Final Report
Adult Coho Spawning Ground Surveys 2006-2007

Report prepared by

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For

CA. Dept of Fish and Game Contract #P0310331 (RCD Ref # 34-2c)
United States Fish and Wildlife Service Contract # 2004-FP-02 (RCD ref #34-3)

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Abstract

Adult Coho Spawning Ground Surveys were completed in a total of 43.65 miles of the Scott River mainstem and tributaries; 4.75 miles of mainstem were surveyed, and 38.90 miles of tributaries. Surveys were completed between November 14th and January 12th. Flow conditions during December were too high to survey during the second and fourth weeks.

During the survey season, a total of fourteen redds were identified. Based on professional judgment (timing, size, and location), seven of the redds are likely coho, and five of the redds were likely to be Chinook. The remaining two redds were not definitely completed, but timing would indicate that they were coho redds. No new redds were observed after December 8th, 2006

A total of six adult coho carcasses were found, four male and two female. One carcass (female) was found in Shackleford, one in the mainstem Scott (male), the rest were found in French Creek. Tissue, scale and otoliths were collected to contribute to the ongoing life history studies in the Klamath Basin.

As in previous years, there was observed overlap in Chinook and coho spawning. The following is apparent from previous years surveys; that coho will move into the system and begin spawning as soon as the first runoff event in the fall, and that Chinook will spawn in low gradient tributary reaches, typically considered coho spawning habitat, if flows allow during the Chinook run. These tendencies allow for significant spatial and temporal overlap in spawning, especially French, Sugar, and Shackleford Creek.

Introduction

Local landowners and land managers have been working since the early 1990's to address watershed health issues. The local community, the Siskiyou Resource Conservation District, and the Scott River Watershed Council recognized that a proactive approach was needed in order to find a solution to the fisheries issues.

Coho salmon (*Oncorhynchus kisutch*) in the Klamath River Basin, the Southern Oregon-Northern California Coast ESU, were listed as threatened by the National Marine Fisheries Service in 1997. In 2001 the State of California began considering a listing of the species as threatened, and in August of 2004 the California Fish and Game Commission acted to add the coho to the list of endangered and threatened species. The listing became effective March 30th, 2005.

Adult coho spawning ground surveys have been performed cooperatively in the Scott River Watershed annually since the winter of 2001-2002. These surveys began in December 2001 as a cooperative effort between local landowners, agencies and concerned volunteers. At this time it was recognized that baseline population and distribution data were needed in order to implement and assess effective restoration efforts.

Spawning ground and carcass surveys in the Scott River Watershed aim to address the following goals:

- ♦Determine and map the distribution and upper extent of coho spawning, in order to identify locations for habitat restoration projects.
- ♦Determine the timing of adult coho migration and spawning.
- ♦Estimate population sizes utilizing different tributaries.
- ♦Sample biological parameters.
- ♦Observe spawning habitats utilized by coho salmon in order to characterize preferred coho spawning habitat.

Project Objectives:

1.) Document the presence of coho salmon within the historic range of distribution and in tributaries not previously documented within the Scott River system.

2.) Survey "Index Reaches", as delineated in the 2001-2002 survey, once per week, or as survey conditions (flow) allow.

3.) Document distribution of adult coho spawning by brood year. Document the upper extent of spawning in each tributary where coho salmon are observed.

4.) Determine the run timing and duration of adult coho spawning in the Scott River.

5.) Collect two (2) sets of tissue samples for DNA analysis to understand the genetic relationship of the Scott River coho salmon to other stocks and collect two sets of scale samples to understand the life history of the Scott River coho salmon. One set of tissue and scale samples will go to NOAA Fisheries and one to CDFG. In addition, it was decided that for the 2006 and future years that otoliths would be collected for life history analysis.

6.) Determine additional site specific information as they relate to spawning: redd composition, substrate composition, temperature, and stream gradient.

7.) Population estimates: Perform mark and recapture on carcasses to determine escapement numbers.

Project Location

The 2006/2007 survey effort took place in the Scott River Watershed, a sub-basin of the Klamath River Basin. The Scott River is located in Siskiyou County, CA. The legal description of the mouth of the Scott River is T45N R10W Sec 6. **See Map # 1 – Vicinity Map.**

Survey Locations
Adult coho spawning ground surveys were completed in the Scott River mainstem, and in the following tributaries: East Fork, Grouse Creek, Kangaroo Creek, Houston Creek, Crater Creek, South Fork Scott River, Sugar Creek, French-Miners Creek, Etna Creek, Patterson Creek, Kidder Creek, Shackleford-Mill Creek, Kelsey Creek, Canyon Creek, Thompkins Creek, Wildcat Creek, and Scott Bar Mill. Some reaches were not surveyed during the season due to flow conditions, or a lack of access. Streams not surveyed at all due to flow barriers include: Moffet Creek, Indian Creek, Patterson Creek (Fort Jones) Rattlesnake Creek.

See **Table I.) Survey Schedule** for a description of reaches surveyed, and the survey schedule.

