Subject: Dredging
Date: Thursday, May 5, 2011 8:50:24 PM PT
From: Gina Barnum
To: dfgsuctiondredge@dfg.ca.gov

Dear Mr. Stopher,

I am writing in regards to your proposed new regulations on mining in California. I find them to be overly restrictive, based on speculation verses fact, and leaning towards liberal ideology. I am disappointed that the DFG would think of moving dredging to the winter months which would completely prohibit dredging due to the weather expecially in Northern California. I buy hunting and fishing licenses in addition to paying taxes to manage and maintain our forests and natural resources. How much money do the environmentalists add to your department?

After talking to many of my colleges that also enjoy mining and the outdoors, we have three points we would like you to consider. Many of us hobby/week-end miners would like to be able to continue to use our six inch dredges. We also agree that anything over a six inch dredge should require approval from your department.

Secondly mining in the winter months it would be impossible in access most of the southern, middle, northern and tributaries of the Yuba River. Not only would it impact the revenue from the miners but also the monies their families generate enjoying the outdoor activities common to summer.

Lastly the dredging in our area is above several large dams, Englebright and Bullards Bar and has zero impact on the Salmon population.

I would like to attend your meetings to present our concerns but find the time of the meetings incompatible to the majority of tax payers that are employed. I would be very interested in communicating with your department to resolve this very important issue impacting Nevada, Sierra, Yuba and Plumas counties. I can be reached at 530-632-1616.

Sincerely,
James Barnum

5 May 2011

Mark Stopher
CA Department of Fish & Game
601 Locust Street
Redding, CA 96001

Re: Comments on Draft Suction Dredge Mining EIR

Dear Mr. Stopher,

I am writing to express concern about the draft Supplemental Environmental Impact Review (EIR) of suction dredge mining that is currently being circulated for comment by your Department (DFG). As a professional geomorphologist with over 30 years applied experience restoring watersheds impacted by resource extraction, I have witnessed significant negative environmental effects of poorly regulated suction dredging. I believe that the current EIR proposes draft regulations for mining that are seriously flawed.

The document proposes as its "preferred alternative" draft regulations for suction dredge gold mining that will cause significant and unavoidable impacts on water quality, mercury discharge, turbidity, aquatic wildlife, noise, and historical and archaeological resources. The new rules open new river and stream segments to dredging where it has already been outlawed by tribal, federal, state or local law, and allows "mega-dredges" to be used.

The proposed regulations lack clarity and cohesion, and for many rivers and streams in California are vague, confusing, inconsistent, and contradictory. Finally, the document relies on a definition of "deleterious to fish" that is not consistent with California law or legislative intent in directing funds for development of the EIR.

This EIR needs to be redrafted with an eye toward protecting all of California's fish and wildlife and other natural resources. It is not acceptable for the DFG to spend $1.5 million on this document and then fail to issue protective regulations that are appropriate and consistent with California's state laws. I believe we should not be subsidising any activity that create negative environmental effects with potential long-term cumulative public costs. At a minimum the Department should adopt the most environmentally protective alternatives – either the "no project" or "water quality" alternatives outlined in the document.

Thank you for this opportunity to comment on the Suction Dredge EIR.

Sincerely,

David Burns
1300 Appaloosa Ct
Auburn, CA 95603

Subject: No dredge gold mining in our waterways protect our waterways
Date: Thursday, May 5, 2011 9:36:28 AM PT
From: Brian Cooney (sent by Defenders of Wildlife <ecommunications@defenders.org>)
To: dfgsuctiondredge@dfg.ca.gov

May 5, 2011

California Department of Fish and Game Section Dredge Program
CA

Dear Section Dredge Program,

The California Department of Fish and Game's regulations on surface dredge gold mining in our waterways will destroy river ecosystems, harming the frogs, salmon, trout and other animals that call it home. The mercury from the dredged material is put back into the waterways that threatens our animals, fisheries and our drinking water.
Protect our river ecosystems and our water quality and amend the dredging regulations to ensure adequate protection of our wildlife and the sources of our drinking water.

Sincerely,

Mr. Brian Cooney
4353 Kansas St
San Diego, CA 92104-1208

From:	"Mary Harper"
To:	dfgsuctiondredge@dfg.ca.gov
CC:	
Date:	05/05/2011 1:38:34 PM
Subject:	Protect California Waterways

May 5, 2011

California Department of Fish and Game Section Dredge Program
CA

Dear Section Dredge Program,

As a California resident, I am deeply concerned about the California Department of Fish and Game's regulations on surface dredge gold mining in our waterways.

It is in these difficult economic times that we must strive to protect our waters, wildernesses, and wildlife. Our water habitats are constantly under siege from development, pesticides and herbicides, overuse, and general disregard for the life sustaining gift that water is.

Please do not permit a resurgence of suction dredging. We all, wildlife and humans need our waterways protected. Protecting our waters is, I hope, your primary concern.

Thank you for taking time to read this and please note my concerns to those who will make this decision.

Sincerely,

Ms. Mary Harper
734 Arbona Cir N
Sonora, CA 95370-8059

Subject: No Poluting Calif. Waters
Date: Thursday, May 5, 2011 12:35:00 AM PT
From: Ted Hoffner (sent by Defenders of Wildlife <ecommunications@defenders.org>)
To: dfgsuctiondredge@dfg.ca.gov

May 5, 2011

California Department of Fish and Game Section Dredge Program
CA

Dear Section Dredge Program,

No, no, no mercury in our water!

As a California resident and a supporter of Defenders of Wildlife, I am concerned about the California Department of Fish and Game's regulations on surface dredge gold mining in our waterways.

Surface dredge mining can destroy river ecosystems, harming the frogs, salmon, trout and other animals that call it home.

Another grave concern about this type of mining is that potential to release mercury into our water. The mercury that can be released once the dredged material is put back into the waterways could harm animals, fisheries and our drinking water.

I support stronger regulations that can actually be monitored by the Department of Fish and Game, but your current proposal does not adequately do this.

Animals that call our waterways home could be in big trouble, along with current and future recovery projects.

Please protect our river ecosystems and our water quality and amend the dredging regulations to ensure adequate protection of our wildlife and the sources of our drinking water.

Sincerely,

Mr. Ted Hoffner
14 Shasta
Wasco, CA 93280

Mark Stopher
California Department of Fish and Game
Suction Dredge Program Draft SEIR Comments
601 Locust Street
Redding, CA 96001

Please take notice that I am the owner of the Bijo #1 claim, located on Clear Creek in Siskiyou County (Bureau of Land Management CAMC # 272019). I have reviewed your proposed regulations for suction dredging, which appear to forbid any and all suction dredge mining on my claim. Because suction dredging is the only practical method of mining the valuable underwater gold deposits on this claim, you are proposing to forbid all mining on my claim.

This is a violation of federal law forbidding material interference with my federally-protected mineral rights, and also constitutes an unconstitutional taking of my private property without just compensation.

I urge you to reconsider your proposed regulations. This area had strong fish runs for decades during and after hydraulic and other large scale mining, and there is no credible case whatsoever for harm to fish from small-scale suction dredging operations. A single fisherman with a good day on the river causes more damage to fish than all the suction dredge miners put together, and you allow the fishing. Focusing environmental regulation on an activity like suction dredging, which actually improves fish habitat, discredits your regulatory role generally.

If you do not reconsider, and allow me to mine my claim, you may rest assured that I and other miners will hold you accountable in the courts for your outrageously unlawful and arbitrary decisions.

Sincerely,

Phyllis Langdon
P.O. Box 1325
Salome Az 85348

Mark Stopher
California Department of Fish and Game
Suction Dredge Program Draft SEIR Comments
601 Locust Street
Redding, CA 96001

Please take notice that I am the owner of the Bijo #1 claim, located on Elk Clear Creek in Siskiyou County (Bureau of Land Management CAMC #272019). I have reviewed your proposed regulations for suction dredging, which appear to forbid any and all suction dredge mining on my claim. Because suction dredging is the only practical method of mining the valuable underwater gold deposits on this claim, you are proposing to forbid all mining on my claim.

This is a violation of federal law forbidding material interference with my federally-protected mineral rights, and also constitutes an unconstitutional taking of my private property without just compensation.

I urge you to reconsider your proposed regulations. This area had strong fish runs for decades during and after hydraulic and other large scale mining, and there is no credible case whatsoever for harm to fish from small-scale suction dredging operations. A single fisherman with a good day on the river causes more damage to fish than all the suction dredge miners put together, and you allow the fishing. Focusing environmental regulation on an activity like suction dredging, which actually improves fish habitat, discredits your regulatory role generally.

If you do not reconsider, and allow me to mine my claim, you may rest assured that I and other miners will hold you accountable in the courts for your outrageously unlawful and arbitrary decisions.

Sincerely,

Phyllis Langdon
P.O. Box 1325
Salome Az 85348

Mark Stopher May 5 th, 2011
California Department of Fish and Game
601 Locust Street
Redding, California 96001

I am writing in regards to the DSEIR on suction dredging. I am a recently retired California State employee, 35 + years with CDF, now known as Cal Fire. I have dredged for over 30 years on the North Yuba River near Downieville California.. My partner is also retired from Cal Fire, both of us as Fire Captains. As a professional Firefighter, I believe in honesty and integrity, so I can assure you my comments ARE exactly that. For some unknown reason, the news media has given gold miners a bad image. Let me set the record straight. Many of us are professional working people who are well educated. Many are doctors, lawyers, students, retired folks, and just plain folks who enjoy the outdoors. We CARE about our natural resources as much or more than most will ever know.

I personally get tired of the so called environmental groups attacking gold dredging. I'm every bit an environmentalist as they are. I have spent my whole life in Forestry protecting California resources while most of them sit on their butts in an office and point fingers. How many of them have actually put on a wet suit and dredged ? This is an actual quote from the CEO (Elizabeth Martin) of the Sierra Fund, an environmental group, in April 2009.

"Dredgers collect the mercury and amalgam, and treat it to release any gold that may have amalgamated with the mercury. They then recover the mercury and usually store it, though some miners dispose of it in an unauthorized manner, such as pouring it back into the river, onto the ground, or in to municipal sewer systems."

These kinds of lies make me SICK !!!!! The truth is I find VERY little mercury while dredging. What I have found in 30 years would fit in a thimble! The little bit recovered is in the sluice box, usually attached to gold, and removed from the river. Some states even have collection sites to turn in any mercury found through dredging. How these people can blatantly lie to support there agenda is beyond me. You will find most dredgers are stewards of the river. I see more trash either left, or floating in the river by swimmers, rafters, fisherman, or hikers. Shoes, sandals, plastics, soda and beer cans, even clothes. I pick up every bit of trash I see, and leave NO TRACE. I teach my kids the same!

Comments on Draft Proposed Regulations

Number of Permits. The Department shall issue a maximum of 4,000 permits annually, on a first-come, first-serve basis. Any permits issued in 2011 will apply toward the limitation of 4,000 permits for 2012.

Limiting permits is WRONG. Do you limit fishing permits? What is to stop the Sierra Fund or other group from buying 3,999 permits if they have the funds? This is nothing more than discrimination against those who are declined. Why should a non California resident get a permit before me? I pay state taxes!

For each location the California Active Mining Claim number, if applicable, and approximate dates of proposed dredging shall be listed.

I'm retired. If you want approximate dates I'm going to list from the opening of season until the end. This is ridiculous. If and when I'm issued a permit, I don't know what days I'll dredge.

Nozzle Restriction. No suction dredge having an intake nozzle with an inside diameter larger than six four inches may be used without Department inspection.

First of all, the VAST majority of dredges in use in California are under 6 inch. Most dredgers are recreational dredgers and work a real job for a living. Some do use 6 inch and larger and dredge full time.
The stream size regulates the dredge. Some small streams can only handle a 2, 3 or 4 inch dredge due to stream size and water. This is where Fish and game needs to compromise. Go to 5 inch AND under, NO INSPECTION needed. This will take care of the majority. Inspect 6 inch and greater. Due to Fish and Games manpower, and the inability to inspect all dredges above 4 inches, this makes more sense and makes it possible to do in a reasonable timeframe. However, there must be a reasonable time to have the inspection done for 6 inch and above.

If you try to inspect every dredge greater than 4 inches, it isn't going to work. People will wait all summer for an inspection ! Perhaps that is what you want ?
.

A list of all suction dredge equipment that will be used under the permit, including nozzle size, constrictor ring size (if needed), engine manufacturer and model number, and horsepower.

Are you permitting the dredge or the person ? What if I have a valid permit and a friend invites me to dredge a few days on his claim and with his dredge ?
I should be able too as long as I have a permit I paid for and follow the regulations !

The suction dredge permit number must be affixed to all permitted dredges at all times, in a manner such that it is clearly visible from the stream bank or shoreline. The number must be displayed in lettering at least three inches in height and maintained in such a condition as to be clearly visible and legible.

Again, are you permitting the dredge or person ? For fishing licensees, do you permit the fisherman or his fishing pole, line and lure ?

Motorized winching or the use of other motorized equipment to move boulders, logs, or other objects is prohibited, unless:
(A)The Department has conducted an on-site inspection and approved the proposed suction dredging operations in writing;

A winch is used to move boulders in the river that are to big to move by hand, and to KEEP ME SAFE. I take NO CHANCES. A winch is a safety net to roll a unsafe boulder. What good is a onsite inspection ? As long as we follow regulations and are not blocking a stream. How long am I going to wait for an inspection ? Again, you could shut me down all summer long. I'm not going to haul a 250 # winch down a canyon unless I can use it. Are you telling me I have to have a winch on site for an inspection, ? Or just an inspection then I can hual it in ?

Impact WQ4. Effects of Mercury Resuspension and Discharge from Suction Dredging
(Significant and Unavoidable).

I find it very interesting you base your conclusions on a recent study done at a 303 (D) site right here where I live in Nevada County. Humbug creek is probably the worse place in the state to do a study. To base conclusions from a 303 d site and apply them to every stream and river in California is ridiculous. As I stated earlier, in 30 years the amount of mercury I have found on a major river (North Yuba), would fit in a thimble. But I could fill buckets with iron, square nails, rusty metal, fishing lead, fishing lures, coins, and any other heavy metal including mercury if it were present. Have you studied how much material (including mercury if it's there) mother nature moves each winter in storms. She does this without a permit. Here is a link to a good example of Sierra Nevada floods……

"The road on the bridge was level with the business street of Downieville and within a very short time there was two to three feet of water on the street from the lower end to the Upper Plaza. At the same time homes and garages on Main Street and on homes along Main were lifted from their foundations and began to float before collapsing or being carried downstream before breaking apart from the water pressure. Some buildings were destroyed, some badly damaged. Some buildings that escaped being torn from foundations received extensive water and mud damage." 1937 !

http://www.kentuckymine.org/sierran/Sierran%20Winter%202008.pdf

Here is a link on flooding in the rivers of the Sierra Nevada Mountain range. There have been MAJOR floods in 1862, floods were noted in March 1907, January 1909, February 1911 and March 1928 (Taylor, 1913; McClure, 1925; Ellis, 1939). Snowmelt was mentioned in descriptions of both the 1907 and 1909 floods (Taylor, 1913). Before the March 1907 flood, snow was observed to have covered the entire Sacramento Valley (Ellis, 1939).

http://iahs.info/redbooks/a239/iahs_239_0059.pdf

Better documentation of streamflow and weather conditions has been available since the 1930s. Since that time, about six floods have exceeded twice the mean annual flood in each of the major rivers of the Sierra Nevada. The dates of floods exceeding this arbitrary criterion were not consistent among all rivers, but were included among the following events: December 1937, November 1950, December 1955, February 1963, December 1964, January 1980, February 1986 and March 1986.

And lets not forget recent history, the great flood of 1997. I personally talked to Mr. Al Pratti, age 94, lives in Downieville. He stated the flood waters in 1997 were greater than those of 1937 !

What does all this mean? That the amount of material, including mercury , moved by a small suction dredge is insignificant. 1,000 dredges in 100 years probably couldn't move the material mother nature does in ONE MAJOR FLOOD, all done without a permit. And she raises the water level every year. This year is NO exception, last week I was in Downieville and the Yuba River was high and murky. And what's more important, if mercury is present, a SUCTION DREDGE WILL CAPTURE IT and it is removed from the river, where as mother nature just continues to wash it downstream. (All without a permit).

While we are on the subject of FLOODS, lets talk about Chapter 4.5. Cultural Resources. This DSEIR really stretches the imagination. First of all, the FLOOD WATERS of the Yuba River have washed most Cultural Resources downstream and probably into Bullards Bar Reservoir
The same for other river systems,

From section 4.5 ……………………

Cultural resources include prehistoric archaeological resources, historic era archaeological resources, historic architectural resources, as well as paleontological resources (i.e., fossils).
The Initial Study found that the Proposed Program would have no significant impacts to historic architectural resources or paleontological resources (see Appendix B). As such, this section focuses solely on the potential impacts of suction dredge mining on historical resources,

You find the impact **as *Significant and Unavoidable, based on*** potential impacts of suction dredge mining on historical resources, There is a greater un-potential than potential !

