2005 Fall Chinook Salmon Spawning Ground Survey

Klamath National Forest

Prepared by
Tami L. Clayton

Edited by
Jim Kilgore

July 19, 2006

USDA Forest Service
Klamath National Forest
11263 N Highway 3
Fort Jones, CA 96032

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Cooperative spawning ground surveys, between the United States Forest Service (USFS), California Department of Fish and Game (CDFG), Yurok Tribe, Karuk Tribe, Quartz Valley Tribe, Salmon River Restoration Council (SRRC), Scott Valley Resource Conservation District and local schools and volunteers, have occurred on the Klamath National Forest since 1992. In addition to providing information to land managers in regard to where these fish spawn; these surveys are used to estimate the total in-river spawner escapement of fall Chinook salmon (*Oncorhynchus tshawytscha*) by the Klamath Fisheries Management Council and the Pacific Fisheries Management Council in the determination of harvest allocations for the subsequent year.

The Salmon River, Scott River, and other mid-Klamath River (MKR) tributaries are surveyed on an annual basis using both carcass mark-recapture and/or redd count techniques. Redd data is used to make spawner estimations on smaller tributaries, while the mark-recapture technique (& possibly redd counts) are used for population estimations on the Salmon and Scott Rivers. The 2005 cooperative survey began October 13 and ended on November 30. There was a series of storms and high water events during November that forced the cancellation of surveys on the Salmon River, Scott River and other mid-Klamath tributaries.

Based on redd surveys (assuming 2.5 adults/redd), approximately 696 fish returned to the Salmon River (North Fork, South Fork, Mainstem Salmon River, and Wooley Creek), 462 fish returned to the Scott River, and 440 fish returned to miscellaneous mid-Klamath River tributaries in 2005. Estimates are conservative due to the number of surveys cancelled due to stormy weather, elevated river flows, and limited survey access in some reaches on the Scott River and in some MKR tributaries. CDFG estimates, based on mark-recapture technique, will be forthcoming and will refine these original estimates. Based on draft CDFG megatable estimates, year 2005 was the lowest return of wild Chinook salmon to MKR tributaries on record (since initiation of organized surveys and estimates in 1978). Year 2005 was the second lowest return of adult wild Chinook salmon to the Scott and Salmon Rivers in the same time period. These low return numbers (essentially equivalent to 2004 results) follow after record-setting low numbers in 2004 for both the Scott and Salmon Rivers.

INTRODUCTION

Over the past twenty-seven years, the California Department of Fish and Game (CDFG) has determined fall Chinook salmon spawner escapement in the Klamath River watershed, using a combination of weirs, mark-recapture surveys, redd surveys, and hatchery returns information. This data is used in the determination of stock size projections and harvest allocations in the management of Klamath River fall Chinook salmon stocks by the Klamath Fisheries Management Council (KFMC) and the Pacific Fisheries Management Council (PFMC).

CDFG, Six Rivers National Forest (SRNF), and the Klamath National Forest (KNF) (SRNF and KNF are hereafter referred to as the USFS) have conducted Chinook spawner surveys for many years. Since missions differ among agencies, the objectives

for these surveys were always slightly different. The USFS traditionally counted redds and live fish in order to estimate the number and distribution of spawning Chinook salmon. Beginning in 1992, the CDFG and the USFS joined forces to accomplish spawner escapement surveys partially due to shrinking budgets in both State and Federal programs and the desire to increase cooperative operations between agencies. These surveys now include collaboration with the Karuk Tribal Government, Yurok Tribal Government, Quartz Valley Tribal Government, Salmon River Restoration Council, Scott Valley Watershed Council, Siskiyou Resource Conservation District, local volunteers and public schools. The cooperative effort has improved the accuracy of CDFG estimates by enabling surveys that are more extensive and occur more frequently.

For Fiscal Year 2006 (field season beginning in October 2005), a combination of redd and mark-recapture counts were completed in the Salmon River Sub-Basin, Scott River Sub-Basin, and MKR tributaries in order to determine fall Chinook spawner escapement and distribution. For the purposes of this report, all streams located in the mid Klamath region, but located outside of the Salmon and Scott drainages, are referred to as MKR tributaries. This report summarizes the redd count portion of surveys conducted from October 13 to November 30 of 2005 in the KNF and SRNF (Table 1). A separate report (Mega-Table, Appendix A) is being prepared by CDFG biologists for the escapement estimates to be used by the KFMC and PFMC. The 2005 portion of the megatable will be included when this report is finalized by CDFG and available for distribution.

Table 1. 2005 Survey Schedule – Fall Spawn

Survey Week	Scott River Monday	Salmon River Tuesday	Tributaries* Wednesday	Scott River Thursday	Salmon River Friday
Training			10/12	10/13	10/14
1	10/17	10/18	10/19	10/20	10/21
2	10/24	10/25	10/26	10/27	10/28
3	10/31	11/1	11/2	11/3	11/4
4	Cancelled	Cancelled	11/9	11/10	11/11
5	11/14	Cancelled	11/16	11/17	11/18
6	11/21	11/22	Off	Off	Off
7	11/28	Off	Off	Off	Off

*The Salmon River mainstem (3 reaches, below Nordheimer Creek to Klamath River confluence) was surveyed (snorkel dive) for redds 1x/week on the same approximate schedule as the mid-Klamath tributaries.

Table 1. 2005 Survey Schedule for Salmon River, Scott River, and MKR Tributaries.

METHODS

In 2005, redd surveys were conducted on the Salmon River from mile marker 12 on the North Fork (NF) to the confluence with the South Fork (SF), and from Matthews Creek campground on the SF to the confluence with the NF. The mainstem Salmon River from Forks to Nordheimer Creek (Reach 4 – R4) was surveyed twice weekly; however, the other three mainstem Salmon reaches (R1, R2, and R3), from Nordheimer to the Klamath River, were surveyed for redds by snorkel diving approximately one time per week. Redd surveys on the Scott River were conducted from Faye Lane to the

confluence of the Klamath River; however, access or known poor spawning areas, excluded some reaches from being surveyed. Other mid-Klamath tributaries surveyed included: Aikens Creek, Boise Creek, Bluff Creek, Slate Creek, Red Cap Creek, Camp Creek, Wooley Creek (Salmon River tributary), Dillon Creek, Independence Creek, Clear Creek, Elk Creek, Indian Creek, Thompson Creek, Grider Creek, Horse Creek, and Beaver Creek.

The USFS and CDFG held two training sessions for agency employees, Tribal employees, and volunteers. On October 12th, the redd survey/carcass mark-recapture training was held at Indian Scotty Group campground on the Scott River. The same training was held at Petersburg on the South Fork of the Salmon River on October 14th. Topics discussed at the training included redd and fish identification, carcass marking, scale samples, data collection, survey safety procedures, salmonid life cycles, and the use of Petersen mark-recapture estimates.

On the Salmon and Scott Rivers, crews conducted two concurrent surveys on survey reaches, using redd counts and carcass counts. A typical crew consisted of two people. Each crew walked (or dove as the case on 3 reaches of the Salmon River mainstem) two to five miles of river each survey day unless health and safety concerns limited the crew's ability to survey. The number of times a reach was surveyed was directly related to the number of people available on the survey dates. When a lack of available surveyors was a concern, the reaches to be surveyed were determined by the level of activity observed on the prior survey date. Access to private land was also a concern on the Scott River when determining reaches to be surveyed. An attempt was made to have people survey different reaches throughout the week, to reduce estimator bias.

