

Scott River Fall Chinook Spawning Ground Surveys



Female Chinook carcass recovered on November 14th 2016 (Siskiyou RCD)

Work Completed by the
Siskiyou Resource Conservation District
for the
United States Fish and Wildlife Service
(Grant Agreement # F15AP00539 and F16AP00654)

Report Prepared by Lindsay Magranet

January 2017

Contents

Introduction.....	2
Surveys.....	2
Lives.....	4
Biological Samples	4
Redds.....	5
Conclusions.....	6
References.....	6

Introduction

The Scott River is an important spawning tributary for natural fall-run Chinook in the Klamath Basin. Since 1992, escapement estimates have been completed in the Scott River through cooperative adult Chinook spawning ground surveys organized by the California Department of Fish and Wildlife (CDFW) and the United States Forest Service (USFS). The objective of these surveys is to collect information on run parameters including the timing, duration, age composition, hatchery contribution and redd distribution. The monitoring of this independent population provides valuable trend data including escapement estimates which are utilized by the Pacific Fisheries Management Council for the allocation of Klamath Basin fall run Chinook.

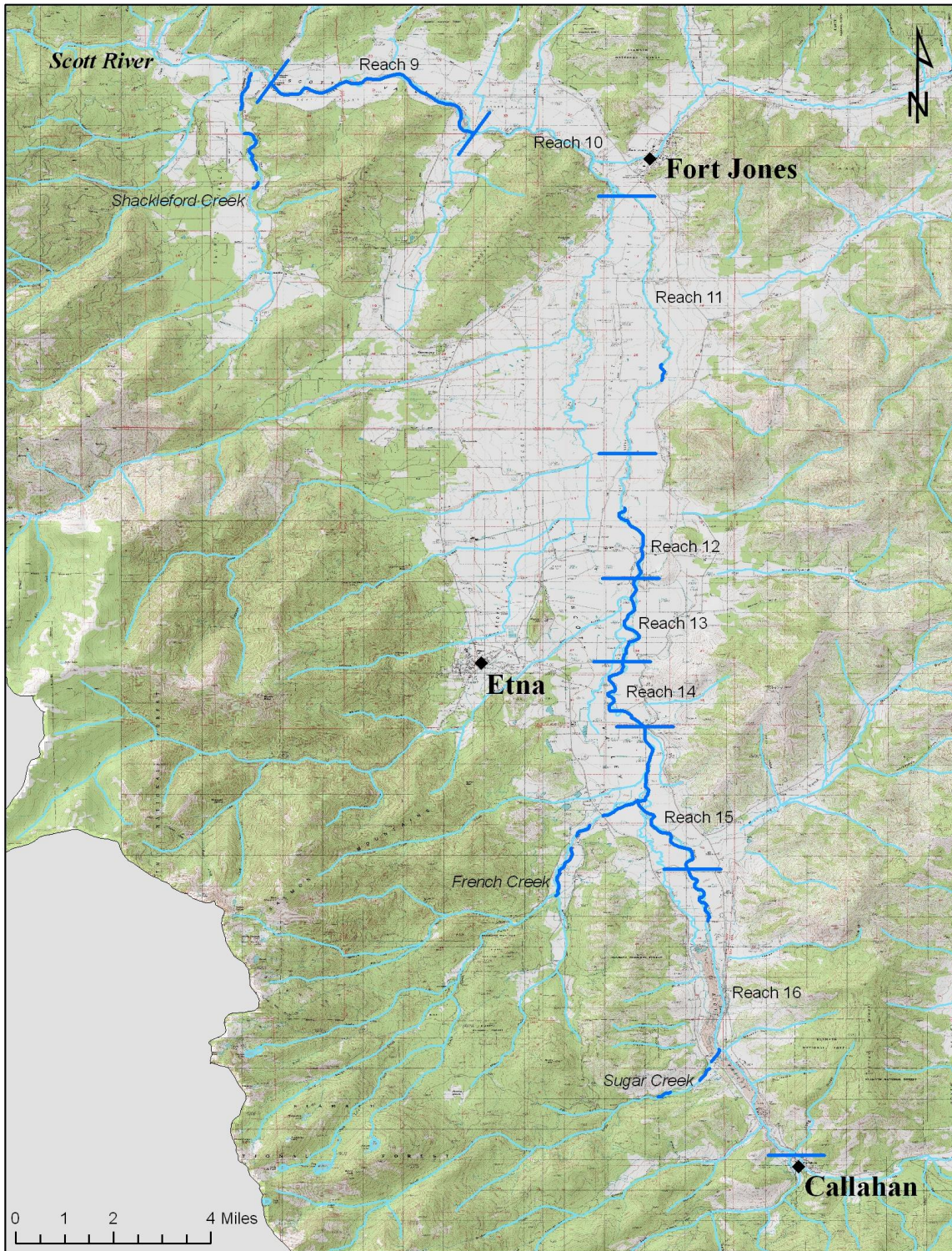
Surveys

The Annual Scott River Spawning Ground Survey Training was held at Indian Scott Campground on October 4th 2016. All individuals who participated in the surveys attended the training event this year or in a previous year. RCD crews initiated spawning ground surveys in the