.5	TRH	1	88.0	1	78.0	2	1	
068823	TRH	2009	06/01-08/10	85,136	91.0	TRH	12	80.8	13	76.3	25		1
068824	TRH	2009	06/01-08/10	89,959	113.0	TRH	15	81.3	11	78.6	26		
068825	TRH	2009	06/01-08/10	91,310	133.0	TRH	10	77.8	12	77.6	22		
068826	TRH	2009	06/01-08/10	88,851	134.0	TRH	10	83.7	10	76.5	20	1	
068827	TRH	2009	06/01-08/10	90,929	186.0	TRH	6	83.0	16	77.8	22		1
068828	TRH	2009	06/01-08/10	39,642	114.0	TRH	3	76.3	12	76.6	15		
068833 ^f	TRH	2009	03/02-07/10/10	5,664	316.0	River	1	86.0	--		1		
068837	TRH	2009	10/01-09/10	230,461	11.6	TRH	252	79.7	307	75.5	559	12	6
068777	TRH	2010	06/01-17/11	114,941	122.5	TRH	19	68.9	6	66.8	25		
068778	TRH	2010	06/01-17/11	119,394	124.0	TRH	14	72.1	12	68.6	26	1	
068779	TRH	2010	06/01-17/11	119,945	124.5	TRH	13	69.5	6	64.3	19	1	
068780	TRH	2010	06/01-17/11	112,828	158.5	TRH	10	68.2	2	68.0	12		
068835 ^f	TRH	2010	06/02-08/13/11	7,945	124.0	River	1	76.0	--		1		
068781	TRH	2010	10/03-12/11	231,430	15.3	TRH	97	66.1	51	64.3	148	1	
068841	TRH	2011	06/01-15/12	86,357	167.0	TRH	5	44.6	--		5	1	
068842	TRH	2011	06/01-15/12	95,355	135.0	TRH	3	44.0	--		3		
068844	TRH	2011	06/06-15/12	112,093	139.0	TRH	6	47.3	--		6		
068845	TRH	2011	06/07-15/12	102,907	149.0	TRH	2	47.0	--		2		
068847	TRH	2011	10/01-17/12	200,337	16.2	TRH	14	46.6	--		14	1	
Lost CWT ^{c,e}							7	80.0	5	76.0	12		
No CWT ^{d,e}							6	75.2	4	75.0	10	1	
Fall Chinook totals:							507		469		976	20	8

a/ CWT = Coded-wire tag.

b/ FL = Mean fork length in cm.

c/ CWT lost or un-readable during recovery (CWT CODES 200,000 - 400,000).

d/ No CWT was detected (CWT CODE = 100,000).

e/ Assigned as either spring or fall Chinook based on entry date into Trinity River Hatchery.

f/ Experimental release groups; fish used in screw trap efficiency studies on main stem Trinity River.

Appendix 3. Fork length (FL) distribution of spring Chinook trapped and tagged at Junction City (JCW) weir, and subsequently recovered during the 2013-14 season.^a

FL (cm)	JCW		RECOVERIES						Total Recoveries	% Recoveries
	Total Trapped and Tagged ^b	Ad-clips ^c	Tag Morts ^d	Angler Harvest ^e	TRH ^f Recoveries	Carcass ^g Recoveries	Found Tags ^h	Angler Released ⁱ		
39	1								0	0.0
40									--	--
41									--	--
42									--	--
43	1								0	0.0
44	1								0	0.0
45									--	--
46	2								0	0.0
47									--	--
48									--	--
49									--	--
50	2				1				1	50.0
51									--	--
52	2	1							0	0.0
53									--	--
54	4	1			2				2	50.0
55	3	1			2				2	66.7
56	5	1			2				2	40.0
57	9	2			3				3	33.3
58	3				2				2	66.7
59	11				4	1			5	45.5
60	11	2		1	4				5	45.5
61	17	6		2	5				7	41.2
62	8	1			2				2	25.0
63	24	5			11			1	12	50.0
64	16	3		1	3	1			5	31.3
65	32	5		1	12				13	40.6
66	16				6	1			7	43.8
67	25			1	7	2		1	11	44.0
68	39	7		2	11	3			16	41.0
69	31	6		1	10	1			12	38.7
70	27	6		1	8	2			11	40.7
71	50	14		1	20	1	1		23	46.0
72	44	11		2	13	1			16	36.4
73	29	6			10	3	3		16	55.2
74	42	5		2	9	3			14	33.3
75	35	8			11	3			14	40.0
76	36	5		4	14	5	1		24	66.7
77	39	9			8	4			12	30.8
78	32	3		1	10	3			14	43.8
79	24	3			3	4		1	8	33.3
80	28	4			8	2		1	11	39.3
81	23	3			5				5	21.7
82	16	3		1	2				3	18.8
83	14	1		1	2	1			4	28.6
84	11				1				1	9.1
85	12	4			2				2	16.7
86	9	2			1	1	1		3	33.3
87	12	1			1			1	2	16.7
88	6	1			1				1	16.7
89	7	1	1		2				3	42.9
90	3								0	0.0
91									--	--
92	1								0	0.0
93	1								0	0.0
94	1								0	0.0
95	1								0	0.0
Totals:	766	131	1	22	218	42	6	5	294	38.4
Mean FL:	72.4	72.0	89.0	71.0	70.8	74.1	75.3	75.2	71.5	
Total jacks: ^j	9	1	0	0	1	0	0	0	1	11.1
Total adults:	757	130	1	22	217	42	6	5	293	38.7

a/ Trapping at JCW took place June 7 - October 1, 2013 (Julian weeks 23-40). Chinook trapped at JCW prior to JW 39 were considered spring Chinook in 2013.

b/ All spring Chinook trapped at Junction City weir in 2013 were tagged.

c/ Ad-clip = Adipose fin clipped fish.

d/ Tagged fish found dead and unspawned within 30 days of tagging are considered tagging mortalities.

e/ Fish reported as harvested by anglers.

f/ Trapping occurred at Trinity River Hatchery September 3, 2013 - March 11, 2014 (JWs 36-10; closed parts or all of JWs 41-43).

g/ Fish recovered in upper Trinity River spawner surveys.

h/ Fish tags found loose or on dead fish and returned by anglers or other river enthusiasts.

i/ Fish caught and released by anglers, their tag removed.

j/ Spring Chinook <54 cm FL were considered jacks in 2013.

Appendix 4. Fork length distribution of coded-wire tagged Trinity Rivery Hatchery-produced spring Chinook recovered at TRH during the 2013-14 season.^a

FL (cm)	Brood Years														Total
	2008	2009 ^b				2010				2011					
	068819-y	068821-f	068822-f	068831-f	068832-f	068836-y	068773-f	068774-f	068775-f	068776-y	068838-f	068839-f	068840-f	068846-y	
42												1	1	2	
43												1			1
44													1	2	3
45													1		1
46											1			1	2
47															0
48															0
49											2		2		4
50											1		1		2
51															0
52									2						2
53															0
54							1								1
55						1		1							2
56			1			1	1	1	1	1					6
57							1	2		4					7
58						1		2	1	2					6
59						2		1	1						4
60						2		4	1	3					10
61						2	2	4	3	2					13
62		1				2	2	5	2	3					15
63						3	4	2	6	1					16
64		1	1			4	3	5	3						17
65		2	1			4		6	2						15
66			1			4	4	5	1	2					17
67		2	3			8	3	5	1						22
68			4			10	3	5	4						26
69		2	3			3	2	7	2	2					21
70		5	4		1	10	2	3	1						26
71		9	5			15	2	5	3						39
72		4	8	1		8	4	6	2	1					34
73		3	7		1	12	2	3	2						30
74		6	3	1	2	8		4	1						25
75		6	11			16	1	4	2	1					41
76		4	4		1	13	1	1	2						26
77		2	6	2	1	8		1	2						22
78		6	9			7		3							25
79		3	6			2		2							13
80		2	5			8		1							16
81		3	3		1	10	1		1						19
82		2	3			5									10
83		1	6			1									8
84		1	1		1	1									4
85		1	1			2									4
86		4	4			3									11
87			3												3
88	1	1	2												4
89															0
90		1													1
Totals:	1	72	105	4	8	176	39	88	44	24	4	2	6	5	578
Mean	88.0	75.3	76.0	75.0	76.1	72.8	67.0	67.7	67.4	61.3	48.5	42.5	46.5	43.6	

a/ Trapping occurred at TRH September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

b/ Age at release: f = fingerlings, y = yearlings.

Appendix 5. Total number and numbers of Junction City weir (JCW) and Willow Creek weir (WCW) tagged Chinook and coho that entered Trinity River Hatchery (TRH) during the 2013-14 season.^a

Julian week ^b	Inclusive dates	Chinook					Coho		
		Total entering	Spring run tagging site		Fall run tagging site		Total entering	Tagging site	
		TRH	JCW	WCW	JCW	WCW	TRH	JCW	WCW
36	3-Sep - 9-Sep	276	43						
37	10-Sep - 16-Sep	432	58						
38	17-Sep - 23-Sep	701	48						
39	24-Sep - 30-Sep	834	41						
40	1-Oct - 7-Oct	276	23		3	1	4		
41	8-Oct - 14-Oct	60	4		1	1	2		
42	15-Oct - 21-Oct								
43	22-Oct - 28-Oct	615	1		6	10	27		1
44	29-Oct - 4-Nov	745			1	10	379		4
45	5-Nov - 11-Nov	829				12	754		11
46	12-Nov - 18-Nov	1,120				31	1,283		24
47	19-Nov - 25-Nov	290				8	2,334		59
48	26-Nov - 2-Dec	193				6	874		30
49	3-Dec - 9-Dec	52					360		12
50	10-Dec - 16-Dec	5					350		16
51	17-Dec - 23-Dec	1					104		4
52	24-Dec - 31-Dec	1					115		3
1	1-Jan - 7-Jan								
2	8-Jan - 14-Jan						42		
3	15-Jan - 21-Jan						3		
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								
9	26-Feb - 4-Mar								
10	5-Mar - 11-Mar								
11	12-Mar - 18-Mar								
Totals:		6,430	218	0	11	79	6,631	0	164

a/ Trapping at TRH occurred September 3, 2013 - March 12, 2014 (Julian weeks 36-11; closed parts or all of JWs 41-43).

b/ Julian week of spawning or death; the fish may have actually entered the hatchery during a previous week.

Appendix 6. Run-size, percent return, in-river sport catch and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire tagged, spring Chinook returning to the Trinity River basin upstream of Junction City weir during the period 2009 through 2013.

Release data					Estimated returns						
CWT a/	Brood					Run-	% of	River	Spawning escapement		
code	year	Date b/	Number	Site	Age	size	release	harvest	TRH c/	Natural	Total ^f
068811	2008	06/01-15/09	75,847	TRH	2	35	0.05	0.0	12	23	35
068811	2008				3	143	0.19	0.0	97	46	143
068811	2008				4	76	0.10	6.0	29	41	70
068811	2008				5	0	0.00	0.0	0	0	0
Totals: d/						253	0.33	6.0	137	110	247
Total adults: e/						219	0.29	6.0	125	87	213
068812	2008	06/01-15/09	89,934	TRH	2	59	0.07	0.0	20	38	59
068812	2008				3	303	0.34	0.0	205	98	303
068812	2008				4	186	0.21	14.8	70	101	171
068812	2008				5	0	0.00	0.0	0	0	0
Totals: d/						548	0.61	14.8	295	238	533
Total adults: e/						490	0.54	14.8	275	200	475
068813	2008	06/01-15/09	64,175	TRH	2	38	0.06	0.0	13	25	38
068813	2008				3	189	0.30	0.0	128	61	189
068813	2008				4	78	0.12	6.2	29	43	72
068813	2008				5	0	0.00	0.0	0	0	0
Totals: d/						306	0.48	6.2	171	129	299
Total adults: e/						268	0.42	6.2	158	104	261
068819	2008	10/1-15/09	104,078	TRH	2	0	0.00	0.0	0	0	0
068819	2008				3	82	0.08	0.0	55	27	82
068819	2008				4	146	0.14	11.6	55	79	134
068819	2008				5	3	0.00	0.1	1	1	3
Totals: d/						231	0.22	11.7	111	107	219
Total adults: e/						231	0.22	11.7	111	107	219
068821	2009	06/01-8/10	63,456	TRH	2	427	0.67	5.9	243	177	421
068821	2009				3	1,211	1.91	96.4	456	659	1,115
068821	2009				4	185	0.29	5.4	73	107	179
068822	2009	06/01-8/10	82,259	TRH	2	479	0.58	6.7	273	199	472
068822	2009				3	1,347	1.64	107.2	507	733	1,240
068822	2009				4	271	0.33	7.9	106	156	263
068831	2009	06/01-8/10	7,234	TRH	2	65	0.90	0.9	37	27	64
068831	2009				3	127	1.75	10.1	48	69	117
068831	2009				4	10	0.14	0.3	4	6	10
068832	2009	06/01-8/10	8,104	TRH	2	71	0.87	1.0	40	29	70
068832	2009				3	146	1.80	11.6	55	79	134
068832	2009				4	21	0.25	0.6	8	12	20
068836	2009	10/1-9/10	108,824	TRH	2	37	0.03	0.5	21	15	36
068836	2009				3	465	0.43	37.0	175	253	428
068836	2009				4	452	0.42	13.2	178	261	439
068773	2010	06/01-17/11	33,636	TRH	2	7	0.02	1.5	1	5	6
068773	2010				3	100	0.30	2.9	39	58	97
068774	2010	06/01-17/11	63,224	TRH	2	73	0.12	14.6	10	48	58
068774	2010				3	226	0.36	6.6	89	130	219
068875	2010	06/01-17/11	71,842	TRH	2	44	0.06	8.8	6	29	35
068875	2010				3	113	0.16	3.3	45	65	110
068776	2010	10/3-12/11	97,128	TRH	2	7	0.01	1.5	1	5	6
068776	2010				3	62	0.06	1.8	24	36	60
068838	2011	06/01-15/12	59,877	TRH	2	7	0.01	0.0	4	3	7
068839	2011	06/01-15/12	35,222	TRH	2	4	0.01	0.0	2	2	4
068840	2011	06/01-15/12	72,106	TRH	2	11	0.01	0.0	6	5	11
068846	2011	10/01-17/12	97,771	TRH	2	9	0.01	0.0	5	4	9

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 2008. 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.

f/ Rounding sometimes makes for seeming addition errors in this column.