On the Salmon (R4 – R11) and Scott Rivers, each redd was counted and then tallied at the end of the reach. Redds in these areas were not flagged. Redds were mapped once during the season, using a GPS unit or marking a dot on a map. The mapping occurred the first week of November on both the Scott and Salmon Rivers. Based on surveys from past years, this is the approximate peak of the fall Chinook spawning season. The original field maps of redd location are available at the appropriate USFS district office. For example, reach maps for MKR tributaries located in the vicinity of Happy Camp, CA, are on file at the Happy Camp Ranger District Office in Happy Camp. Reach maps for the Scott and Salmon (R4-R11) Rivers are available at the Scott/Salmon Ranger District Office located in Fort Jones, CA. CDFG (Yreka, CA) is also currently compiling reach map information into Arcinfo and these maps for the Scott River are expected to be available in July 2006. The SRRC (Sawyers Bar, CA) also records Salmon River redd location by year in Arcinfo. Table 2 summarizes each reach, including reach number, length of reach, number of times surveyed in 2005, and the number of redds when mapped.

On three reaches of the Salmon River mainstem (R1-R3) and on the other mid-Klamath tributaries (excluding the Scott and the remainder of the Salmon River), each redd was counted once and flagged. The redd numbers given for these will be total redds in that particular reach or creek.

Table 2. Klamath River Tributaries Fall Chinook Spawning Survey Reach Descriptions 2005					
Stream Name	**Reach Name**	**Reach Number**	**Miles**	**# of times Surveyed**	**# of Redds as of…**
Salmon River					**11/01/2005**
Mainstem	Nordheimer Ck to Mouth	1 - 3	13	6	36*
	Forks to Nordheimer	4	4	6	91
North Fork	4 mile to Forks	9	4	5	36
	8 mile to 4 mile	10	4	5	9
	12 mile to 8 mile	11	4	2	Not mapped
South Fork	Henry Bell to Forks	5a	3	9	36
	O'Farrell Gulch to Henry Bell	5b	2	8	17
	Indian Ck to O'Farrell Gulch	6a	3	8	15
	Matthews Ck to Indian Ck	6b	2.2	7	9
Wooley Ck	North Fork Wooley to Mouth		12.6	1	1
Scott River					**11/03/2005**
	Midpoint to Confluence	1	2.5	9	1
	Pat Ford to Midpoint	2	2.5	9	8
	George Allen to Pat Ford	3	3	8	21
	Townsend Gulch to George Allen	4	2.5	9	16
	Kelsey Ck to Townsend Gulch	5	4.2	9	13
	Jones Beach to Kelsey Ck	6	4.6	8	13
	USGS Gauge to Jones Beach	7	3.5		4
	Wilhite's to USGS Gauge	8a	2.5	0	Not surveyed
	Meamber Bridge to Duvall	8b	2.5		36
	Dunlap to Duvall	9	3	0	Not surveyed
	Hwy 3 to Dunlap	10	3	6	11
	Eller Ln. to Hwy 3	11	7	0	Not surveyed
	Sweezy to Eller Ln.	12	2.5	0	Not surveyed
	Horn Ln to Sweezy	13	3	4	2
	Young's Dam to Horn Ln.	14	2	0	Not surveyed
	Fay Ln. to Young's Dam	15	3.5	1	Not mapped
Mid-Klamath (MKR) Tributaries					**Total Redds**
Dillon Ck	Mill Ck to Mouth			3	15
Clear Ck	Slippery RA to Mouth			5	46
	0.25 Miles above Slippery RA to Slippery RA			1	3
Elk Ck	5MB to Water Plant			4	17
	Twins Ck to 5MB			4	3
	Doolittle to Twins Ck			5	11
	Bear Ck to Doolittle			2	0
	Bear Ck to 11 Mile Bridge			2	0
	11 Mile Bridge to Doolittle			2	2
Grider Ck	No Name to Mouth			4	10
	Bark Shanty to Mouth			2	0
	Trib river left to Mouth			1	0
Thompson Ck	2.0 Mi. to Mouth			2	1
Independence	Mine to Mouth			1	1
Beaver Ck	Forks to 2 Mile			1	3

Table 2. Klamath River Tributaries Fall Chinook Spawning Survey Reach Descriptions 2005					
Stream Name	**Reach Name**	**Reach Number**	**Miles**	**# of times Surveyed**	**# of Redds as of…**
	2 Mile to Mouth			1	0
Horse Ck	4 Mile Bridge to 2 Mile Br.			1	0
	2 Mile Bridge to Mouth			2	0
Indian Ck	West Branch to private			1	1
	SF Confl. to Buchanan			1	5
	Buchanan Falls to Mouth			1	3
Aikens Ck	Bridge to Mouth			3	0
Bluff Ck	Dragon to Wrights			2	0
	Wrights to Mouth			2	0
Boise Ck	10N47 to Mouth			4	0
Camp Ck	Head Camp to Third			1	2
	Third to Hatchery			3	19
	Hatchery to Mouth			5	11
Red Camp Ck	Barrier to Schnable			1	0
	Schnable to Bridge			4	4
	Bridge to Larson's			6	9
	Larson's to Mouth			5	0
Slate Ck	½ Mile Ck to Mouth			2	0

*The last date of surveying on the lower 3 reaches of the Salmon River mainstem was the week of November 20, 2005.

Table 2. Klamath River Tributaries, Fall Chinook Spawning Survey Reach Descriptions 2005.

Population estimations were then made based on the redd counts for the Salmon and Scott Rivers. The number of redds counted during the peak of the spawn, or the day redds were mapped, was multiplied by 2 and 2.5 (assuming this many fish per redd). The total live count obtained on the date that the mapping was completed was multiplied by .3 and then added into the estimate. Thirty percent (30%) of the live fish count on the mapping day (also the last survey date before onset of the early, large November storm) in the Scott and Salmon Rivers (but not in the other MKR tributaries) was added to the redd count estimation for following reasons: 1) most live fish counted on mapping day were already affiliated with redds, that is their contribution to the 2005 population estimate was already represented by a counted redd, 2) previous survey years indicate that peak spawning occurs approximately through the first week of November but some decreasing spawning activity occurs throughout November, and 3) 2005 survey results (Appendix D) indicate that the same process described in #2 occurred in 2005. The 30% figure represents that portion of the live fish counted in early November that were not yet affiliated with a constructed redd and these were fish that would construct redds later in November. The same basic method was used for mid-Klamath tributaries, however there were total redd numbers available due to flagging of the sites (old and new redds could be easily distinguished), therefore the total number of redds was multiplied by 2 and 2.5 and then the total number of lives on the last survey was added into the estimate. (Adding the total number of live fish on the last survey to the MKR estimate likely improves the estimate when the last survey was conducted early in the spawning season and not all fish were associated with redds but less accuracy is obtained when the last survey was conducted late in the spawning season, with most fish being associated with redds. Survey end dates were variable by stream but due to

the overall low number of live fish involved, all live fish encountered on the last survey date were added to the estimate). Table 3 below shows fish to redd ratios for past surveys on the Scott River and at least for the Scott system, fish-to-redd ratios of 2 and 2.5 are conservative.