Scott River Valley on October 12th 2016 (Appendix A). Scheduling involved a minimum of bi-weekly surveys of Index Reaches 12 through 15 as stream conditions permitted. Surveys were also completed on sections of Reach 9, 11 and 16 as landowner access was granted (Table 1). At least one surveyed covered the full length of Reach 9, after which efforts were focused on the upper 2.8 miles where there was more suitable spawning substrate. A very limited extent of Reach 11 was surveyed in order to monitor a planned bank stabilization site. Unfortunately due to scheduling only the lower portion of reach 16 was surveyed. Surveys were also completed on French Creek, Sugar Creek and Shackleford Creek beginning in mid-November after coho salmon were identified in the system. Map 1 indicates the index reach breaks and the tributary reaches surveyed. Jim Morris, a former high school teacher, led a crew of 2-4 Etna High School students on several occasions. All surveys were carried out following protocols and procedures detailed in the Klamath Basin Cooperative Spawning Ground Survey 2016 Training Manual.

Index Reach	Reach Description	Upstream River Mile	Downstream River Mile	Total Length	Length Surveyed 2016
9	Oro Fino to Quartz Valley Bridge	28.6	24.4	4.2	4.2
10	Highway 3 to Oro Fino	35.6	28.6	7	0
11	Eller Lane to Highway 3	41.1	35.6	5.5	0.4
12	Etna Creek to Eller Lane	44.7	41.1	3.6	2.1
13	Horn Lane to Etna Creek	46.5	44.7	1.8	1.8
14	Young's Point to Horn Lane	48.6	46.5	2.1	2.1
15	Fay Lane to Young's Point	52.2	48.6	3.6	3.6