Cooperators
The following entities cooperated in the survey effort this year:

California Dept. of Fish and Game
National Oceanic Atmospheric Administration
Natural Resource Conservation Service
North Coast Resource Center
United States Fish and Wildlife Service
United States Forest Service
Scott Valley Landowners
Quartz Valley Indian Reservation

Crew Training
Survey training for all survey participants occurred on November 14th, 2006. See **Appendix A – Training Materials**. The following people participated in Adult Coho Surveys this year:

Stephen Addison (NCRC)
Gary Black (RCD)
Mike Bennett (USFS)
Homer Bennett (QVIR)
John Bowman (NCRC)
Nancy Burns-Edel (landowner)
David Cross (RCD)
Donald Flickinger (NMFS)
Mark Garza (USFS)
Preston Harris (RCD)
Marc Horney (NRCS)
Jim Kilgore (USFS)
Justin Ly (NRCS)
Casey Munson (RCD)
Danielle Quigley (RCD)
Jennifer Silviera (USFWS)
Annie Tyner (RCD)
Jason Vasques (CDFG)
Bill Watrous (RCD)
Erich Yokel (RCD)

Table I. Survey Schedule

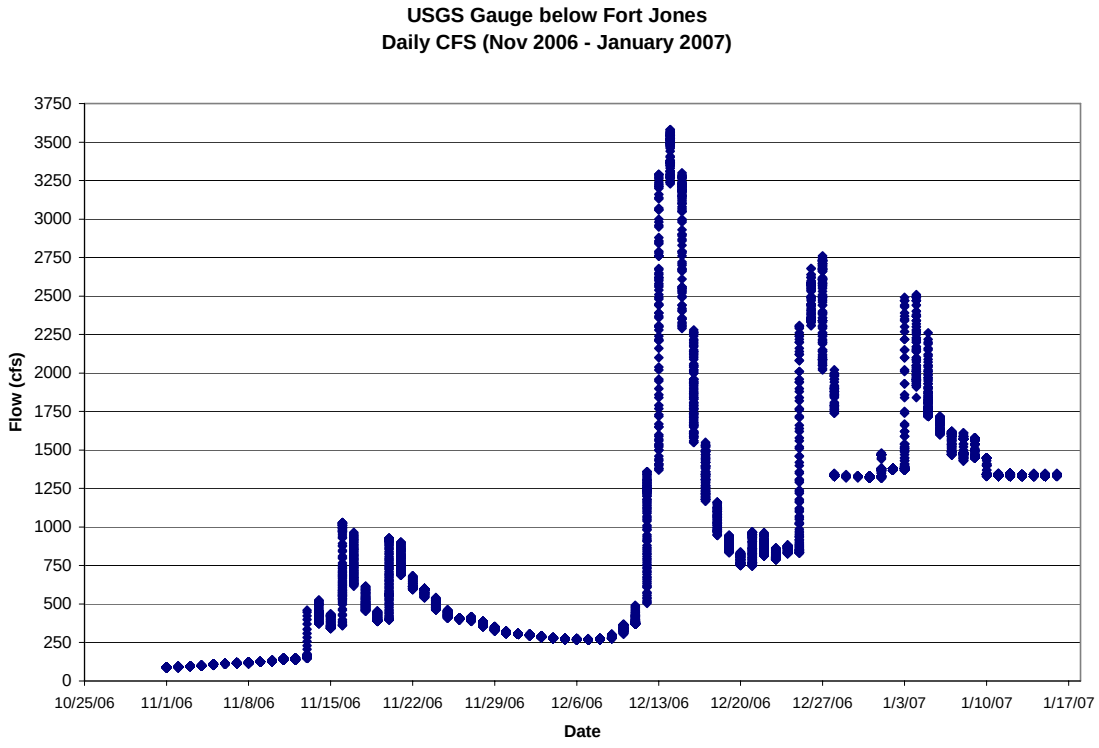
Watershed	Reach Description	Begin Mile	End Mile	Survey Complet	Survey Crew	Total Miles
Scott Bar Mill						
Lower	Lowest ½ mile up of Mill Creek	0.4	0	1	CDFG	0.4
Upper	From RM 2.5 to RM 1.8	2.5	1.8	1	CDFG	0.7
Tompkins Creek						
Lower.	Lowest 1.25 miles of Thompkins Creek	1.8	0	1	CDFG	1.8
Upper	From USFS road # 46N64 crossing to Potato Patch	2	1	2	USFS/NOA	1.0
Middle Creek	Lowest .4 miles of Middle Creek	0.4	0	1	CDFG	0.4
Kelsey Creek	Lower Kelsey from barrier to mouth	0.6	0	3	CDFG	0.6
Kelsey Spawning Channel	Spawning channel	0.2	0	3	CDFG	0.2
Canyon Creek	From the uppermost Maurer property line to the mouth of Canyon Creek	1.1	0	2	NOAA	1.1
Boulder Creek(Scott)	County bridge to mouth	0.2	0	1	CDFG	0.2
Meamber Gulch	Lower			0	-	0
Shackleford-Mill Creek						
Lower Shackleford A	From wooden bridge to mouth	0.5	0	1	RCD	0.5
Lower Shackleford B	From Milepost 2 to bridge	2.17	0.5	5	RCD	1.67
Upper Shackleford	Below the falls	5	4.5	NS	RCD	0
Lower Mill A	From Beaver Dam to confluence with Shack	0.6	0	4	RCD	0.6
Lower Mill B	From Quartz Valley Rd. Bridge to Beaver Dam	0.6	1.6	3	RCD	1
Middle Mill	From the Quartz Valley Rd bridge to above Emigrant Cr.	3.1	1.7	NC	-	0
Emmigrant Creek(trib to Mill)	Confluence with Mill Creek to County Road	0.1	0	NC	-	0
Upper Mill Creek	From county road crossing to 1/2 mile above	3.8	3.3	2	RCD	0.5
McAdams Creek				NC	-	0
Indian Creek	Upper			NC	-	0
Johnson Creek	Upper			NC	-	0