1999-2003 Fish : Redd Ratios			
Year	# of Redds – Scott River	Run Size Estimate – Scott River	Fish:Redd ratio
1999	1029	3584	3.5
2000	1725	6253	3.6
2001	943	6142	6.5
2002	1000	4308	4.3
2003	1891	12053	6.4

Table 3. 1999-2003 Fish: Redd Ratios for the Scott River (Run size estimate is from CDFG Mega-Table, appendix A).

RESULTS

Salmon River

The Salmon River reached the peak of spawning or the most amount of redds at one time for the period of surveying on November 1, 2005 (Figure 1). Redds in reaches 4-6b, 9 and 10 were mapped on this day. There was a total of 213 redds found on November 1, 2005 in seven reaches; however, reach 11 was not done on this day due to lack of personnel. Redds totaled 256 for the entire Salmon River system when the data for the Lower Salmon River mainstem (R1-R3) and Wooley Creek were added. A redd table for the Salmon River organized by reaches and dates is in appendix D. The survey effort was affected by amount of surveyors' available, weather, and flows. An early winter storm hit the Klamath River Basin on November 3rd – 7th causing flows too high to conduct safe surveys. The higher flows cancelled or limited surveys on the Salmon River until nearly the end of surveys, November 22nd. A chart of flows from the USGS gauge near Somes Bar can be seen in appendix B for the time period during the fall Chinook redd surveys.

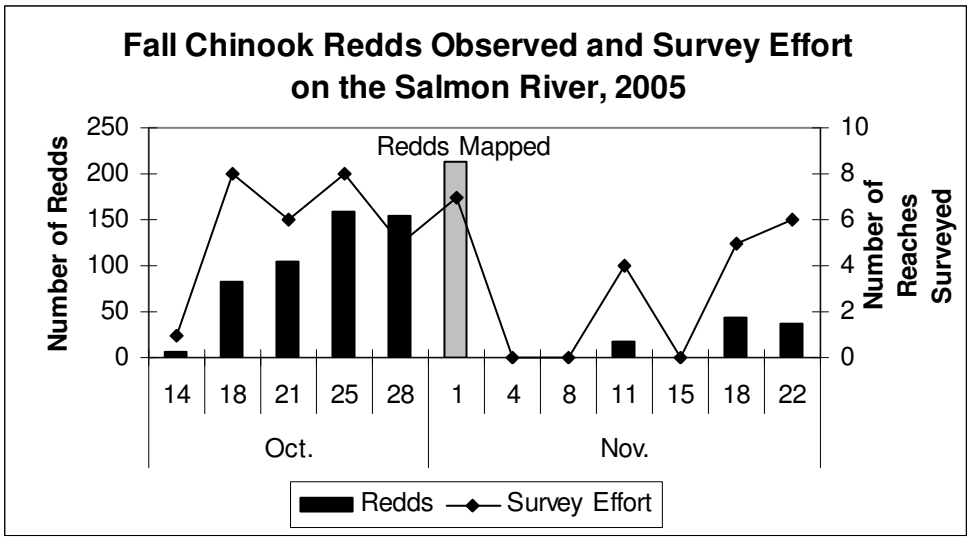


Figure 1. Fall Chinook Redds Observed and Survey Effort on the Salmon River (R4-R11), 2005. (Redds on Mainstem Salmon River below Nordheimer Creek are not included.)

Based on redd data, the Salmon River is estimated to have had about 568 (2 fish/redd) or 696 (2.5 fish/redd) Chinook salmon return in the fall 2005 (Table 4). Based on draft mega-table results, this is the second lowest run estimated on the Salmon River since 1978 (Figure 2). The lowest run estimate was in 2004, with 333 Chinook returning to the Salmon River (Appendix A).

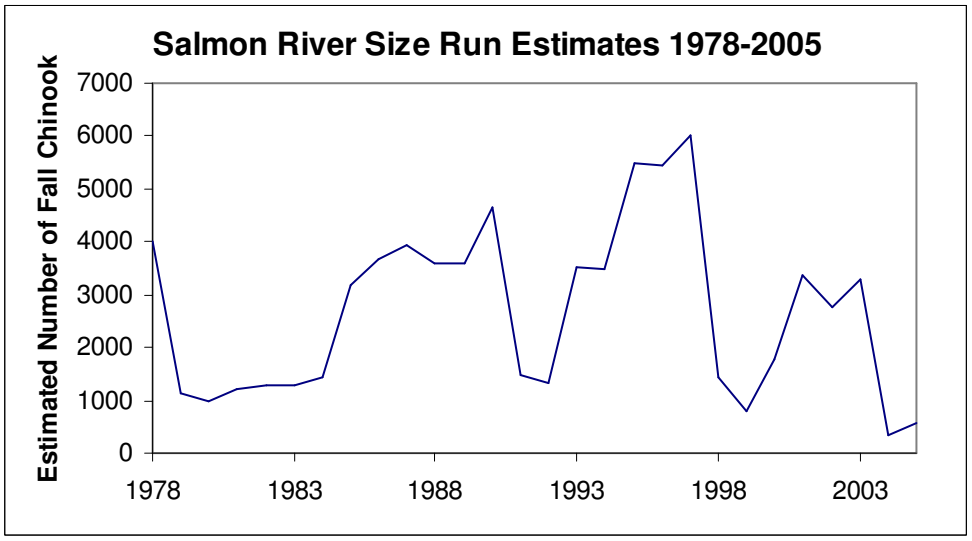


Figure 2. Salmon River Run Size Estimates 1978-2005.

Scott River

Based on available data, the Scott River reached the peak of spawning (or the most amount of redds at one time) on November 3, 2005 (Figure 3). Redds in reaches 1-7,

8b, 10 and 13 were mapped on this day. There was a total of 160 redds found on November 3, 2005. There was a total of 77 reaches, or 245 miles, surveyed in 2005. A redd table for the Scott River organized by reaches and dates is in appendix D. The survey effort on the Scott River was also affected by the amount of surveyors' available, weather, and flows. The same storm that hit the Salmon River sub-basin also affected the Scott River sub-basin. Similarly, surveys had to be cancelled or limited on the Scott River for crew safety. A USGS flow chart for the Scott River at Fort Jones can be seen in appendix B.

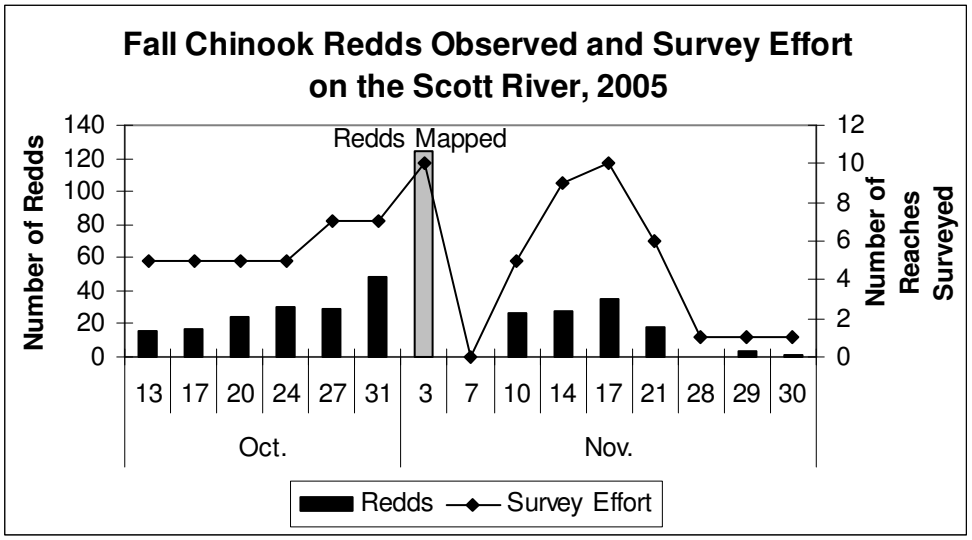


Figure 3. Fall Chinook Redds Observed and Survey Effort on the Scott River, 2005.