16	Callahan to Fay Lane	59.1	52.2	6.9	1.3
			Total	34.7	15.5

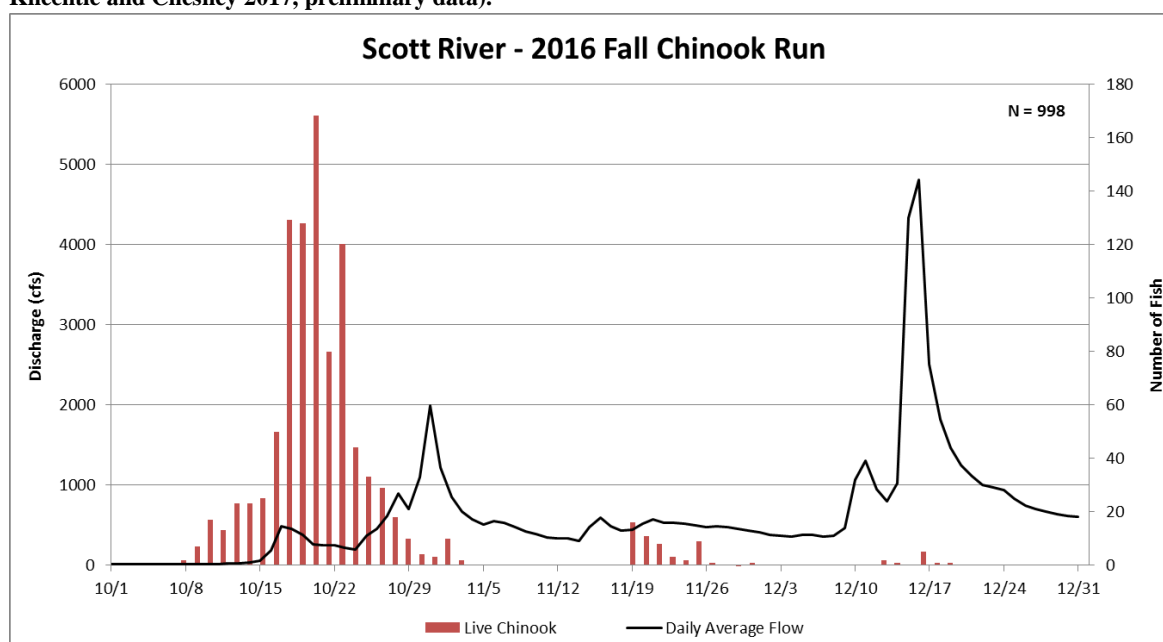
Map 1. Stream reaches surveyed by the Siskiyou RCD during the 2016 fall-Chinook run.



Lives

CDFW operates a Fish Counting Facility on the Scott River, which is situated at river mile 18.2 near the transition between the canyon and the low-gradient valley. A total of 998 Chinook were recorded passing upstream through the video weir from October 6th through December 3rd 2016 (Knechtle and Chesney 2017, preliminary data, Figure 1). The Scott River was confirmed to be connected through Oro Fino on October 12th 2016, after which rains insured that fish passage was no longer a concern. The first Chinook encountered in the valley was a pair migrating through Reach 11 on October 19th 2016 (Appendix A). Chinook were consistently documented between Eller Lane (Blacks Bridge) and Fay Lane on surveys completed through November 14th 2016. November 18th 2016 was the last day a live fish was positively identified as a Chinook (Appendix A).

Figure 1. Scott River streamflow and Chinook migration through the CDFW Fish Counting Facility (USGS 2016 & Knechtle and Chesney 2017, preliminary data).



Biological Samples

All carcasses encountered (with the exception of those that were inaccessible) were inventoried and then chopped to indicate that they had been handled. Surveyors recorded the fork length, sex, and presence of hatchery markings (if any). They also checked females for evidence of pre-spawn mortality. A total of 91 Chinook carcasses were handled and inventoried by RCD field technicians over the season (Appendix B). Of these, 57% were females and 33% were males; the remaining 10% of the carcasses were too deteriorated to determine the sex. No evidence of pre-spawn mortality was found. The last two Chinook carcasses recovered by crews were found on Shackleford Creek on December 12th and December 19th 2016. The collection of fresh female carcasses this late in the season corroborates the small pulse of fish identified passing through the Fish Counting Facility in mid-December.

There were 80 recovered carcasses that were of suitable condition to allow for scale samples to be collected (Appendix B). Gill plate and otolith samples were also gathered from selected carcasses, generally the first fish encountered per reach on each survey day. All samples were submitted to CDFW – Yreka Fisheries Office for further distribution and analysis. On November 21st 2016, a male carcass with

a fork length of 76 cm was found on Reach 14 with a clipped adipose fin. The head was taken to CDFW – Yreka for recovery of the coded wire tag, which confirmed the origin of the fish to be the Trinity River Hatchery.