Submerged Vessels

Potential historic era resources that are located within California's river system are submerged vessels. The California State Lands Commission maintains a Shipwreck Database that currently identifies approximately 1,550 recorded shipwrecks in California, of which about 70 are recorded in California's river system.

This is really stretching it. I'm to believe that the small streams, creeks and rivers in the Mother Lode have submerged Vessels ? Maybe the Sacramento or Yuba River in the valley, or the San Francisco Bay !

Mining Sites and Features

Other historic era resources that might be present in California's waterways are mining sites and features that are submerged within or adjacent to the state's river system. Property types include mining remains such as tailing piles and river diversions; water conveyance features such as ditches, flumes, and dams; and community remains including foundations, dugouts, and refuse deposits located along riverbanks and in the surrounding vicinity (Caltrans, 2008). Similar to submerged vessels, many of these other Gold Rush era resources are concentrated within California's Sierra Nevada foothills, but may exist anywhere within the state's waterways.

Let me explain Dredging !!!!!!!!! We do not dredge Tailing piles, we dredge IN THE RIVER.
Mother nature already leveled the tailing piles in the river along with some buildings.
We don't touch or DREDGE tailing piles on the banks !
We don't dredge river diversions, ditches, flumes. If it is a foundation (Most miners were smart enough to not build IN A RIVER) and it's cement, a dredge won't hurt it. If it's wood, mother nature already washed it away in one of the many floods. Dugouts ! I haven't seen one yet in the river! If there is a refuse deposit located along a riverbank, it is buried or mother nature would have already destroyed it and washed it away. I don't dredge into dry land on the banks, I don't dredge banks ! DREDGERS ATTEMPT to get down to the BEDROCK in the rivers where hopefully NO ONE HAS BEEN BEFORE !!!

Modern Development

California's waterways are a patchwork of both highly altered riverine systems and wild and scenic drainages that are undisturbed by modern development. The construction of dams, levees, canals, and reservoirs during modern times, whether for power generation, irrigation, flood control or transportation, have greatly altered the state's waterways, and with it, much of the surface evidence associated with the types of prehistoric and historic era sites described above. Natural processes such as flooding and erosion / deposition have also altered or destroyed many of the cultural resources found along the state's waterways.
Regardless of these natural and human made disturbances, the state's waterways remain abundant with both recorded and unrecorded cultural resources, all of which provide a detailed record of California's rich cultural heritage.

You have made my point , a quote from above………

" have greatly altered the state's waterways, and
with it, much of the surface evidence associated with the types of prehistoric and historic era sites described above."

SURFACE Evidence……….Again, dredging does NOT damage surface evidence. Only the dams and reservoirs put in by Government does. (By the way, these dams are blocking the salmon run in Mother Lode Rivers)

"Natural processes such as flooding and erosion/deposition have
also altered or destroyed many of the cultural resources found along the state's waterways"

Bingo ! It's mother nature again, NOT US DREDGERS !!!!!!!!!!!!!!!!

In all honesty, I have found a few Chinese coins, and a small 4 x 6 inch lead plate from an old print press, probably late 1800's era. Square nails ! A few worn silver coins, French and Spanish (1860-70's) AHHHH Cultural Resources! You can view these at the museum in Downieville with OTHER artifacts dredgers have recovered and donated to preserve history. So it seems we preserve more than we ever will destroy. You notice these items are heavy (metal). Makes sense.
Just like the Gold AND Mercury we remove from the river system !

Historical Resources

A significant impact could occur if suction dredge mining would cause a substantial adverse change, when considered statewide, in the significance of historical resources that are either listed or eligible for listing on the NRHP, the CRHR, or a local register of historic resources. Substantial adverse change is defined as the demolition, relocation, or alteration of a resource to the extent that the character defining features which convey its significance would be lost.

"Could occur"…………" if suction dredge mining would cause"

Your basing findings on none facts. It should read may not occur also ! It may not cause also !

"Substantial adverse change is defined as the demolition, relocation, or alteration of a resource to the extent that the character defining features which convey its significance would be lost."

Dredging doesn't demolish or relocate cultural resources. We process gravel to recover minerals ! In the water !

"Damage to, or destruction of, historically significant submerged vessels would be a potentially significant impact. Although the potential damage to or destruction of such resources resulting from dredge mining operations is unknown"

If it's unknown, how can you find the impact as ***Significant and Unavoidable ???***

AND LAST…………….

"A previous study conducted on the effects of suction dredge mining on cultural resources concluded that the activity has the potential to affect historic era resources along the creek banks during access and camping activities (USFS, 2006)."

So if it's not in the river, then those damn dredgers will walk on it and damage and destroy the cultural resources. Point the finger again ! I will have to have a talk with my friends in the USFS, (I worked for CDF)

I guess the fisherman, rafters, hikers, bears, swimmers, picture takers, mountain bikers (Downieville is the mountain biker utopia) must all float in the air so they don't destroy cultural resources.

228.5. Suction Dredge Use Classifications and Special Regulations.

My comment is that the difference from 1994 to the current proposed regulations is astounding. Before I could dredge in the spring / early summer, and was told by regulations no dredging after Oct. 15 th. Now the proposed regulations say No dredging in spring / early summer, and its OK to dredge past Oct 15 th into winter. Makes No sense, and who in their right mind is going to dredge in the winter?

In closing there is no evidence Suction Dredging harms Fish or the environment WHEN regulations are followed. Many times the DSEIR refers to may cause, or the potential to cause, or could cause. In retrospect, if it hasn't been proven, this same document should reflect the fact in that it may not cause or have the effects of being significant in any of the categories of the DSEIR

Thank you, any questions my contact is

Herb Miller
13520 Tranquility Lane
Nevada City, Calif. 95959

530 272-9137 miller@jps.net

TOM DALY
ORANGE COUNTY CLERK - RECORDER

ORANGE COUNTY
CLERK-RECORDER'S OFFICE
12 Civic Center Plaza, Room 106, P.O. BOX 238, Santa Ana, CA 92702
web: www.oc.ca.gov/recorder/
PHONE **(714) 834-5284** FAX **(714) 834-2500**

CDFG
601 LOCUST STREET
REDDING, CA 96001

Office of the Orange County Clerk-Recorder
Memorandum

SUBJECT: NOTICE OF AVAILABILITY

The attached notice was received, filed and a copy was posted on 03/07/2011

It remained posted for 30 (thirty) days.

TOM DALY
ORANGE COUNTY CLERK - RECORDER
In and for the County of Orange

By: ADRIENNE GARCIA Deputy

Public Resource Code 21092.3

The notice required pursuant to Sections 21080.4 and 21092 for an environmental impact report shall be posted in the office of the County Clerk of each county *** in which the project will be located and shall remain posted for a period of 30 days. The notice required pursuant to Section 21092 for a negative declaration shall be so posted for a period of 20 days, unless otherwise required by law to be posted for 30 days. The County Clerk shall post notices within 24 hors of receipt.

Public Resource Code 21152

All notices filed pursuant to this section shall be available for public inspection, and shall be posted *** **within 24 hours of receipt** in the office of the County Clerk. Each notice shall remain posted for a period of 30 days.
*** Thereafter, the clerk shall return the notice to the local **lead** agency *** within a notation of the period it was posted. The local **lead** agency shall retain the notice for not less than nine months.

Additions or changes by underline; deletions by ***

DFG Suction Dredge Permitting Program SEIR NOA (SCH#2005-09-2070)

Notice of Availability of a Draft Subsequent Environmental Impact Report for the Suction Dredge Permitting Program (SCH #2009112005)

NOTICE IS HEREBY GIVEN that a Draft Subsequent Environmental Impact Report (Draft SEIR) has been prepared by the California Department of Fish and Game (CDFG) for the Proposed Program described below, and is available for public review. The Draft SEIR addresses the potential environmental effects that could result from implementation of this Program. CDFG invites comments on the adequacy and completeness of the environmental analyses and mitigation measures described in the Draft SEIR. Note that pursuant to Fish and Game Code Section 711.4, CDFG is exempt from the environmental filing fee collected by County Clerks on behalf of CDFG.

PROJECT LOCATION: The scope of the Proposed Program is statewide. Suction dredging occurs in rivers, streams and lakes throughout the state of California where gold is present, and CDFG's draft suction dredge regulations identify areas throughout the state that would be open or closed to suction dredging. Most dredging takes place in streams draining the Sierra Nevada, Klamath Mountains, and San Gabriel Mountains. Suction dredging may also occur to a lesser extent in other parts of the state. Because suction dredging may occur throughout the state, it is possible that the activity could occur in a hazardous waste site or listed toxic site.

PROJECT DESCRIPTION AND ENVIRONMENTAL REVIEW: The Proposed Program, as analyzed in this Draft SEIR, is the issuance of permits and suction dredge activities conducted in compliance with these permits, consistent with CDFG's proposed amendments to the existing regulations governing suction dredge mining in California. The environmental assessment of the Program was developed in parallel with amendments to the previous regulations governing suction dredge mining throughout California. To most accurately reflect the environmental effects of the Program, the DSEIR includes an assessment of the suction dredge activities as well as the proposed amendments to the previous regulations.

four alternatives: a No Program Alternative (continuation of the existing moratorium); a 1994 Regulations Alternative (continuation of previous regulations in effect prior to the 2008 moratorium); a Water Quality Alternative (which would include additional Program restrictions for water bodies listed as impaired pursuant to the Clean Water Act Section 303(d) for sediment and mercury); and a Reduced Intensity Alternative (which would include greater restrictions on permit issuance and methods of operation to reduce the intensity of environmental effects).

The analysis found that significant environmental effects could occur as a result of the Proposed Program (and several of the Program alternatives), specifically in the areas of water quality and toxicology, noise, and cultural resources. However, as CDFG does not have the jurisdictional authority to mitigate impacts to these resources, such impacts have been identified as significant and unavoidable.

POSTED

MAR 0 7 2011

TOM DALY, CLERK-RECORDER

By________________ DEPUTY

DFG Suction Dredge Permitting Program SEIR NOA (SCH#2005-09-2070)

PUBLIC REVIEW: The Draft SEIR and supporting documents are available on the CDFG Program website (http://www.dfg.ca.gov/suctiondredge) and upon request at 530-225-2275. Copies of the Draft SEIR are available to review at the following county libraries and CDFG offices:

- 601 Locust Street, Redding
- 1701 Nimbus Road, Suite A, Rancho Cordova
- 1807 13th Street, Suite 104, Office of Communications, Sacramento
- 7329 Silverado Trail, Napa
- 1234 E. Shaw Avenue, Fresno
- 4949 Viewridge Avenue, San Diego
- 4665 Lampson Avenue, Suite J, Los Alamitos
- 3602 Inland Empire Blvd, Suite C-220, Ontario
- 20 Lower Ragsdale Drive, Suite 100, Monterey
- County libraries (please see web page listed above for list of County libraries)

PUBLIC COMMENT: Written comments should be received during the public review period which begins on February 28, 2011 and ends at 5 p.m. on April 29, 2011. Comments must be postmarked or received by April 29, 2011. Please mail, email, or hand deliver comments to CDFG at: Suction Dredge Program Draft SEIR Comments, Department of Fish and Game, 601 Locust Street, Redding, CA 96001, Written comments may also be submitted by email: dfgsuctiondredge@dfg.ca.gov (Please include the subject line: Suction Dredge Program Draft SEIR Comments) or by going to the Program website at (http://www.dfg.ca.gov/suctiondredge). All comments received including names and addresses, will become part of the official public record.

PUBLIC HEARINGS: All interested persons are encouraged to attend the public hearings to present written and/or verbal comments. Five hearings will be held at the following locations and times:

Santa Clarita: Wednesday, March 23, 2011 at 5 p.m. at the Residence Inn by Marriott, 25320 The Old Road, Santa Clarita, CA 91381

Fresno: Thursday, March 24, 2011 at 5 p.m. at the CA Retired Teachers Association, 3930 East Saginaw Way, Fresno, CA 93726

Sher Room, 1001 – I Street, Sacramento, CA 95812

Yreka: Wednesday, March 30, 2011 at 5 p.m. at the Yreka Community Center, 810 North Oregon Street, Yreka, CA 96097

Redding: Thursday, March 31, 2011 at 5 p.m. at Shasta Senior Nutrition Program, 100 Mercy Oaks Drive, Redding, CA 96003

If you require reasonable accommodation or require this notice or the DSEIR in an alternate format, please contact the Suction Dredge Program at (530) 225-2275, or the California Relay (Telephone) Service for the deaf or hearing-impaired from TDD phones at 1-800-735-2929 or 711.

POSTED

MAR 0 7 2011

TOM DALY, CLERK-RECORDER

By________________ DEPUTY

SUCTION DREDGE PERMITTING PROGRAM
Subsequent EIR - CEQA Scoping Comment Form

Name: LONNIE RANDALL
Mailing Address: P.O. Box 343 Brownsvalley, CA. 95918

Telephone No. (optional):

Email (optional):

Comments/Issues:

The majority of dredging takes place above the dams. There is no way for the salmon to get past these dams. The dredging in these areas no way effects the salmon.

Please use additional sheets if necessary.

Subject: No Dredging in California's Waterways
Date: Thursday, May 5, 2011 2:51:49 PM PT
From: John Ritchie (sent by Defenders of Wildlife <ecommunications@defenders.org>)
To: dfgsuctiondredge@dfg.ca.gov

May 5, 2011

California Department of Fish and Game Section Dredge Program
CA

Dear Section Dredge Program,

As a California resident and someone who has worked in the dredgin industry, I am concerned about the California Department of Fish and Game's regulations on surface dredge gold mining in our waterways. Dredging has its place in necessary engineering and maintenance of harbors and
crucial infrastructure. It is hugely destrictive and would devastate the river ecosystems ... and for what, some more special interest greed.

Another grave concern about this type of mining is that potential to release mercury into our water. The mercury that can be released once the dredged material is put back into the waterways could harm animals, fisheries and our drinking water.

I support stronger regulations that can actually be monitored by the Department of Fish and Game, but your current proposal does not adequately do this.

Animals that call our waterways home could be in big trouble, along with current and future recovery projects.

Please protect our river ecosystems and our water quality and amend the dredging regulations to ensure adequate protection of our wildlife and the sources of our drinking water.

Sincerely,

Mr. John Ritchie
5628 Lodi St
San Diego, CA 92117-1140

Mark Stopher
California Department of Fish and Game
Suction Dredge Program Draft SEIR Comments
601 Locust Street
Redding, CA 96001

Please take notice that I am the owner of the Big Bum claim, located on Indian Creek in Siskiyou County (Bureau of Land Management CAMC # 293814). I have reviewed your proposed regulations for suction dredging, which appear to forbid any and all suction dredge mining on my claim. Because suction dredging is the only practical method of mining the valuable underwater gold deposits on this claim, you are proposing to forbid all mining on my claim.

This is a violation of federal law forbidding material interference with my federally-protected mineral rights, and also constitutes an unconstitutional taking of my private property without just compensation.

I urge you to reconsider your proposed regulations. This area had strong fish runs for decades during and after hydraulic and other large scale mining, and there is no credible case whatsoever for harm to fish from small-scale suction dredging operations. A single fisherman with a good day on the river causes more damage to fish than all the suction dredge miners put together, and you allow the fishing. Focusing environmental regulation on an activity like suction dredging, which actually improves fish habitat, discredits your regulatory role generally.

If you do not reconsider, and allow me to mine my claim, you may rest assured that I and other miners will hold you accountable in the courts for your outrageously unlawful and arbitrary decisions.

Sincerely,

Kari Silver 28834 Selfridge Dr., Malibu, CA 90265

Mark Stopher
California Department of Fish and Game
Suction Dredge Program Draft SEIR Comments
601 Locust Street
Redding, CA 96001

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[signature] 28834 Selfridge Dr., Malibu, CA 90265

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California Department of Fish and Game
Suction Dredge Program Draft SEIR Comments
601 Locust Street
Redding, CA 96001

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If you do not reconsider, and allow me to mine my claim, you may rest assured that I and other miners will hold you accountable in the courts for your outrageously unlawful and arbitrary decisions.

Sincerely,

Steve Silver

28834 SELFRIDGE DR.
MALIBU CA # 90265

050511_SRRC

Salmon River Restoration Council

PO Box 1089♦25631 Sawyers Bar Rd ♦ Sawyers Bar, CA 96027
Email: info@srrc.org ♦ webpage: www.srrc.org
Phone: (530) 462-4665 ♦ fax: (530)462-4664

May 5, 2011

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Subject: Draft SEIR for Suction Dredge Permitting Program.

To: California Department of Fish and Game
From: Salmon River Restoration Council

Dear Mr. Stopher:

Thank you for this opportunity to provide comments and feedback on the Draft SEIR for Suction Dredge Permitting. The Salmon River Restoration Council (SRRC) strives to assess, protect, restore and maintain the Salmon River ecosystem and in particular its anadromous fisheries resources.

The Salmon River supports a diverse anadromous fishery of fall and spring run Chinook salmon, coho salmon, summer and winter run steelhead, Pacific lamprey, and green sturgeon. It hosts all runs of sensitive and threatened anadromous fish found in the entire Klamath River system and retains the largest (and likely *only* non-hatchery influenced) remaining wild run of spring Chinook in the Klamath watershed.