Appendix 7. Percent return of Trinity River Hatchery produced, coded-wire tagged, spring Chinook salmon, brood years 1986-2008.^a

Brood year	Fingerling releases			Yearling releases		
	Number released	Number of returns	Percent return	Number released	Number of returns	Percent return
1986	197,113	103	0.05%	101,030	1,960	1.94%
1987	185,718	208	0.11%	0	0	---
1988	181,698	84	0.05%	98,820	112	0.11%
1989	186,413	7	0.00%	102,555	176	0.17%
1990	196,908	479	0.24%	94,639	82	0.09%
1991	198,277	297	0.15%	110,797	68	0.06%
1992	215,038	2,766	1.29%	109,856	1,272	1.16%
1993	222,056	1,125	0.51%	111,525	958	0.86%
1994	113,236	202	0.18%	113,491	513	0.45%
1995 ^a	196,211	450	0.23%	101,934	1,581	1.55%
1996	222,950	743	0.33%	112,464	312	0.28%
1997	209,155	1,834	0.88%	147,507	4,471	3.03%
1998	176,968	845	0.48%	137,602	2,186	1.59%
1999	148,380	3,372	2.27%	129,919	4,288	3.30%
2000	261,193	4,422	1.69%	99,304	2,029	2.04%
2001	253,248	412	0.16%	104,627	1,480	1.41%
2002	244,754	2,217	0.91%	106,139	514	0.48%
2003	265,556	310	0.12%	104,974	339	0.32%
2004	253,830	2,095	0.83%	104,478	1,269	1.21%
2005	263,108	317	0.12%	107,607	111	0.10%
2006	486,833	229	0.05%	104,019	1,354	1.30%
2007	180,083	252	0.14%	96,803	626	0.65%
2008	229,956	1,107	0.48%	104,078	231	0.22%
Means:	221,247	1,038	0.49%	104,529	1,127	1.02%

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, in-river harvest, and escapement below Junction City weir.

Appendix 8. Run-size estimates and 95% confidence limits for Trinity River basin spring and fall Chinook and coho salmon and adult fall steelhead during the 2013-14 season.

Species/ race	Area of Trinity River basin for run-size estimate	Stratum ^a	Number effectively tagged ^b	Trinity River Hatchery recoveries		Run-size estimate ^d	Confidence limits 1-p= 0.95	Confidence limit estimator
				Number examined for tags ^c	Number of tags in sample			
Spring Chinook	Upstream of Junction City weir	Jacks	9	96	1	281	7,864 - 10,135	Normal Approximation
		Adults	751	2,482	217	8,680		
		Total	760	2,578	218	8,961		
Fall Chinook	Upstream of Willow Creek weir	Jacks	137	135	3	6,717	30,035 - 46,663	Poisson Approximation
		Adults	630	3,717	76	30,272		
		Total	767	3,852	79	36,989		
Coho	Upstream of Willow Creek weir	Jacks	71	427	18	2,819	18,885 - 25,644	Poisson Approximation
		Adults	473	6,204	146	19,087		
		Total	544	6,631	164	21,906		
Fall-run steelhead	Upstream of Willow Creek weir	Adults	1,759	2,375	251	16,594	14,717 - 18,593	Normal Approx

a/ Stratum: Jacks = two year old salmon; Adults = three years or older; Steelhead adults = 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 and fall Chinook were estimated from expansion of coded wire tag recoveries at Trinity River Hatchery; coho and steelhead numbers were actual recoveries.

d/ Run-size estimates for fall Chinook were based on scale ageing proportions, coho were based on the proportion of jacks to adults observed at Willow Creek weir only; while the spring Chinook was based on the Junction City weir and Trinity River Hatchery combined jack/adult ratio.

Appendix 9. Estimates of Trinity River basin spring and fall Chinook and coho salmon, and adult fall-run steelhead run-size, angler harvest, and spawner escapement during the 2013-14 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 Chinook	Upstream of Junction City weir	Jacks	281	0.0%	0	185	96	281
		Adults	8,680	2.9%	254	5,944	2,482	8,426
		Total	8,961		254	6,129	2,578	8,707
Fall Chinook	Upstream of Willow Creek weir	Jacks	6,717	0.0%	0	6,582	135	6,717
		Adults	30,272	2.9%	880	25,675	3,717	29,392
		Total	36,989		880	32,257	3,852	36,109
Coho	Upstream of Willow Creek weir	Jacks	2,819	0.0%	0	2,392	427	2,819
		Adults	19,087	0.0%	0	12,883	6,204	19,087
		Total	21,906		0	15,275	6,631	21,906
Fall-run adult steelhead	Upstream of Willow Creek weir	Natural	9,205	0.9%	83	9,042	80	9,122
		Hatchery	7,389	7.8%	576	4,518	2,295	6,813
		Total	16,594		659	13,560	2,375	15,935

a/ Stratum: Jacks = 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 fall and spring Chinook and steelhead. There was no coho harvest.

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. Any difference between these numbers and others throughout this report are due to rounding.

Appendix 10. Estimates of contribution of naturally-produced and hatchery-produced adult spring and fall Chinook and coho salmon, and adult fall-run steelhead to the Trinity River basin spawner escapement during the 2013-14 season.

Species/ race	Area of Trinity River	Produced	Total Spawner Escapement			Naturally-produced contribution to escapement	
			Natural area spawners ^a	Trinity River Hatchery	Total	TRRP Goal	% of Goal
Spring Chinook	Upstream of Junction City weir	Naturally	2,475	116	2,591	6,000	43.2%
		Hatchery	3,469	2,366	5,835		
		Total	5,944	2,482	8,426		
Fall Chinook	Upstream of Willow Creek weir	Naturally	16,689	-82 ^b	16,607	62,000	26.8%
		Hatchery	8,986	3,799	12,785		
		Total	25,675	3,717	29,392		
Coho	Upstream of Willow Creek weir	Naturally	3,948	357	4,305	1,400	307.5%
		Hatchery	8,935	5,847	14,782		
		Total	12,883	6,204	19,087		
Fall-run steelhead	Upstream of Willow Creek weir	Naturally	9,039	80	9,119	40,000	22.8%
		Hatchery	4,521	2,295	6,816		
		Total	13,560	2,375	15,935		

a/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery. Any difference between these numbers and others throughout this report are due to rounding.

b/ The negative number here indicates an over-estimate of the hatchery-produced fall Chinook contribution to the total escapement.

Appendix 11. Spring Chinook estimated run-size, spawner escapement, and angler harvest estimates for the Trinity River upstream of Junction City weir, 1977 - 2013.

Year	Run-size estimate						Spawner escapements						Angler harvest		
	Jacks ^d			Adults			Natural Area Spawners ^a			Trinity River Hatchery			Jacks	Adults	Total
	Number	Percent	Number	Percent	Total	Jacks	Adults	Total	Jacks	Adults	Total				
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	b/	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	c/	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	c/	298
1993	68	1.3	5,164	98.7	5,232	37	2,111	2,148	31	2,630	2,661	0	423	c/	423
1994	1,793	26.4	4,995	73.6	6,788	550	2,897	3,447	944	1,943	2,887	299	155	c/	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	c/	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	c/	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	c/	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	c/	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	c/	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
2006	1,963	26.2	5,520	73.8	7,483	1,127	2,955	4,082	819	2,565	3,384	17	0		17
2007	135	0.9	14,700	99.1	14,835	80	8,154	8,234	55	5,981	6,036	0	565		565
2008	2,218	21.6	8,065	78.4	10,283	1,741	4,470	6,211	329	3,437	3,766	148	158		306
2009	260	3.5	7,166	96.5	7,426	191	3,724	3,915	69	3,000	3,069	0	442		442
2010	1,554	13.8	9,731	86.2	11,285	1,309	6,810	8,119	245	2,457	2,702	0	463		463
2011	8,087	42.1	11,132	57.9	19,219	5,217	7,309	12,526	2,758	3,823	6,581	112	0		112
2012	813	3.2	24,804	96.8	25,617	542	16,117	16,659	109	6,712	6,821	163	1,976		2,139
2013	281	3.1	8,680	96.9	8,961	185	5,956	6,141	96	2,482	2,578	0	243		243

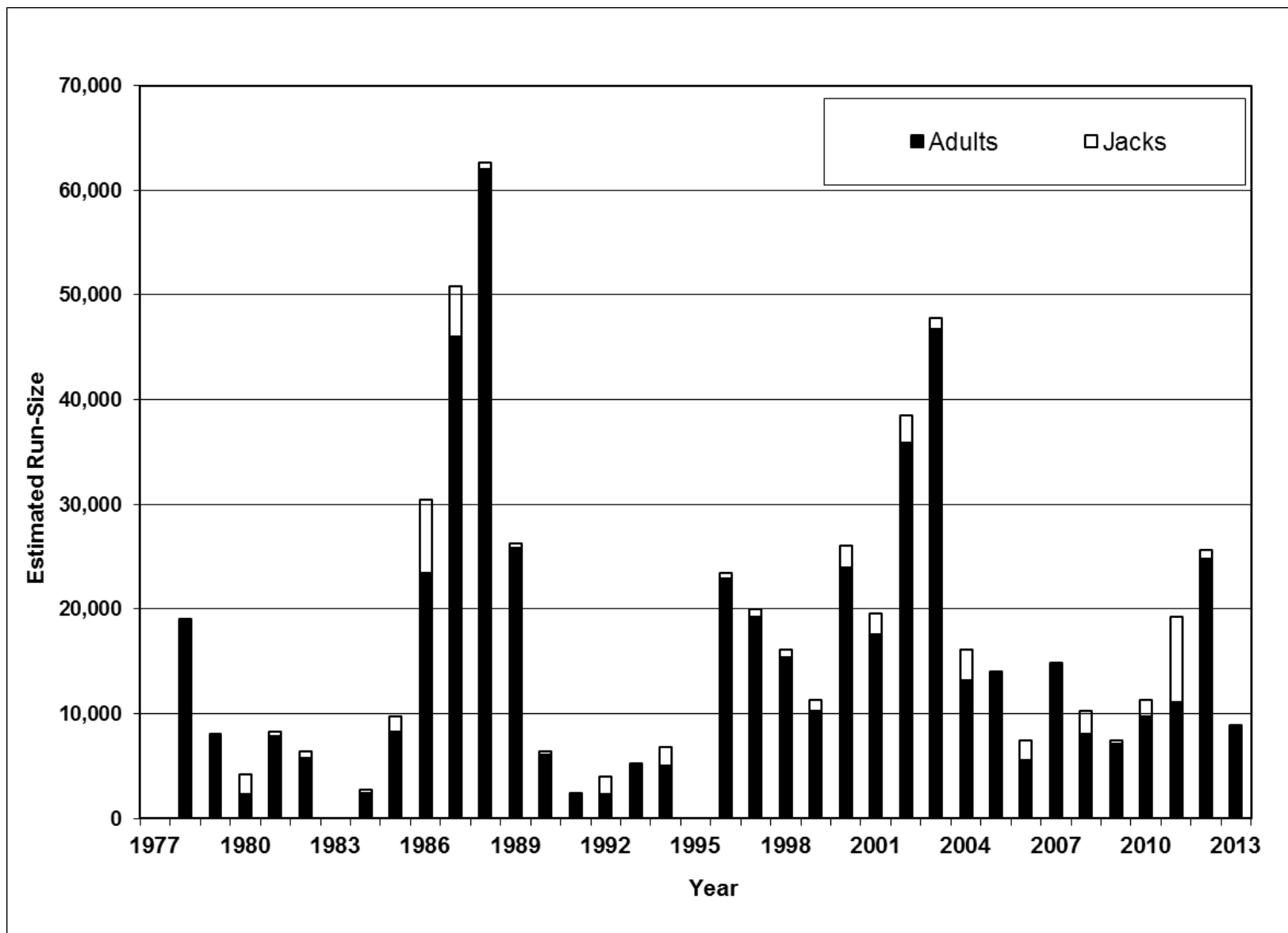
a/ Natural area spawners includes both wild and hatchery fish that spawn in areas outside Trinity River Hatchery.

b/ The 1978 sport harvest of spring Chinook was limited by a salmon fishing closure beginning August 25, 1978.