For the purpose of this report, the upper extent of Chinook presence in the tributaries has been defined by the documentation of carcasses rather than redds because the species can be reliably determined. However, in 2016, the upper extent of spawning could not be determined on any of the surveyed tributaries because either no carcasses were recovered (French Creek and Sugar Creek) or a carcass was recovered at the upper boundary of the reach (Shackleford Creek river mile 2.9, just below the confluence with Mill Creek).

Redds

The 2016 season was a difficult one for the documentation of redds. Surveys on the mainstem Index Reaches 9 through 16 do not involve marking redds with flagging due to landowner preference. As a result all visible redds are counted on each survey and positional information, in the form of GPS coordinates, is collected once (sometimes twice) during the season at the peak of spawning. This year there was a sufficient amount of spawning documented on October 24th 2016 that GPS coordinates were scheduled to be collected the following week. However, a storm event increased flows to the extent that surveys had to be postponed until November 4th 2016 after which previously constructed redds were no longer visible for documentation. From that point on, coordinates were taken for all redds on each survey however, spawning had noticeably subsided. Therefore, the Siskiyou RCD is able to provide counts of new redds encountered each survey day but positional information is not inclusive enough to allow for mapping (Appendix A).

Surveys were conducted on 15.5 miles of the Scott River mainstem covering the Index Reaches 9 and 11 – 16. There was a moderate amount of spawning observed within index reaches 13-15 (Eller Lane to Fay Lane) with spawning densities increasing upstream (Table 2).

Surveys conducted on tributaries to the Scott River are handled differently; GPS coordinates are collected on every survey where permitted by landowners to alleviate double counting and interference between species.

The first survey conducted on Shackleford Creek occurred on November 18th 2016 and was complicated by evidence of spawning from both Chinook and coho salmon. Surveyors considered dimensions,

gravel size and habitat characteristics to differentiate redds by species but some could not be allocated with certainty. Of the 13 redds identified that day, 8 were attributed to Chinook salmon (Table 3), the

Valley Reach	Total Number of Redds Surveyed
9	1
10	Not Surveyed
11 (partial access)	0
12 (partial access)	0
13	11
14	16
15	61
16 (partial access)	2
Total	91

*number reported is the maximum redds recorded on a single survey day (10-24-16)

Tributary	Total Number of Redds Surveyed
Shackleford Creek	8
French Creek	2
Sugar Creek	0
Total	10

most upstream of which was located at river mile 2.4. There were no subsequent Chinook redds encountered on the tributary during the season.

A total of two redds on French Creek were attributed to Chinook salmon, one at river mile 0.1 and the other at river mile 1.9 (Table 3). A live fish was encountered in the vicinity of the redd near Wolford Slough.

No evidence of Chinook spawning was documented on Sugar Creek (Table 3).

Conclusions

Since 1978, the natural Chinook escapement into the Scott River has ranged from 14,477 fish (1995) to 467 fish (2004) (Knechtle and Chesney 2017, preliminary data). The 2016 run ranks third lowest on record. Chinook spawning throughout the valley reaches of the Scott River was noticeably low during season; surveyors walking reaches 12 through 14 reported very few habitat units being utilized compared with past years.

Unfortunately, this small brood year was further disadvantaged by consistent high water from October through March, which was punctuated by several substantial peaks. The first of these occurred on October 31st after the majority of the seasons redds had been identified and although flows only reached 2,360 cfs that was sufficient to completely destroy any evidence of previously utilized spawning sites (USGS 2016, preliminary data). There were some additional redds that were observed by surveyors up through the first week of December (and it is possible that others were constructed even later into the season and went undocumented) but spawning was not nearly to the extent that was found in mid-October. Subsequent peak flows such as those on December 15th (6,930 cfs), January 9th (4,770 cfs), and February 10th (16,100 cfs) further redistributed the streambed (USGS 2016, preliminary data).