The Salmon River is recognized as an important fish refugia and maintains a remnant repository of Klamath River fish genetics. Maintaining the health and vibrancy of the Salmon River's fishery is vital to the restoration of the troubled Klamath River fishery.

The SRRC has been collecting extensive fisheries data on the Salmon River for many years. I am attaching several spreadsheets of data and reports that seem pertinent to this program. Additional fisheries reports are available on our website at:
http://www.srrc.org/publications/index.php

Comment 1: The SEIR assumes that Salmon River's distinct metapopulation of KTR spring-run Chinook is not limited enough in number or geographic distribution to warrant consideration of impacts to individual fish and potentially affecting the species and the population and range level. The SEIR states that: *"CDFG did not consider impacts to individual members of a population to be significant, unless the species was extremely rare."*(4.3-23 line 26)

The Salmon River's KTR spring-run Chinook are a distinct wild metapopulation (Barnhart 1994), different from the Trinity River's hatchery-influenced stock. In fact, the Salmon River's stock is the largest wild run of spring Chinook in the entire Klamath River system (West 1991) and one of the last in California (Moyle 2002). In 8 years of conducting spring-run Chinook spawning surveys in the Salmon River, the SRRC has found only 2 fin-clipped fish, suggesting that there is little to no crossover between the Salmon River and Trinity River spring-run Chinook. See attached SRRC spring Chinook carcass data.

Thirty years of Salmon River spring-run Chinook census population surveys between 1980 and 2010 prove that this species is rare and very limited in distribution. Total census population numbers of adult spring Chinook in the Salmon River have ranged between 78 and 1,304 individuals. Outside of the Trinity River's hatchery influenced stock, only a handful of wild spring-run Chinook are found each year in Klamath River tributaries other than the Salmon River. Elder et al. (2002) concluded that Salmon River spring-run Chinook escapement is low enough to place the population at elevated risk of significant mortality due to stochastic events in many years. Nehlsen et al. (1991) classify the greater Klamath River spring-run Chinook as being at "high risk of extinction." See attached Spring Chinook population data.

Given these critical numbers, any additional stress to Salmon River KTR spring-run Chinook—including impacts to individual fish, holding habitat, spawning substrate, etc.—is likely to adversely affect the run at a population- or range-level and pose deleterious effects to these fish.

It is our observation the main areas of summer holding and spawning habitat on the North Fork and South Fork Salmon coincide with what are commonly the highest use dredge areas in the Salmon River watershed.

Comment 2: The proposed program does not avoid adverse spacial and temporal impacts for Salmon River KTR spring-run Chinook.

The SEIR states that, *"the Proposed Program incorporates spatial and temporal restrictions on suction dredging activities that are based on life history, distribution and abundance of Fish action species. This includes restrictions on suction dredging in the period immediately before spawning and during critical early life stages (i.e., spawning, incubation, and early emergence) of Fish action species (Table 4.3-1). Streams within the state that provide habitat for Fish species that are either very limited in number and/or distribution are proposed to be closed to suction dredging (Class A), or closed during critical spawning periods."* (SEIR 4.3-24)

In the case of KTR spring-run Chinook in the Salmon River watershed, the life history, abundance, and distribution of the fish are improperly accounted for in the spatial and temporal restrictions proposed by CDFG. The Class F suction dredging season (July 1 – Sept. 30) overlaps a minimum of two weeks with the well-documented start of spring-run Chinook spawning season beginning on the Salmon River no later than mid-September. The SRRC has documented spring-run Chinook spawning as early as September 14th, and regularly observes spawning occurring in the 3rd week of September. Since we don't begin our surveying until mid-September, it is probable that spawning begins earlier than we have documented during some years. See attached SRRC spring Chinook redd data. There is therefore no restriction on suction dredging "in the period immediately *before* spawning" (which would be late August or early September for the Salmon River KTR spring-run Chinook). Dredging will be permitted concurrently with the spawning of Salmon River KTR spring-run Chinook.

Comment 3: The proposed program does not avoid adverse impacts to thermal refugia for Salmon River KTR spring-run Chinook, because many documented thermal refugia have been omitted from the list of areas closed to dredging.

The SEIR states that, *"unrestricted dredging of thermal refugia utilized by Chinook salmon in the Klamath and Salmon River watersheds could result in a substantial decline of the species, alteration of thermal refugia habitat, and affect movement of the species within summer holding areas. However, the Proposed Program regulations include specific year-round closures of areas within streams that are known to provide thermal refugia for this species (Appendix L). Closures of these areas, and appropriate buffers in the upstream direction, will provide protection for this type of habitat."* (SEIR 4.3-41)

Salmon River thermal refugia with holding habitat that have been documented both on the ground and/or by airborne remote sensing surveys but are omitted from the SEIR's Appendix L ("Species Based Restrictions On Proposed Program Activities") include:

1. Wooley Creek confluence with mainstem Salmon River [*†]
2. Tom Payne Creek confluence with mainstem Salmon River [†]
3. Grants Creek confluence with mainstem Salmon River [†]
4. Morehouse Creek confluence with mainstem Salmon River [*†]
5. Lewis Creek confluence with mainstem Salmon River [*†]
6. Springs at Bloomer Falls on mainstem Salmon River [*]
7. Crapo Creek confluence with mainstem Salmon River [*†]
8. Knownothing Creek confluence with SF Salmon River [*†]
9. Hotelling Creek confluence with SF Salmon River [*]
10. Black Bear Creek [*†‡]
11. Indian Creek confluence with SF Salmon River [*]
12. East Fork of the SF Salmon River confluence with SF Salmon River [*†]
13. Cronan Gulch confluence with NF Salmon River [*†‡]
14. Olsen Gulch confluence with NF Salmon River [*]
15. Glasgow Creek confluence with NF Salmon River [*†]
16. Whites Gulch confluence with NF Salmon River [*†‡] (SRRC 2005 thermal refugia survey documented dredge tailings filling in much of the pool)
17. North Russian Creek confluence with NF Salmon River [*†‡]
18. South Russian Creek confluence with North Russian Creek (NF Salmon drainage) [*†‡]

* = identified by Salmon River Restoration Council's Thermal Refugia Surveys, 2004 & 2005
† = identified by Salmon River Basin Thermal Infrared (TIR) Survey, 2009
‡ = coho present in refugia during Salmon River Restoration Council's Thermal Refugia Survey, 2005
All data from Salmon River Restoration Council, PO Box 1089, Sawyers Bar, CA, (530) 462-4665

Not all thermal refugia occur at mouths of cooler tributary streams. Interactions with groundwater and hyporheic flows also provide important cool water sources. Several such areas can be seen in the data from a thermal infrared remote sensing survey of the Salmon River and its forks conducted by Watershed Sciences, Inc. in 2009. In some areas (such as below the Little North Fork's confluence) substantial effects from these subsurface flows can be seen for long reaches. It is probable that there are further important thermal refugia that we have not yet identified. We have not done a thorough analysis of the Thermal Infrared Survey data to locate additional potential refugial areas. SRRC is willing to provide the GIS layers from the TIR survey to CDFG upon request. The summery report is attached.

Of particular concern in the list of refugial areas not identified in the SEIR are the confluences of Wooley Creek and Crapo Creek on the mainstem Salmon River, and Knownothing Creek on the South Fork Salmon River. These are well documented spring-run Chinook holding pools. The SRRC considers them to be some of the most important summer holding habitat in the Salmon River. The reach above and below Crapo Creek should be given extra consideration since it sees frequent summer dredging activity, and is one of the most visible and highly used spring-run Chinook holding pools in the Salmon River. The oversite of the confluence of Whites Gulch with the mouth of the North Fork as a thermal refugia is also of concern, as it is important spring-run Chinook holding and spawning habitat, as well as having documented coho presence. It also sees a high occurrence of dredging on an annual basis.

Recommendations:

The SRRC recommends that the SEIR should more thoroughly analyze the impacts to the Salmon River's metapopulation of KTR spring-run Chinook, taking into extra consideration the recent decision by NMFS to conduct an Endangered Species Act Status Review of Upper Klamath and Trinity Rivers ESU Chinook, and their interim designation as a candidate species.

We also recommend reassessing the special and temporal impacts to Salmon River spring-run Chinook, given that the proposed Class F dredging season for the Salmon River overlaps spawning season by at least two full weeks.

All thermal refugia listed above that were omitted from the SEIR's Appendix L should have a Class A closure with an effective 500 foot closure area. The confluences of Wooley Creek, Crapo Creek, Knownothing Creek and Whites Gulch should be given extra consideration. CDFG should closely review the July 2009 Salmon River TIR data (available from SRRC upon request) to identify all areas where hyporheic thermal refugia are likely to exist and close these areas to dredging.

Sincerely,

Lyra Cressey

Lyra Cressey, Associate Director

References

Barnhart, R. A. 1994. Salmon and steelhead populations of the Klamath-Trinity Basin, California. pp. 73-97 In: T. J. Hassler (ed.) Klamath Basin Fisheries Symposium. Humboldt State University. Arcata, CA.

Elder, D., B. Olson, A. Olson, J. Villeponteaux, and P. Brucker. 2002. Salmon River Sub-basin Restoration Strategy: Steps to Recovery and Conservation of Aquatic Resources. Report for Klamath River Basin Fisheries Restoration Task Force, IA Agreement No. 14-48-11333-98-H019: 52 pp.
http://www.srrc.org/publications/general/SRRC%20Salmon%20River%20Subbasin%20Restoration%20Strategy.pdf

Moyle, P. B. 2002. Inland Fishes of California. Revised and expanded. University of California Press. Berkley, CA.: 502 pp.

Nehlsen, W., J.E. Williams, and J.A. Lichatowich. 1991. Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington. Fisheries, Vol. 16, No. 2. pps 4-21.
http://www.krisweb.com/krisrussian/krisdb/html/krisweb/biblio/gen_afs_nehlsenetal_1991.pdf

West, John R. 1991. A Proposed Strategy to Recover Endemic Spring-Run Chinook Salmon Populations and Their Habitats in the Klamath River Basin, USDA Forest Service, Klamath National Forest, 1312 Fairlane Road, Yreka, CA 96097
http://www.krisweb.com/biblio/klamath_usfs_west_1991.pdf

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1980			1981			1982		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	353	547 b/	900	95	2,405	2,500	150	1,226	1,376
Natural Spawners									
Klamath River Basin									
Salmon River	0	65 a/	65	0	28	28	0	20	20
Misc. Tribs.				0	4 e/	4	0	5	5
Trinity River Basin									
Above JCW, excluding TRH	1,312	1,614 b/	2,926	242	3,362	3,604	387	3,868	4,255
South Fork		200	200			0		161	161
Misc. Tribs.		49 d/	49			0		8	8
Subtotals	1,312	1,928	3,240	242	3,394	3,636	387	4,062	4,449
Total Spawner Escapement	1,665	2,475	4,140	337	5,799	6,136	537	5,288	5,825

RIVER HARVEST

	1980			1981			1982		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe				0	1,717	1,717	0	2,440	2,440
Angler									
Trinity River Basin									
Hoopa Tribal Harvest				0	1,090	1,090	0	715	715
Angler	284	140	424	10	2,146	2,156	119	637	756
Total River Harvest	284	140	424	10	4,953	4,963	119	3,792	3,911

RUN-SIZE ESTIMATES

	1980			1981			1982		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	1,949	2,615	4,564	347	10,752	11,099	656	9,080	9,736

a/ 1980-88 Index reach counts only.

(Continued next page)

b/ CDFG Trinity Basin Salmon and Steelhead Monitoring Project Annual Reports, 1999-2005 Season.

c/ Full Habitat Dive Survey Counts 1990-2005 / (Includes grilse.)

d/ New River, North Fork Trinity, Canyon Creek (All streams not surveyed each year.)

e/ Clear, Indian, and Elk Creeks.

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1983			1984			1985		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Hatchery Spawners									
Trinity River Hatchery (TRH)	385	930	1,315	76	736	812	508	2,645	3,153
Natural Spawners									
Klamath River Basin									
Salmon River								45	45
Misc. Tribs.		6	6		16	16		5	5
Trinity River Basin									
Above JCW, excluding TRH				140	1,345	1,485	799	4,897	5,696
South Fork								100	100
Misc. Tribs.		39	39		25	25		29	29
Subtotals		45	45	140	1,386	1,526	799	5,076	5,875
Total Spawner Escapement	385	975	1,360	216	2,122	2,338	1,307	7,721	9,028

RIVER HARVEST

	1983			1984			1985		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe		510	510		247	247		1,074	1,074
Angler									
Trinity River Basin									
Hoopa Tribal Harvest		75	75		380	380		1,000	1,000
Angler				39	375	414	127	736	863
Total River Harvest	0	585	585	39	1,002	1,041	127	2,810	2,937

RUN-SIZE ESTIMATES

	1983			1984			1985		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	385	1,560	1,945	255	3,124	3,379	1,434	10,531	11,965

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1986			1987			1988		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	1,461	7,083	8,544	1,387	8,466	9,853	377	13,905	14,282
Natural Spawners									
Klamath River Basin									
Salmon River		88	88		64	64		179	179
Misc. Tribs.					2	2		8	8
Trinity River Basin									
Above JCW, excluding TRH	4,335	13,371	17,706	2,577	29,083	31,660	241	39,329	39,570
South Fork		183	183		153	153		59	59
Misc. Tribs.								273	273
Subtotals	4,335	13,642	17,977	2,577	29,302	31,879	241	39,848	40,089
Total Spawner Escapement	5,796	20,725	26,521	3,964	37,768	41,732	618	53,753	54,371

RIVER HARVEST

	1986			1987			1988		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	0	692	692	0	1,646	1,646	0	2,918	2,918
Angler							104	44	148
Trinity River Basin									
Hoopa Tribal Harvest	0	2,022	2,022	0	4,146	4,146	0	2,727	2,727
Angler	1,222	2,949	4,171	894	8,467	9,361	102	8,738	8,840
Total River Harvest	1,222	5,663	6,885	894	14,259	15,153	206	14,427	14,633

RUN-SIZE ESTIMATES

	1986			1987			1988		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	7,018	26,388	33,406	4,858	52,027	56,885	824	68,180	69,004

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1989			1990			1991		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	17	4,983	5,000	104	2,433	2,537	71	614	685
Natural Spawners									
Klamath River Basin									
Salmon River			0		179 c/	179		187	187
Misc. Tribs.		9	9						0
Trinity River Basin									
Above JCW, excluding TRH	435	18,241	18,676	126	2,880	3,006	92	1,268	1,360
South Fork		33	33		82	82		66	66
Misc. Tribs.		17	17		32	32		5	5
Subtotals	435	18,300	18,735	126	3,173	3,299	92	1,526	1,618
Total Spawner Escapement	452	23,283	23,735	230	5,606	5,836	163	2,140	2,303

RIVER HARVEST

	1989			1990			1991		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	0	4,745	4,745	0	1,413	1,413	0	283	283
Angler	0	145	145	0	17	17	17	91	108
Trinity River Basin									
Hoopa Tribal Harvest	0	1,978	1,978	0	865	865	0	263	263
Angler	50	2,580	2,630	35	810	845	27	309	336
Total River Harvest	50	9,448	9,498	35	3,105	3,140	44	946	990

RUN-SIZE ESTIMATES

	1989			1990			1991		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	502	32,731	33,233	265	8,711	8,976	207	3,086	3,293

c/ Full Habitat Dive Survey Counts 1990-2005 / (Includes grilse.)