Watershed	Reach Description	Begin Mile	End Mile	Survey Schedule	Survey Crew	Total Miles
Patterson Creek(Fort Jones)	Lower			NC	-	0
Rattlesnake Creek	Upper			NC	-	0
Kidder Creek						
Lower	Below Hwy 3 bridge			2	RCD	0.5
Middle	Above Hwy 3 bridge outside of Greenview			1	RCD	0.8
Upper	Upper FGS property			NS-spot*	RCD	0
Patterson (Etna)						
Lower	Confluence of Johnson and Patterson Creek to 1/2 mile below Hwy 3(Note this reach is split)	1.05 1.5	0 1.25	1	RCD	1.3
Mid (FGS)	From Upper Youngs Diversion to Hwy 3 (New Reach)	6.2	4.6	3	RCD/FGS	1.6
Upper (FGS)	From the Falls down	7.9	7.6	2	RCD	0.3
Etna Creek						
Lower	200 yards below Highway 3 to mouth (New Reach)	2.25	0	NS	-	0
Middle	From Etna City Diversion to End of FGS property above town	5.2 4.1	4.6 3.7	1	RCD	1
Upper	From Mill Creek to Alder Creek	8	6.35	NS	-	0
Ruffy Gap (Trib to Etna)	area above mouth	0.2	0	NS	-	0
Clarks Creek	TP property above Hwy 3			NS	-	0
French Creek						
Lower	Hwy 3 to mouth (New Reach 2003)	0.7	0	7	RCD	0.7
Mid and Middle	Mid=Confluence w/Miners to bottom of Krum. Middle = Bottom of Krum to above Hwy 3 bridge	2.43	0.8	5	RCD	1.63
North Fork Area	From below North Fork to confluence of French and Miners	3.43	2.43	1	RCD	1
Paynes Creek Area	French Creek from 1/4 mile above Paynes Creek to 1/4 mile below (New Reach)	5.25	4.75	NS	-	0.5
Duck Lake Area	Above & below mouth of Duck Lake Cr.			NS	-	0

Watershed	Reach Description	Begin Mile	End Mile	# Surveys	Survey Crew	Total Miles
French Creek						
Horse Range Creek	Above mouth		0	NS	-	0
Miners Creek	Upper - Second Miners Rd. bridge to third Miners Rd. Bridge			1		1
Miners Creek	Lower - Confluence with French Creek to second Miners Cr. Road bridge	0.9	0	4	RCD	0.9
Paynes Cr.	Lowest .2 miles	0.2	0	NS	RCD	0.2
North Fork French Cr.	Timber Products	0.7	0	NS	-	0
Scott River Tailings A	From .30 miles below Wildcat Cr. To below Sugar Creek.	55	53.45	1	RCD	1.65
Scott River Tailings B	From Below Sugar Creek to 1/2 mile upstream from Messner gulch	53.45	52.35	1	RCD	1.1
Scott River	Fay Lane to French Creek	52.5	49.00	2	RCD	2
Sugar Creek						
Lower	From Hwy 3 to mouth	0.7	0	2	RCD	0.7
Upper	Bridge on Rd # 40N23 to cattle guard on Sugar Cr. Rd.	4	1.9	5	RCD/FGS /NOAA	2.1
Wildcat	Mouth up 2 mile			1	-	2
South Fork						
Lower S. Fork	USFS piece	0.7	0.3	NS	-	0
Upper S. Fork	800 meters above Fox Cr. to Boulder Cr.	4	2.1	3	RCD/CDF G/QVIR	1.9
Boulder Creek	Mouth area	0	0.25	NS	-	0
Fox Creek	Mouth Area	0	0.25	NS	-	0
East Fork						
East Fork Callahan	Spot Survey					
E. Fork-Lower Masterson	Beginning 1.4 miles above mouth of Grouse Cr.	6.3	4.9	1	-	1.4
East Fork-Upper	Above and Below confluence of Rail Creek	12.1	7	1	RCD	5.1
Upper East Fork	Confluence of Crater and Houston Creek	13.8	12.8	1	RCD/QVIR	1.0
Grouse Cr.	lower .6mile	0.6	0	2	RCD	
Grouse Cr.	Upper USFS to Carmen Cr.	0	1	NS	-	0
Kangaroo Cr. - Lower	Lower 1 mile of creek	1.1	0.1	1	RCD	1
Kangaroo Cr. - Upper	USFS piece	2.1	1.4	NS	-	0.6
Rail Creek	Rd 41N39 to end of USFS land	1.25	1.75	NS	-	0
				Total		42.65

Results

A total of 43.65 miles of stream were surveyed during the 2006-2007 season (Nov 14th – Jan 12th, 2006). A total of 4.75 miles of mainstem were surveyed, and 38.90 miles of tributaries See **Table I**. for reach descriptions and survey schedule. Index reaches were surveyed three to seven times during the season, all other reaches were surveyed one to three times during the season.