It is likely that the low adult returns coupled with repeated high water events adversely impacted the abundance of the 2016 brood year of fall-Chinook salmon on the Scott River.

References

- Knechtle, M. and Chesney, D. 2017. 2016 Scott River Salmon Studies Final Report. California Department of Fish and Wildlife, Northern Region. Available at 1625 South Main Street Yreka Ca. 96097
- U.S. Geological Survey (USGS). 2016. Discharge records for Scott River Gage 11519500 near Fort Jones. (data was identified to be preliminary at time of retrieval)
http://waterdata.usgs.gov/usa/nwis/inventory/?site_no=11519500&agency_cd=USGS

Addendix A. Summary of Chinook Spawning Ground Surveys Completed by the Siskiyou Resource Conservation District, 2016 Fall Run

Date	Stream	Reach	Lives	Redds	Carcasses	Carcasses	Notes
					Inventoried	Sampled	
10/12/2016	Scott River	9 partial	0	0	0	0	complete connectivity through Oro Fino, additional trout observations made
10/19/2016	Scott River	9	0	0	0	0	visibility limited observations
10/19/2016	Scott River	11 partial	2	0	0	0	
10/20/2016	Scott River	12	4	NR	0	0	
10/20/2016	Scott River	13	11	NR	0	0	live pacific lamprey
10/20/2016	Scott River	14	18	0	0	0	+8 partial/incomplete redds
10/20/2016	Scott River	15	31	0	0	0	+13 partial/incomplete redds
10/24/2016	Scott River	12	10	NR	0	0	several redd test sites
10/24/2016	Scott River	13	14	8	0	0	active spawning
10/24/2016	Scott River	14	30	15	2	2	
10/24/2016	Scott River	15	77	44	0	0	+10 partial/incomplete redds
10/26/2016	Scott River	9 partial	1	1	0	0	
10/27/2016	Scott River	12	2	NR	0	0	visibility limited observations
10/27/2016	Scott River	13	0	NR	0	0	visibility limited observations
10/27/2016	Scott River	14	5	NR	1	1	visibility limited observations
10/27/2016	Scott River	15 partial	2	NR	0	0	visibility limited observations, only surveyed to French Creek
10/28/2016	Scott River	11 partial	1	0	0	0	visibility limited observations
11/1/2016	French Creek	Lower	1	1	0	0	
11/1/2016	Sugar Creek	Lower	0	0	0	0	
11/1/2016	French Creek	partial	0	0	0	0	Miners Cr. Bridge to Hwy 3
11/4/2016	Scott River	15	20	3	6	6	previously constructed redds no longer visible
11/4/2016	Scott River	14 partial	2	0	5	5	previously constructed redds no longer visible
11/7/2016	Scott River	12	3	NR	7	5	
11/7/2016	Scott River	13	2	NR	14	11	pacific lamprey carcass recovered, previously constructed redds no longer visible, additional trout observations made
11/7/2016	Scott River	14	3	NR	6	6	
11/7/2016	Scott River	15	12	1	2	2	
11/9/2016	Scott River	11 partial	0	0	0	0	
11/9/2016	Scott River	9 partial	1	0	1	1	
11/10/2016	Scott River	12	0	NR	0	0	
11/10/2016	Scott River	13	7	3	6	5	
11/10/2016	Scott River	14	4	1	1	1	
11/10/2016	Scott River	15	11	7	3	2	additional coho observations made - first live pair identified
11/11/2016	French Creek	Lower	0	0	0	0	
11/11/2016	Sugar Creek	Lower	0	0	0	0	
11/11/2016	French Creek	partial	0	0	0	0	additional coho observations made
11/11/2016	Sugar Creek	partial	0	0	0	0	
11/14/2016	Scott River	12	1	NR	2	2	

Addendix A. Summary of Chinook Spawning Ground Surveys Completed by the Siskiyou Resource Conservation District, 2016 Fall Run