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1992			1993			1994		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	533	1,313	1,846	31	2,630	2,661	944	1,943	2,887
Natural Spawners									
Klamath River Basin									
Salmon River		370	370		309	309		755	755
Misc. Tribs.						0		1	1
Trinity River Basin									
Above JCW, excluding TRH	944	942	1,886	37	2,111	2,148	550	2,897	3,447
South Fork		166	166		284	284		243	243
Misc. Tribs.		18	18		52	52		11	11
Subtotals	944	1,496	2,440	37	2,756	2,793	550	3,907	4,457
Total Spawner Escapement	1,477	2,809	4,286	68	5,386	5,454	1,494	5,850	7,344

RIVER HARVEST

	1992			1993			1994		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	0	396	396	0	550	550	0	501	501
Angler	0	17	17	0	0	0	96	0	96
Trinity River Basin									
Hoopa Tribal Harvest	0	346	346	0	228	228	0	255	255
Angler	194	104	298	0	423	423	299	155	454
Total River Harvest	194	863	1,057	0	1,201	1,201	395	911	1,306

RUN-SIZE ESTIMATES

	1992			1993			1994		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	1,671	3,672	5,343	68	6,587	6,655	1,889	6,761	8,650

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1995			1996			1997		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	385	8,722	9,107	119	5,131	5,250	225	4,892	5,117
Natural Spawners									
Klamath River Basin									
Salmon River		1,485	1,485		1,244	1,244		1,276	1,276
Misc. Tribs.		2	2		2	2			0
Trinity River Basin									
Above JCW, excluding TRH			0	370	16,283	16,653	543	13,049	13,592
South Fork		579	579		1,097	1,097		655	655
Misc. Tribs.		71	71		73	73		49	49
Subtotals	0	2,137	2,137	370	18,699	19,069	543	15,029	15,572
Total Spawner Escapement	385	10,859	11,244	489	23,830	24,319	768	19,921	20,689

RIVER HARVEST

	1995			1996			1997		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	0	2,592	2,592	0	5,905	5,905	0	5,440	5,440
Angler	206	258	464	264	406	670	227	559	786
Trinity River Basin									
Hoopa Tribal Harvest	0	1,175	1,175	0	1,182	1,182	0	1,250	1,250
Angler				0	1,513	1,513	0	1,330	1,330
Total River Harvest	206	4,025	4,231	264	9,006	9,270	227	8,579	8,806

RUN-SIZE ESTIMATES

	1995			1996			1997		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	591	14,884	15,475	753	32,836	33,589	995	28,500	29,495

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	1998			1999			2000		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	184	4,679	4,863	547	3,671	4,218	571	11,594	12,165
Natural Spawners									
Klamath River Basin									
Salmon River		265	265		436	436		230	230
Misc. Tribs.		2	2		14	14		6	6
Trinity River Basin									
Above JCW, excluding TRH	567	9,057	9,624	440	5,968	6,408	1,264	10,846	12,110
South Fork		172	172		175	175		256	256
Misc. Tribs.		33	33		15	15		17	17
Subtotals	567	9,529	10,096	440	6,608	7,048	1,264	11,355	12,619
Total Spawner Escapement	751	14,208	14,959	987	10,279	11,266	1,835	22,949	24,784

RIVER HARVEST

	1998			1999			2000		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe		2,338	2,338		2,392	2,392		3,207	3,207
Angler	19	393	412	41	604	645	39	122	161
Trinity River Basin									
Hoopa Tribal Harvest		426	426		776	776	17	1,347	1,364
Angler	51	1,629	1,680	41	626	667	324	1,483	1,807
Total River Harvest	70	4,786	4,856	82	4,398	4,480	380	6,159	6,539

RUN-SIZE ESTIMATES

	1998			1999			2000		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	821	18,994	19,815	1,069	14,677	15,746	2,215	29,108	31,323

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	2001			2002			2003		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	629	6,366	6,995	617	10,440	11,057	130	14,512	14,642
Natural Spawners									
Klamath River Basin									
Salmon River		387	387	27	975	1,002	25	1,220	1,245
Misc. Tribs.	1	1	2	2	2	4	0	1	1
Trinity River Basin									
Above JCW, excluding TRH	1,178	10,284	11,462	1,888	23,745	25,633	919	33,301	34,220
South Fork		166	166	0	348	348	12 f/	148 f/	160 f/
Misc. Tribs.		14	14	8	16	24	1	93	94
Subtotals	1,179	10,852	12,031	1,925	25,086	27,011	957	34,763	35,720
Total Spawner Escapement	1,808	17,218	19,026	2,542	35,526	38,068	1,087	49,275	50,362

RIVER HARVEST

	2001			2002			2003		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe		14,890	14,890	127	12,139	12,266	93	6,597	6,690
Angler	65	833	898	61	751	812	20	226	246
Trinity River Basin									
Hoopa Tribal Harvest	46	4,164	4,210	40	3,192	3,232	7	2,377	2,384
Angler	258	906	1,164	75	1,796	1,871	0	2,033	2,033
Total River Harvest	369	20,793	21,162	303	17,878	18,181	120	11,233	11,353

RUN-SIZE ESTIMATES

	2001			2002			2003		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	2,177	38,011	40,188	2,845	53,404	56,249	1,207	60,508	61,715

f/ Includes Hayfork Creek.

(Continued next page)

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates
1980-2009

SPAWNER ESCAPEMENT

	2004			2005			2006		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	985	5,251	6,236	34	6,956	6,990	819	2,565	3,384
Natural Spawners									
Klamath River Basin									
Salmon River	101	338	439	12	78	90	83	233	316 j/
Misc. Tribs.	1	2	3	1	8	9	0	1	1
Trinity River Basin									
Above JCW, excluding TRH	1,390	5,699	7,089	44	7,084	7,128	1,127	2,955	4,082
South Fork	14	45	59	11	61	72 f/	8	138	146 f/
Misc. Tribs.	12	12	24	2	4	6 h/	42	70	112 i/
Subtotals	1,518	6,096	7,614	70	7,235	7,305	1,260	3,397	4,657
Total Spawner Escapement	2,503	11,347	13,850	104	14,191	14,295	2,079	5,962	8,041

RIVER HARVEST

	2004			2005			2006		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	15	3,595	3,610	0	2,258	2,258	47	2,671	2,718
Angler	16	17	33 g/	9	84	93 g/	123	35	158 g/
Trinity River Basin									
Hoopa Tribal Harvest	62	1,944	2,006	17	1,858	1,875	58	1,632	1,690
Angler	145	421	566	0	691	691	21	0	21 k/
Total River Harvest	238	5,977	6,215	26	4,891	4,917	249	4,338	4,587

RUN-SIZE ESTIMATES

	2004			2005			2006		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	2,741	17,324	20,065	130	19,082	19,212	2,328	10,300	12,628

f/ Includes Hayfork Creek.

(Continued next page)

g/ From spring chinook CWTs recovered in CDFG fall chinook sport angler surveys. CDFG surveys began about August 6 each year.

h/ Totaled from Summary2005.xls

i/ New River above confluence of East Fork not surveyed due to forest fires.

j/ Due to fire closure on USDA-FS lands these numbers were derived from expansion using a combination of partial surveys and historic numbers.

k/ Includes Hoopa creel below Willow Creek weir and estimated harvest above Junction City weir

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates 1980-2009

SPAWNER ESCAPEMENT

	2007			2008			2009		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)	55	5,981	6,036	329	3,437	3,766	69	3,000	3,069
Natural Spawners									
Klamath River Basin									
Salmon River	80	831	911	367	945	1,312	116	527	643
Misc. Tribs.			0			0			0
Trinity River Basin									
Above JCW, excluding TRH	80	8,154	8,234	1,741	4,470	6,211	184	3,709	3,893
South Fork	4	202	206			0 [l]			118
Misc. Tribs.	4	46	50			0 [l]			95
Subtotals	168	9,233	9,401	2,108	5,415	7,523	300	4,236	4,749
Total Spawner Escapement	223	15,214	15,437	2,437	8,852	11,289	369	7,236	7,818

RIVER HARVEST

	2007			2008			2009		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe	0	4,494	4,494	9	2,020	2,029	2	1,760	1,762
Angler[g]	25	72	97	174	74	248	11	37	48
Trinity River Basin									
Hoopa Tribal Harvest	66	1,349	1,415	77	1,327	1,404	74	1,764	1,838
Angler[m]	0	565	565	148	158	306	0	442	442
Total River Harvest	91	6,480	6,571	408	3,579	3,987	87	4,003	4,090

RUN-SIZE ESTIMATES

	2007			2008			2009		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	314	21,694	22,008	2,845	12,431	15,276	456	11,239	11,908

g/ From spring chinook CWTs recovered in CDFG fall chinook sport angler surveys. CDFG surveys began about August 6 each year.
i/ New River above confluence of East Fork not surveyed due to forest fires.
l/ Due to fire closure on USDA-FS lands these numbers were not obtained (no dives took place).
m/ Above JC weir, numbers derived from tag returns.

Klamath River Basin Spring Chinook Salmon Spawner Escapement, River Harvest and Run-size Estimates 1980-2009

SPAWNER ESCAPEMENT

	2010			2011			2012		
Hatchery Spawners	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Trinity River Hatchery (TRH)			0			0			0
Natural Spawners									
Klamath River Basin									
Salmon River	**271**	**1,004**	**1,275**			0			0
Misc. Tribs.			0			0			0
Trinity River Basin									
Above JCW, excluding TRH			0			0			0
South Fork			0			0			0
Misc. Tribs.			0			0			0
Subtotals	**271**	**1,004**	**1,275**	0	0	0	0	0	0
Total Spawner Escapement	**271**	**1,004**	**1,275**	0	0	0	0	0	0

RIVER HARVEST

	2010			2011			2012		
Harvest	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Klamath River Basin									
Yurok Tribe			0			0			0
Angler			0			0			0
Trinity River Basin									
Hoopa Tribal Harvest			0			0			0
Angler			0			0			0
Total River Harvest	0	0	0	0	0	0	0	0	0

RUN-SIZE ESTIMATES

	2010			2011			2012		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Total Run-size Estimates	**271**	**1,004**	**1,275**	0	0	0	0	0	0

f/ Includes Hayfork Creek.

(Continued next page)

g/ From spring chinook CWTs recovered in CDFG fall chinook sport angler surveys. CDFG surveys began about August 6 each year.

h/ Totaled from Summary2005.xls

i/ New River above confluence of East Fork not surveyed due to forest fires.

j/ Due to fire closure on USDA-FS lands these numbers were derived from expansion using a combination of partial surveys and historic numbers.

k/ Includes Hoopa creel below Willow Creek weir and estimated harvest above Junction City weir

l/ Due to fire closure on USDA-FS lands these numbers were not obtained (no dives took place).

	CONTACT NAME	EMAIL
SPAWNER ESCAPEMENT		
Hatchery Spawners		
Trinity River Hatchery (TRH)	CDFG-Mary Claire Kier	mckier@dfg.ca.gov
Natural Spawners		
Klamath River Basin		
Salmon River	Petey Brucker	pbrucker@srrc.org
	Rebecca M Quinones	rquinones@fs.fed.us
Misc. Tribs.	John Grunbaum - Happy Camp	jgrunbaum@fs.fed.us
	LeRoy Cyr - Orleans	lcyr@fs.fed.us
	Toz Soto from Karuk	tsoto@karuk.us
	CDFG Chesney (for Scott)]	dchesney@dfg.ca.gov
Trinity River Basin		
Above JCW, excluding TRH	CDFG-Mary Claire Kier	mckier@dfg.ca.gov
South Fork	CDFG-Andrew Hill	ahill@dfg.ca.gov
Misc. Tribs.	USFS	
HARVEST		
Klamath River Basin		
Yurok Tribe	YTF-Desma Williams	dwilliams@yuroktribe.nsn.us
Angler	CDFG-Sara Borok	sborok@dfg.ca.gov
Trinity River Basin		
Hoopa Tribal Harvest	HVT-Billy Matilition	bmatilton@hoopa-nsn.gov
Angler (above JCW only)	CDFG - Mary Claire Kier	mckier@dfg.ca.gov

Footnotes

a/ 1980-88 Index reach counts only

b/ CDFG Trinity Basin Salmon and Steelhead Monitoring Project Annual Reports, 1999 - 2006

c/ Full habitat dive survey counts 19990-2005 (includes grilse)

d/ New River, North Fork Trinity, Canyon Creek (all streams not surveyed each year)

e/ Clear, Indian, and Elk Creeks

f/ Includes Hayfork Creek

g/ From spring chinook CWTs recovered in CDFG fall chinook sport angler surveys. Surveys begin about August 6 each year. In 1999 based on creel survey by YTF until beginning of CDFG survey.

h/ Totaled from Summary 2005.xls

i/ New River above confluence of East Fork not surveyed due to forest fire

j/ Due to fire closure on USDA-FS lands these numbers were derived from expansion using a combination of partial surveys and historic numbers.

k/ Includes Hoopa creel below Willow Creek weir and estimated harvest above Junction City weir

l/ Due to fire closure on USDA-FS lands these numbers were not obtained (no dives took place).

m/ Only above JC weir, numbers derived from tag returns.

SRRC Weak Stocks Cooperative Spring Chinook Survey Carcass Data Tables '03

Total percentage of Spring Chinook carcasses with signs of Columnaris Infection= 53%

Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C. Shasta

#	Species:	Sex M/F	Fork Length	Spawned Y/N	Scales Y/N	Fin Clip Y/N	Otilith Y/N	Tissue Y/N	Scar #	Disease #
1	KS	M	77	Y	Y	N	N	N	/	N
2	KS	M	83	Y	Y	N	N	N	/	1
3	KS	M	65	Y	Y	N	N	N	/	1
4	KS	F	72	Y	N	N	N	N	/	N
5	KS	M	96	Y	Y	N	N	N	/	N
6	KS	F	75	Y	Y	N	N	N	/	N
7	KS	F	88	Y	Y	N	N	N	/	1
8	KS	M	85	Y	Y	N	N	N	/	1
9	KS	F	73	Y	Y	N	N	N	/	N
10	KS	F	66	Y	Y	N	N	N	/	N
11	KS	M	71	Y	Y	N	N	N	/	N
12	KS	M	92	Y	Y	N	N	N	/	N
13	KS	M	74	Y	Y	N	N	N	1	1
14	KS	F	66	Y	Y	N	N	N	/	N
15	KS	M	72	Y	Y	N	N	N	1	1
16	KS	F	76	Y	Y	N	N	N	/	1
17	KS	F	73	Y	Y	N	N	N	/	1
18	KS	M	88	Y	N	N	N	N	/	N
19	KS	F	62	Y	Y	N	N	N	/	1
20	KS	F	77	Y	Y	N	N	N	/	1
21	KS	M	45	N	Y	N	N	N	/	1
22	KS	M	72	Y	Y	N	N	N	1	N
23	KS	M	96	Y	Y	N	N	N	/	1
24	KS	F	75	Y	Y	N	N	N	/	1
25	KS	M	88	Y	Y	N	N	N	/	N
26	KS	F	85	Y	N	N	N	N	/	N
27	KS	F	73	Y	Y	N	N	N	/	N
28	KS	M	66	N	Y	N	N	N	/	1
29	KS	F	71	Y	Y	N	N	N	/	1
30	KS	F	92	Y	Y	N	N	N	/	N
31	KS	M	74	Y	Y	N	N	N	/	1
32	KS	M	66	Y	Y	N	N	N	/	N
33	KS	M	72	Y	Y	N	N	N	/	N
34	KS	F	76	Y	Y	N	N	N	1	1
35	KS	M	73	Y	Y	N	N	N	/	N
36	KS	F	88	Y	Y	N	N	N	/	1
37	KS	F	62	Y	Y	N	N	N	/	1
38	KS	M	77	Y	Y	N	N	N	/	1
39	KS	F	45	Y	Y	N	N	N	/	N

40	KS	F	77	Y	Y	N	N	N	/	1
41	KS	M	77	Y	Y	N	N	N	/	N
42	KS	M	83	Y	Y	N	N	N	/	1
43	KS	M	65	Y	Y	N	N	N	/	1
44	KS	F	72	Y	N	N	N	N	/	N
45	KS	M	96	Y	Y	N	N	N	/	N
46	KS	F	75	Y	Y	N	N	N	/	N
47	KS	F	88	Y	Y	N	N	N	/	1
48	KS	M	85	Y	Y	N	N	N	/	1
49	KS	F	73	Y	Y	N	N	N	/	N
50	KS	F	66	Y	Y	N	N	N	/	N
51	KS	M	71	Y	Y	N	N	N	/	N
52	KS	M	92	Y	Y	N	N	N	/	N
53	KS	M	74	Y	Y	N	N	N	1	1
54	KS	F	66	Y	Y	N	N	N	/	N
55	KS	M	72	Y	Y	N	N	N	1	1
56	KS	F	76	Y	Y	N	N	N	/	1
57	KS	F	73	Y	Y	N	N	N	/	1
58	KS	M	88	Y	N	N	N	N	/	N
59	KS	F	62	Y	Y	N	N	N	/	1
60	KS	F	77	Y	Y	N	N	N	/	1
61	KS	M	45	N	Y	N	N	N	/	1
62	KS	M	72	Y	Y	N	N	N	1	N
63	KS	M	96	Y	Y	N	N	N	/	1
64	KS	F	75	Y	Y	N	N	N	/	1
65	KS	M	88	Y	Y	N	N	N	/	N
66	KS	F	85	Y	N	N	N	N	/	N
67	KS	F	73	Y	Y	N	N	N	/	N
68	KS	M	66	N	Y	N	N	N	/	1
69	KS	F	71	Y	Y	N	N	N	/	1
70	KS	F	92	Y	Y	N	N	N	/	N
71	KS	M	74	Y	Y	N	N	N	/	1
72	KS	M	66	Y	Y	N	N	N	/	N
73	KS	M	72	Y	Y	N	N	N	/	N
74	KS	F	76	Y	Y	N	N	N	1	1
75	KS	M	73	Y	Y	N	N	N	/	N
76	KS	F	88	Y	Y	N	N	N	/	1
77	KS	F	62	Y	Y	N	N	N	/	1
78	KS	M	77	Y	Y	N	N	N	/	1
79	KS	F	45	Y	Y	N	N	N	/	N
80	KS	F	77	Y	Y	N	N	N	/	1
81	KS	M	77	Y	Y	N	N	N	/	N
82	KS	M	83	Y	Y	N	N	N	/	1
83	KS	M	65	Y	Y	N	N	N	/	1
84	KS	F	72	Y	N	N	N	N	/	N
85	KS	M	96	Y	Y	N	N	N	/	N
86	KS	F	75	Y	Y	N	N	N	/	N
87	KS	F	88	Y	Y	N	N	N	/	1
88	KS	M	85	Y	Y	N	N	N	/	1
89	KS	F	73	Y	Y	N	N	N	/	N
90	KS	F	66	Y	Y	N	N	N	/	N
91	KS	M	71	Y	Y	N	N	N	/	N
92	KS	M	92	Y	Y	N	N	N	/	N
93	KS	M	74	Y	Y	N	N	N	1	1
94	KS	F	66	Y	Y	N	N	N	/	N
95	KS	M	72	Y	Y	N	N	N	1	1