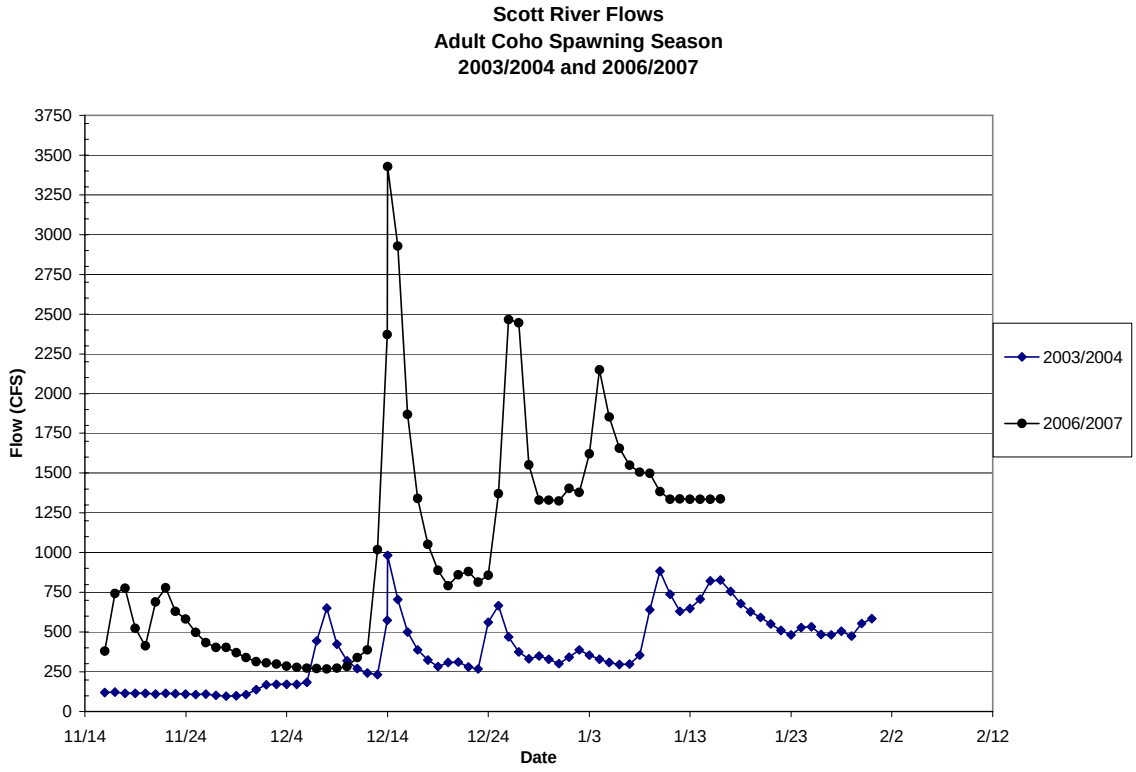


Data downloaded from the USGS website http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11519500

Graph 1. – Scott River Flows

Rains in early November provided salmonid access into both Shackleford and French Creek by mid-November. See **Graph 1. – Scott River Flows** The Chinook run was still active at this time. Chinook were observed spawning in the vicinity of the mouth of French Creek as late as November 27th.

Compared to the previous run of this brood year (2003-2004), flows were high enough to allow fish passage into the upper Scott tributaries in mid-November, compared to December 7th in 2003. This allowed for an earlier period of spawning, as well as potentially greater spawning distribution. A comparison with 2003-2004 shows that again, coho were observed spawning directly after the first significant flow event. See **Graph # 2.** However, high flows from December 12th through 19th, and again on the 25th through 28th made most streams unsafe to wade during those periods. These high flows impeded the ability to fully survey.



Data downloaded from the USGS website http://waterdata.usgs.gov/ca/nwis/uv/?site_no=11519500

Graph # 2 – Comparison with 2003-2004

Overlap with Chinook Spawning

Chinook were observed actively spawning in the Scott River mainstem near French Creek until November 13th, and fresh carcasses were found as late as November 30th. The first coho carcass was found on November 27th, the first verifed coho redd was observed in Shackleford Creek on November 28th. This shows overlap with the coho spawning period. Five redds which were likely Chinook based on timing, size, and spawning location (substrate and cover) were found in French Creek, Shackleford Creek, and Kidder Creek.