Date	Stream	Reach	Lives	Redds	Carcasses		Notes
					Inventoried	Sampled	
11/14/2016	Scott River	13	1 unk	NR	4	4	
11/14/2016	Scott River	14	1	0	3	3	
11/14/2016	Scott River	15	4	1	7	7	+ 1 partial/incomplete redd, additional unk lives
11/16/2016	Scott River	11 partial	0	0	0	0	
11/16/2016	Scott River	9 partial	1 unk	0	2	2	
11/16/2016	French Creek	Lower	0	0	0	0	additional coho observations made
11/16/2016	French Creek	Middle	0	1	0	0	additional coho observations made
11/17/2016	Scott River	14	1	0	1	1	
11/18/2016	Scott River	12	2 unk	NR	0	0	
11/18/2016	Scott River	13	1	NR	1	1	
11/18/2016	Shackleford Creek	Lower	1 unk	2	2	2	additional coho observations made
11/18/2016	Shackleford Creek	Middle	2 unk	6	1	1	additional coho observations made
11/21/2016	Scott River	12	0	0	0	0	
11/21/2016	Scott River	13	0	0	1	1	
11/21/2016	Scott River	14	0	0	1	1	adipose fin clipped KS recovered
11/21/2016	Scott River	15	0	0	0	0	
11/22/2016	Scott River	16 partial	0	0	3	3	additional coho observations made
12/1/2016	Shackleford Creek	Lower	0	0	1	1	additional coho observations made
12/1/2016	Shackleford Creek	Middle	0	0	2	1	additional coho observations made
12/5/2016	Scott River	15 partial	1 unk	4	1	1	additional coho observations made
12/5/2016	Scott River	16, partial	1 unk	2	1	0	additional coho observations made
12/6/2016	Scott River	15 partial	0	1	0	0	additional coho observations made
12/8/2016	Shackleford Creek	Middle	0	0	2	0	
12/12/2016	Shackleford Creek	Lower	1 unk	0	1	1	fresh carcass
12/19/2016	Shackleford Creek	Lower	0	0	0	0	
12/19/2016	Shackleford Creek	Middle	0	0	1	1	fresh carcass

NR = Not Recorded

Total 282 101 91 80

Appendix B. Summary of Chinook Carcasses Recovered by the Siskiyou Resource Conservation District, 2016 Fall Run

#	Date	Stream	Reach	FL	Sex	Spawned?	Ad Clip	Sample Number	Biological	Comments
									Samples	
1	10/24/2016	Scott River	14	82	M		N	sc-102416-R14-01	STO	
2	10/24/2016	Scott River	14	84	M		N	sc-102416-R14-02	S	
3	10/27/2016	Scott River	14	79	M		N	sc-102716-R14-01	STO	
4	11/4/2016	Scott River	15	76	F	Y	N	sc-110416-R15-01	STO	
5	11/4/2016	Scott River	15	74	M		N	sc-110416-R15-02	S	
6	11/4/2016	Scott River	15		M		N	sc-110416-R15-03	S	Predation - no cranium
7	11/4/2016	Scott River	15	81	F	Y	N	sc-110416-R15-04	S	
8	11/4/2016	Scott River	15	77	F	Y	N	sc-110416-R15-05	S	
9	11/4/2016	Scott River	15	73	F	Y	N	sc-110416-R15-06	S	
10	11/4/2016	Scott River	14	72	F	Y	N	sc-110416-R14-01	STO	
11	11/4/2016	Scott River	14	71	F	Y	N	sc-110416-R14-02	S	
12	11/4/2016	Scott River	14	77	F	Y	N	sc-110416-R14-03	S	
13	11/4/2016	Scott River	14	69	F	Y	N	sc-110416-R14-04	S	
14	11/4/2016	Scott River	14	72	M		N	sc-110416-R14-05	S	
15	11/7/2016	Scott River	15	76	F	Y	N	sc-110716-R15-01	STO	
16	11/7/2016	Scott River	15	61	F	Y	N	sc-110716-R15-02	S	
17	11/7/2016	Scott River	14	67	M		N	sc-110716-R14-01	STO	
18	11/7/2016	Scott River	14	83	M		N	sc-110716-R14-02	S	
19	11/7/2016	Scott River	14	72	F	Y	N	sc-110716-R14-03	S	
20	11/7/2016	Scott River	14	77	F	Y	N	sc-110716-R14-04	S	
21	11/7/2016	Scott River	14	76	F	Y	N	sc-110716-R14-05	S	
22	11/7/2016	Scott River	14	83	M		N	sc-110716-R14-06	S	
23	11/7/2016	Scott River	13	62	F	Y	N	sc-110716-R13-01	STO	
24	11/7/2016	Scott River	13	54	M		N	sc-110716-R13-02	STO	
25	11/7/2016	Scott River	13	91	M		N	sc-110716-R13-03	S	
26	11/7/2016	Scott River	13	80	F	Y	N	sc-110716-R13-04	S	
27	11/7/2016	Scott River	13	77	M		N	sc-110716-R13-05	S	
28	11/7/2016	Scott River	13	56	M		N	sc-110716-R13-06	S	
29	11/7/2016	Scott River	13	81	F	Y	N	sc-110716-R13-07	S	