96	KS	F	76	Y	Y	N	N	N	/	1
97	KS	F	73	Y	Y	N	N	N	/	1
98	KS	M	88	Y	N	N	N	N	/	N
99	KS	F	62	Y	Y	N	N	N	/	1
100	KS	F	77	Y	Y	N	N	N	/	1
101	KS	M	45	N	Y	N	N	N	/	1
102	KS	M	72	Y	Y	N	N	N	1	N
103	KS	M	96	Y	Y	N	N	N	/	1
104	KS	F	75	Y	Y	N	N	N	/	1
105	KS	M	88	Y	Y	N	N	N	/	N
106	KS	F	85	Y	N	N	N	N	/	N
107	KS	F	73	Y	Y	N	N	N	/	N
108	KS	M	66	N	Y	N	N	N	/	1
109	KS	F	71	Y	Y	N	N	N	/	1
110	KS	F	92	Y	Y	N	N	N	/	N
111	KS	M	74	Y	Y	N	N	N	/	1
112	KS	M	66	Y	Y	N	N	N	/	N
113	KS	M	72	Y	Y	N	N	N	/	N
114	KS	F	76	Y	Y	N	N	N	1	1
115	KS	M	73	Y	Y	N	N	N	/	N
116	KS	F	88	Y	Y	N	N	N	/	1
117	KS	F	62	Y	Y	N	N	N	/	1
118	KS	M	77	Y	Y	N	N	N	/	1
119	KS	F	45	Y	Y	N	N	N	/	N
120	KS	F	77	Y	Y	N	N	N	/	1
121	KS	M	77	Y	Y	N	N	N	/	N
122	KS	M	83	Y	Y	N	N	N	/	1
123	KS	M	65	Y	Y	N	N	N	/	1
124	KS	F	72	Y	N	N	N	N	/	N
125	KS	M	96	Y	Y	N	N	N	/	N
126	KS	F	75	Y	Y	N	N	N	/	N
127	KS	F	88	Y	Y	N	N	N	/	1
128	KS	M	85	Y	Y	N	N	N	/	1
129	KS	F	73	Y	Y	N	N	N	/	N
130	KS	F	66	Y	Y	N	N	N	/	N
131	KS	M	71	Y	Y	N	N	N	/	N
132	KS	M	92	Y	Y	N	N	N	/	N
133	KS	M	74	Y	Y	N	N	N	1	1
134	KS	F	66	Y	Y	N	N	N	/	N
135	KS	M	72	Y	Y	N	N	N	1	1
136	KS	F	76	Y	Y	N	N	N	/	1
137	KS	F	73	Y	Y	N	N	N	/	1
138	KS	M	88	Y	N	N	N	N	/	N
139	KS	F	62	Y	Y	N	N	N	/	1
140	KS	F	77	Y	Y	N	N	N	/	1
141	KS	M	45	N	Y	N	N	N	/	1
142	KS	M	72	Y	Y	N	N	N	1	N
143	KS	M	96	Y	Y	N	N	N	/	1
144	KS	F	75	Y	Y	N	N	N	/	1
145	KS	M	88	Y	Y	N	N	N	/	N
146	KS	F	85	Y	N	N	N	N	/	N
147	KS	F	73	Y	Y	N	N	N	/	N
148	KS	M	66	N	Y	N	N	N	/	1
149	KS	F	71	Y	Y	N	N	N	/	1
150	KS	F	92	Y	Y	N	N	N	/	N
151	KS	M	74	Y	Y	N	N	N	/	1
152	KS	M	66	Y	Y	N	N	N	/	N

153	KS	M	72	Y	Y	N	N	N	/	N
154	KS	F	76	Y	Y	N	N	N	1	1
155	KS	M	73	Y	Y	N	N	N	/	N
156	KS	F	88	Y	Y	N	N	N	/	1
157	KS	F	62	Y	Y	N	N	N	/	1
158	KS	M	77	Y	Y	N	N	N	/	1
159	KS	F	45	Y	Y	N	N	N	/	N
160	KS	F	77	Y	Y	N	N	N	/	1
161	KS	F	66	Y	Y	N	N	N	/	N
162	KS	M	72	Y	Y	N	N	N	1	1
163	KS	F	76	Y	Y	N	N	N	/	1
164	KS	F	73	Y	Y	N	N	N	/	1
165	KS	M	88	Y	N	N	N	N	/	N
166	KS	F	62	Y	Y	N	N	N	/	1
167	KS	F	77	Y	Y	N	N	N	/	1
168	KS	M	45	N	Y	N	N	N	/	1
169	KS	M	72	Y	Y	N	N	N	1	N
170	KS	M	96	Y	Y	N	N	N	/	1
171	KS	F	75	Y	Y	N	N	N	/	1
172	KS	M	88	Y	Y	N	N	N	/	N
173	KS	F	85	Y	N	N	N	N	/	N
174	KS	F	73	Y	Y	N	N	N	/	N
175	KS	M	66	N	Y	N	N	N	/	1
176	KS	F	71	Y	Y	N	N	N	/	1
177	KS	F	92	Y	Y	N	N	N	/	N
178	KS	M	74	Y	Y	N	N	N	/	1
179	KS	M	66	Y	Y	N	N	N	/	N

Total percentage of Spring Chinook carcasses with signs of Columnaris Infection= 53%

Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C. Shasta

SRRC Weak Stocks Cooperative Spring Chinook Survey Carcass Data Tables '04										
Total percentage of Spring Chinook carcasses with signs of Columnaris Infection=										62%
Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite						**Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C. Shasta**				
#	Species:	Sex M/F	Fork Length	Spawned Y/N	Scales Y/N	Fin Clip Y/N	Otilith Y/N	Tissue Y/N	Scar #	Disease #
Nat Pennington, Petey Brucker				10/22/04		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	F	77	Y	Y	N	Y	Y	N	1
Irie Swift, Laurissa Gough				10/11/04		Stream: South Fork Salmon River Reach: Cecil Creek to French Creek				
1	SPCH	F	29	Y	Y	N	Y	N	N	1
2	SPCH	M	35	Y	Y	N	Y	N	N	None
3	SPCH	M	32	Y	N	N	N	N	1	1
Irie Swift, Laurissa Gough				10/14/04		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	F	54	Y	Y	N	Y	Y	N	1
S.Corum, M. Payne, S. Lenihan				10/7/04		Stream: South Fork Salmon River Reach:Taylor Creek - Cecil Creek				
1	SPCH	F	71	Y	N	N	N	N	N	None
A. Jacobs, C. Wase				10/7/04		Stream: South Fork Salmon River Reach: Cecil Creek to French Creek				
1	SPCH	M	48	Y	Y	N	Y	Y	4	None
Nat Pennington, Bill Souza				10/7/04		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	F	82	Y	Y	N	Y	N	N	1
Susan Corum, Megan Payne				10/4/04		River: South Fork Salmon Reach: Cecil Creek -French Creek				
1	SPCH	M	80	Y	Y	N	Y	N	N	None

SRRC Weak Stocks Cooperative Spring Chinook Survey Carcass Data Tables '05

Total percentage of Spring Chinook carcasses with signs of Columnaris Infection= 46%

Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C. Shasta

#	Species:	Sex M/F	Fork Length	Spawned Y/N	Scales Y/N	Fin Clip Y/N	Otilith Y/N	Tissue Y/N	Scar #	Disease #
Adam Jacobs, Petey Brucker				9/23/05		Stream: South Fork Salmon River Reach:Taylor Creek - Cecil Creek				
1	SPCH	M	71	Y	Y	N	Y	Y	N	None
2	SPCH	M	64	Y	Y	N	N	Y	N	1
Nat Pennington, Laurissa Gough				9/30//2005		Stream: South Fork Salmon River Reach: Cecil Creek to French Creek				
1	SPCH	F	69	Y	Y	N	Y	N	N	1
Irie Swift, Candace Wase				10/4/05		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	F	54	Y	Y	N	Y	Y	N	1
Susan Corum, Eileen Williams				10/7/05		Stream: South Fork Salmon River Reach: Cecil Creek to French Creek				
1	SPCH	M	73	Y	N	N	N	N	N	None
Nat Pennington, Candace Wase				10/7/05		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	M	87	Y	Y	N	Y	Y	4	None
2	SPCH	F	48	Y	Y	N	Y	N	N	None
Nat Pennington, Bill Souza				10/11/05		River: South Fork Salmon Reach: Cecil Creek -French Creek				
1	SPCH	M	35	Y	N	N	N	N	1	1
2	SPCH	F	82	Y	Y	N	Y	N	N	1
Susan Corum, Alex Corum				10/4/05		Stream: South Fork Salmon River Reach: Blind Horse Creek to Petersburg				
1	SPCH	M	80	Y	Y	N	Y	N	N	None
2	SPCH	F	71	Y	Y	N	N	Y	N	None
3	SPCH	M	50	Y	Y	N	Y	Y	N	None
Kris Denny, Bill Souza				10/11/05		River: South Fork Salmon Reach: Cecil Creek -French Creek				
1	SPCH	F	75	Y	Y	N	Y	Y	N	1

SRRC Weak Stocks Cooperative Spring Chinook Survey Carcass Data Tables '06

Total percentage of Spring Chinook carcasses with signs of Columnaris Infection= 7%

Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C. Shasta

#	Species:	Sex M/F	Fork Length	Spawned Y/N	Scales Y/N	Fin Clip Y/N	Otilith Y/N	Tissue Y/N	Scar #	Disease #
S. Maurer, S Stenhouse				9/21/06		Stream: South Fork Salmon River Reach:Little Southfork- Grizzly				
1	SPCH	M	83	Y	Y	N	Y	Y	N	None
2	SPCH	F	56	Y	N	N	N	N	?	None
M. Kleeman, E. Williams				9/27/06		Stream: South Fork Salmon River Reach:Cecilville - French				
1	SPCH	M	44	?	Y	N	Y	Y	N	None
j. Bownman, S. Stenhouse				9/28/06		Stream: South Fork Salmon River Reach: Blinhorse - Petersburg				
1	SPCH	M	43	Y	Y	N	Y	Y	N	None
I. Swift, J. Cullen				10/4/06		Stream: North Fork Salmon River Reach: Idlewild- Whites				
1	SPCH	F	70	Y	Y	N	Y	Y	N	None
j. Bownman, S. Addison				10/5/06		Stream: South Fork Salmon River Reach: Petersburg - Eastfork				
1	SPCH	F	58	Y	Y	N	Y	Y	N	None
2	SPCH	M	43	Y	Y	N		Y	N	None
M. Kleeman, E. Williams				10/5/06		Stream: South Fork Salmon River Reach: Eastfork				
1	SPCH	F	74	N	Y	N	Y	Y	N	1
A. Jacobs, L. Gough				10/5/06		Stream: South Fork Salmon River Reach: Cecil- Limestone				
1	SPCH	F	24	Y	Y	N	Y	Y	N	1
2	SPCH	F	16.5	Y	Y	N	Y	Y	N	None
3	SPCH	M	33	Y	Y	N	Y	Y	N	None
N. Pennington, K Denny, P Lauer				10/5/06		Stream: South Fork Salmon River Reach: Eastfork- Cecilville				
1	SPCH	F	70	Y	Y	N	Y	Y	N	1
S. Stenhouse, M. Bennett				10/5/06		Stream: South Fork Salmon River Reach: Blindhorse- Petersburg				
1	SPCH	F	63	Y	Y	N	Y	Y	N	None
2	SPCH	M	33	Y	Y	N	Y	Y	N	None
3	SPCH	M	63	Y	Y	N	Y	Y	N	None
4	SPCH	F	66	Y	Y	N	N	Y	N	None
5	SPCH	F	57	Y	N	N	N	N	N	2
6	SPCH	M	61	Y	N	N	N	N	N	None
J. Bowman, S. Addison				10/10/06		Stream: South Fork Salmon River Reach: Blindhorse- Petersburg				
1	SPCH	F	64	Y	N	N	Y	N	N	None
2	SPCH	F	60	Y	Y	N	Y	Y	N	None
3	SPCH	F	62	Y	Y	N	Y	Y	N	None
4	SPCH	M	42	Y	Y	N	Y	Y	N	None
5	SPCH	F	72	Y	Y	N	Y	Y	N	None
M. Kleeman, TC				10/12/06		Stream: South Fork Salmon River Reach: Eastfork				
1	SPCH	M	63.5	?	Y	N	Y	Y	N	None
2	SPCH	M	67.8	?	Y	N	N	Y	N	None
3	SPCH	M	60	?	Y	N	N	Y	N	None
4	SPCH	M	53	?	Y	N	Y	Y	N	None
L. Gough, N. Kingery				10/12/06		Stream: South Fork Salmon River Reach: Eastfork -Cecil Creek				
1	SPCH	M	81	Y	Y	Y	Y	N	1	None
S. Farhi, N. Small, L. Smith				10/12/06		Stream: South Fork Salmon River Reach: Petersburg- Eastfork				
1	SPCH	M	39.5	Y	N	N	N	N	1	None
2	SPCH	M	47	Y	Y	N	N	N	N	None
3	SPCH	F	46	Y	Y	N	Y	Y	N	None
4	SPCH	M	43	Y	Y	N	N	N	N	None
M. Bennett, S. Addison				10/12/06		Stream: South Fork Salmon River Reach: French- Matthews				
1	SPCH	F	71	Y	N	N	N		N	None
2	SPCH	M	54	Y	Y	N	Y	N	N	None
3	SPCH	M	78	Y	Y	N	Y	Y	N	1
4	SPCH	M	36	Y	Y	N	Y	N	N	None

j. Bowman, D. Lowe				10/12/06		Stream: South Fork Salmon River Reach: Cecil- Limestone				
1	SPCH	M	65	Y	N	N	N	N	N	None
2	SPCH	M	71	Y	N	N	N	N	N	None
3	SPCH	M	42	Y	Y	N	Y	N	N	None
4	SPCH	M	47	Y	Y	N	Y	Y	1	None
5	SPCH	M	55	Y	Y	N	Y	Y	N	None
6	SPCH	F	69	Y	Y	N	Y	Y	N	None
7	SPCH	F	58	Y	Y	N	Y	Y	N	None
8	SPCH	M	46	Y	N	N	N	N	N	None
9	SPCH	M	71	Y	Y	N	Y	Y	1	None
I. Swift, J. Hanscom				10/13/06		Stream: North Fork Salmon River Reach: Idlewild- Whites				
1	SPCH	F	70	Y	Y	Y	Y	Y	N	None
C. Calimpong, J. Bishop, L. Smith				10/13/06		Stream: North Fork Salmon River Reach:Sawyers- Kelly				
1	SPCH	M	59.5	?	?	?	?	?	N	None
L. Smith, S. Kingery				10/18/06		Stream: North Fork Salmon River Reach: Idlewild- Whites				
1	SPCH	F	63	Y	Y	N	Y	Y	N	None
2	SPCH	?	?	?	?	?	?	?	?	too decomposed
3	SPCH	?	?	?	?	?	?	?	?	too decomposed
4	SPCH	F	71	Y	N	N	N	N	N	None
5	SPCH	?	?	?	?	?	?	?	?	too decomposed
6	SPCH	?	?	?	?	?	?	?	?	too decomposed
N. Pennington, B. Atwood				10/19/06		Stream: South Fork Salmon River Reach:East Fork- Cecilville				
1	SPCH	F	64	Y	Y	N	Y	Y	N	None
2	SPCH	F	65	Y	Y	N	N	Y	N	None
L. Gough, K. Denny				10/19/06		Stream: South Fork Salmon River Reach: Cecil-Limestone				
1	SPCH	M	69	Y	Y	N	Y	Y	N	None
2	SPCH	F	46	Y	N	N	N	N	N	None
3	SPCH	M	90	Y	N	N	N	N	N	None
4	SPCH	F	75	Y	N	N	N	N	N	None

TOTALS:

# FISH:	59
AVG LENTH:	58.06909091
% SPAWNED	79.66%
% ? SPAWNED	18.64%
% NOT SPAWNED	1.69%
% FEMALE	40.68%
%MALE	49.15%

Cooperative Spring Chinook Spawning Ground and Carcass Survey

2008 Carcass Data

Path #: 1=Fresh Carcass, 2=Decomposed Carcass, 3=Recapture, 4=Unretrievable

Disease #: 1=Columnaris, 2=Icth, 3=C.Shasta

Species: SPCH=Spring Chinook, STHD=Steelhead

Scar #: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

#	Date	Species:	Path #	Applied	Recap	Sex M/F	F / L	SpawnedY/N	ScalesY/N	F ClipY/N	OtilithY/N	Tissue Y/N	Scar #	Disease #
1	19-Sep	SPCH	1	flag	-	M	31	N	Y	N	Y	Y	-	-
2	19-Sep	SPCH	2	-	-	F	33	Y	Y	N	N	Y	-	-
3	19-Sep	SPCH	2	-	-	M	24	Y	Y	N	Y	Y	-	-
4	23-Sep	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
5	23-Sep	SPCH	1	3105	-	M	46	N	Y	N	Y	Y	-	-
6	30-Sep	SPCH	1	3170	-	M	85	-	Y	N	Y	Y	-	-
7	30-Sep	SPCH	2	-	-	F	75	Y	N	N	N	N	-	-
8	30-Sep	SPCH	2	-	-	M	58	-	Y	N	N	Y	-	-
9	30-Sep	SPCH	3	-	-	-	-	-	-	-	-	-	-	-
10	30-Sep	SPCH	1	3208	-	F	74	N	Y	N	Y	Y	-	-
11	7-Oct	SPCH	2	-	-	M	91	Y	N	N	N	N	-	-
12	7-Oct	SPCH	1	3110	-	F	76	N	Y	N	Y	Y	-	-
13	7-Oct	SPCH	1	3212	-	M	71	-	Y	N	Y	Y	1	-
14	7-Oct	SPCH	1	3097	-	F	76	Y	Y	N	Y	Y	-	-
15	7-Oct	SPCH	1	3215	-	M	45	N	Y	N	Y	Y	-	-
16	10-Oct	SPCH	1	3108	-	F	79	Y	Y	N	Y	Y	1	-
17	10-Oct	SPCH	1	3107	-	F	79	Y	Y	N	Y	Y	1	-
18	10-Oct	SPCH	1	3109	-	F	79	Y	Y	N	Y	Y	1	-
19	10-Oct	SPCH	3	-	3212	F	76	-	-	-	-	-	-	-
20	10-Oct	SPCH	3	-	3097	F	79	-	-	-	-	-	-	-
21	10-Oct	SPCH	1	3112	-	F	69	Y	Y	N	Y	Y	-	-
22	10-Oct	SPCH	2	-	-	M	69	Y	N	N	N	N	-	-
23	10-Oct	SPCH	1	3231	-	F	78	Y	Y	N	N	N	-	-
24	10-Oct	SPCH	1	3232	-	F	70	Y	Y	N	Y	Y	-	-
25	10-Oct	SPCH	1	3238	-	F	72	Y	Y	N	Y	Y	-	-
26	10-Oct	SPCH	2	-	-	F	69	Y	N	N	N	N	-	-
27	10-Oct	SPCH	1	3236	-	F	68	Y	Y	N	Y	Y	-	-
28	10-Oct	SPCH	1	3242	-	F	80	Y	Y	N	Y	Y	-	-
29	10-Oct	SPCH	1	3176	-	M	41	Y	Y	N	Y	Y	-	-
30	10-Oct	SPCH	1	3175	-	F	85	Y	Y	N	Y	Y	-	-
31	10-Oct	SPCH	2	3167	-	F	73	Y	Y	N	N	Y	-	-
32	10-Oct	SPCH	1	3250	-	M	80	Y	Y	N	Y	Y	-	-
33	10-Oct	SPCH	1	3248	-	F	75	N	Y	N	N	Y	-	-
34	13-Oct	SPCH	1	3121	-	M	81	N	Y	N	Y	Y	-	-
35	13-Oct	SPCH	2	-	-	F	80	Y	N	N	N	N	-	-
36	13-Oct	SPCH	1	3120	-	F	77	Y	Y	N	Y	Y	-	-
37	13-Oct	SPCH	2	-	-	M	83	-	Y	N	N	Y	-	-
38	13-Oct	SPCH	1	3118	-	F	81	Y	Y	N	Y	Y	-	-
39	13-Oct	SPCH	1	3122	-	F	77	Y	Y	N	Y	Y	-	-
40	13-Oct	SPCH	1	3124	-	F	78	Y	Y	N	Y	Y	-	-
41	13-Oct	SPCH	1	3123	-	F	70	Y	Y	N	Y	Y	-	-
42	13-Oct	SPCH	1	3116	-	F	71	Y	Y	N	Y	Y	-	-
43	13-Oct	SPCH	3	-	3231	F	81	Y	N	N	N	N	-	-
44	13-Oct	SPCH	1	3103	-	F	74	Y	Y	N	Y	Y	-	-
45	13-Oct	SPCH	3	-	3232	F	69	Y	N	N	N	N	1	-
46	13-Oct	SPCH	3	-	3238	F	71	N	N	N	N	N	1	-
47	13-Oct	SPCH	3	-	3236	F	66	Y	N	N	N	N	-	-
48	13-Oct	SPCH	1	3237	-	F	67	Y	Y	N	Y	Y	-	-
49	13-Oct	SPCH	2	-	-	M	70	-	N	N	N	N	-	-
50	13-Oct	SPCH	3	-	3107	F	79	Y	-	-	-	-	-	-
51	13-Oct	SPCH	1	3180	-	M	79	Y	Y	N	Y	Y	-	-
52	13-Oct	SPCH	1	3190	-	F	75	Y	Y	N	Y	Y	-	-
53	13-Oct	SPCH	3	-	3176	F	41	Y	-	-	-	-	-	-
54	13-Oct	SPCH	1	3185	-	F	84	Y	Y	N	Y	Y	-	-
55	13-Oct	SPCH	3	-	3242	F	83	-	-	-	-	-	-	-
56	13-Oct	SPCH	1	3192	-	M	82	Y	Y	N	Y	Y	-	-
57	13-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
58	13-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
59	13-Oct	SPCH	3	-	3250	M	75	-	-	N	-	-	-	-
60	13-Oct	SPCH	1	3188	-	F	74	Y	Y	N	Y	Y	-	-
61	13-Oct	SPCH	1	3184	-	F	81	Y	N					
62	13-Oct	SPCH	1	3191	-	F	81	Y	N	N	N	N	-	-

63	13-Oct	SPCH	1	3194	-	F	73	Y	N	N	N	N	-	-
64	13-Oct	SPCH	2	-	-	M	79	Y	N	N	N	N	-	-
65	16-Oct	SPCH	2	-	-	F	74	Y	N	N	N	N	-	-
66	16-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
67	20-Oct	SPCH	1	3130	-	F	76	Y	Y	N	Y	Y	-	-
68	20-Oct	SPCH	2	-	-	F	77	Y	N	N	N	N	-	-
69	20-Oct	SPCH	2	-	-	M	74	Y	N	N	N	N	-	-
70	20-Oct	SPCH	2	-	-	F	67	Y	N	N	N	N	-	-
71	20-Oct	SPCH	1	3129	-	F	68	Y	Y	N	Y	Y	-	-
72	20-Oct	SPCH	2	-	-	M	72	Y	N	N	N	N	-	-
73	20-Oct	SPCH	2	-	-	F	77	Y	N	N	N	N	-	-
74	20-Oct	SPCH	3	-	3120	-	-	-	-	-	-	-	-	-
75	20-Oct	SPCH	1	3127	-	F	77	Y	Y	N	Y	Y	-	-
76	20-Oct	SPCH	1	3148	-	F	70	Y	Y	N	Y	Y	-	-
77	20-Oct	SPCH	2	-	-	F	71	Y	N	N	N	N	-	-
78	20-Oct	SPCH	3	-	3122	-	-	-	-	-	-	-	-	-
79	20-Oct	SPCH	3	-	3125	-	-	-	-	-	-	-	-	-
80	20-Oct	SPCH	1	3147	-	F	74	Y	Y	N	Y	Y	-	-
81	20-Oct	SPCH	1	3146	-	F	76	N	Y	N	Y	Y	-	-
82	20-Oct	SPCH	1	3117	-	F	77	N	Y	N	Y	Y	-	-
83	20-Oct	SPCH	3	-	3232	-	-	-	-	-	-	-	-	-
84	20-Oct	SPCH	1	3279	-	F	79	Y	Y	N	Y	Y	-	-
85	20-Oct	SPCH	2	-	-	F	76	Y	Y	N	N	Y	-	-
86	20-Oct	SPCH	2	-	-	F	75	Y	Y	N	N	Y	-	-
87	20-Oct	SPCH	3	-	3108	F	77	-	-	-	-	-	-	-
88	20-Oct	SPCH	2	-	-	F	77	Y	-	-	-	-	-	-
89	20-Oct	SPCH	1	3269	-	F	58	Y	Y	N	Y	Y	-	-
90	20-Oct	SPCH	2	-	-	F	79	Y	N	N	N	N	-	-
91	20-Oct	SPCH	2	-	-	F	77	Y	N	N	N	N	-	-
92	20-Oct	SPCH	1	3268	-	F	75	Y	Y	N	Y	Y	-	-
93	20-Oct	SPCH	2	-	-	-	-	Y	N	N	N	Y	-	-
94	20-Oct	SPCH	1	3099	-	F	80	Y	Y	N	Y	Y	-	-
95	20-Oct	SPCH	1	3209	-	F	74	Y	Y	N	Y	Y	-	-
96	20-Oct	SPCH	2	-	-	F	91	Y	Y	N	N	Y	-	-
97	20-Oct	SPCH	2	-	-	F	63	Y	Y	N	N	Y	-	-
98	20-Oct	SPCH	2	-	-	M	53	-	N	N	N	N	-	-
99	20-Oct	SPCH	2	-	-	F	87	Y	N	N	N	N	-	-
100	20-Oct	SPCH	1	3265	-	F	75	Y	Y	N	N	Y	-	-
101	20-Oct	SPCH	2	-	-	F	60	Y	N	N	N	N	-	-
102	20-Oct	SPCH	3	-	3185	F	85	-	-	-	-	-	-	-
103	20-Oct	SPCH	1	3138	-	M	42	Y	Y	N	N	N	1	-
104	20-Oct	SPCH	2	-	-	M	46	Y	Y	N	N	N	-	-
105	20-Oct	SPCH	2	-	-	F	95	Y	N	N	N	N	-	-
106	20-Oct	SPCH	1	3229	-	F	80	Y	Y	N	N	Y	1	-
107	23-Oct	SPCH	1	3252	-	F	76	Y	Y	N	N	Y	-	-
108	23-Oct	SPCH	1	3166	-	M	90	Y	Y	N	N	Y	-	-
109	23-Oct	SPCH	1	5241	-	F	82	Y	Y	N	Y	Y	-	-
110	23-Oct	SPCH	1	3254	-	F	79	Y	Y	N	Y	Y	-	-
111	23-Oct	SPCH	1	3174	-	F	79	Y	Y	N	N	Y	-	-

112	23-Oct	SPCH	1	3191	-	M	87	Y	N	N	N	N	-	-
113	23-Oct	SPCH	2	-	-	F	67	Y	N	N	N	N	-	-
114	23-Oct	SPCH	1	5246	-	M	82	Y	N	N	N	N	-	-
115	23-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
116	23-Oct	SPCH	3	-	3269	F	87	-	-	-	-	-	-	-
117	23-Oct	SPCH	3	-	3268	F	71	-	-	-	-	-	-	-
118	23-Oct	SPCH	2	-	-	M	41	Y	N	N	N	N	-	-
119	23-Oct	SPCH	3	-	3138	M	-	-	-	-	-	-	-	-
120	23-Oct	SPCH	2	-	-	M	89	-	-	-	-	-	-	-
121	23-Oct	SPCH	3	-	3130	F	81	-	-	-	-	-	-	-
122	23-Oct	SPCH	3	-	3129	F	70	-	-	-	-	-	-	-
123	23-Oct	SPCH	3	-	3127	F	80	-	-	-	-	-	-	-
124	23-Oct	SPCH	1	3150	-	F	77	Y	Y	N	Y	Y	-	-
125	23-Oct	SPCH	2	-	-	F	77	Y	Y	N	N	Y	-	-
126	23-Oct	SPCH	3	-	3146	F	82	-	-	-	-	-	-	-
127	23-Oct	SPCH	3	-	3117	F	83	-	-	-	-	-	-	-
128	23-Oct	SPCH	1	3240	-	M	75	Y	Y	N	Y	Y	-	-
129	23-Oct	SPCH	1	3133	-	M	93	Y	Y	N	Y	Y	-	-
130	27-Oct	SPCH	2	-	-	F	72	Y	N	N	N	N	-	-
131	27-Oct	SPCH	2	-	-	F	71	Y	N	N	N	N	-	-
132	27-Oct	SPCH	1	-	-	F	74	Y	Y	N	Y	Y	-	-
133	27-Oct	SPCH	2	-	-	F	83	Y	N	N	N	N	-	-
134	27-Oct	SPCH	3	-	3174	F	75	Y	N	N	N	N	-	-
135	27-Oct	SPCH	2	-	-	F	43	Y	N	N	N	N	-	-
136	27-Oct	SPCH	2	-	-	M	89	Y	N	N	N	N	-	-
137	27-Oct	SPCH	2	-	-	F	83	Y	N	N	N	N	-	-
138	27-Oct	SPCH	2	-	-	F	81	Y	N	N	N	N	-	-
139	27-Oct	SPCH	2	-	-	F	77	Y	N	N	N	N	-	-
140	27-Oct	SPCH	2	-	-	M	84	Y	N	N	N	N	-	-
141	27-Oct	SPCH	3	-	3150	F	72	Y	N	N	N	N	-	-

Total # SPCH Carcasses: 141
Total # Caracasses Tagged: 64
Total # Tags Recaptured: 27

Cooperative Spring Chinook Spawning Ground and Carcass Survey

2009 Carcass Data

Path #: 1=Fresh Carcass, 2=Decomposed Carcass, 3=Recapture, 4=Unretrievable

Disease #: 1=Columnaris, 2=Icth, 3=C.Shasta

Species: SPCH=Spring Chinook, STHD=Steelhead

Scar #: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

#	Date	Species:	Path #	Applied	Recap	Sex M/F	F / L	SpawnedY/N	ScalesY/N	F ClipY/N	OtilithY/N	Tissue Y/N	Scar #	Disease #
1	15-Sep	SPCH	1	3007	-	M	87	Y	Y	N	Y	Y	1	-
2	18-Sep	SPCH	3	-	3007	M	87	-	-	N	-	-	-	-
3	22-Sep	SPCH	2	-	-	F	70	N	N	N	N	N	-	-
4	22-Sep	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
5	29-Sep	SPCH	1	3575	-	F	80	Y	Y	N	Y	Y	-	-
6	29-Sep	SPCH	1	3272	-	F	64	Y	Y	N	N	Y	-	-
7	2-Oct	SPCH	3	-	3575	M	-	-	-	-	-	-	-	-
8	2-Oct	SPCH	2	-	-	-	-	-	-	-	-	-	-	-
9	2-Oct	SPCH	2	-	-	-	-	-	-	-	-	-	-	-
10	2-Oct	SPCH	2	-	-	-	-	-	-	-	-	-	-	-
11	6-Oct	SPCH	1	3262	-	F	-	Y	Y	N	Y	Y	-	-
12	6-Oct	SPCH	1	3588	-	F	84	Y	Y	N	Y	Y	-	-
13	9-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
14	9-Oct	SPCH	2	-	-	F	39	Y	N	N	N	N	-	-
15	12-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
16	12-Oct	SPCH	1		-	F	83	Y	Y	N	Y	Y	2	1
17	12-Oct	SPCH	1		-	F	67	Y	Y	N	Y	Y	-	-
18	12-Oct	SPCH	2	-	-	M	70	-	N	N	N	N	-	-
19	12-Oct	SPCH	2	-	-	F	86	Y	N	N	N	N	-	-
20	19-Oct	SPCH	1	5281	-	F	68	Y	Y	N	Y	Y	1	-
21	19-Oct	SPCH	2	-	-	F	-	-	N	-	N	N	-	-
22	19-Oct	SPCH	1	3220	-	M	66	-	Y	N	Y	Y	-	-
23	19-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
24	19-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
25	19-Oct	SPCH	1	3582	-	F	75	Y	Y	N	Y	Y	-	-
26	19-Oct	SPCH	1	3115	-	F	91	Y	Y	N	N	Y	-	-
27	19-Oct	SPCH	1	3201	-	F	40	Y	Y	N	Y	Y	-	-
28	19-Oct	SPCH	1	3102	-	M	71	Y	Y	N	Y	Y	-	-
29	26-Oct	SPCH	1	-	-	F	73	Y	Y	N	Y	Y	-	-
30	26-Oct	SPCH	2	-	-	M	63	-	N	N	N	N	-	-
31	26-Oct	SPCH	1	-	-	F	65	Y	Y	N	Y	Y	-	-
32	26-Oct	SPCH	1	-	-	F	74	Y	Y	N	Y	Y	-	-
33	26-Oct	SPCH	1	-	-	M	94	Y	Y	N	Y	Y	-	-
34	26-Oct	SPCH	1	-	-	M	91	Y	Y	N	Y	Y	1	-
35	26-Oct	SPCH	1	-	-	F	82	Y	Y	N	Y	Y	1	-
36	26-Oct	SPCH	2	-	-	F	-	Y	Y	N	Y	Y	-	-
37	26-Oct	SPCH	1	-	-	F	64	Y	Y	N	Y	Y	-	1
38	26-Oct	SPCH	2	-	-	F	49	Y	N	N	N	N	-	-
39	26-Oct	SPCH	1	-	-	F	75	Y	Y	N	Y	Y	-	-
40	26-Oct	SPCH	2	-	-	F	79	Y	Y	N	N	Y	-	-
41	26-Oct	SPCH	1	-	-	F	62	Y	Y	N	Y	Y	-	-
42	26-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
43	29-Oct	SPCH	1	-	-	F	66	Y	Y	N	Y	Y	-	-
44	29-Oct	SPCH	2	-	-	F	76	Y	N	N	N	N	-	-
45	2-Nov	SPCH	1	-	-	F	59	Y	Y	N	Y	Y	-	-
46	2-Nov	SPCH	1	-	-	F	91	Y	Y	N	Y	Y	-	-
47	2-Nov	SPCH	1	-	-	F	70	Y	Y	N	Y	Y	-	-
48	2-Nov	SPCH	2	-	-	F	55	Y	N	N	N	N	-	-
49	2-Nov	SPCH	1	-	-	F	78	Y	Y	N	Y	Y	-	-
50	2-Nov	SPCH	2	-	-	F	91	Y	N	N	N	N	-	-
51	2-Nov	SPCH	2	-	-	F	84	Y	N	N	N	N	-	-
52	2-Nov	SPCH	2	-	-	M	67	Y	N	N	N	N	-	-
53	2-Nov	SPCH	1	-	-	F	64	Y	Y	N	Y	Y	-	-
54	2-Nov	SPCH	1	-	-	M	78	Y	Y	N	Y	Y	-	-