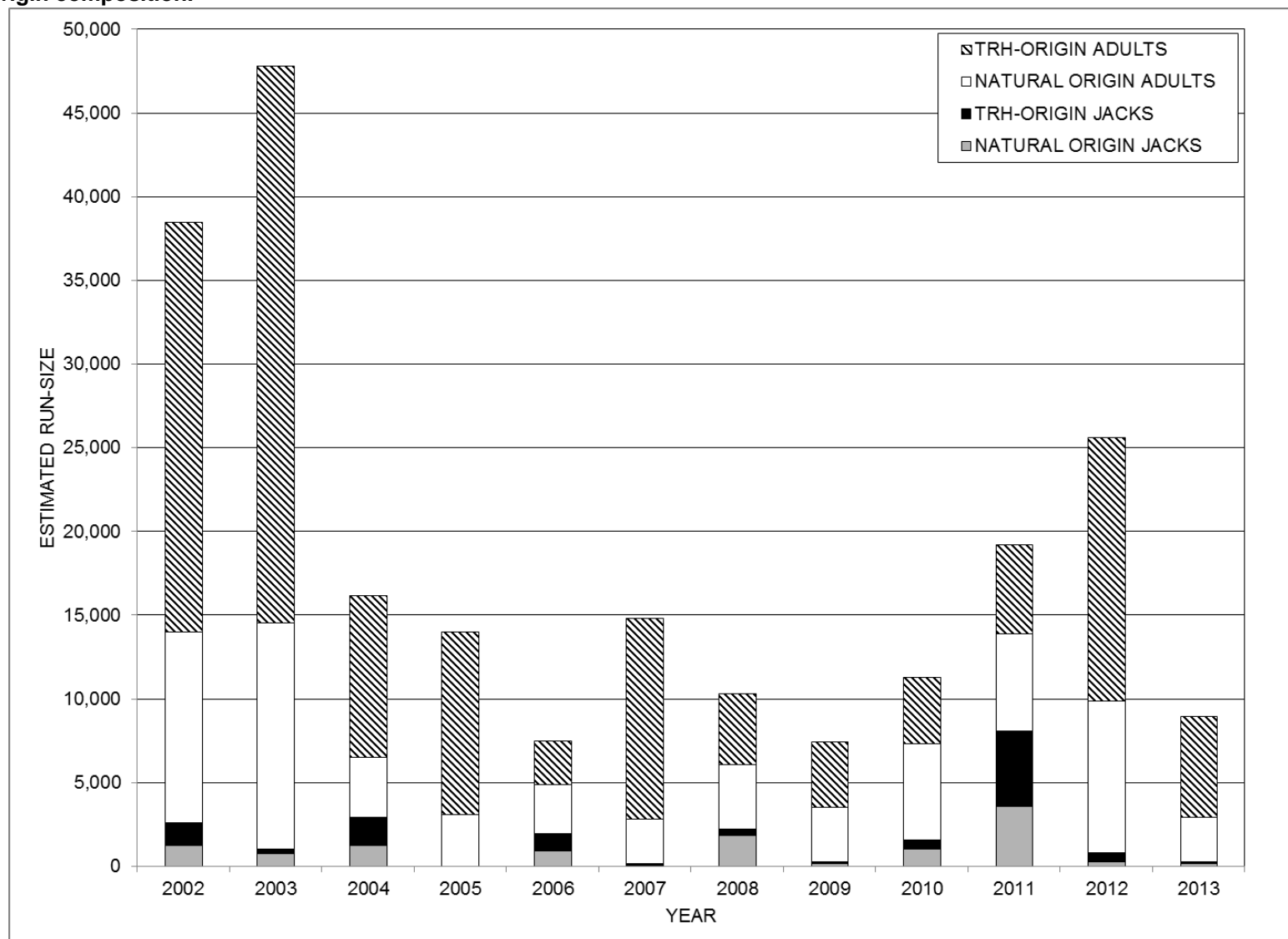
c/ The sport harvest of adult spring Chinook was subject to seasonal and size limit restrictions.

d/ Jacks are two year old salmon, adults are three years old or older.

Appendix 12. Spring Chinook estimated run-size upstream of Junction City weir, 1977 - 2013.



Appendix 13. Spring Chinook estimated run-size for the Trinity River upstream of Junction City weir, 2002 – 2013, showing natural- and TRH-origin composition.



Appendix 14. Fork length (FL) distribution of fall Chinook trapped and tagged at Willow Creek (WCW) weir, and subsequently recovered during the 2013-14 season.^a

FL (cm)	WCW			RECOVERIES							Total Recoveries	% Recoveries
	Total Trapped	Total Tagged ^b	Ad-clips ^c	Tag Morts ^d	Angler Harvest ^e	TRH ^f Recoveries	Carcass ^g Recoveries	Found Tags ^h	Angler Released ⁱ			
38	1	1								0	0.0	
39	2	2								0	0.0	
40	6	5								0	0.0	
41	4	4								0	0.0	
42	6	6		1						1	16.7	
43	17	17				1	1			2	11.8	
44	11	11								0	0.0	
45	18	17	1			1				1	5.9	
46	22	18							1	1	5.6	
47	11	8					1			1	12.5	
48	8	8				1				1	12.5	
49	14	14								0	0.0	
50	10	10							1	1	10.0	
51	4	4								0	0.0	
52	3	3								0	0.0	
53	7	7								0	0.0	
54	4	4								0	0.0	
55	4	3	1							0	0.0	
56	2	2								0	0.0	
57	1	1								0	0.0	
58	2	1	1				1			1	100.0	
59	5	5				1			1	2	40.0	
60	5	5				1				1	20.0	
61	5	5	1							0	0.0	
62	11	10				2				2	20.0	
63	8	8			1					1	12.5	
64	11	10				1	1			2	20.0	
65	7	7			1	1	1		1	4	57.1	
66	10	10	2			1	2			3	30.0	
67	16	15	6		1	6				7	46.7	
68	19	18	1			2				2	11.1	
69	15	13				1	1	1	1	4	30.8	
70	15	14	2			2	3			5	35.7	
71	21	21	5			8			1	9	42.9	
72	13	12	1			1	2			3	25.0	
73	19	18	3			3	2			5	27.8	
74	27	23	3		1	5	2			8	34.8	
75	36	34	4			5	1	1		7	20.6	
76	33	31	2	1	1	5	2	1	2	12	38.7	
77	38	36	9		3	5	3			11	30.6	
78	35	34	6	1	2	3	2	1		9	26.5	
79	38	37	5		1	2	2			5	13.5	
80	32	30	4			3	1			4	13.3	
81	36	36	3			8	2		1	11	30.6	
82	34	33	1		1	3	1			5	15.2	
83	32	31	4		2	1	1	1		5	16.1	
84	18	18	1			1		2		3	16.7	
85	24	23	3			3	2	1		6	26.1	
86	12	11								0	0.0	
87	13	13	1							0	0.0	
88	20	19	1	1			1			2	10.5	
89	10	9								0	0.0	
90	11	11					1			1	9.1	
91	10	8	2			1				1	12.5	
92	5	5								0	0.0	
93	5	5	1			1	1			2	40.0	
94	3	3								0	0.0	
95	5	5								0	0.0	
96	1	1								0	0.0	
97	1	1								0	0.0	
98	3	3								0	0.0	
99	2	2								0	0.0	
100	1	1								0	0.0	
Totals:	822	780	74	4	14	79	37	8	9	151	19.4	
Mean FL:	71.8	72.0	75.7	71.0	75.6	73.7	74.2	79.3	65.9	73.8		
Total jacks: ^j	120	111	1	1	0	3	2	0	1	7	6.3	
Total adults:	702	669	73	3	14	76	35	8	8	144	21.5	

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50). All Chinook trapped were considered fall Chinook.

b/ Forty-two (9 jack and 33 adult) fall Chinook were not tagged due to poor condition.

c/ Ad-clip = Adipose fin clipped fish.

d/ Tagged fish found dead and unspawed within 30 days of tagging are considered tagging mortalities.

e/ Fish reported as harvested by anglers.

f/ Trapping occurred at Trinity River Hatchery September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

g/ Fish recovered in upper Trinity River spawner surveys.

h/ Fish tags found loose or on dead fish and returned by anglers or other river enthusiasts.

i/ Fish caught and released by anglers, their tag removed.

j/ Fall Chinook <55 cm FL were considered jacks in 2013.

Appendix 15. Fork length distribution of coded-wire tagged, Trinity River Hatchery-produced fall Chinook recovered at TRH during the 2013-14 season.^a

FL (cm)	2008 ^b		Brood Year							
	068814-f	068820-y	068823-f	068824-f	068825-f	068826-f	068827-f	068828-f	068833-f	068837-y
41										
42										
43										
44										
45										
46										
47										
48										1
49										
50										
51										
52								1		
53										
54										
55										
56										
57										
58										
59										
60										
61										
62						1				
63										2
64								1		2
65										5
66										6
67										7
68										10
69										8
70										17
71			1	2	1					24
72			1		2		2			28
73			1	1	1					35
74					2	2		1		35
75			4		3	1	2	2		28
76			4	1		1	3	3		40
77			1	3	4	1	2			49
78		1	2	1	1		1	1		36
79			3	3	1	3	2			24
80			2	4		1	3	1		35
81			1	1	4	2	1	2		29
82			1	2	1	1	2			32
83				3		3	1	1		27
84			2	3	1	1	1			20
85	1									19
86									1	11
87						1				9
88		1					1	1		6
89			1	1				1		3
90						1	1			1
91			1							1
92				1						1
93					1	1				1
94										4
95										1
96										
97										1
98										
99										1
Totals:	1	2	25	26	22	20	22	15	1	559
Mean	85.0	83.0	78.4	80.2	77.7	80.1	79.2	76.5	86.0	77.4

a/ Trapping occurred at TRH September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

b/ Age at release: f = fingerlings, y = yearlings.

Appendix 15 (continued). Fork length distribution of coded-wire tagged, Trinity River Hatchery-produced fall Chinook recovered at TRH during the 2013-14 season.^a

FL (cm)	Brood Year											TOTALS
	2010 ^b					2011						
	068777-f	068778-f	068779-f	068780-f	068835-f	068781-y	068841-f	068842-f	068844-f	068845-f	068847-y	
41									1		1	2
42							2					2
43								2			2	4
44											3	3
45							1		1	1	1	4
46							1	1	1		1	4
47						1					1	2
48							1				1	3
49										1	1	2
50									2			2
51											1	1
52						1			1			3
53											1	1
54			1									1
55						2					1	3
56				1		1						2
57						3						3
58						1						1
59				1		1						2
60	1					2						3
61	1	1		1		8						11
62	1		2			17						21
63	1		2	1		17						23
64	1	1	1			14						20
65	2	1		1		9						18
66	2	2	2			16						28
67	3	3	1			17						31
68	4	4	2			8						28
69	1	5	1			3						18
70	1		2	1		7						28
71	2	2	2	2		4						40
72	1	1		1		4						40
73			1			3						42
74						2						42
75	1		1	1		2						45
76				1	1	1						55
77		3			1	1						64
78	2					2						47
79		1		1								38
80												46
81	1											41
82		1										40
83												35
84						1						29
85		1										21
86												12
87			1									11
88												9
89												6
90												3
91												2
92												2
93												3
94												4
95												1
96												0
97												1
98												0
99												1
Totals:	25	26	19	12	1	148	5	3	6	2	14	954
Mean	68.4	70.4	67.8	68.2	76.0	65.4	44.6	44.0	47.3	47.0	46.6	

a/ Trapping occurred at TRH September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

b/ Age at release: f = fingerlings, y = yearlings.