The Scott River is estimated to have had 382 (2 fish/redd) or 462 (2.5 fish/redd) Chinook salmon return in the fall 2005 (Table 4). Just like the Salmon River, this is the second lowest run (approximate) estimated on the Scott River since 1978 (Figure 4). The lowest run estimate was in 2004, with 438 Chinook returning to the Scott River. Similar to the situation in the Salmon River, the 2004 and 2005 fall Chinook spawning runs in the Scott River, were very low and essentially the same in magnitude.

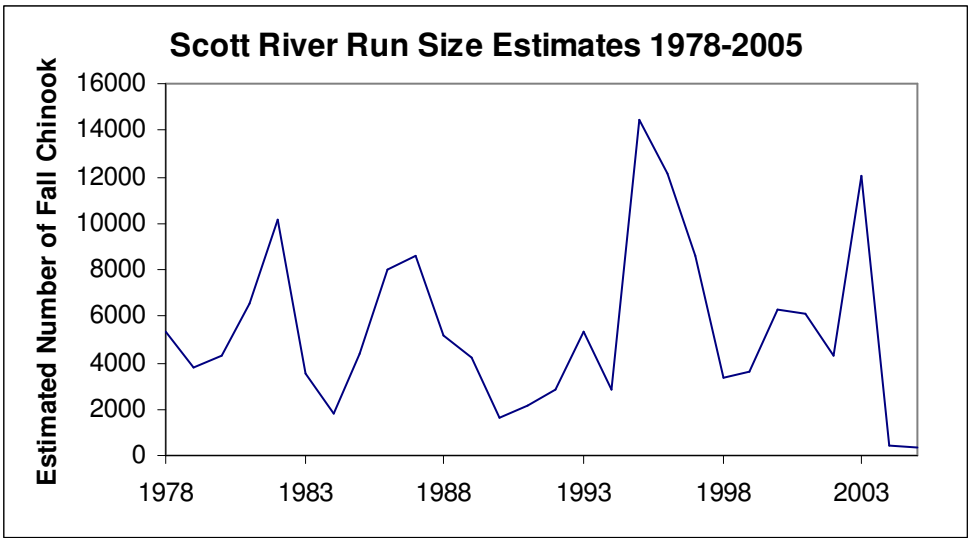


Figure 4. Scott River Run Size Estimate 1978-2005.

Mid-Klamath (MKR) Tributaries

Dates of redd surveys for MKR tributaries varied by stream and survey summaries (dates with number of lives and redds – all by reach) are in Appendix D after the Salmon River Summary, starting with the Aikens Creek data. Total redds per stream (and the number of live fish observed on the last survey) are summarized in Table 4 below.

Fall Chinook Redds and Live Fish – Mid Klamath Tributaries 2005		
Tributary Streams Orleans Area	**Total Redds**	**Live Adults – Last Survey**
Aikens	0	0
Bluff	0	0
Boise	0	0
Camp	32	0
Red Cap	13	1
Slate	0	0
L. Salmon River*	36	33
Wooley*	7	1
Tributary Streams Happy Camp Area		
Beaver	3	3
Clear	49	3
Dillon	15	2
Elk	33	0
Grider	10	1
Horse	0	0
Independence	1	0

Fall Chinook Redds and Live Fish – Mid Klamath Tributaries 2005, cont.		
Tributary Streams Happy Camp Area	**Total Redds**	**Live Adults – Last Survey**
Indian	9	15
Thompson	1	0
Totals	**209**	**59**

*Lower Salmon and Wooley Creek are part of the Salmon River subbasin but are included in this table to denote survey responsibilities. Redd and live fish totals for the L. Salmon and Wooley Creek are included in population estimates for the entire Salmon River (see table below). The Happy Camp fisheries crew assisted the Orleans crew in surveying the lower Salmon and Wooley Creek.

Table 4. MKR Tributaries – Total observed redds and last survey live counts.

MKR tributaries (excluding Lower Salmon and Wooley) that recorded greater than 9 redds in 2005 were Camp, Red Cap, Clear, Dillon, Elk, Grider, and Indian Creeks. The same storms in November that hampered survey efforts in the Scott and Salmon Rivers also hampered efforts in the MKR tributaries. However, due to flagging of the redds, more confidence is able to placed in the total redd numbers derived from tributary surveys. Portions of Indian Creek (1/2 mile) and Elk Creek (1/3 mile) were not surveyed in 2005 due to limited access on private property. Happy Camp surveys on MKR tributaries, from Dillon Creek north, recorded also that adult steelhead trout were observed in most of the streams except Horse and Independence Creeks. In addition, five adult coho salmon (*O. kisutch*) were observed in Elk Creek on the 11/16/05 survey of the index section near Cougar Creek. One coho salmon and one coho salmon Redd were in Cougar Creek within the floodprone zone of Elk Creek.

2005 Redd Summary and Population Estimate (Salmon, Scott, and MKR Tributaries)

Salmon, Scott, and MKR Tributaries 2005 Run Size Estimate from Redd Surveys				
Location	**Total Redds Observed**	**Number of Live Fish Observed**	**(Redds x 2) + (.3 x Live Fish Count)**	**(Redds x 2.5) + (.3 x Live Fish Count)**
Salmon River*	11/01/2005 256 Redds	11/01/2005 184 Lives	568	696
Scott River	11/03/2005 160 Redds	11/03/2005 205 Lives	382	462
Tributaries	Variable Dates 166 Redds	Variable Dates 25 Lives	357 (entire # of lives added)	440 (entire # of lives added)

Table 5. Klamath River Tributaries, 2005 Run Size Estimate from Redd Surveys.
*Includes Wooley Creek, Lower Salmon River Mainstem (R1-R4), and all Salmon River reaches on NF and SF.

Recorded Temperatures in the Scott River during the 2005 fall spawn period

Water temperatures strongly influence salmon run and spawning, with an optimal spawning temperature for fall Chinook of 5.6 – 13.9°C (Meehan 1991). Spawning can occur at other temperatures; however mortality increases outside of this range. Water temperature data is available for certain reaches on the Scott River during the first half of the 2005 survey (Table 5).

2005 Scott River Maximum Daily Temperature					
Month	**Date**	**Reach 1**	**Reach 5**	**Reach 6**	**Reach 7**
Oct.	13	15.52	13.42	14.18	15.36
	17	14.82	12.72	13.56	14.73
	20	14.47	12.36	12.79	13.95
	24	13.42	12.36	12.79	14.11
	27	11.29	10.58	10.77	11.33
	31	11.29	N/A	N/A	N/A
Nov.	3	8.77	N/A	N/A	N/A
	7	8.41	N/A	N/A	N/A
	10	8.41	N/A	N/A	N/A

Table 6. 2005 Scott River Maximum Daily Temperatures.