Appendix B. Summary of Chinook Carcasses Recovered by the Siskiyou Resource Conservation District, 2016 Fall Run

#	Date	Stream	Reach	FL	Sex	Spawned?	Ad Clip	Sample Number	Biological	Comments
									Samples	
30	11/7/2016	Scott River	13							Remnant
31	11/7/2016	Scott River	13	88	M		N	sc-110716-R13-08	S	
32	11/7/2016	Scott River	13	64	F	Y	N	sc-110716-R13-09	S	
33	11/7/2016	Scott River	13	69	F	Y	N	sc-110716-R13-10	S	
34	11/7/2016	Scott River	13	74	F	Y	N	sc-110716-R13-11	S	
35	11/7/2016	Scott River	13							Remnant
36	11/7/2016	Scott River	13							Remnant
37	11/7/2016	Scott River	12	75	F	Y	N	sc-110716-R12-01	STO	
38	11/7/2016	Scott River	12	84	F	Y	N	sc-110716-R12-02	S	
39	11/7/2016	Scott River	12	91	F	Y	N	sc-110716-R12-03	S	
40	11/7/2016	Scott River	12	72	F	Y	N	sc-110716-R12-04	S	
41	11/7/2016	Scott River	12	80	F	Y	N	sc-110716-R12-05	S	
42	11/7/2016	Scott River	12							Remnant
43	11/7/2016	Scott River	12							Remnant
44	11/9/2016	Scott River	9	71	F	Y	N	sc-110916-R9-01	STO	
45	11/10/2016	Scott River	15	73	F	Y	N	sc-111016-R15-01	STO	
46	11/10/2016	Scott River	15		F?					Complete predation
47	11/10/2016	Scott River	15	72	F	Y	N	sc-111016-R15-02	S	
48	11/10/2016	Scott River	14	76	F	Y	N	sc-111016-R14-01	STO	
49	11/10/2016	Scott River	13	91	M		N	sc-111016-R13-01	STO	
50	11/10/2016	Scott River	13	75	F	Y	N	sc-111016-R13-02	S	
51	11/10/2016	Scott River	13							Remnant
52	11/10/2016	Scott River	13	86	F	Y	N	sc-111016-R13-03	S	
53	11/10/2016	Scott River	13	51	M		N	sc-111016-R13-04	S	
54	11/10/2016	Scott River	13	75	F	Y	N	sc-111016-R13-05	S	
55	11/14/2016	Scott River	15	78	M		N	sc-111416-R15-01	STO	
56	11/14/2016	Scott River	15	76	F	Y	UNK	sc-111416-R15-02	S	Predation - estimated FL, adipose fin eaten