Appendix 16. Run-size, percent return, in-river sport catch, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire tagged, fall Chinook returning to the Trinity River upstream of Willow Creek weir during the period 2009 through 2013.

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 ^g
065356	2008	06/1-15/09	11,403	TRH	2	10	0.09	0.1	5	5	10
065356	2008				3	60	0.53	1.1	26	33	59
065356	2008				4	2	0.02	0.1	1	1	2
065356	2008				5	0	0.00	0.0	0	0	0
Totals: d/						72	0.63	1.3	32	38	71
Total adults: e/						62	0.55	1.2	27	34	61
065357	2008	06/1-15/09	9,676	TRH	2	6	0.06	0.1	3	3	6
065357	2008				3	46	0.48	0.9	20	25	46
065357	2008				4	6	0.06	0.1	3	3	6
065357	2008				5	0	0.00	0.0	0	0	0
Totals: d/						58	0.60	1.1	26	31	57
Total adults: e/						52	0.54	1.0	23	28	51
065358	2008	06/1-15/09	9,882	TRH	2	10	0.10	0.1	5	5	10
065358	2008				3	61	0.61	1.1	26	33	59
065358	2008				4	10	0.10	0.2	5	4	9
065358	2008				5	0	0.00	0.0	0	0	0
Totals: d/						80	0.81	1.5	36	43	79
Total adults: e/						70	0.71	1.4	31	38	69
065359	2008	10/01-15/09	6,257	TRH	2	6	0.09	0.1	3	3	6
065359	2008				3	79	1.26	1.5	34	43	77
065359	2008				4	16	0.25	0.4	8	7	15
065359	2008				5	0	0.00	0.0	0	0	0
Totals: d/						100	1.60	1.9	45	53	98
Total adults: e/						94	1.51	1.8	42	50	93
068814	2008	06/1-15/09	93,228	TRH	2	157	0.17	1.6	79	77	156
068814	2008				3	657	0.70	12.3	285	359	644
068814	2008				4	74	0.08	1.8	38	34	72
068814	2008				5	4	0.00	0.1	1	2	3
Totals: d/						891	0.96	15.8	404	472	876
Total adults: e/						734	0.79	14.2	325	395	720
068815	2008	06/1-15/09	94,165	TRH	2	101	0.11	1.0	50	49	100
068815	2008				3	652	0.69	12.2	283	356	640
068815	2008				4	74	0.08	1.8	38	34	72
068815	2008				5	0	0.00	0.0	0	0	0
Totals: d/						827	0.88	15.0	372	440	812
Total adults: e/						726	0.77	14.0	322	390	712
068816	2008	06/1-15/09	96,264	TRH	2	74	0.08	0.8	37	36	74
068816	2008				3	507	0.53	9.5	220	277	497
068816	2008				4	56	0.06	1.4	29	26	55
068816	2008				5	0	0.00	0.0	0	0	0
Totals: d/						637	0.66	11.6	287	339	626
Total adults: e/						563	0.58	10.8	249	303	552

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 2008. 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.

f/ Experimental release group. Fish used in screw trap efficiency studies; released near North Fork Trinity River or Willow Creek.

g/ Rounding sometimes makes for seeming addition errors in this column.

Appendix 16. (continued) Run-size, percent return, in-river sport catch, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire tagged, fall Chinook returning to the Trinity River upstream of Willow Creek weir during the period 2009 through 2013.

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 ^g
068817	2008	06/1-15/09	92,360	TRH	2	77	0.08	0.8	38	37	76
068817	2008				3	411	0.45	7.7	179	225	403
068817	2008				4	82	0.09	2.0	42	37	80
068817	2008				5	0	0.00	0.0	0	0	0
Totals: d/						570	0.62	10.4	259	300	559
Total adults: e/						493	0.53	9.7	221	262	483
068818	2008	06/1-15/09	90,758	TRH	2	40	0.04	0.4	20	20	40
068818	2008				3	355	0.39	6.6	154	194	349
068818	2008				4	45	0.05	1.1	23	20	44
068818	2008				5	0	0.00	0.0	0	0	0
Totals: d/						440	0.48	8.1	198	235	432
Total adults: e/						400	0.44	7.7	178	215	392
068820	2008	10/01-15/09	253,073	TRH	2	99	0.04	1.0	49	48	98
068820	2008				3	3,203	1.27	59.9	1,392	1,751	3,143
068820	2008				4	802	0.32	19.3	417	366	783
068820	2008				5	7	0.00	0.2	2	5	7
Totals: d/						4,111	1.62	80.4	1,860	2,170	4,030
Total adults: e/						4,012	1.59	79.4	1,810	2,122	3,932
0608080000 ^f	2008	04/29 - 08/20/09	17,618	River	2	16	0.09	0.2	8	8	16
0608080000 ^f	2008				3	49	0.28	0.9	21	27	48
0608080000 ^f	2008				4	8	0.04	0.2	4	4	8
0608080000 ^f	2008				5	0	0.00	0.0	0	0	0
Totals: d/						72	0.41	1.3	33	38	72
Total adults: e/						57	0.32	1.1	25	30	56
0608080001 ^f	2008	04/29 - 08/20/09	2,915	River	2	4	0.13	0.0	2	2	4
0608080001 ^f	2008				3	7	0.24	0.1	3	4	7
0608080001 ^f	2008				4	0	0.00	0.0	0	0	0
0608080001 ^f	2008				5	0	0.00	0.0	0	0	0
Totals: d/						11	0.37	0.2	5	6	11
Total adults: e/						7	0.24	0.1	3	4	7

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 2008. 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.

f/ Experimental release group. Fish used in screw trap efficiency studies; released near North Fork Trinity River or Willow Creek.

g/ Rounding sometimes makes for seeming addition errors in this column.

Appendix 16. (continued) Run-size, percent return, in-river sport catch, and spawner escapement estimates for Trinity River Hatchery-produced, coded-wire tagged, fall Chinook returning to the Trinity River upstream of Willow Creek weir during the period 2009 through 2013.

Release data						Estimated returns					
CWT ^a	Brood	Date ^b	Number	Site	Age	Run-	% of	River	Spawning escapement		
code	year					size	release	harvest	TRH ^c	Natural	Total ^g
068823	2009	06/1 - 8/10	85,136	TRH	2	331	0.39	8.5	116	206	322
068823	2009				3	462	0.54	11.1	240	211	451
068823	2009				4	88	0.10	2.6	25	60	85
068824	2009	06/1 - 8/10	89,959	TRH	2	253	0.28	6.5	89	157	246
068824	2009				3	386	0.43	9.3	200	176	377
068824	2009				4	91	0.10	2.7	26	62	89
068825	2009	06/1 - 8/10	91,310	TRH	2	77	0.08	2.0	27	48	75
068825	2009				3	282	0.31	6.8	147	129	275
068825	2009				4	78	0.08	2.3	22	53	75
068826	2009	06/1 - 8/10	88,851	TRH	2	35	0.04	0.9	12	21	34
068826	2009				3	181	0.20	4.3	94	83	176
068826	2009				4	70	0.08	2.1	20	48	68
068827	2009	06/1 - 8/10	90,929	TRH	2	23	0.03	0.6	8	14	22
068827	2009				3	206	0.23	5.0	107	94	201
068827	2009				4	77	0.08	2.2	22	53	75
068828	2009	06/1 - 8/10	39,642	TRH	2	52	0.13	1.3	18	32	50
068828	2009				3	212	0.54	5.1	110	97	207
068828	2009				4	53	0.13	1.5	15	36	51
068833 ^f	2009	03/2-7/10/10	5,664	River	2	3	0.05	0.1	1	2	3
068833 ^f	2009				3	12	0.21	0.3	6	5	11
068833 ^f	2009				4	4	0.06	0.1	1	2	3
068834 ^f	2009	03/2-7/10/10	5,270	River	2	3	0.05	0.1	1	2	3
068834 ^f	2009				3	8	0.15	0.2	4	4	8
068834 ^f	2009				4	0	0.00	0.0	0	0	0
068837	2009	10/1 - 9/10	230,461	TRH	2	400	0.17	10.3	141	249	389
068837	2009				3	4,984	2.16	119.8	2,589	2,276	4,865
068837	2009				4	1,963	0.85	57.0	566	1,340	1,906
068777	2010	06/1-17/11	114,941	TRH	2	33	0.03	0.2	6	27	33
068777	2010				3	88	0.08	2.6	25	60	85
068778	2010	06/1-17/11	119,394	TRH	2	39	0.03	0.2	7	31	38
068778	2010				3	91	0.08	2.7	26	62	89
068779	2010	06/1-17/11	119,945	TRH	2	22	0.02	0.1	4	18	22
068779	2010				3	67	0.06	1.9	19	45	65
068780	2010	06/1-17/11	112,828	TRH	2	27	0.02	0.2	5	22	27
068780	2010				3	42	0.04	1.2	12	29	41
068781	2010	10/3-12/11	231,430	TRH	2	44	0.02	0.3	8	36	44
068781	2010				3	520	0.22	15.1	150	355	505
068835 ^f	2010	06/2-8/13/11	7,954	River	2	11	0.14	0.1	2	9	11
068835 ^f	2010				3	4	0.04	0.1	1	2	3
068830	2011	5/24-8/27/12	9,706	River	2	0	0.00	0.0	0	0	0
068841	2011	06/1-15/12	86,357	TRH	2	7	0.01	0.2	5	2	7
068842	2011	06/1-15/12	95,355	TRH	2	4	0.00	0.1	3	1	4
068844	2011	06/6-15/12	112,093	TRH	2	9	0.01	0.3	6	3	9
068845	2011	06/7-15/12	102,907	TRH	2	3	0.00	0.1	2	1	3
068847	2011	10/1-17/12	200,337	TRH	2	21	0.01	0.6	14	6	21

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 2008. These fish have reached five years of age and are considered to have

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

f/ Experimental release group. Fish used in screw trap efficiency studies; released near North Fork Trinity River or Willow Creek.

g/ Rounding sometimes makes for seeming addition errors in this column.

Appendix 17. Percent return of Trinity River Hatchery-produced, coded-wire tagged, fall Chinook salmon, brood years 1986-2008.

Brood year	Fingerling releases			Yearling releases		
	Number released	Number of returns	Percent return	Number released	Number of returns	Percent return
1986	393,955	292	0.07%	153,700	4,899	3.19%
1987	172,980	129	0.07%	92,300	418	0.45%
1988	194,197	138	0.07%	143,934	796	0.55%
1989	201,622	21	0.01%	143,978	174	0.12%
1990	---	---	---	103,040	166	0.16%
1991	206,416	937	0.45%	115,300	517	0.45%
1992	192,032	2,503	1.30%	108,894	5,369	4.93%
1993	201,032	158	0.08%	110,336	798	0.72%
1994	216,563	374	0.17%	113,124	756	0.67%
1995	216,051	285	0.13%	110,327	3,106	2.82%
1996	217,981	445	0.20%	112,746	394	0.35%
1997	216,772	1,707	0.79%	313,080	11,396	3.64%
1998	184,781	292	0.16%	334,726	7,173	2.14%
1999	181,301	693	0.38%	296,892	5,833	1.96%
2000	522,316	3,909	0.75%	216,593	5,245	2.42%
2001	499,919	476	0.10%	230,055	5,894	2.56%
2002	508,963	3,563	0.70%	236,319	3,561	1.51%
2003	534,219	289	0.05%	225,798	944	0.42%
2004	486,369	4,125	0.85%	218,386	3,909	1.79%
2005	488,466	157	0.03%	227,903	675	0.30%
2006	486,833	849	0.17%	238,156	3,240	1.36%
2007	446,316	324	0.07%	244,661	2,330	0.95%
2008	518,269	3,576	0.69%	259,330	4,211	1.62%
Means:	331,243	1,147	0.33%	189,112	3,122	1.53%

a/ Based on estimated returns upstream of Willow Creek weir. Does not include ocean harvest, in-river harvest, and escapement below Willow Creek weir.