DISCUSSION

A series of storms in November had both positive and negative effects for the fall Chinook spawn in the Salmon and Scott Rivers sub-basins and in the MKR tributaries. A storm in the beginning of November caused flows to reach over 4,000 cubic feet per second (cfs) and 600 cfs in the Salmon and Scott Rivers, respectively. The higher flows allowed access to spawning areas that had previously been closed off because of low flow. The Chinook in the Scott River sub-basin had access to valley reaches, the East Fork (EF), and the South Fork (SF) of the Scott River. The EF and SF of the Scott River are only accessed during higher flow years. The salmon were also able to access tributaries that are often not available, such as Shackleford Creek. Unfortunately, it is unknown how extensively the fish used or didn't use some of these tributaries and the EF and SF of the Scott as they were not surveyed. A similar situation occurred on the Salmon River of higher flows likely allowing fall Chinook into the upper portions of the NF and SF Salmon River; however reaches were not surveyed above Matthews Creek on the SF and above R11 on the NF.

The storm during the first week of November coincided with the peak of the spawn. Mapping of redds occurred just prior to the storm, however it was raining the day the Scott River was mapped, which lowered visibility. It was fortunate that mapping occurred before the storm, as redds had been flattened out and the river bottom had been scoured during the high flows. Redds were not flagged throughout the survey this season, but flagging would have been imperative for an accurate redd estimation if the mapping was done after the storm. Flagging would have also been useful as older redds or pre-storm redds became harder to detect later in the season. For these reasons, it is

recommended that redds be flagged in the future.

After redd surveys ended on November 30, 2005, another storm hit the mid Klamath region. The Salmon River experienced flows of nearly 12,000 cfs on December 1st at the confluence with the Klamath River (Appendix B). These extremely high flows should be noted as they may have impacted the survival of eggs in redds, especially on the Salmon River.

The redd estimations in this report are very conservative estimations. There were many reaches that weren't surveyed either at all or on designated survey days throughout the fall spawn and, as a result, this information is not available for inclusion in the redd count. Surveys for Wooley Creek and some other MKR tributaries were able to be done only once (Indian, Independence, Horse, and Beaver). Redd identification became increasingly difficult after the first episode of high flows in early November. For this reason, many older redds were likely not counted after the storm. The assumption of two or two and a half fish per redd can also be viewed as leaning on the conservative side. Fish to redd ratios from previous years are generally much higher, one year as high as 6.5 fish per redd (Table 3). However, these ratios vary greatly from year to year and have many factors influencing them.

Several variables are likely contributing to the low Chinook runs for the past two years. Disease incidence has been significant in salmonid juveniles in the Klamath River. The California-Nevada Fish Health Center (USFWS) found 45% of Chinook juveniles in the Lower Klamath River to be infected with *Ceratomxya shasta* in summer of 2004. Once infected with this parasite the majority of the fish will not survive (Nichols and Foote 2005). In addition to C. shasta infecting the juveniles, the parasite, *Ichthyophthirius multifiliis* (Ich), and the bacteria, *Flavobacterium columnare* (Columnaris disease/gill rot), have had great impacts on the adult Chinook population in the Klamath River basin. Pre-spawn mortalities may be associated with these pathogens, as in the fish kill of September 2002 in which over 33,000 adult Chinook died (Foote 2003).

The Salmon and Scott Rivers are listed as impaired by California State Water Quality Control Board for high temperatures. The high end of the range for water temperature for optimal spawning is 13.9°C. Temperatures in the Scott River exceed this range for the first two weeks of the fall surveys (Table 5). It may be beneficial in the future to examine water temperature in tributaries of the Klamath as a possible limiting factor for the fall Chinook spawn.

Conclusion: Fall Chinook population estimates based on redd surveys during the 2005 season have limitations that resulted from weather events and increased river flows that prevented timely surveying. Likewise, lack of redd flagging in the Salmon and Scott systems precluded rigid determination of the date of redd creation in many situations, especially after the large storm that occurred in early November, 2005. Population estimates from redd surveys will no doubt vary from final population estimates derived from mark and recapture methodology as recorded in CDFG's megatable for the Scott and Salmon systems. However, accurate population determination based on the mark and recapture methodology also likely suffered due to weather and flow events that prevented timely recovery of tags. Likewise, the very small run size in 2005 also prevented putting out enough tags (marks) to facilitate recapture. However, both

processes (mark and recapture, redd surveys) indicate the alarmingly low wild fall Chinook salmon returns for the last two years (2004 and 2005) in the mid Klamath region. The steadily decreasing numbers of fall Chinook in the Klamath River Basin needs to be studied more extensively and appropriate actions undertaken. A strong collaborative effort between agencies, landowners, tribes, anglers and commercial fishermen will be necessary to return the Klamath River Basin back to its past recognition as one of the largest salmon producing rivers on the Pacific Coast.

Literature Cited

DFG (California Department of Fish and Game). 2005. Klamath Basin Cooperative Spawning Ground Survey, 2005 Training Manual.

DFG (California Department of Fish and Game). 2003. September 2002 Klamath River Fish Kill: Preliminary Analysis of Contributing Factors. California Department of Fish and Game, Northern California – North Coast Region. 67 pp.

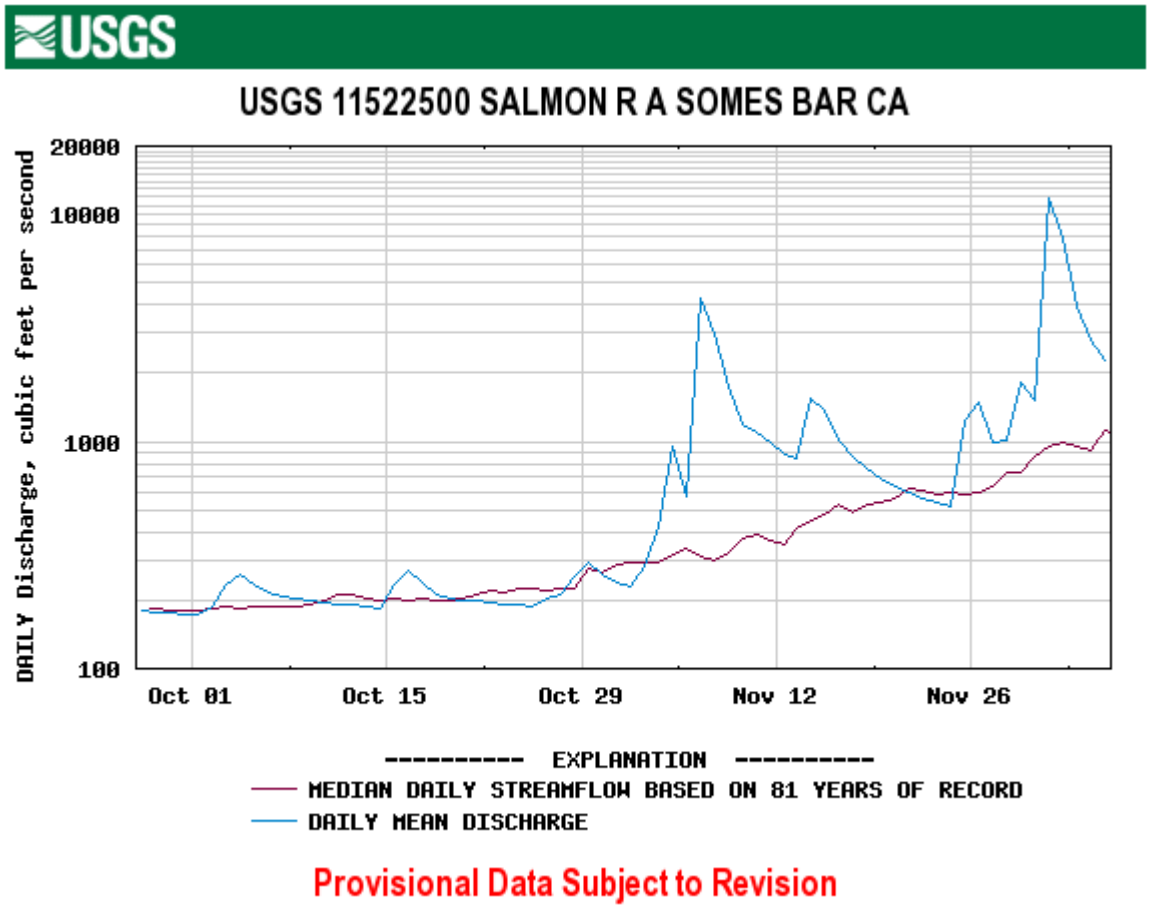
Foote, J.S. 2003. Health Monitoring of adult Fall-run Chinook Salmon in the lower Klamath River, August – October 2003. US Fish and Wildlife Service, California – Nevada Fish Health Center, Anderson, CA. 7p.