Appendix B. Summary of Chinook Carcasses Recovered by the Siskiyou Resource Conservation District, 2016 Fall Run

#	Date	Stream	Reach	FL	Sex	Spawned?	Ad Clip	Sample Number	Biological	Comments
									Samples	
57	11/14/2016	Scott River	15	83	M		N	sc-111416-R15-03	S	
58	11/14/2016	Scott River	15	74	F	Y	N	sc-111416-R15-04	S	
59	11/14/2016	Scott River	15	61	M		N	sc-111416-R15-05	S	
60	11/14/2016	Scott River	15	76	F	Y	N	sc-111416-R15-06	S	
61	11/14/2016	Scott River	15	56	M		N	sc-111416-R15-07	S	
62	11/14/2016	Scott River	14	73	F	Y	N	sc-111416-R14-01	STO	
63	11/14/2016	Scott River	14	74	F	Y	N	sc-111416-R14-02	S	
64	11/14/2016	Scott River	14	70	F	Y	N	sc-111416-R14-03	S	
65	11/14/2016	Scott River	12	73	F	Y	N	sc-111416-R12-01	STO	
66	11/14/2016	Scott River	12	86	M		N	sc-111416-R12-02	S	
67	11/14/2016	Scott River	13	88	M		N	sc-111416-R13-01	STO	
68	11/14/2016	Scott River	13	75	F	Y	N	sc-111416-R13-02	S	
69	11/14/2016	Scott River	13	72	F	Y	N	sc-111416-R13-03	S	
70	11/14/2016	Scott River	13	73	F	Y	N	sc-111416-R13-04	S	
71	11/16/2016	Scott River	9	81	F	Y	N	sc-111616-R9-01	STO	
72	11/16/2016	Scott River	9	73	F	Y	N	sc-111616-R9-02	S	
73	11/17/2016	Scott River	14	54	M		N	sc-111716-R14-01	STO	
74	11/18/2016	Shackleford	Mid	77	F	Y	N	sh-111816-m-01	STO	
75	11/18/2016	Shackleford	Lower	80	F	Y	N	sh-111816-l-01	STO	
76	11/18/2016	Shackleford	Lower	76	M		N	sh-111816-l-02	S	
77	11/18/2016	Scott River	13	70	F	Y	N	sc-111816-R13-01	STO	
78	11/21/2016	Scott River	14	76	M		Y	sc-112116-R14-01	STO	Head Tag #14110
79	11/21/2016	Scott River	13	78	M		N	sc-112116-R13-01	STO	
80	11/22/2016	Scott River	16	67	F	unk	N	sc-112216-R16-01	STO	
81	11/22/2016	Scott River	16	86	M		N	sc-112216-R16-02	S	
82	11/22/2016	Scott River	16	64	F	Y	N	sc-112216-R16-03	S	
83	12/1/2016	Shackleford	Mid							Remnant
84	12/1/2016	Shackleford	Mid	74	F	Y	N	sh-120116-m-03	STO	

Appendix B. Summary of Chinook Carcasses Recovered by the Siskiyou Resource Conservation District, 2016 Fall Run

#	Date	Stream	Reach	FL	Sex	Spawned?	Ad Clip	Sample Number	Biological	
									Samples	Comments
85	12/1/2016	Shackleford	Lower	78	M		N	sh-120116-l-01	S	
86	12/5/2016	Scott River	16							Remnant
87	12/5/2016	Scott River	15	71	F	Y	N	sc-120516-R15-01	STO	
88	12/8/2016	Shackleford	Mid	82	M		N			Remnant
89	12/8/2016	Shackleford	Mid	78	M		N			carcass deteriorated, no samples
90	12/12/2016	Shackleford	Lower	73	F	Y	N	sh-121216-l-01	STO	
91	12/19/2016	Shackleford	Mid	101	F	Y	N	sh-121916-m-02	STO	