Appendix 18. Fall Chinook estimated run-size, spawner escapement, and angler harvest estimates for the Trinity River upstream of Willow Creek weir, 1977 - 2013

Year	Run-size estimate					Spawner escapements						Angler harvest		
	Jacks ^e		Adults		Total	Natural Area Spawners ^a			Trinity River Hatchery			Jacks	Adults	Total
						Jacks	Adults	Total	Jacks	Adults	Total			
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 b/		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	c/ 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	c/ 472
1993	3,381	32.2	7,104	67.8	10,485	2,473	5,898	8,371	736	815	1,551	172	391	c/ 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	c/ 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	c/ 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	c/ 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	c/ 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	c/ 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	d/ 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

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

b/ The 1978 sport harvest of fall Chinook was restricted by a salmon fishing closure beginning August 25, 1978.

c/ The sport harvest of adult fall Chinook was subject to seasonal and size limit restrictions.

d/ The 1999-2013 sport harvest of Klamath Basin fall Chinook was managed with a quota system. The quota for adult fall Chinook was 957 in 1999; 693 in 2000; 9,834 in 2001; 6,926 in 2002; 10,800 in 2003; 4,700 in 2004; 1,262 in 2005, zero in 2006, 10,600 in 2007, 20,500 in 2008, 30,800 in 2009, 12,000 in 2010, 7,900 in 2011, 67,600 in 2012, and 40,006 in 2013.

e/ Jacks are two year old fish, adults are a minimum of three years old.

Appendix 18 (continued). Fall Chinook estimated run-size, spawner escapement, and angler harvest estimates for the Trinity River upstream of Willow Creek weir, 1977 – 2013.

Year	Run-size estimate					Spawner escapements						Angler harvest		
	Jacks ^a		Adults		Total	Natural Area Spawners ^a			Trinity River Hatchery			Jacks	Adults	Total
	Number	Percent	Number	Percent		Jacks	Adults	Total	Jacks	Adults	Total			
2002 NATURAL	1,314	15.1	7,367	84.9	8,681	1,231	6,549	9,019	26	523	549	57	295	352
2002 TRH	2,498	26.4	6,977	73.6	9,475	1,335	3,761	3,857	1,052	2,952	4,004	111	264	375
2002 TOTAL	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 NATURAL	579	5.1	10,839	94.9	11,418	415	9,273	9,688	105	1,243	1,349	58	322	380
2003 TRH	968	1.8	51,976	98.2	52,944	343	21,922	22,265	529	28,509	29,037	97	1,545	1,642
2003 TOTAL	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 NATURAL	3,210	90	369	10	3,578	2,941	-223	2,718	70	595	664	200	-3	197
2004 TRH	2,014	8	23,941	92	25,956	898	11,768	12,666	989	11,789	12,779	127	384	511
2004 TOTAL	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 NATURAL	879	10.3	7,678	89.7	8,557	743	6,364	7,107	36	1,065	1,101	100	247	347
2005 TRH	20	0.1	19,654	99.9	19,674	8	6,353	6,361	12	12,693	12,705	0	609	609
2005 TOTAL	899	3.2	27,332	96.8	28,231	751	12,717	13,468	48	13,758	13,806	100	856	d/ 956
2006 NATURAL	6,845	52	6,299	48	13,144	6,358	5,114	11,472	421	1,185	1,606	66	0	66
2006 TRH	5,445	25	16,323	75	21,768	1,870	9,452	11,322	3,517	6,871	10,388	58	0	58
2006 TOTAL	12,290	35.2	22,622	64.8	34,912	8,228	14,566	22,794	3,938	8,056	11,994	124	0	d/ 124
2007 NATURAL	819	2.4	33,421	97.6	34,240	723	31,412	32,135	16	1,457	1,473	81	552	633
2007 TRH	67	0.3	24,566	99.7	24,633	42	7,555	7,597	17	16,624	16,641	8	387	395
2007 TOTAL	886	1.5	57,987	98.5	58,873	765	38,967	39,732	33	18,081	18,114	89	939	d/ 1,028
2008 NATURAL	6,723	46.6	7,689	53.4	14,412	6,373	6,951	13,324	185	599	784	165	138	303
2008 TRH	1,133	13.2	7,452	86.8	8,585	488	3,457	3,945	616	3,852	4,468	29	143	172
2008 TOTAL	7,856	34.2	15,141	65.8	22,997	6,861	10,408	17,269	801	4,451	5,252	194	281	d/ 475
2009 NATURAL	5,733	29.4	13,788	70.6	19,521	5,602	12,537	18,139	-9	921	912	141	330	471
2009 TRH	285	2.8	9,787	97.2	10,072	130	3,126	3,256	150	6,432	6,582	4	229	233
2009 TOTAL	6,018	20.3	23,575	79.7	29,593	5,732	15,663	21,395	141	7,353	7,494	145	559	d/ 704
2010 NATURAL	10,125	40.6	14,814	59.4	24,939	9,782	14,104	23,886	241	611	852	102	99	201
2010 TRH	2,429	15.3	13,424	84.7	15,853	1,187	6,197	7,384	1,217	7,138	8,355	25	89	114
2010 TOTAL	12,554	30.8	28,238	69.2	40,792	10,969	20,301	31,270	1,458	7,749	9,207	127	188	d/ 315
2011 NATURAL	30,462	63.5	17,482	36.5	47,943	29,530	15,470	45,000	146	1,688	1,834	786	327	1,113
2011 TRH	4,815	14.6	28,060	85.4	32,875	2,997	15,340	18,337	1,694	12,194	13,888	124	524	648
2011 TOTAL	35,277	43.6	45,542	56.4	80,818	32,527	30,810	63,337	1,840	13,882	15,722	910	851	d/ 1,761
2012 NATURAL	4,514	11.0	36,416	89.0	40,931	4,530	34,702	39,232	-42	838	796	31	1,644	1,675
2012 TRH	729	2.2	32,007	97.8	32,735	590	14,615	15,205	134	16,623	16,757	4	769	773
2012 TOTAL	5,243	7.1	68,423	92.9	73,666	5,120	49,317	54,437	92	17,461	17,553	31	1,644	d/ 2,448
2013 NATURAL	6,514	27.6	17,104	72.4	23,618	6,515	16,689	23,204	-1	-82	-83	0	498	498
2013 TRH	203	1.5	13,168	98.5	13,371	67	8,986	9,053	136	3,799	3,935	0	382	382
2013 TOTAL	6,717	18.2	30,272	81.8	36,989	6,582	25,675	32,257	135	3,717	3,852	0	880	d/ 880

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

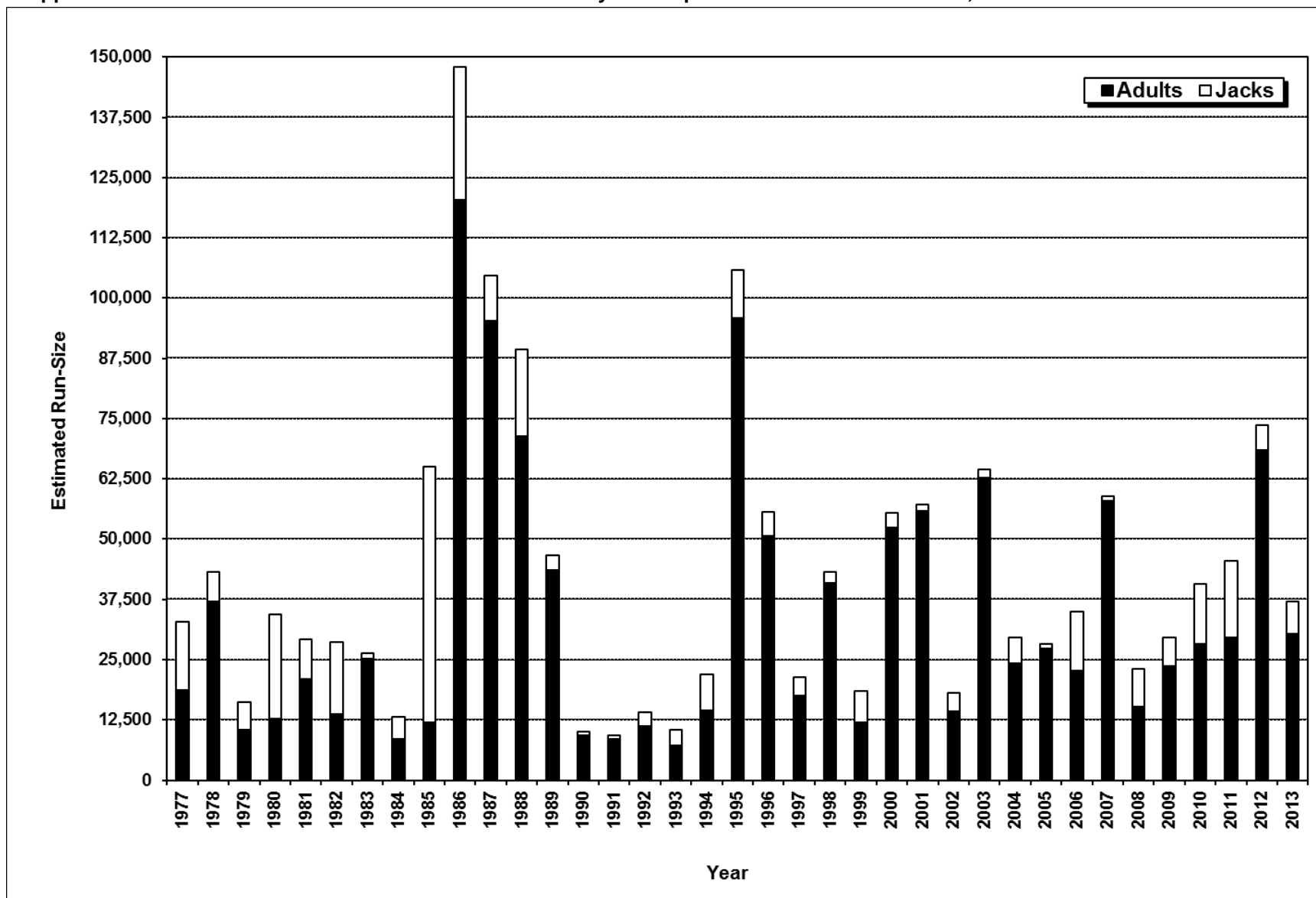
b/ The 1978 sport harvest of fall Chinook was restricted by a salmon fishing closure beginning August 25, 1978.

c/ The sport harvest of adult fall Chinook was subject to seasonal and size limit restrictions.

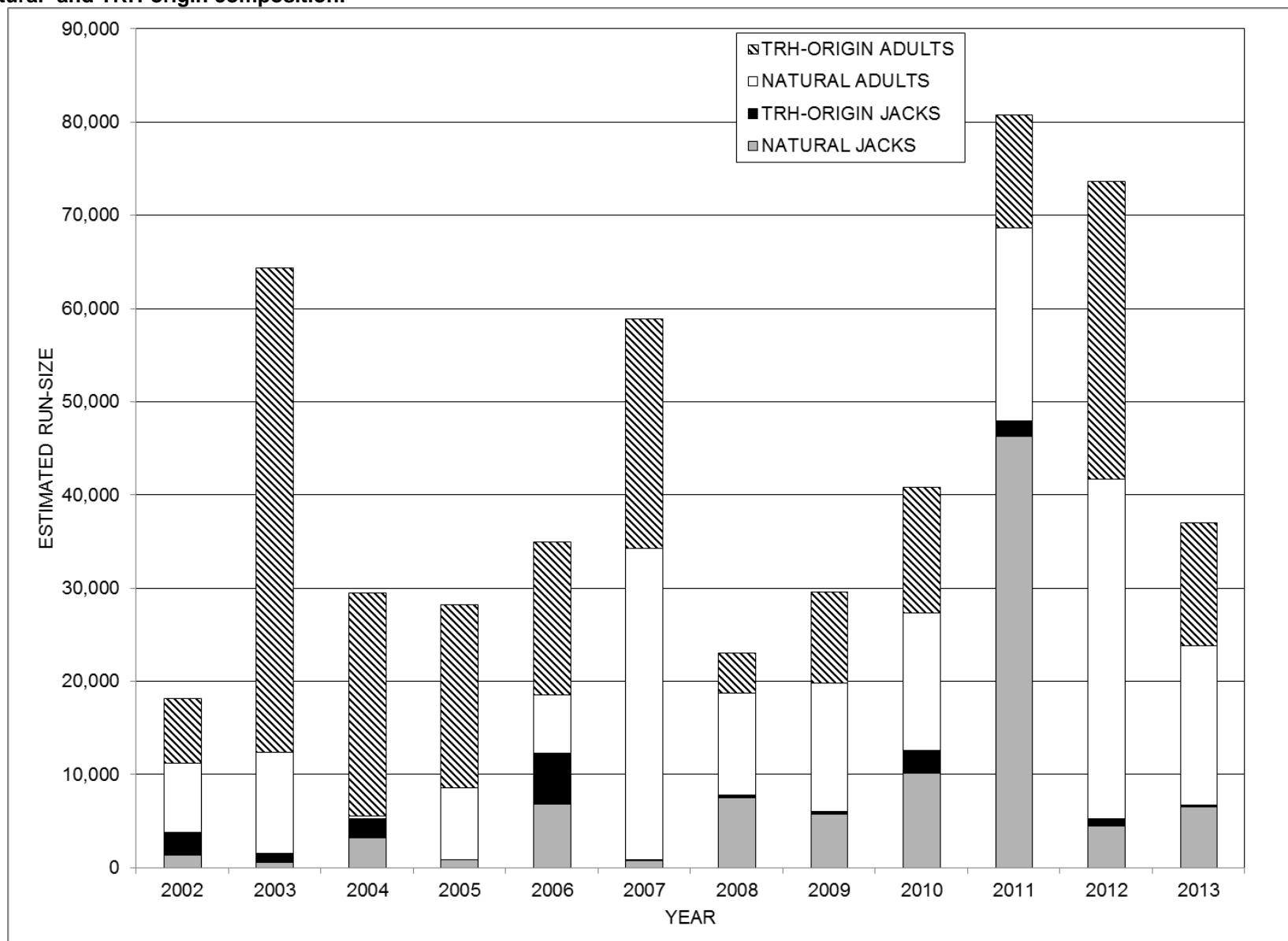
d/ The 1999-2013 sport harvest of Klamath Basin fall Chinook was managed with a quota system. The quota for adult fall Chinook was 957 in 1999; 693 in 2000; 9,834 in 2001; 6,926 in 2002; 10,800 in 2003; 4,700 in 2004; 1,262 in 2005, zero in 2006, 10,600 in 2007, 20,500 in 2008, 30,800 in 2009, 12,000 in 2010, 7,900 in 2011, 67,600 in 2012, and 40,006 in 2013.

e/ Jacks are two year old fish, adults are a minimum of three years old.