Redds

A total of 14 redds were identified, two of which did not have definite potts. Of the remaining 12 redds, 5 were likely Chinook based on size and timing. No confirmed redds were found after December 12th, except for one potential redd in Shackleford on 12/18/06. This redd had no clear pott, but was in habitat preferred by coho, and looked like a redd otherwise. All three redds found in Kidder Creek are likely Chinook. Especially noteworthy is the redd located in Upper Kidder Creek. This redd was found significantly higher than expected for Chinook spawning, and higher than previously observed coho spawning.

Table II. Redd Observations 2006-2007

Date	Location	Species	Notes
11/19/06	Lower French Creek	Coho	Likely coho
11/22/06	Lower Shackleford	Unk	Likely Chinook based on timing
11/28/06	Mid French Creek	Unk	Likely Chinook timing/size
11/28/06	Lower Shackleford	Coho	Female carcass found 12/04
11/29/06	Lower Mill	Coho	
11/30/06	Lower Kidder	Unk	Likely Chinook timing
11/30/06	Lower Kidder	Unk	Likely Chinook timing
12/01/06	Miners	possible	Looked like Redd/possible barrier downstream
12/01/06	Kelsey	Coho	
12/06/06	Mid French Creek	Coho	Female carcass found 12/08
12/07/06	Lower Mill (**2 redds**)	Coho	Location/timing
12/08/06	Upper Kidder	Unk	Likely Chinook timing/size
12/18/06	Lower Shackleford	Possible	Looked like Redd, pott not clear

Carcasses

During this survey effort six coho carcasses were identified; one in Shackleford (female), one on the Scott River Mainstem (male), and four in French Creek. Three of the male coho carcasses were found in French Creek between December 15th and 20th. However, no redds were observed in French Creek after December 6th, so it is unlikely these carcasses were associated with a redd.

Otoliths were taken from five of the six carcasses, scale samples were collected from five of the six, and tissue samples collected off all six carcasses. All samples were submitted to the California Dept. of Fish and Game (Jason Vasques, Yreka).

Table III. Coho Carcasses

Date	Location	Sex	Tissue	Scale	Otolith	Lat	Long
11/27/06	Scott River Reach 15 (French to SVID)	M	Y	Y	N	512963	4586970
12/04/06	Shackleford	F	Y	Y	Y	5028571	4606866
12/08/06	French	F	Y	Y	Y	511153	4583396
12/15/06	French	M	Y	Y	Y	511180	4583090
12/20/06	French	M	Y	N	Y	511980	4584329
12/20/06	French	M	Y	Y	Y	512807	4584766

(coordinates are NAD27, UTM)

Note: No scale was taken on the French Creek 12/20/06 due to carcass being too damaged.

Other Observations

During the survey effort it was noted that Upper Sugar Creek has been scoured clean of spawning gravels. In the 2004-2005 survey season coho were observed spawning as far upstream as Tiger Fork. In addition, the Upper South Fork Scott is very scarce in terms of gravel. Surveys completed in 2001-2002 showed significant spawning as far upstream as above Fox Creek. It is likely that spawning gravels utilized in 2001-2002 have been scoured out, even in 2004-2005 little spawning was observed in the upper South Fork reach.

In addition, Lower Miners creek appeared to have been significantly altered during the 2005/2006 New Years Flood. Significant amounts of sediment may have been deposited. In addition, log jams and new side channels may have blocked fish passage at many locations, except during high flow events. In addition, during the extreme cold snap, much of Miners Creek was frozen solid, preventing fish passage during this period.

Discussion

Chinook Spawning

During the 2006-2007 survey season an overlap, both spatial and temporal, of the Chinook and coho run was observed. Based on previous years survey efforts it appears that this overlap will occur in good water years which allow Chinook access to what is traditionally considered coho spawning habitat. In addition, the last six years of survey data appear to indicate that the coho will enter the Scott River as soon as flows allow. This is a positive sign for Chinook, if they can access Shackleford and French Creek for additional spawning habitat. Winter rearing distribution in the Scott River is still largely unknown, so it is not certain if in the strong coho brood years this will lead to intense competition.

As has happened every year previously, high flows during December and January prevented surveys. These flow events have the potential to obscure redds, and move carcasses out of the survey reach. The higher flows also make live fish observations and positive ID of live fish difficult. A total of six coho carcasses were found during the survey season. Many of the survey reaches are in fairly remote areas (Sugar Creek, South Fork) or in areas with a large riparian set aside (Lower French). These areas are subject to heavy predation, and a carcass doesn't last too long in these reaches.

Comparison with previous brood year

In 2003 a total of seven redds were observed; three in French-Miners Creek, and four in Shackleford-Mill Creek. In 2006 a total of 7 potential coho redds were observed; and two additional possible redds(which may have been Chinook or coho). Three of these redds were in French- Miners Creek and six in Shackleford-Mill.

In Mill Creek (Shackleford) during the 2006-2007 survey season, 1.5 miles of reach were not surveyed due to lack of fish passage. However, communications with the landowner, and a known beaver dam indicated a lack of access for much of the active part of the survey season. This reach showed no spawning in 2003, and is poorer quality habitat than the 1.6 miles found downstream.