Total # SPCH Carcasses: 54
Total # Caracasses Tagged: 13
Total # Tags Recaptured: 2

Contact Name	Email
Tom Hotaling	fisheries@srrc.org

Data collected by the Salmon River Restoration Council and cooperators

Data Set for Spring Chinook Redds , (SRRC)

Date	Reach	Redd #	# of fish on redd	% Canopy Over Redd	Instream Cover (none, wood, boulder, white water, undercut ledge, pool)	Proximity to instream cover in ft.	Enhanced Y/N	Habitat Type (pool, riffle, run,)	Spawning Area Available (L x W)	Spawning Area Used (L x W)	G.P.S. Reference #	Comments:
10/11/03	Left Fork Falls, Mule Bridge	1	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	2	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	3	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	4	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	5	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	6	1	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	7	1	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/11/03	Left Fork Falls, Mule Bridge	8	0	N/A	N/A	N/A	No	Run	N/A	N/A	N/A	
10/2/03	Gorges to Confluence	1	2	60%	none	0		Run	5*5	5*5	18	
10/2/03	Gorges to Confluence	2	2	30%	pool	25		PTC	10*15	6*4	19	
10/2/03	Gorges to Confluence	3	1	30%	pool	25		PTC	10*15	7*4	20	
10/2/03	Gorges to Confluence	4	1	50%	boulders	15		PTC	7*4	7*4	21	
10/2/03	Gorges to Confluence	5	2	50%	boulders	10		PTC	4*3	4*3	22	
10/2/03	Gorges to Confluence	6	1	35%	ledge	3		PTC	9*5	8*3	23	
10/2/03	Gorges to Confluence	7	1	50%	none	0		PTC	8*6	7*4	24	
10/2/03	Gorges to Confluence	8	2	70%	wood	under cover		Run	7*5	7*5	25	
10/2/03	Gorges to Confluence	9	2	80%	none	0		Run	8*5	6*3	26	
10/2/03	Gorges to Confluence	10	2	100%	wood	0		LGR	3*3	3*3	27	
10/2/03	Gorges to Confluence	11	1	60%	boulders	10		LGR	8*8	5*4	28	
10/2/03	Gorges to Confluence	12	3	50%	none	0		Run	8*4	8*4	29	
10/2/03	Gorges to Confluence	13	2	70%	none	0		Run	9*6	7*5	30	
10/2/03	Gorges to Confluence	14	1	30%	ledge	25		Run	10*6	9*3	31	
10/2/03	Gorges to Confluence	15	1	70%	none	0		LGR	12*5	10*5	32	
10/2/03	Gorges to Confluence	16	1	60%	wood	5		LGR	9*5	9*4	33	
10/2/03	Gorges to Confluence	17	1	40%	boulders	15		Run	9*6	6*7	35	
10/2/03	Cecil-Frech	1	1	50%	none	0		riffle	30*1.5	5*2	1	
10/2/03	Cecil-Frech	2	2	100%	boulders	50		riffle	30*1.5	8*2	1	
10/2/03	Cecil-Frech	3	0	0%	ledge	20		pool/tail out	8*4	8*3	2	
10/2/03	Cecil-Frech	4	1	50%	white water/ledge	8		run	4*2	4*2	2	

10/2/03	Cecil-Frech	5	2	0%	ledge	6		run	8*3	6*3	2		
10/2/03	Cecil-Frech	6	0	60%	wood	3		run/riffle transition	8*8	8*4	2		
10/2/03	Cecil-Frech	7	0	40%	wood	15		riffle	20*5	4*3	3		
10/2/03	Cecil-Frech	8	1	10%	boulders	20		riffle	10*4	10*3	5		
10/2/03	Cecil-Frech	9	1	60%	wood	30		run	18*8	14*6	6		
10/2/03	Cecil-Frech	10	1	100%	undercut	3		run	40*15	12*5	7		
10/2/03	Cecil-Frech	11	3	100%	none	0		riffle	100*10	4*2	8		
10/2/03	Cecil-Frech	12	1	100%	none	0		riffle	100*10	8*3	8		
10/2/03	Cecil-Frech	13	1	50%	none	0		riffle	100*10	8*2	8		
10/2/03	Cecil-Frech	14	0	10%	none	0		riffle	100*10	8*3	8		
10/2/03	Cecil-Frech	15	0	10%	none	0		riffle	100*10	10*4	8		
10/2/03	Cecil-Frech	16	2	100%	undercut	2		riffle	60*8	6*5	9		
10/2/03	Cecil-Frech	17	1	100%	undercut	2		riffle	60*8	8*3	9		
10/2/03	Cecil-Frech	18	1	50%	undercut	3		riffle	60*8	6*3	9		
10/2/03	Cecil-Frech	19	3	30%	undercut	8		riffle	60*8	6*3	9		
10/2/03	Cecil-Frech	20	3	90%	wood	10		riffle	20*8	8*4	10		
10/2/03	Cecil-Frech	21	0	20%	wood	1		riffle	80*8	12*5	11		
10/2/03	Cecil-Frech	22	2	100%	wood	3		riffle	80*8	9*8	11		
10/2/03	Cecil-Frech	23	0	60%	wood	2		riffle	80*8	10*3	11		
10/2/03	Cecil-Frech	24	1	10%	pool	10		riffle	10*10	10*3	11		
10/2/03	Cecil-Frech	25	4	0%	ledge	4		riffle	20*10	10*4	13		
10/2/03	Cecil-Frech	26	0	0%	wood	20		riffle	5*8	5*8	15		
10/2/03	Cecil-Frech	27	0	0%	wood	20		riffle	5*8	4*8	15		
10/2/03	Cecil-Frech	28	0	0%	wood	20		riffle	5*8	4*8	15		
10/2/03	Cecil-Frech	29	0	0%	wood	20		riffle	5*8	4*8	15		
10/2/03	Cecil-Frech	30	0	0%	wood	20		riffle	5*8	4*2	15		
10/2/03	Cecil-Frech	31	5	40%	Alder/rocks	5		riffle	10*50	3*6	16		
10/2/03	Cecil-Frech	32	0	0%	none	0		run	0	4*7	17		
10/2/03	Cecil-Frech	33	0	0%	none	0		riffle	50*8	4*8	18		
10/2/03	Cecil-Frech	34	3	0%	ledge	8		pool/tail out	20*10	10*8	19		
10/2/03	Cecil-Frech	35	1	100%	wood	8		run	10*0	4*6	20		
10/2/03	Cecil-Frech	36	0	100%	wood	8		run	10*100	8*3	21		
10/2/03	Cecil-Frech	37	0	0%	none	0		riffle	10*50	6*2	22		
10/2/03	Cecil-Frech	38	0	0%	none	0		pool/tail out	8*8	5*2	23		
10/2/03	Cecil-Frech	39	3	0%	ledge	10		riffle	10*8	8*3	23		
10/2/03	Cecil-Frech	40	1	0%	boulders	4		riffle	12*4	8*4	23		
10/2/03	Cecil-Frech	41	1	10%	boulders	6		riffle	15*6	7*3	24		
10/2/03	Cecil-Frech	42	1	0%	none	0		run	20*20	10*8	25		
10/2/03	Cecil-Frech	43	2	0%	none	0		riffle	20*20	10*6	25		
10/2/03	Cecil-Frech	44	2	50%	wood	4		run	20*10	8*3	26		

Date	Area	Reach	Redd #	# of fish on redd	Habitat Type (pool, riffle, run,)	Spawning Area Available (L x W)	Spawning Area Used (L x W)	Comments:
9/30/04	S. Fork	Georges to Cecil creek.	1	0	run	30*40	7*3	
9/30/04	S. Fork	Georges to Cecil creek.	2	0	run	30*40	6*3	
9/30/04	S. Fork	Georges to Cecil creek.	3	0	run	3*6	4*4	
9/30/04	S. Fork	Georges to Cecil creek.	4	2	run	5*8	5*6	
9/30/04	S. Fork	Blind Horse to Petersburg	0	0	n/a	0	0	
9/27/04	S. Fork	Cecil- French.	1	0	riffle	15*10	5*5	
9/27/04	S. Fork	Cecil- French.	2	1	run	25*6	5*4	
9/27/04	S. Fork	Cecil- French.	3	2	riffle	10*6	5*5	
9/27/04	S. Fork	Cecil- French.	4	1	pool T C	10*25	4*6	
9/27/04	S. Fork	Cecil- French.	5	0	run	40*15	6*4	
9/27/04	S. Fork	Cecil- French.	6	0	riffle	10*5	6*4	
9/30/04	S. Fork	Petersburg-confluence	1	0	run	5*2	5*2	
9/30/04	S. Fork	Cecil- French.	1	0	riffle	6*2	2*1	
9/30/04	S. Fork	Cecil- French.	2	1	riffle	4*2	2*1	
9/30/04	S. Fork	Cecil- French.	3	1	riffle	3*4	1.5*1.5	
9/27/04	S. Fork	Georges to Cecil creek	1	0	riffle	3*4	3*4	
9/27/04	S. Fork	Georges to Cecil creek	2	1	pool T C	15*3	6*2	saw female
9/27/04	S. Fork	Georges to Cecil creek		0	n/a	0	0	
9/20/04	S. Fork	S. Fork Salmon	0	0	n/a	0	0	
9/20/04	S. Fork	Cecil- French.	0	0	n/a	0	0	
10/22/04	S. Fork	Cecil- French	1	2	run	4*6	3*5	New Fish Male and Female
10/14/04	S. Fork	Petersburg to east fork	1	0	riffle	19*8	10*64	
10/11/04	S. Fork	Cecil-Limestone	1	0	run	30*50	5*3	
10/11/04	S. Fork	Cecil-Limestone	2	0	run	3*10	3*10	
10/11/04	S. Fork	Cecil-Limestone	3	0	run	5*15	5*10	
10/11/04	S. Fork	Cecil-Limestone	4	0	pto	5*10	3*4	
10/11/04	S. Fork	Cecil-Limestone	5	0	riffle	5*4	3*4	
10/11/04	S. Fork	Cecil-Limestone	6	1	run	35*25	10*5	
10/11/04	S. Fork	Cecil-Limestone	7	1	riffle	10*7	6*5	
10/11/04	S. Fork	Cecil-Limestone	8	1	pto	10*12	5*5	
10/11/04	S. Fork	Cecil-Limestone	9	0	pto	10*12	5*7	
10/14/04	S. Fork	Blind Horse-Petersburg	0	0	n/a	0	0	
10/7/04	S. Fork	Taylor Creek-Cecil Creek	1	0	riffle	5*12	4*8	
10/7/04	S. Fork	Taylor Creek-Cecil Creek	2	0	riffle	6*10	3*5	
10/7/04	S. Fork	Petersburg to East Fork	1	2	riffle	30*10	10*5	
10/7/04	S. Fork	Petersburg to East Fork	2	1	tailout/riffle	42*10	30*8	
10/7/04	S. Fork	Petersburg to East Fork	3	4	pool/tailout	15*5	8*4	
10/7/04	S. Fork	Petersburg to East Fork	4	0	riffle/pool	20*15	5*3	
10/7/04	N. Fork	19 mile-Eddy's Gulch	1	2	pool/tailout	80*20	7*7	Marked on Map
10/7/04	N. Fork	19 mile-Eddy's Gulch	2	1	pool/tailout	8*12	8*12	
10/7/04	N. Fork	19 mile-Eddy's Gulch	3	0	pool/tailout	30*20	12*6	
10/7/04	S. Fork	Cecil-French	1	1	run	12*3	7*3	small fish
10/7/04	S. Fork	Cecil-French	2	0	riffle	24*5	8*3	
10/7/04	S. Fork	Cecil-French	3	0	run	10*4	8*3	
10/7/04	S. Fork	Cecil-French	4	1	pool	12*3	9*3	
10/7/04	S. Fork	Cecil-French	5	0	pto	40*5	8*5	7 fish in pool above, 3 spawned female/ 2 jacks
10/7/04	S. Fork	Cecil-French	6	0	pto	40*5	6*5	
10/7/04	N. Fork	North Fork Mule Br.-Idywild	0	0	n/a	0	0	
10/6/04	S. Fork	Blindhorse-Peters	1	2	riffle	25*30	7*4	
9/27/04		Blindhorse-Peters	1	1	run, pto	5*8	5*8	1 old one flagged, 1 female
9/27/04		Blindhorse-Peters	2	0	run	7*8	3*5	
9/27/04		Blindhorse-Peters	3	0	run	8*4	3*3	small
9/27/04		Blindhorse-Peters	4	0	run	4*3	3*7	
9/27/04		Blindhorse-Peters	5	0	run	12*4	10*4	
9/27/04		Blindhorse-Peters	6	0	run	7*4	7*4	1 live seen leaving

10/4/04	S. Fork	Cecil- French	1	0	riffle	10*4	4*3	adjacent redds
10/4/04	S. Fork	Cecil- French	2	0	riffle	10*4	4*3	adjacent redds
10/4/04	S. Fork	Cecil- French	3	0	no data	no data	no data	Redd #1 from 9/30/04 AC&MK took GPS
10/4/04	S. Fork	Cecil- French	4	0	no data	no data	no data	
10/4/04	S. Fork	Cecil- French	5	0	no data	no data	no data	redd #3 from 9/27/04 LG, NP
10/4/04	S. Fork	Cecil- French	6	0	no data	no data	no data	redd #2 from 9/30/04 AC, MK
10/4/04	S. Fork	Cecil- French	7	0	run	6*12	4*8	nice pile in large, gravely nest
10/4/04	S. Fork	Cecil- French	8	0	no data	no data	no data	NP Redd #4 9/27/04
10/4/04	S. Fork	Cecil- French	9	0	riffle	no data	5*6	
10/4/04	S. Fork	Cecil- French	10	0	no data	no data	no data	AC, MK Redd #4 9/30/04
10/4/04	S. Fork	Cecil- French	11	0	no data	no data	no data	9/27/04 redd #5 NP, LG
10/4/04	S. Fork	Cecil- French	12	0	no data	no data	no data	9/27/04 redd #6 NP, LG
10/4/04	S. Fork	Cecil- French	13	2	riffle	no data	2*5	In riffle, female on redd
10/4/04	S. Fork	Cecil- French	14	0	no data	no data	no data	9/30/04 LH #1
10/4/04	S. Fork	Cecil- French	15	0	no data	no data	no data	
10/7/04	S. Fork	Blind horse to Petersburg	1		run	20*5	4*5	
10/7/04	S. Fork	Blind horse to Petersburg	2		PTC	30*20	5*6	
10/7/04	S. Fork	Blind horse to Petersburg	3		run	40*6	5*3	
10/7/04	S. Fork	Blind horse to Petersburg	4	3	run	40*6	10*4.5	
10/7/04	S. Fork	Blind horse to Petersburg	5	2	PTC	50*20	20*8	
10/4/04	S. Fork	George- Cecil	1	1	riffle	7*2	7*2	
10/4/04	S. Fork	George- Cecil	2	0	run	4*2	4*2	
10/4/04	S. Fork	French-Mathews	1	0	riffle	10*6	5*6	
10/4/04	S. Fork	French-Mathews	2	0	PTO	4*4	3*4	
10/4/04	S. Fork	French-Mathews	3	0	no data	no data		
10/4/04	S. Fork	French-Mathews	4	1	riffle	10*10	7*6	
10/4/04	S. Fork	French-Mathews	5	2	run	4*8	4*4	

Total redds surveyed_________________________77
Total spring Chinook observed________________439
Total miles surveyed_________________________66