Appendix 19. Fall Chinook estimated run-size for the Trinity River upstream of Willow Creek weir, 1977 – 2013.



Appendix 19 (continued). Fall Chinook estimated run-size for the Trinity River upstream of Junction City weir, 2002 – 2013, showing natural- and TRH-origin composition.



Appendix 20. Fork length (FL) distribution of coho trapped and tagged at Willow Creek (WCW) weir, and subsequently recovered during the 2013-14 season.^a

FL (cm)	WCW			RECOVERIES						Total Recoveries	% Recoveries
	Total Trapped	Total Tagged ^b	RM-clips ^c	Tag Morts ^d	Angler Harvest ^e	TRH ^f Recoveries	Carcass ^g Recoveries	Found Tags ^h	Angler Released ⁱ		
35	1	1	1	1						1	100.0
36	--									--	--
37	1	1	1							0	0.0
38	1	1	1							0	0.0
39	4	3	4							0	0.0
40	3	3	3			2				2	66.7
41	9	9	7			3				3	33.3
42	4	4	4			2	1			3	75.0
43	10	10	10							0	0.0
44	10	9	9							0	0.0
45	6	6	6			3				3	50.0
46	9	9	9			3				3	33.3
47	6	6	6			1				1	16.7
48	2	2	2							0	0.0
49	2	2	2			1				1	50.0
50	3	3	3			2				2	66.7
51	2	2	1			1				1	50.0
52	1	1	1							0	0.0
53	2	2	2							0	0.0
54	2	2	2			1	1			2	100.0
55	2	2	2							0	0.0
56	4	3	4			2				2	66.7
57	7	7	5			4				4	57.1
58	2	2	2							0	0.0
59	4	3	4			1				1	33.3
60	9	8	7			3				3	37.5
61	14	13	13			1				1	7.7
62	21	19	14			9				9	47.4
63	30	27	23			10				10	37.0
64	33	31	28			11	2			13	41.9
65	42	41	31			13	1			14	34.1
66	58	57	51			17	1			18	31.6
67	59	56	48			18	5			23	41.1
68	64	63	47			25	1			26	41.3
69	50	46	38			13	2		1	16	34.8
70	34	31	22			6			1	7	22.6
71	23	22	18			3				3	13.6
72	22	22	15			7			1	8	36.4
73	8	8	5							0	0.0
74	5	5	2			1				1	20.0
75	3	3	2			1				1	33.3
76	1	1	1							0	0.0
77	2	2	2							0	0.0
Totals:	575	548	458	1	0	164	14	0	3	182	33.2
Mean FL:	63.6	63.6	62.9	35.0	--	63.7	64.0	--	70.3	63.7	
Total jacks: ^j	74	72	70	1	0	18	1	0	0	20	27.8
Total adults:	501	476	388	0	0	146	13	0	3	162	34.0

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50).

b/ Twenty seven (2 jack and 25 adult) coho were not tagged due to poor condition.

c/ RM-clips = Right maxillary clipped fish of Trinity River Hatchery origin.

d/ Tagged fish found dead and spawned within 30 days of tagging are considered tagging mortalities.

e/ Fish reported as harvested by anglers. There were zero reported as harvested by anglers in 2013.

f/ Trapping occurred at Trinity River Hatchery September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

g/ Fish recovered in upper Trinity River spawner surveys.

h/ Fish tags found loose or on dead fish and returned by anglers or other river enthusiasts. There were zero returned in 2013.

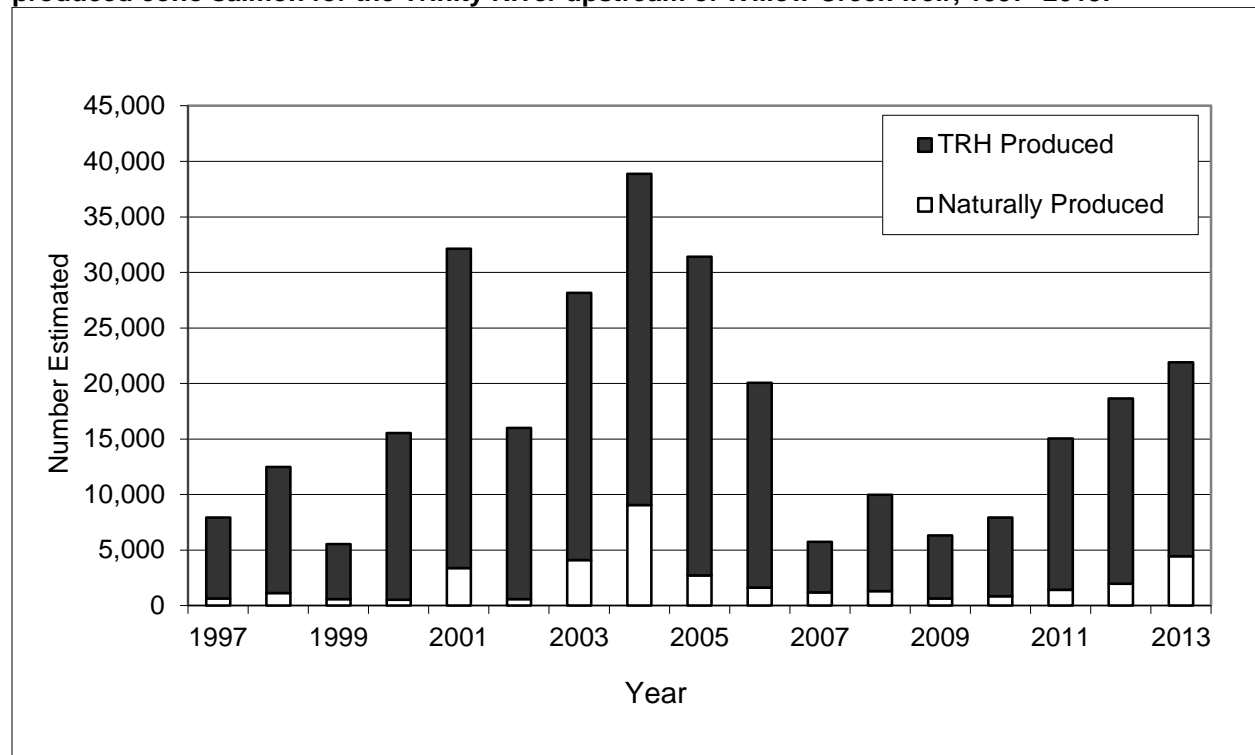
i/ Fish caught and released by anglers, their tag removed.

j/ Coho <53 cm FL were considered jacks in 2013.

Appendix 21. Estimated run-size, spawner escapement and harvest of naturally- and hatchery-produced coho salmon for the Trinity River upstream of Willow Creek weir, 1997- 2013.

Run year	Run-size Estimate				Spawner Escapement		Trinity River Hatchery			Angler harvest			
	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	4,655	865	5,520	858	867	1,725	39	0	39
1998	Natural	131	1,001	1,132	123	886	1,009	8	115	123	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	1,256	1,467	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	71	1,728	1,799	10	920	930	0	0	0
	TRH	3,012	25,678	28,690	1,270	9,974	11,244	1,721	15,704	17,425	21	0	21
2006	Natural	38	1,586	1,624	34	1,416	1,450	4	170	174	0	0	0
	TRH	1,331	17,123	18,454	674	7,454	8,128	657	9,669	10,326	0	0	0
2007	Natural	42	1,157	1,199	37	940	977	5	217	222	0	0	0
	TRH	503	4,048	4,551	233	1,612	1,845	270	2,436	2,706	0	0	0
2008	Natural	89	1,223	1,312	83	861	944	6	362	368	0	0	0
	TRH	2,290	6,381	8,671	1,647	2,204	3,851	643	4,177	4,820	0	0	0
2009	Natural	116	520	636	113	429	542	3	91	94	0	0	0
	TRH	1,630	4,067	5,697	758	1,681	2,439	872	2,386	3,258	0	0	0
2010	Natural	44	817	861	34	654	688	10	193	203	0	0	0
	TRH	1,233	5,852	7,085	717	2,146	2,863	516	3,706	4,222	0	0	0
2011	Natural	208	1,205	1,413	187	991	1,178	21	214	235	44	0	44
	TRH	9,514	4,113	13,627	6,606	2,403	9,009	2,865	1,710	4,575	0	0	0
2012	Natural	192	1,774	1,966	184	1,577	1,761	8	197	205	0	0	0
	TRH	3,198	13,494	16,692	2,327	6,335	8,662	871	7,159	8,030	0	0	0
2013	Natural	152	4,305	4,457	149	3,948	4,097	3	357	360	0	0	0
	TRH	2,667	14,782	17,448	2,243	8,935	11,177	424	5,847	6,271	0	0	0

Appendix 22.. Estimated run-size, spawner escapement and harvest of naturally- and hatchery-produced coho salmon for the Trinity River upstream of Willow Creek weir, 1997- 2013.



Appendix 23. Coho estimated run-size, spawner escapement, and angler harvest estimates for the Trinity River upstream of Willow Creek weir, 1977 - 2013.

YEAR	Run-size estimate					Spawner escapements						Angler harvest		
	Number		Percent		Total	Natural Area Spawners ^a			Trinity River Hatchery			Jacks	Adults	Total
	Jacks ^e		Adults			Jacks	Adults	Total	Jacks	Adults	Total			
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 ^b		
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	763 ^c
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 ^d
1997	5,951	75.0	1,984	25.0	7,935	5,038	1,097	6,135	871	887	1,758	42	0	42 ^d
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 ^d
1999	623	11.3	4,912	88.7	5,535	234	1,696	1,930	389	3,118	3,507	0	98	98 ^d
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 ^d
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 ^d
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 ^d
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 ^d
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 ^d
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 ^d
2006	1,369	6.8	18,709	93.2	20,078	708	8,870	9,578	661	9,839	10,500	0	0	0 ^d
2007	545	9.5	5,205	90.5	5,750	270	2,552	2,822	275	2,653	2,928	0	0	0 ^d
2008	2,379	23.8	7,603	76.2	9,982	1,730	3,064	4,794	649	4,539	5,188	0	0	0 ^d
2009	1,762	27.5	4,634	72.5	6,396	888	2,157	3,045	874	2,477	3,351	0	0	0 ^d
2010	1,278	16.1	6,669	83.9	7,947	752	2,770	3,522	526	3,899	4,425	0	0	0 ^d
2011	9,722	64.6	5,318	35.4	15,040	6,792	3,394	10,186	2,886	1,924	4,810	44	0	44 ^d
2012	3,389	18.2	15,268	81.8	18,657	2,510	7,912	10,422	879	7,357	8,236	0	0	0 ^d
2013	2,819	12.9	19,087	87.1	21,906	2,392	12,883	15,275	427	6,204	6,631	0	0	0 ^d