Life History Studies

Tissue, scale and otholith samples were collected from adult coho carcasses during the survey effort to contribute to the genetic and life history studies in the Klamath Basin. The RCD plans to continue to collect otolith samples during the 2007-2008 brood year, as this will provide an opportunity to collect a statistically significant sample size.

Recommendations

Effort should be made to dive the upper Kidder Creek site in early spring to see if Chinook fry are present. Based on temperature data for the basin, and the out-migrant trapping efforts, it is likely that the fry will emerge in mid-April.

A spawning gravel enhancement project should be considered for Upper Sugar Creek and Upper South Fork. Ideally these projects will be completed during the summer of 2007 to prepare for the strong brood year in the winter of 2007/2008.

High Priority spawning areas

Based on Adult Coho Spawning Ground Surveys completed in the past six years, as well as juvenile salmonid observations, the following reaches are identified as high priority spawning reaches. These reaches have had live fish and/or redds observed during all brood years.

Lower Mill Creek (RM 3.1 to mouth)
Lower Shackleford Creek (RM 2.2 to mouth)
Mid-French Creek (RM 2.0-3.2)

Expected Benefit to Anadromous Salmonids

This project will benefit anadromous salmonids by contributing data to the known range of adult coho spawning in the Scott River Watershed. This information will allow the design of specific restoration and enhancement projects that will target high priority stream reaches.

In addition, this project collected scale, otolith, and genetic samples to contribute to ongoing genetic and life history analysis of salmonid populations.

Salmon Research, Monitoring, and Evaluation Projects-Reporting Metrices

♦Is the project directly related to key salmon management question regarding salmon recovery and/or sustainability of healthy salmon stocks?

Yes

♦Name the comprehensive monitoring strategy/program the project is part of

♦Number of publications produced on key management or restoration data, information and needs

One

♦Number of applications incorporated into abundance-based management regimes identified in the Pacific Salmon Treaty.

♦Was information gained on salmon stocks that will reduce the risk of over-fishing?

N/A

Appendix A

Adult Coho Spawning Ground Survey Training

November 15th, 2006

Siskiyou RCD Office, Etna
9:00-12:00

Introductions	9:00- 9:10
Survey Objectives/Background	9:10-9:30
GPS units and datasheets	9:30-10:15
Carcass ID and Tissue sample Handling Erich (RCD) and Jason (CDFG)	10:15 –11:15
Sign up for reaches/equipment/survey days	11:15-11:45

Optional 12:30 to 3:00 In the field survey training

(for those who have never walked a survey or just need a refresher – please bring boots and waders, or let me know what size you need)

Scott River Watershed Adult Coho Salmon Spawning Survey 2006-2007
GPS Codes for Streams

Datum for all Garmin GPS units should be set at WGS84, and Projection in Lat/Long Decimal Degrees

Naming Convention: S F K 0 7 K R = South Fork # 7 King salmon Redd

Next to last Character: K = King salmon , S= Silver

Last Character is: R = Redd – individual
F = Fish(if on fish on Redd use R), indicate # of fish in notes
C = Carcass

Boulder Cr. (South Fork)	BOU
Boulder Cr.(Scott)	SRB
Canyon Cr.	CAN
Clark Cr.	CLA
East Fork Scott	EFK
Emigrant Creek	EMI
Etna Cr.	ETN
French Cr.	FRE
Grouse Creek	GRO
Horse Range Cr.	HRC
Indian Creek	IND
Johnson Creek	JOH
Kangaroo Cr.	KAN
Kelsey Channel	KCH
Kelsey Creek	KEL
Kidder Creek	KID
McAdams Cr.	MCA
Meamber Gulch	MEA
Middle Creek	MID
Mill Cr. (Scott Bar)	SBM
Mill Creek	SML
Miners Cr.	MIN
Moffet Creek	MOF
North Fork French	NFF
Patterson Creek (Scott)	PSR
Patterson Creek(Etna)	PAT
Rattlesnake Cr.	RAT
Ruffy Gap Trib	RUF
Shackleford	SHK
Shackleford-Mill	SHM
South Fork Scott	SFK
Sugar Creek	SUG
Thompkins Creek	TOM
Wildcat Cr.	WIL
Wooliver	WOO
Scott River Tailings	TAI

2006-2007 Scott River Adult Coho Salmon Spawning Survey **Data Form** Page_____of_____