Meehan, William R. 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. United States Forest Service. Bethesda, Maryland. p.91.

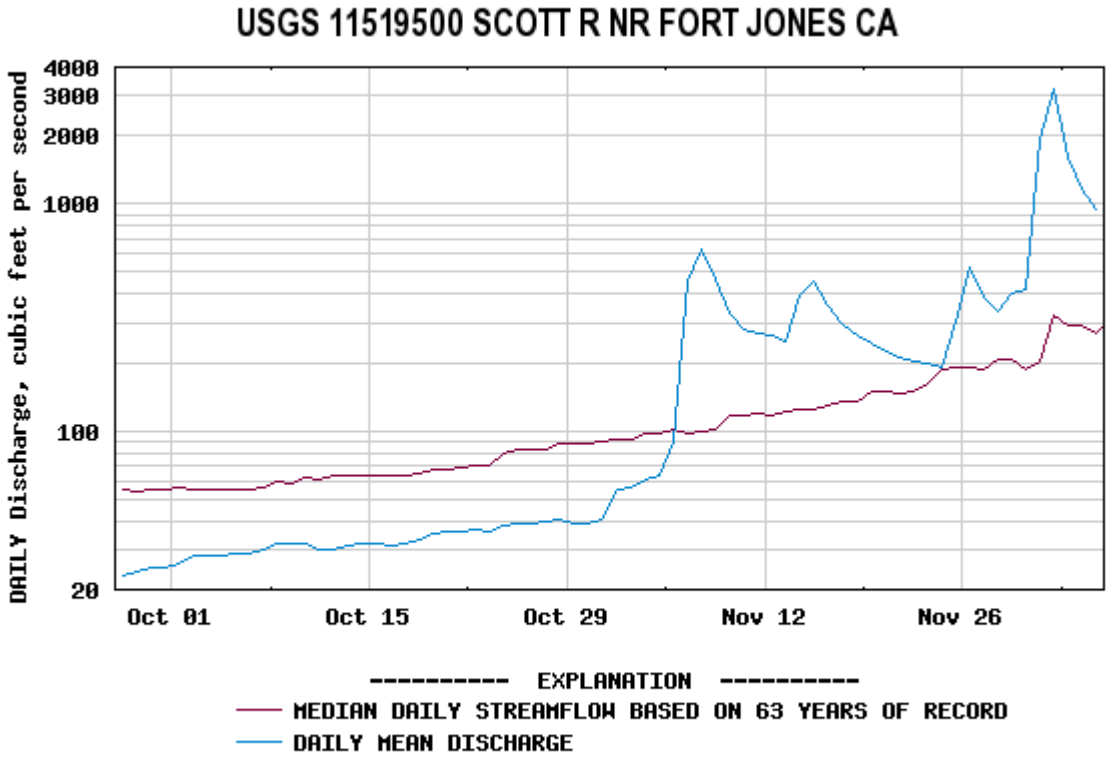
Nichols, K. and J.S. Foote. 2005. Health Monitoring of Juvenile Klamath River Chinook Salmon. US Fish and Wildlife Service, California – Nevada Fish Health Center, Anderson, CA. 16p.

Appendix A. CDFG Mega – Table.

Appendix B. USGS Flow Charts.



USGS



Provisional Data Subject to Revision

Appendix C. 2005 Redd Tables.

2005 Scott River Redd Surveys

			Canyon							Valley				
Survey #	**Month**	**Date**	**Reach 1***	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**	**Reach 8b**	**Reach 10**	**Reach 13**	**Reach 15**	**Totals**
1	Oct.	13	7	8	1	0	0	NS	NS	NS	NS	NS	NS	16
2		17	13	9	2	4	2	NS	NS	NS	NS	NS	NS	30
3		20	21	6	9	6	3	NS	NS	NS	NS	NS	NS	45
4		24	27	4	8	9	NS	9	NS	NS	NS	NS	NS	57
5		27	30	5	2	3	8	7	4	NS	NS	NS	NS	59
6		31	35	10	NS	8	8	10	4	NS	8	NS	NS	83
7	Nov.	3	36	8	21	16	13	13	4	36	11	2	NS	160
8		7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
9		10	NS	NS	NS	NS	5	2	0	17	2	NS	NS	26
10		14	0	4	0	1	NS	0	0	15	3	5	NS	28
11		17	1	0	0	0	4	0	1	21	4	4	NS	35
12		21	NS	NS	NS	NS	0	0	2	12	0	4	NS	18
14		28	NS	NS	NS	NS	NS	NS	NS	0**	NS	NS	NS	0
15		29	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	4	4
16		30	NS	NS	NS	NS	NS	NS	NS	1	NS	NS	NS	1
Reach Length in Miles			2.5	2.5	3	3	4	3	3	4	4	3	3.5	35.5
Times Surveyed			9	9	8	9	9	8	7	7	6	4	1	77
Total Miles Surveyed			22.5	22.5	24	27	36	24	21	28	24	12	3.5	244.5

* In Reach 1, redds were flagged and only new redds were counted each survey, however the data is this chart is the total amount of redds on each survey date.