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

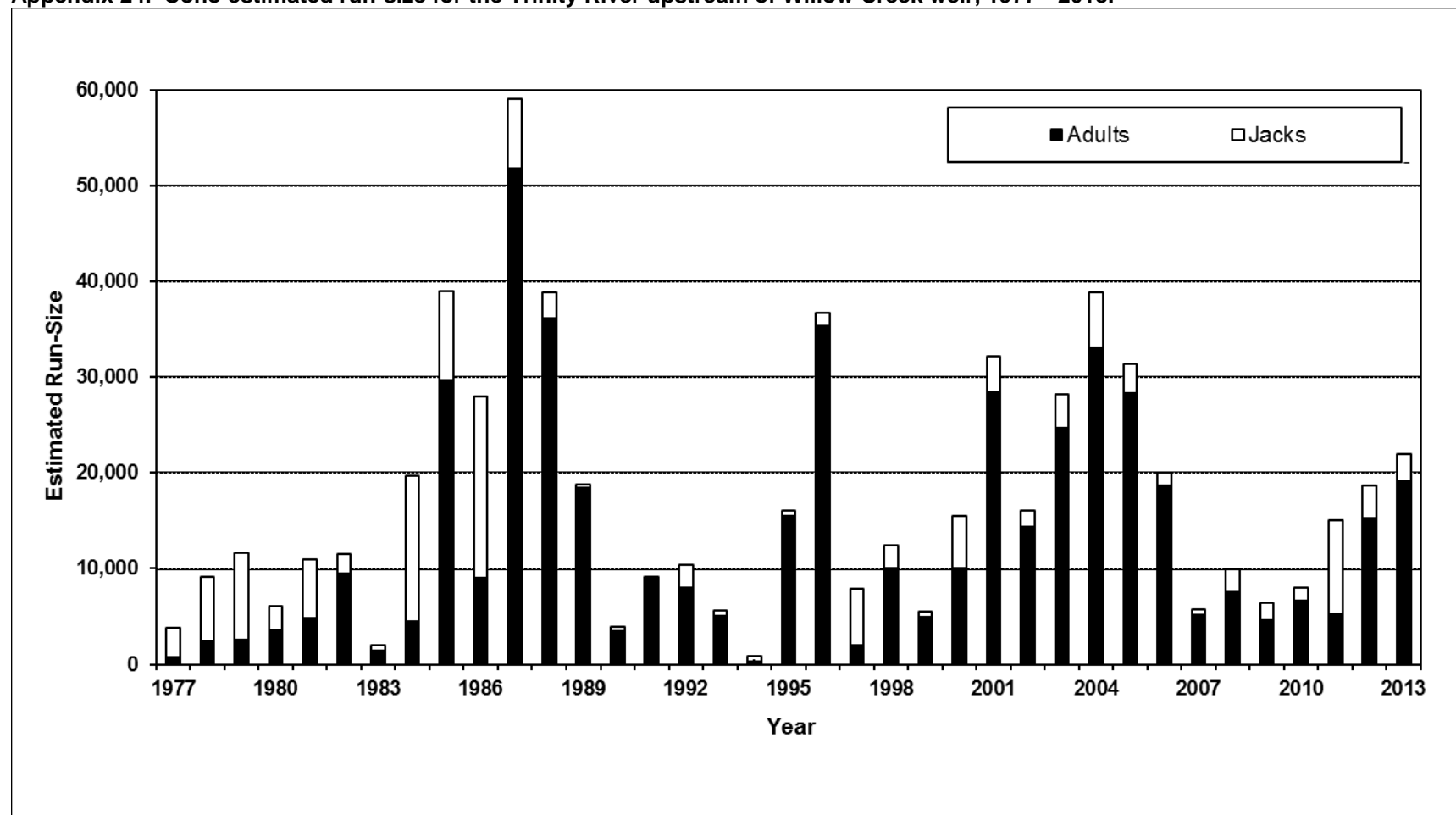
b/ The 1978 sport harvest of coho was essentially eliminated by a salmon fishing closure beginning August 25, 1978.

c/ The 1985 sport harvest of adult coho was limited by a closure for the taking of salmon > 55 cm total length beginning September 22, 1985.

d/ The 1996-2013 sport fishery was closed to the take of coho salmon.

e/ Jacks are two year old fish, adults are three years.

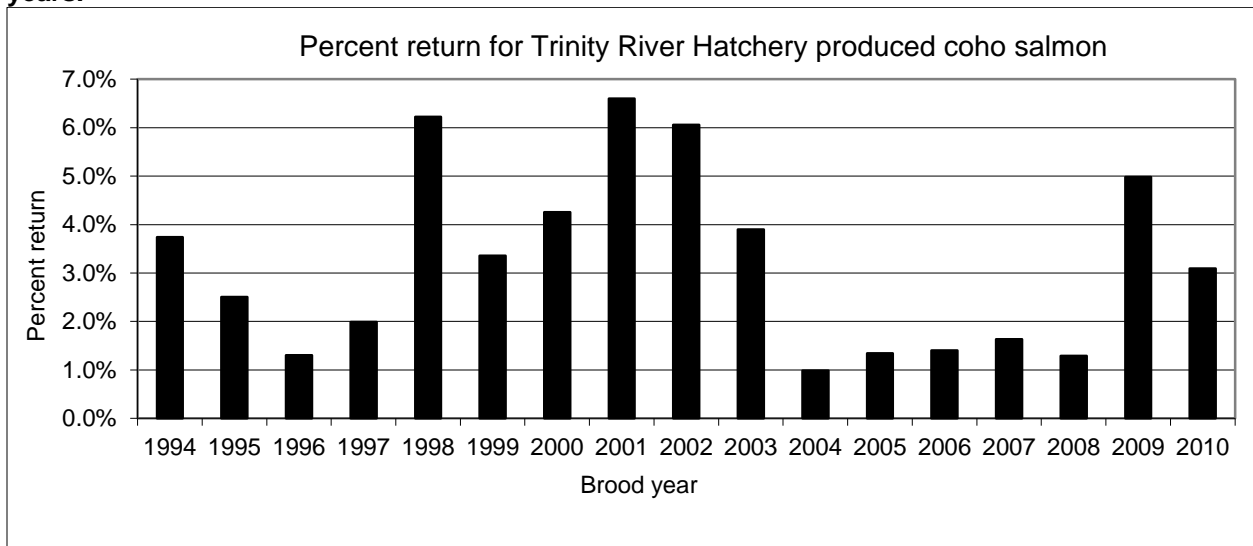
Appendix 24. Coho estimated run-size for the Trinity River upstream of Willow Creek weir, 1977 - 2013.



Appendix 25. Brood year performance and return data for Trinity River Hatchery coho salmon returning to Trinity River, upstream of Willow Creek weir, 1994 - 2010.

Release data					Return data					
Brood year	Date	Effective Number	Site	Age	Run-size	% of release	In-river harvest	Spawner TRH	Escapement Natural	Total
1994	3/17-21 /96	72,311	TRH	2	970	1.34%	0	105	865	970
				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
				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
				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
				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
				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
				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
				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
				3	24,162	5.81%	40	8,835	15,287	24,122
				Totals:	27,500	6.60%	40	10,284	17,176	27,460
2002	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	6.06%	0	16,772	14,571	31,343
2003	3/14-18/05	520,847	TRH	2	3,012	0.58%	21	1,269	1,721	2,990
				3	17,123	3.29%	0	7,454	9,669	17,123
				Totals:	20,135	3.90%	21	8,723	11,390	20,113
2004	3/15-20/06	545,199	TRH	2	1,331	0.24%	0	657	674	1,331
				3	4,048	0.74%	0	2,436	1,612	4,048
				Totals:	5,379	0.99%	0	3,093	2,286	5,379
2005	3/15-20/07	511,961	TRH	2	503	0.10%	0	270	233	503
				3	6,381	1.25%	0	4,177	2,204	6,381
				Totals:	6,884	1.34%	0	4,447	2,437	6,884
2006	3/15-20/08	455,482	TRH	2	2,290	0.50%	0	643	1,647	2,290
				3	4,067	0.89%	0	2,386	1,681	4,067
				Totals:	6,357	1.40%	0	3,029	3,328	6,357
2007	3/16-20/09	457,478	TRH	2	1,645	0.36%	0	871	774	1,645
				3	5,852	1.28%	0	3,706	2,146	5,852
				Totals:	7,497	1.64%	0	4,577	2,920	7,497
2008	4/6-8/10	413,178	TRH	2	1,233	0.30%	0	516	707	1,233
				3	4,113	0.99%	0	1,710	2,403	4,113
				Totals:	5,346	1.29%	0	2,226	3,110	5,336
2009	3/15-28/11	490,998	TRH	2	10,982	2.24%	0	2,862	8,120	10,982
				3	13,494	2.75%	0	7,159	6,335	13,494
				Totals:	24,476	4.98%	0	10,021	14,455	24,476
2010	3/15-26/12	489,429		2	3,198	0.07%	0	871	2,327	3,198
				3	14,782	3.02%	0	5,847	8,935	14,782
				Totals		3.09%	0	6,718	11,262	179

Appendix 26. Percent return for Trinity River Hatchery produced coho salmon, 1994 – 2010 brood years.



Appendix 27. Fork length (FL) distribution of fall run steelhead trapped and tagged at Willow Creek weir (WCW) , and subsequently recovered during the 2013-14 season.^a

FL (cm)	WCW			RECOVERIES							Total Recoveries	% Recoveries
	Total Trapped	Total Tagged ^o	Ad-clips ^c	Tag Morts ^d	Angler Harvest ^e	TRH ^f Recoveries	Carcass ^g Recoveries	Found Tags ^h	Angler Released ⁱ			
25	1		1							--	--	
26	--									--	--	
27	--									--	--	
28	--									--	--	
29	--									--	--	
30	1		1							--	--	
31	3									--	--	
32	2									--	--	
33	7		4							--	--	
34	7		3							--	--	
35	16		9							--	--	
36	20		14							--	--	
37	18		15							--	--	
38	10		5							--	--	
39	10		2							--	--	
40	12	1	6						1	1	100.0	
41	5		2							--	--	
42	1									--	--	
43	4	4							2	2	50.0	
44	3	3	1							0	0.0	
45	4	4	1			1			1	2	50.0	
46	7	6							1	1	16.7	
47	5	5							4	4	80.0	
48	13	13	3						2	2	15.4	
49	19	19	4			1			2	3	15.8	
50	13	13	1						1	1	7.7	
51	30	30	9		3	3			2	8	26.7	
52	49	49	12		3	1		1	12	17	34.7	
53	51	51	20		2	5			6	13	25.5	
54	75	75	37		4	3			11	18	24.0	
55	97	96	35	1	3	9		1	12	26	27.1	
56	134	130	61		3	16			15	34	26.2	
57	169	168	91		8	29			17	54	32.1	
58	162	161	68		6	17			19	42	26.1	
59	174	172	90		7	17		1	22	47	27.3	
60	163	156	82		4	25			20	49	31.4	
61	143	143	48			18			20	38	26.6	
62	135	131	57		5	18			11	34	26.0	
63	96	95	37		3	12			11	26	27.4	
64	82	82	36		1	9		1	8	19	23.2	
65	68	66	37			9			8	17	25.8	
66	58	57	23		2	8			7	17	29.8	
67	59	58	25		2	3			6	11	19.0	
68	40	40	20		2	9			2	13	32.5	
69	45	42	23		1	9			4	14	33.3	
70	49	49	31		1	9			6	16	32.7	
71	26	25	14			5			2	7	28.0	
72	20	20	11			7			1	8	40.0	
73	13	13	8			5			1	6	46.2	
74	5	5	2						1	1	20.0	
75	1	1	1							0	0.0	
76	2	2								0	0.0	
77	7	7	6			3				3	42.9	
78	2	2								0	0.0	
79	3	3	2							0	0.0	
80	1	1	1							0	0.0	
Totals:	2,140	1,998	959	1	60	251	0	4	237	554	27.7	
Mean FL:	58.8	60.0	59.1	55.0	58.8	61.5	--	57.5	59.2	60.1		
Total 1/2lb ^{ers}	112	1	62	0	0	0	0	0	1	1		
Total adults:	2,028	1,997	897	1	60	251	0	4	237	553	27.7	

a/ Trapping at Willow Creek weir took place August 30 - December 10, 2013 (Julian weeks 35-50).

b/ One hundred forty two steelhead were trapped but not tagged at WCW in 2013, 111 half-pounders (too small) and 31 adult (poor condition).

c/ Ad-clip = Adipose fin clipped fish.

d/ Tagged fish found dead and unspawned within 30 days of tagging are considered tagging mortalities.

e/ Fish reported as harvested by angler.

f/ Trapping occurred at Trinity River Hatchery September 3, 2013 - March 12, 2014 (JWs 36-11; closed parts or all of JWs 41-43).

g/ Fish recovered in upper Trinity River spawner surveys. No steelhead were recovered in the spawner survey in 2013.

h/ Fish tags found loose or on dead fish and returned by anglers or other river enthusiasts.

i/ Fish caught and released by anglers, their tag removed.

j/ Adult steelhead are all those > 41 cm FL.