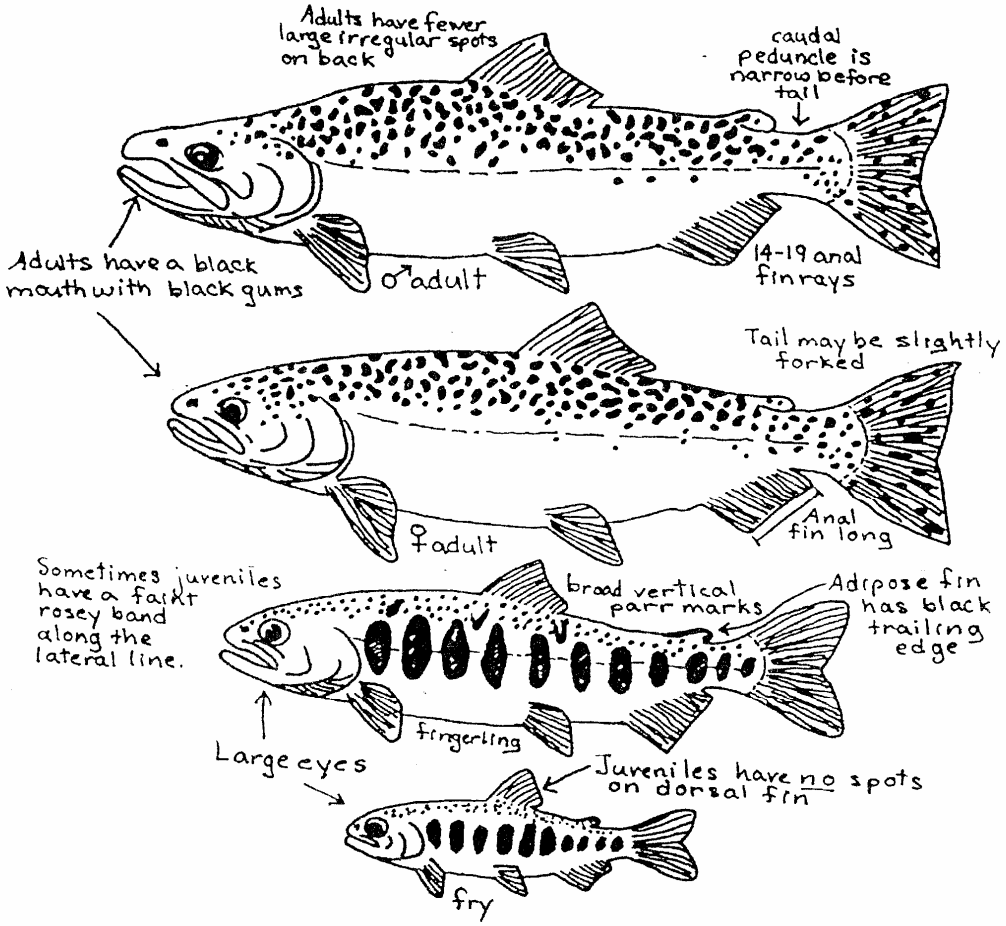
Stream _____Reach_____ GPS Unit # _____
Datum:_____
Date_____ Weather_____ Start Time_____ Air Temp ^{o}F_____ H_2O Temp ^{o}F_____
_____
End Time_____Air Temp ^{o}F_____ H_2O Temp ^{o}F_____
Crew_____ Field Notebook #_____

ALL	REDDS/LIVE FISH						CARCASSES					ALL		
Site #	HT* P,R,F	# Fish	Redd Length M	Redd Width M	Pott Depth M	SUB* D/S	FL CM	Sex M/F Unk	Ad Clip Y/N	Left Max. Clip Y/N	Other Clips Y/N	Lat	Long	Notes Ref. Field Notebook #/pg

Habitat Type: P=Pool R=Riffle F=Flatwater
S=Side Channel (i.e. S/R)