** Reach Incomplete

2005 Salmon River Redd Surveys											
			Mainstem	South Fork				North Fork			
Survey #	Month	Date	Reach 4	Reach 5a	Reach 5b	Reach 6a	Reach 6b	Reach 9	Reach 10	Reach 11	Totals
1	Oct.	14	NS	6	NS	NS	NS	NS	NS	NS	6
2		18	4*	9	4	11	9	44	23*	5	82
3		21	NS	13	14	17	8	20	33	NS	105
4		25	41	16	16	7	9	23	40	6	158
5		28	72	22	18	20	NS	NS	23	NS	155
6	Nov.	1	91	36	17	15	9	36	9	NS	213
7		4	NS	NS	NS	NS	NS	NS	NS	NS	0
8		8	NS	NS	NS	NS	NS	NS	NS	NS	0
9		11	NS	14	0	2	2	NS	NS	NS	18
10		15	NS	NS	NS	NS	NS	NS	NS	NS	0
11		18	22	5	6	9	2	NS	NS	NS	44
12		22	4	10	4	14	4	5*	NS	NS	36
Reach Length in Miles			4	3	2	3	2.2	4	4	4	26.2
Times Surveyed			6	9	8	8	7	5	5	2	50
Total Miles Surveyed			24	27	16	24	15.4	20	20	8	154.4
* Reach Incomplete											

2005 MKR Tributary Redd Surveys

Week	Aikens Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Bridge to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	–	–	–	–	–	–	–
B	10/09/05-10/15/05	–	–	–	–	–	–	–
C	10/16/05-10/22/05	–	–	–	–	–	–	–
D	10/23/05-10/29/05	–	–	–	–	–	–	–
E	10/30/05-11/05/05	0.0	0.0	0.0	0.0	0.0	0.0	0.9
F	11/06/05-11/12/05	–	–	–	–	–	–	–
G	11/13/05-11/19/05	–	–	–	–	–	–	–
H	11/20/05-11/26/05	–	–	–	–	–	–	–
I	11/27/05-12/03/05	0.0	0.0	0.0	0.0	0.0	0.0	0.3
J	12/04/05-12/10/05	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	Totals	0.0	0.0	0.0	0.0	0.0	0.0	1.4

Week	Bluff Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Wright's to Mouth	Reach #2 Dragon's to Wrights	Reach #3 Fish Cr. To Dragon's	Reach #4 Louse Camp to Fish Cr.	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	0.0	0.0	0.0	0.0	_	_	0.0	0.0	0.0	0.9
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_	_	_	_
D	10/23/05-10/29/05	0.0	0.0	0.0	0.0	_	_	0.0	0.0	0.0	5.1
E	10/30/05-11/05/05	_	_	_	_	_	_	_	_	_	_
F	11/06/05-11/12/05	_	_	_	_	_	_	_	_	_	_
G	11/13/05-11/19/05	_	_	_	_	_	_	_	_	_	_
H	11/20/05-11/26/05	_	_	_	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_	_
	Totals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0

Week	Slate Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 1/2 Mile Cr. To Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_
D	10/23/05-10/29/05	0.0	0.0	0.0	0.0	0.0	0.0	1.7
E	10/30/05-11/05/05	_	_	_	_	_	_	_
F	11/06/05-11/12/05	1.0	0.0	0.0	0.0	0.0	0.0	2.1
G	11/13/05-11/19/05	_	_	_	_	_	_	_
H	11/20/05-11/26/05	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Totals	1.0	0.0	0.0	0.0	0.0	0.0	4.8

Week	Red Cap Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Larson's to Mouth	Reach #2 10N02 Bridge to Larson's	Reach #3 Schnable to Bridge	Reach #4 Barrier to Schnable	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	0.0	0.0	0.0	_	_	_	0.0	0.0	0.0	1.3
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	0.0	0.0	_	0.0	2.0	_	2.0	0.0	2.0	6.9
D	10/23/05-10/29/05	1.0	0.0	_	2.0	_	_	2.0	0.0	2.0	3.6
E	10/30/05-11/05/05	2.0	0.0	0.0	5.0	_	_	5.0	0.0	5.0	4.9
F	11/06/05-11/12/05	0.0	0.0	0.0	1.0	0.0	_	1.0	0.0	1.0	8.2
G	11/13/05-11/19/05	_	_	_	_	_	_	_	_	_	_
H	11/20/05-11/26/05	0.0	2.0	_	1.0	2.0	_	3.0	0.0	3.0	6.9
I	11/27/05-12/03/05	0.0	0.0	0.0	_	_	0.0	0.0	0.0	0.0	2.3
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_	_
K	12/11/05-12/17/05	1.0	1.0	0.0	0.0	0.0	_	0.0	0.0	0.0	8.2
	Totals	4.0	3.0	0.0	9.0	4.0	0.0	13.0	0.0	13.0	42.3

Week	Boise Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 10N47 to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_
D	10/23/05-10/29/05	0.0	0.0	0.0	0.0	0.0	0.0	2.7
E	10/30/05-11/05/05	_	_	_	_	_	_	_
F	11/06/05-11/12/05	0.0	0.0	0.0	0.0	0.0	0.0	2.7
G	11/13/05-11/19/05	_	_	_	_	_	_	_
H	11/20/05-11/26/05	0.0	0.0	0.0	0.0	0.0	0.0	2.7
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	0.0	0.0	0.0	0.0	0.0	0.0	2.7
	Totals	0.0	0.0	0.0	0.0	0.0	0.0	10.8

Week	Camp Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Hatchery to Mouth	Reach #2 Third Cr. To Hatchery	Reach #3 Head Camp to Third Cr.	Reach #4 Barrier to Head Camp	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	0.0	0.0	0.0	_	_	_	0.0	0.0	0.0	2.5
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	0.0	1.0	1.0	0.0			1.0	0.0	1.0	6.4
D	10/23/05-10/29/05	_	_	_	_	_	_	_	_	_	_
E	10/30/05-11/05/05	11.0	0.0	1.0	4.0	_	_	5.0	0.0	5.0	6.4
F	11/06/05-11/12/05	4.0	0.0	2.0	_	_	_	2.0	0.0	2.0	0.8
G	11/13/05-11/19/05	_	_	_	_	_	_	_	_	_	_
H	11/20/05-11/26/05	38.0	3.0	7.0	15.0	2.0	_	22.0	2.0	24.0	8.7
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_	_
K	12/11/05-12/17/05	0.0	0.0	0.0	_	_	_	0.0	0.0	0.0	2.5
	Totals	53.0	4.0	11.0	19.0	2.0	0.0	30.0	2.0	32.0	27.3

Week	Wooley Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Gates to Mouth	Reach #2 Bridge to Gates	Reach #3 N. Fork to Bridge	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_	_	_
D	10/23/05-10/29/05	_	_	_	_	_	_	_	_	_
E	10/30/05-11/05/05	_	_	_	_	_	_	_	_	_
F	11/06/05-11/12/05	_	_	_	_	_	_	_	_	_
G	11/13/05-11/19/05	1.0	0.0	6.0	1.0	0.0	7.0	0.0	7.0	12.6
H	11/20/05-11/26/05	_	_	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_
	Totals	1.0	0.0	6.0	1.0	0.0	7.0	0.0	7.0	12.6

Week	Lower Salmon Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Wooley to Mouth	Reach #2 Grants to Wooley	Reach #3 Nordheimer to Grants	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_	_	_
B	10/09/05-10/15/05	118.0	0.0	0.0	3.0	5.0	8.0	0.0	8.0	9.4
C	10/16/05-10/22/05	68.0	0.0	2.0	4.0	6.0	12.0	0.0	12.0	14.8
D	10/23/05-10/29/05	40.0	3.0	1.0	5.0		6.0	0.0	6.0	9.4
E	10/30/05-11/05/05	21.0	3.0	1.0	_	6.0	7.0	0.0	7.0	10.4
F	11/06/05-11/12/05	15.0	2.0	0.0	1.0	0.0	1.0	0.0	1.0	9.4
G	11/13/05-11/19/05	_	_	_	_	_	_	_	_	_
H	11/20/05-11/26/05	33.0	4.0	2.0	0.0	0.0	2.0	0.0	2.0	14.8
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_
	Totals	295.0	12.0	6.0	13.0	17.0	36.0	0.0	36.0	68.2