Appendix 28. Total number of adult steelhead^a (>41 cm FL) entering Trinity River Hatchery (TRH) and number recovered that were tagged at Willow Creek or Junction City weir (WCW) during the 2013-14 season.^b

Julian Week of Entry ^c	Inclusive Dates		Number Entering TRH	Recoveries from	
				WCW	JCW
36	3-Sep	9-Sep	3		
37	10-Sep	16-Sep	3		
38	17-Sep	- 23-Sep	2		
39	24-Sep	- 30-Sep	5		
40	1-Oct	- 7-Oct	2		1
41	8-Oct	- 14-Oct	1		
42	15-Oct	- 21-Oct	--	--	--
43	22-Oct	- 28-Oct	6		
44	29-Oct	- 4-Nov	9		
45	5-Nov	- 11-Nov	6		0
46	12-Nov	- 18-Nov	26	3	
47	19-Nov	- 25-Nov	83	5	0
48	26-Nov	- 2-Dec	89	15	3
49	3-Dec	- 9-Dec	30	1	0
50	10-Dec	- 16-Dec	25	1	
51	17-Dec	- 23-Dec	32	3	0
52	24-Dec	- 31-Dec	141	6	
1	1-Jan	- 7-Jan			
2	8-Jan	- 14-Jan	427	42	2
3	15-Jan	- 21-Jan	305	33	3
4	22-Jan	- 28-Jan	165	24	1
5	29-Jan	- 4-Feb	281	30	1
6	5-Feb	- 11-Feb	278	30	
7	12-Feb	- 18-Feb	265	32	
8	19-Feb	- 25-Feb	96	8	
9	26-Feb	- 4-Mar	53	10	
10	5-Mar	- 11-Mar	41	7	
11	12-Mar	- 18-Mar	1	1	
Totals:			2,375	251	11

a/ Steelhead <42 cm FL are considered sub-adults and were not counted at TRH.

b/ The fish ladder was open Aug 30, 2013 - March 12, 2014 (Julian weeks 35 -11; closed all or parts of JWs 41-43).

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

Appendix 29. Fall-run adult steelhead (>41cm FL) estimated run-size, spawner escapement, and angler harvest estimates for the Trinity River upstream of Willow Creek weir, 1977 - 2013.

Year	Run-size estimate					Spawner escapement						Angler harvest			
	Hatchery ^b		Wild ^c		Total	Natural Area Spawners ^a			Trinity River Hatchery			Hatchery	Wild	Total	
	Number	Percent	Number	Percent		Hatchery	Wild	Total	Hatchery	Wild	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 component				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 component				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	681	24	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 component				5,212	No estimates			4,267	No estimates			No estimates		516
1998			"		2,972	"			2,463	"			"		68 ^e
1999			"		5,470	"			3,817	"			"		82 ^e
2000			"		8,042	"			7,097	"			"		177 ^e
2001			"		12,638	"			9,938	"			"		367 ^e
2002	14,408	75.6	4,650	24.4	19,058	7,715	4,551	12,266	5,996	42	6,038	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	
2006	32,609	78.8	8,781	21.2	41,390	20,272	8,660	28,932	11,509	38	11,547	828	83	911 ^e	
2007	46,379	86	7,506	14	53,885	31,923	7,405	39,328	11,366	31	11,397	3,090	70	3,160 ^e	
2008	9,538	64	5,477	36	15,015	6,680	5,415	12,095	2,471	24	2,495	386	38	424 ^e	
2009	13,314	73	5,047	27	18,361	7,704	4,877	12,581	4,234	17	4,251	1,376	154	1,530 ^e	
2010	4,640	55	3,811	45	8,451	2,468	3,749	6,217	2,000	37	2,037	172	25	197 ^e	
2011	14,969	68	6,932	32	21,901	8,344	6,850	15,194	5,700	50	5,750	925	32	957 ^e	
2012	12,253	59	8,359	41	20,612	6,060	8,215	14,275	5,685	52	5,737	507	92	599 ^e	
2013	7,389	45	9,205	55	16,594	4,521	9,039	13,560	2,295	80	2,375	573	86	659 ^e	

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

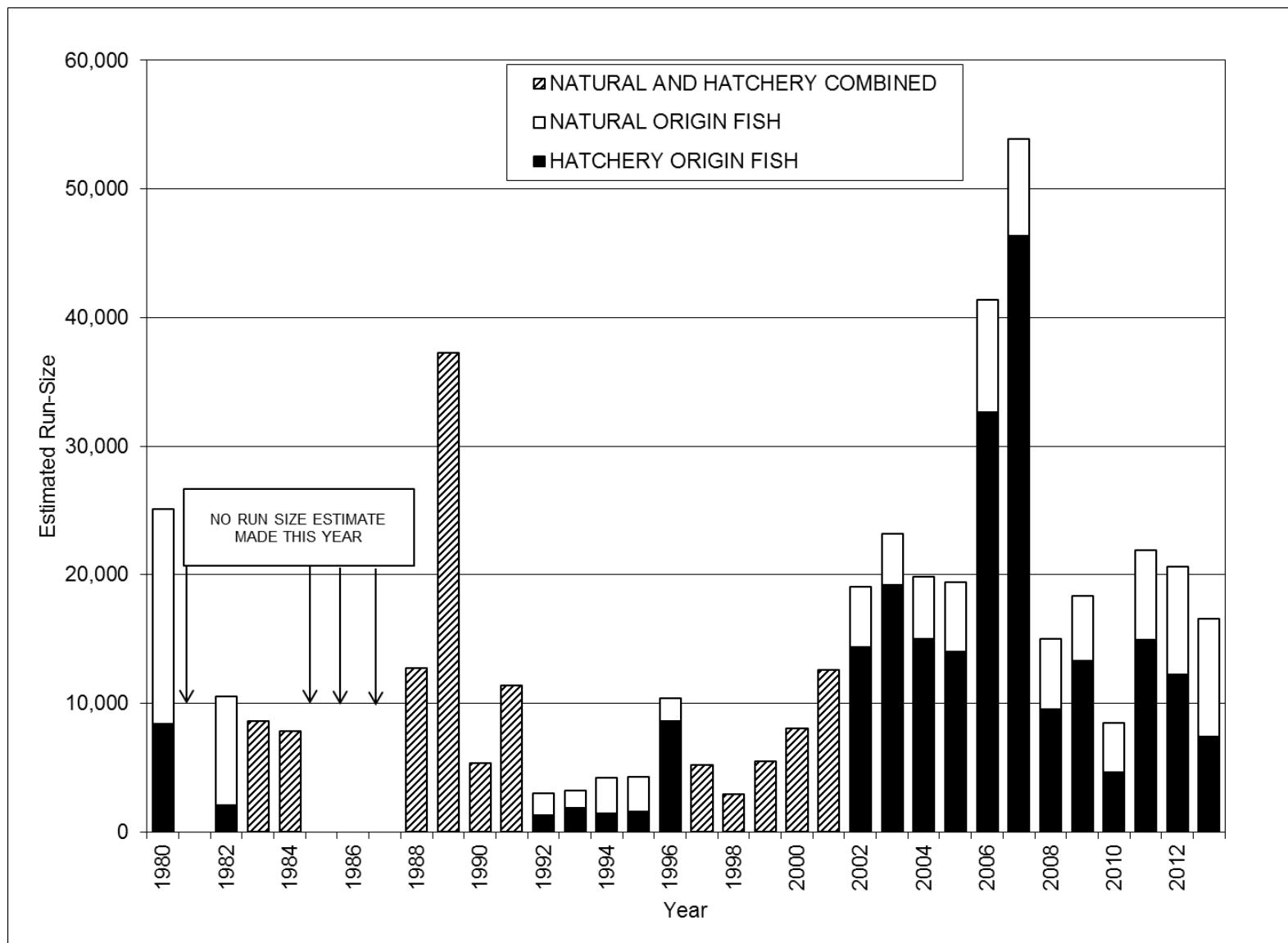
b/ Trinity River Hatchery-produced steelhead.

c/ Naturally produced steelhead.

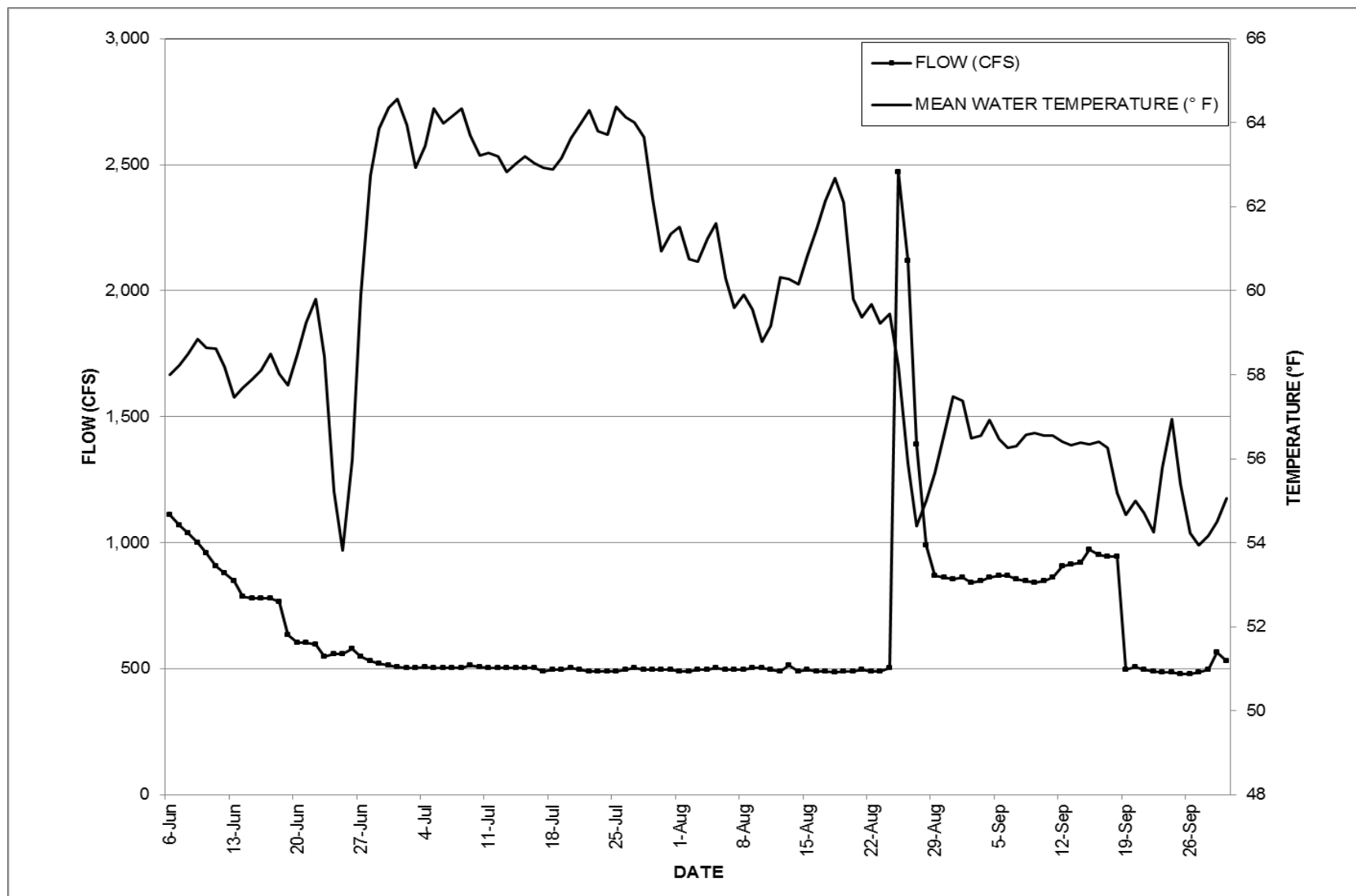
d/ The natural spawner escapement reflects an overestimate due to the unknown number of fish harvested by anglers upstream of Willow Creek Weir.

e/ Harvest was limited to hatchery-produced fish only. Hatchery fish are those with an adipose fin-clip.

Appendix 30. Fall-run adult steelhead (>41cm FL) estimated for the Trinity River upstream of Willow Creek weir, 1977 – 2013.



Appendix 31. Daily mean flow (CFS) recorded at USGS gauge (11526250) and water (°C) temperature for Trinity River near Junction City, 2013.



Appendix 32. Daily mean flow (CFS) recorded at USGS gauge (11530000) and water (°C) temperature for Trinity River near Willow Creek weir, 2013 sampling season.