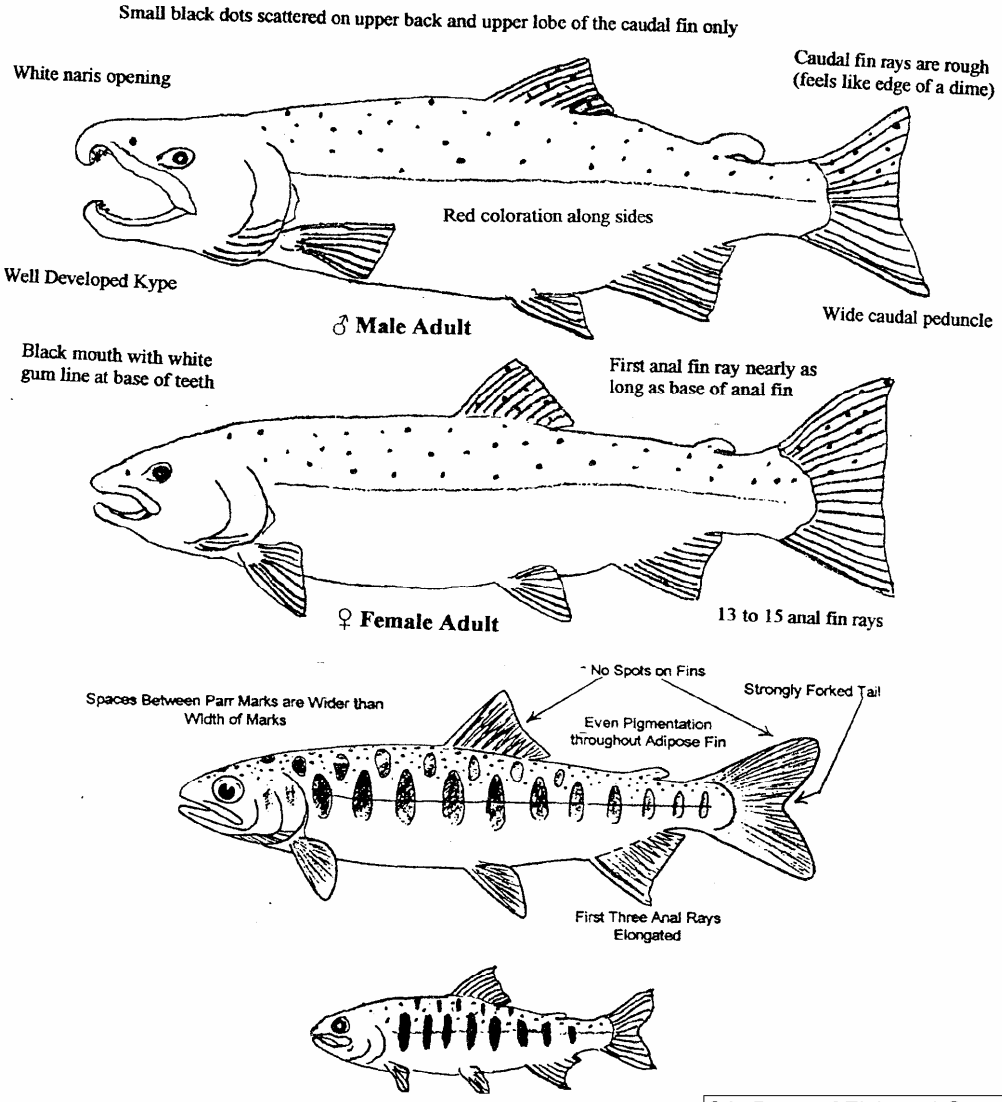
Substrate: 1= <0.2cm SAND 2=0.2-5cm SM. GRAVEL 3=6-9cm LG.GRAVEL 4=10-13cm SM COBBLE 5=>13cm LG. COBBLE

Chinook



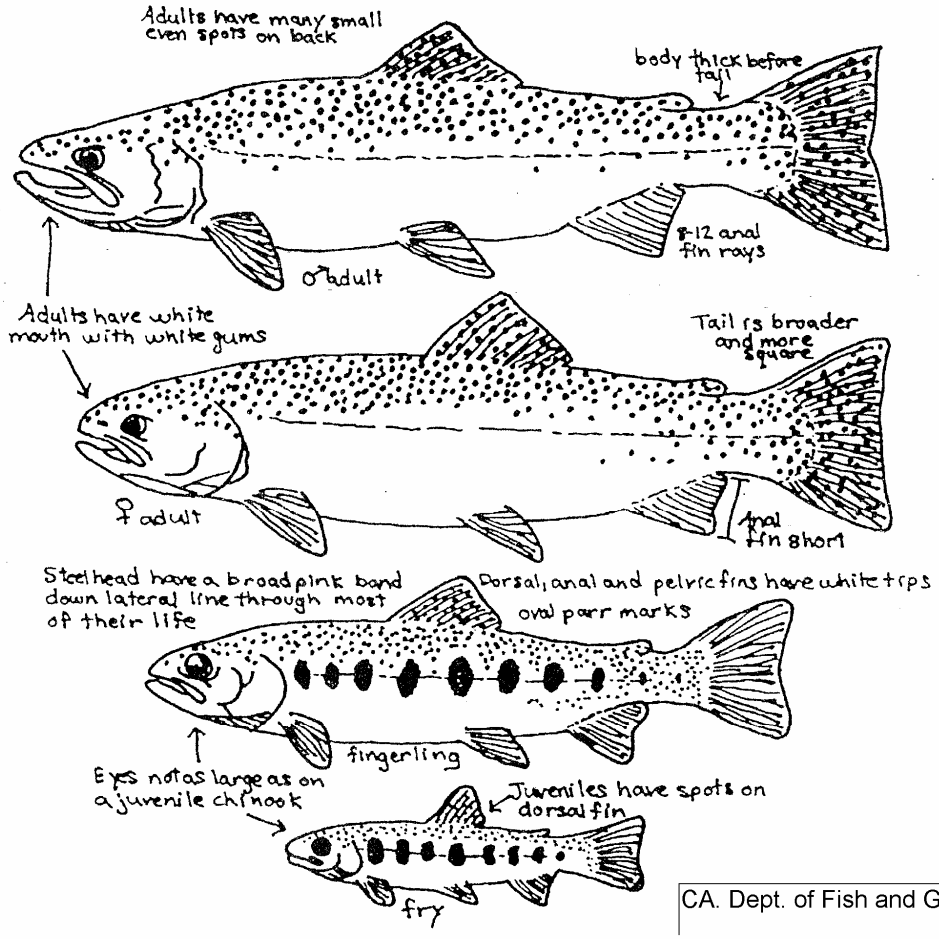
CA. Dept. of Fish and Game - KRP

Coho



CA. Dept. of Fish and Game - KRP

Steelhead



CA. Dept. of Fish and Game - KRP

Chum Salmon Captured at the Willow Creek (Trinity) weir November 2006