Week	Dillon Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 3 Mile to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_
B	10/09/05-10/15/05	13.0	0.0	0.0	_	_	0.0	1.4
C	10/16/05-10/22/05	_	_	_	_	_	_	_
D	10/23/05-10/29/05	_	_	_	_	_	_	_
E	10/30/05-11/05/05	26.0	3.0	14.0	14.0	_	14.0	1.4
F	11/06/05-11/12/05	_	_	_	_	_	_	_
G	11/13/05-11/19/05	2.0	0.0	1.0	1.0	_	1.0	1.4
H	11/20/05-11/26/05	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_
	Totals	41.0	3.0	15.0	15.0	0.0	15.0	4.2

Week	Independence Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Mine to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_
D	10/23/05-10/29/05	_	_	_	_	_	_	_
E	10/30/05-11/05/05	0.0	0.0	1.0	1.0	_	1.0	1.0
F	11/06/05-11/12/05	_	_	_	_	_	_	_
G	11/13/05-11/19/05	_	_	_	_	_	_	_
H	11/20/05-11/26/05	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_
	Totals	0.0	0.0	1.0	1.0	0.0	1.0	1.0

Week	Clear Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Slippery to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	20.0	0.0	0.0	0.0	_	0.0	4.2
B	10/09/05-10/15/05	_	_	_	_	_	_	_
C	10/16/05-10/22/05	53.0	0.0	10.0	10.0	_	10.0	4.2
D	10/23/05-10/29/05	_	_	_	_	_	_	_
E	10/30/05-11/05/05	69.0	3.0	35.0	35.0	_	35.0	4.2
F	11/06/05-11/12/05	27.0	0.0	2.0	2.0	_	2.0	4.2
G	11/13/05-11/19/05	_	_	_	_	_	_	_
H	11/20/05-11/26/05	3.0	0.0	2.0	2.0	_	2.0	4.2
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_
	Totals	172.0	3.0	49.0	49.0	0.0	49.0	21.0

Week	Elk Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Five Mile Bridge to Mouth	Reach #2 Twin to Five Mile Bridge	Reach #3 Doolittle to Twins	Reach #4 Bear to Doolittle	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	13.0	0.0	0.0	0.0	1.0	0.0	1.0	_	1.0	13.7
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	38.0	2.0	6.0	3.0	5.0	0.0	14.0	_	14.0	13.7
D	10/23/05-10/29/05	_	_	_	_	_	_	_	_	_	_
E	10/30/05-11/05/05	14.0	0.0	9.0	0.0	2.0	2.0	13.0	_	13.0	13.7
F	11/06/05-11/12/05	_	_	_	_	_	_	_	_	_	_
G	11/13/05-11/19/05	6.0	0.0	2.0	0.0	3.0	0.0	5.0	_	5.0	13.7
H	11/20/05-11/26/05	_	_	_	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	0.0	0.0	_	_	_	0.0	_	_	0.0	_
	Totals	71.0	2.0	17.0	3.0	11.0	2.0	33.0	0.0	33.0	54.8

Week	Indian Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Ikes to Mouth	Reach #2 SFB to Ikes	Reach #3 WBC to SFB	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	_	_	_	_	_	_	_	_	_
D	10/23/05-10/29/05	15.0	0.0	3.0	5.0	1.0	9.0	_	9.0	12.8
E	10/30/05-11/05/05	_	_	_	_	_	_	_	_	_
F	11/06/05-11/12/05	_	_	_	_	_	_	_	_	_
G	11/13/05-11/19/05	_	_	_	_	_	_	_	_	_
H	11/20/05-11/26/05	_	_	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_
	Totals	15.0	0.0	3.0	5.0	1.0	9.0	0.0	9.0	12.8

Week	Thompson Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 Bridge to Mouth	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_
C	10/16/05-10/22/05	1.0	0.0	1.0	1.0	_	1.0	2.0
D	10/23/05-10/29/05	_	_	_	_	_	_	_
E	10/30/05-11/05/05	0.0	0.0	0.0	0.0	_	0.0	2.0
F	11/06/05-11/12/05	_	_	_	_	_	_	_
G	11/13/05-11/19/05	_	_	_	_	_	_	_
H	11/20/05-11/26/05	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_
	Totals	1.0	0.0	1.0	1.0	0.0	1.0	4.0

Week	Grider Creek Weekly Surveys	Live Fish Total	Carcass Total	Reach #1 No Name to Mouth	Reach #2 Barky Shanty to No Name	Reach #3 Rancharia to Bark Shanty	Redd Natural	Redd Artificial	Redd Total	Mile Total
A	10/02/05-10/08/05	_	_	_	_	_	_	_	_	_
B	10/09/05-10/15/05	_	_	_	_	_	_	_	_	_
C	10/16/05-10/22/05	4.0	0.0	1.0	0.0	_	1.0	_	1.0	5.9
D	10/23/05-10/29/05	3.0	0.0	7.0	0.0	_	7.0	_	7.0	5.9
E	10/30/05-11/05/05	_	_	_	_	_	_	_	_	_
F	11/06/05-11/12/05	1.0	0.0	0.0	0.0	_	0.0	_	0.0	5.9
G	11/13/05-11/19/05	1.0	0.0	2.0	0.0	_	2.0	_	2.0	5.9
H	11/20/05-11/26/05	_	_	_	_	_	_	_	_	_
I	11/27/05-12/03/05	_	_	_	_	_	_	_	_	_
J	12/04/05-12/10/05	_	_	_	_	_	_	_	_	_
	Totals	9.0	0.0	10.0	0.0	0.0	10.0	0.0	10.0	23.6

		Lives	Carcasses	Redd Nat.	Redd Art.	Redd Total	Mile Totals
ORD	TOTAL	354	19	86	2	88	173
HCRD	TOTAL	309	8	118	0	118	121
	YEAR TOTAL	663	27	204	2	206	295

USGS Gauge No. 11523000 Klamath River at Orleans, CA

2005 Fall Chinook Spawning Survey
Klamath National Forest

Week	Surveys	ORD	HCRD	Avg. Flows
A	10/02/05-10/08/05	0	1	2101.0
B	10/09/05-10/15/05	8	0	2083.0
C	10/16/05-10/22/05	15	26	2127.0
D	10/23/05-10/29/05	8	16	2191.0
E	10/30/05-11/05/05	17	63	2847.0
F	11/06/05-11/12/05	4	2	7987.0
G	11/13/05-11/19/05	7	8	4580.0
H	11/20/05-11/26/05	29	2	3664.0
I	11/27/05-12/03/05	0	0	16107.0
J	12/04/05-12/10/05	0	0	8659.0
K	12/11/05-12/17/05	0	0	5787.0
	TOTAL	88	118	5284.8

Watershed Totals	# of Redds
Aikens	0.0
Bluff	0.0
Slate	0.0
Red Cap	13.0
Boise	0.0
Camp	32.0
L.Salmon River	36.0
Wooley Creek	7.0
Dillon	15.0
Independence	1.0
Clear	49.0
Elk	33.0
Indian	9.0
Thompson	1.0
Grider	10.0
TOTAL	206.0

Note: ORD surveys are from Aikens through Wooley Creek; HCRD includes Dillon through Grider Creek and also Beaver Creek and Horse Creek (not displayed here) but they were surveyed on 11/15 and 10/28 respectively. Three fall Chinook redds (& three live Chinooks) were observed in Beaver Creek but no fish or redds were observed in Horse Creek.