Date	Reach	Redd #	Redds Observed	# of fish on redd	% Canopy Over Redd	Instream Cover (none, wood, boulder, white water, undercut ledge, pool)	Proximity to instream cover in ft.	Enhanced Y/N	Habitat Type (pool, riffle, run,)	Spawning Area Available (L x W)	Spawning Area Used (L x W)	G.P.S. Reference #	Comments:	total # of Spring Chinook
9/21/06	Petersburg- East Fork	1	1	0	50	None	2	No	top of Riffle	20x10	15x5	N/A	pool above redd w/ 7 k.s., 2 sthd	13
9/21/06	Blindhorse - Petersburg	1		1	75	None	-	No	riffle	12x10	10x4	RB 1		
9/21/06	Blindhorse - Petersburg	2		4	0	pool/pool	25	no	riffle	30x30	20x12	RB 2		
9/21/06	Blindhorse - Petersburg	3		3	5	pool/ white water	20/25	no	riffle	25x15	9x4	RB3		
9/21/06	Blindhorse - Petersburg	4	4	0	5	pool	30	No	riffle	50x30	12x6	RB4		24
9/21/06	Cecil - Limestone	1	1	0	0	none	n/a	no	run	12x5	4x3	n/a		33
9/21/06	Georges - Confluence	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		5
9/21/06	Little South Fork - Grizzly	1		0	0	white water	10	no	run	30x3	15x3	RA 1	marginal; some cobble	
9/21/06	Little South Fork - Grizzly	2		0	0	pool/ ledge	40	no	pool	9x5	9x5	RA 2		
9/21/06	Little South Fork - Grizzly	3		0	60	pool/ ledge	50	no	run	9x4	9x4	RA 3	same habitat as redd #4	
9/21/06	Little South Fork - Grizzly	4		0	30	pool/ ledge	55	no	run	8x4	8x5	RA 4		
9/21/06	Little South Fork - Grizzly	5		0	75	pool/ white water	75	no	run	17x4	7x4	RA 5		
9/21/06	Little South Fork - Grizzly	6		1	0	pool	30	no	pool	12x3	10x3	RA 6		
9/21/06	Little South Fork - Grizzly	7		1	0	boulder/ white water	25	no	run	22x6	12x6	RA 7		
9/21/06	Little South Fork - Grizzly	8		1	0	pool/ledge	25	no	pool	25x6	12x6	RA 8	same habitat as redd #9	
9/21/06	Little South Fork - Grizzly	9		1	0	pool/ledge	35	no	run	25x6	10x5	RA 9		
9/21/06	Little South Fork - Grizzly	10	10	0	10	boulder/ white water	30	no	run	16x4	8x4	RA 10		9
9/21/06	East fork - Cecil Creek	1		1	35	undercut ledge	1 / zero	Yes	run	20x10	8x4			
9/21/06	East fork - Cecil Creek	2		1	15	none	0	No	run	6x4	6x4			
9/21/06	East fork - Cecil Creek	3	3	0	30	white water/ pool	15/35	No	riffle	7x3	7x3			8
9/27/06	Cecilville - French	1		1	10	pool	40	No	riffle	60x25	12x4		only made it to slightly past mile marker 17	
9/27/06	Cecilville - French	2		1	10	pool	30	no	riffle	60x25	11x5			
9/27/06	Cecilville - French	3	3	0	5	wood	10	no	riffle	60x20	11x4			16
9/28/06	E. Fork - Cecil Creek	1		0	50	wood, ledge	5	no	run	25x40	5x10		nice redd	
9/28/06	E. Fork - Cecil Creek	2		0	5	none	N/A	no	pool tailout	10x20	4x7			
9/28/06	E. Fork - Cecil Creek	3	3	0	30	none	N/A	no	riffle	19x5	12x5			5
9/28/06	Limestone - Smith Creek	1		0	5	rock/ log/ bubbles	40	No	run	20x4	18x4		first four all together, not very nice redd	
9/28/06	Limestone - Smith Creek	2		0	5	rock/ log/ bubbles	40	No	run	20x4	18x4		not protected not defined	
9/28/06	Limestone - Smith Creek	3		0	5	rock/ log/ bubbles	40	No	run	20x4	18x4		all sideways - 1 lrg. Redd	
9/28/06	Limestone - Smith Creek	4		0	5	rock/ log/ bubbles	40	No	run	20x4	18x4			
9/28/06	Limestone - Smith Creek	5		0	20	none	n/a	No	riffle	4x3	3x3		small redd	
9/28/06	Limestone - Smith Creek	6		1	35	rock	10	No	riffle	14x4	7x3			
9/28/06	Limestone - Smith Creek	7		0	35	rock	5	No	riffle	14x4	7x4			
9/28/06	Limestone - Smith Creek	8		0	3	white water	10	No	run	20x4	3x4			
9/28/06	Limestone - Smith Creek	9		1	45	pool	30	No	riffle	20x20	10x3			
9/28/06	Limestone - Smith Creek	10		1	45	pool	20	No	run	15x15	6x3			
9/28/06	Limestone - Smith Creek	11		0	35	white water/pool	15-20	No	pool/riffle	4x4	4x4			
9/28/06	Limestone - Smith Creek	12		1	30	pool	30+	No	run	7x5	5x3		out of flagging	
9/28/06	Limestone - Smith Creek	13		1	20	pool	30+	No	run	3x2	3x2			
9/28/06	Limestone - Smith Creek	14		0	50	pool	40	No	run	20x20	10x5		maybe 2 redds	
9/28/06	Limestone - Smith Creek	15	15	0	5	pool	50	No	run	15x15	5x3			5
9/28/06	Little Grizzly - Blindhorse	1		0	5	undercut ledge	20	No	run	3x3	4x3		* recruitment of gravel at mouth of Little	
9/28/06	Little Grizzly - Blindhorse	2		0	10	none	--	No	run	4x2	2.5x2		Grizzly unfinished look to redd- fresh bear	
9/28/06	Little Grizzly - Blindhorse	3		0	20	whitewater	12	No	run	8x3	3x3		deep	
9/28/06	Little Grizzly - Blindhorse	4		3	40	pool	24	No	pool	16x5	16x4		at horseshoe bend	
9/28/06	Little Grizzly - Blindhorse	5		1	15	undercut ledge	30	No	pool	3x3	2x1		small	
9/28/06	Little Grizzly - Blindhorse	6		2	35	pool	18	No	pool	12x5	5x3			
9/28/06	Little Grizzly - Blindhorse	7		0	65	none	--	No	run	30x5	10x3			
9/28/06	Little Grizzly - Blindhorse	8		2	60	none	--	No	run	30x5	6x4			
9/28/06	Little Grizzly - Blindhorse	9		1	50	none	--	No	run	9x3	5x2			
9/28/06	Little Grizzly - Blindhorse	10		0	0	pool	20	No	pool	5x2	3x2			
9/28/06	Little Grizzly - Blindhorse	11	11	0	10	whitewater	10	No	run	5x3	4x3			21
9/28/06	Georges - East Fork	1	1	2	90	wood, undercut ledge	30	no	run	20x4	5x4			9
9/28/06	Blindhorse - Petersburg	1		3	10	pool/ w. water	30	no	run	30x20	18x8	RB 1		
9/28/06	Blindhorse - Petersburg	2		2	75	pool	30	no	riffle	16x7	15x5	RB 2		
9/28/06	Blindhorse - Petersburg	3		5	0	pool	10	no	tailout	25x15	12x5	RB 3		
9/28/06	Blindhorse - Petersburg	4		1	10	pool/ w. water	10	no	run	15x5	15x5	RB 4		
9/28/06	Blindhorse - Petersburg	5		2	0	pool	30	no	run	40x18	10x5	RB 5		
9/28/06	Blindhorse - Petersburg	6		1	0	pool	20	no	run	10x4	10x4	RB 6		
9/28/06	Blindhorse - Petersburg	7		3	0	pool	35	no	riffle	40x30	10x6	RB 7		
9/28/06	Blindhorse - Petersburg	8		1	5	pool	50	no	riffle	35x15	12x5	RB 8		
9/28/06	Blindhorse - Petersburg	9	9	1	0	pool	30	no	riffle	30x20	9x5	RB 9		57
9/28/06	Petersburg - East Fork	1		2	10	none	15	No	riffle	50x15	8x3	RB 1		
9/28/06	Petersburg - East Fork	2		1	10	none	3	No	riffle	50x15	5x3	RB 2		
9/28/06	Petersburg - East Fork	3		0	60	disturbance wh. Wate	0.5	No	riffle	10x4	10x4	RB 3		
9/28/06	Petersburg - East Fork	4		2	5	disturbance wh. Wate	0.5	No	run	10x3	8x3	RB 4		
9/28/06	Petersburg - East Fork	5		1	25	disturbance wh. Wate	0.5	No	riffle	20x10	8x3		(not enough satellites	
9/28/06	Petersburg - East Fork	6	6	1	5	disturbance wh. Wate	3	No	riffle	10x3	7x3	RB 5	saw an additional 10 spch	17
10/3/06	Little S. F. - blindhorse	1		0	0	pool	20	No	run	60x30	15x6	RA 1		
10/3/06	Little S. F. - blindhorse	2	2	0	0	pool	40	No	run	60x30	20x5	RA 1		15
10/4/06	Idlewild - Whites gulch	1		1	40	pool	15	no	run	5x10	5x8			
10/4/06	Idlewild - Whites gulch	2		6	25	pool	15	no	run	20x5	20x5		3 redds, 6 fish; nice pool	

10/4/06	Idlewild - Whites gulch	3		0	25	pool			20	no	run	20x5	20x5				
10/4/06	Idlewild - Whites gulch	4		0	25	pool			25	no	run	20x5	20x5				
10/4/06	Idlewild - Whites gulch	5		1	30	pool			30	no	run	8x10	6x7			8 lives in pool upstream	
10/4/06	Idlewild - Whites gulch	6		2	15	none		n/a		no	riffle	5x6	5x5				
10/4/06	Idlewild - Whites gulch	7		1	40	none		n/a		no	riffle	5x5	5x5				
10/4/06	Idlewild - Whites gulch	8		1	45	none		n/a		no	riffle	5x7	5x7				
10/4/06	Idlewild - Whites gulch	9	9	2	20	pool			20	no	riffle	10x5	8x5				22
10/4/06	Big Creek - Mule (I)	1		0	65	pool, terr. Veg			15	No	pool	40x12	15x6	RI 1		more or less 99 ft	
10/4/06	Big Creek - Mule (I)	2	2	0	0	pool			15	no	pool	15x6	15x3	RI 2		redd not complete	
10/4/06	Mule Bridge - Idlewild	1		2	65	pool			30	No	pool tail-out	15x5	13x5	RJ 01		no GPS point	
10/4/06	Mule Bridge - Idlewild	2		2	5	pool			40	No	run	35x20	15x8	RJ 02			
10/4/06	Mule Bridge - Idlewild	3	3	1	80	none		n/a		No	riffle	20x7	18x5	RJ 03			5
10/5/06	Petersburg - Eastfork	1		1	0	pool			5	No	tailout	20x10	12x8	RC 01			
10/5/06	Petersburg - Eastfork	2		1	0	pool			15	No	pool tailout	25x20	8x4	RC 02			
10/5/06	Petersburg - Eastfork	3		1	0	pool			15	No	riffle	25x25	20x10	RC 03			
10/5/06	Petersburg - Eastfork	4	4	1	0	boulder/ wood			35	No	riffle	20x5	15x4	RC 04			25
10/5/06	East Fork	1		1	0	pool			20	No	Riffle	5x6	8x8				
10/5/06	East Fork	2		6	0	pool			10	No	Pool	15x6	6x3			Same Location as redd #3	
10/5/06	East Fork	3		6	0	pool			10	No	Pool	15x6	3x2				
10/5/06	East Fork	4	4	1	60	pool			30	No	Riffle	8x9	8x6				17
10/5/06	Cecil - Limestone	1		0	90	none		n/a		No	run	25x6	9x4				
10/5/06	Cecil - Limestone	2		1	90	wood			6	No	run	8x4	3x3				
10/5/06	Cecil - Limestone	3		4	10	boulder pool			3	No	pool	? Too deep	4x3			deep	
10/5/06	Cecil - Limestone	4		2	20	pool wood/ boulder			3	No	pool	20x4	4x3				
10/5/06	Cecil - Limestone	5		0	75	undercut ledge			10	No	pool	12x6	8x4			Cecil	
10/5/06	Cecil - Limestone	6		1	90	undercut ledge			8	No	riffle	5x3	5x3			Crawford	
10/5/06	Cecil - Limestone	7		0	0	boulder			10	No	run	8x3	2x2			Crawford	
10/5/06	Cecil - Limestone	8		0	100	undercut ledge			8	No	riffle	25x4	6x3			Andy's	
10/5/06	Cecil - Limestone	9		1	80	undercut ledge			4	No	riffle	25x4	4x3			Andy's	
10/5/06	Cecil - Limestone	10		6	80	wood			1	No	run	16x4	10x3				
10/5/06	Cecil - Limestone	11		0	20	wood			2	No	run	10x4	5x3				
10/5/06	Cecil - Limestone	12		0	70	willow wood			0	No	run	12x5	8x4				
10/5/06	Cecil - Limestone	13		1	10	grass			4	No	run	20x5	10x4			Bridge	
10/5/06	Cecil - Limestone	14		1	80	undercut ledge			3	No	run	16x4	10x4				
10/5/06	Cecil - Limestone	15		2	20	pool wood/ boulder			30	No	pool	20x6	10x6			St. Claire	
10/5/06	Cecil - Limestone	16		6	100	undercut ledge			8	No	pool	40x6	8x3				
10/5/06	Cecil - Limestone	17	17	2	90	grass			4	No	run	12x6	8x5				58
10/5/06	East fork to Cecilville	1		0	0	None			0	No	Run	12x5	9x4		38	multi-fish fight on the next sight up-river	
10/5/06	East fork to Cecilville	2		2	0	undercut ledge			5	No	Run	5x3	7x5		39		
10/5/06	East fork to Cecilville	3	3	0	30	dead trees			20	No	Run	10x5	5x4		47		2
10/5/06	Blindhorse - Petersburg	1		0	0	pool			30	No	Riffle	30x30	12x5	RB 01			
10/5/06	Blindhorse - Petersburg	2		1	0	pool			30	No	run	20x10	10x4	RB 02			
10/5/06	Blindhorse - Petersburg	3		0	40	pool			29	No	run	20x8	15x6	RB 03			
10/5/06	Blindhorse - Petersburg	4		0	20	pool			49	No	run	20x6	14x4	RB 04			
10/5/06	Blindhorse - Petersburg	5	5	0	0	pool			15	No	run	30x30	12x5	RB 05			49
10/10/06	Blindhorse - Petersburg	1		0	10	none		n/a		No	riffle	12x5	12x5	RB 01			
10/10/06	Blindhorse - Petersburg	2		0	0	pool			5	No	riffle	10x15	10x4	RB 02			
10/10/06	Blindhorse - Petersburg	3	3	0	5	pool			25	No	riffle	25x10	20x8	RB 03			10
10/12/06	East Fork Salmon R.	0	0	0 n/a		n/a		n/a		n/a	n/a	n/a	n/a	n/a		possibly one redd at the last private	6
10/12/06	East Fork - Cecil Creek	1		0	10	none		n/a		No	riffle	75x8	5x4				
10/12/06	East Fork - Cecil Creek	2		3	40	white water and pool			10	No	run	30x8	10x5				
10/12/06	East Fork - Cecil Creek	3		0	0	pool			15	No	riffle/ run	30x15	11x7			beautiful redd!	
10/12/06	East Fork - Cecil Creek	4		0	45	ledge/ boulder			15	No	run	30x10	7x4			2 slightly old redds just called one	
10/12/06	East Fork - Cecil Creek	5		0	55	ledge/ boulder			4	No	run	25x20	15x10				
10/12/06	East Fork - Cecil Creek	6		0	59	wood, willows			2	No	run	30x10	5x3				
10/12/06	East Fork - Cecil Creek	7	7	2	45	pool			15	No	riffle	40x6	10x5				8
10/12/06	Petersburg -	1		2	20	Boulder			40	No	riffle	20x5	5x3			steelhead?	
10/12/06	Petersburg -	2		2	90	bank slightly undercut			10	No	run	25x10	10x3				
10/12/06	Petersburg -	3		0	0	none		n/a		No	riffle	30x15	4.5x2.5			small!	
10/12/06	Petersburg -	4		0	1	boulder, wood			6	No	run	11x5	7x4.5				
10/12/06	Petersburg -	5	5	2	20	ledge/ pool			50	No	riffle	30x10	15x8			huge! Possilby multiple redds	7
10/12/06	Smith - Matthews	1		0	0		0	N/A		No	riffle	40x20	12x7		49	1-4 in same large riffle	
10/12/06	Smith - Matthews	2		0	0		0	N/A		No	riffle	40x20	14x5		49		
10/12/06	Smith - Matthews	3		0	0		0	N/A		No	riffle	40x20	12x5		49		
10/12/06	Smith - Matthews	4		0	0		0	N/A		No	riffle	40x20	12x5		49	3 & 4 next to each other	
10/12/06	Smith - Matthews	5	5	0	40		0	N/A		No	run	25x10	25x10		50		0
10/12/06	French - Smith	1		1	0		0		0	No	riffle	30x20	16x8	RE01			
10/12/06	French - Smith	2		0	20		0		20	No	riffle	30x30	20x15	RE02			
10/12/06	French - Smith	3		0	0		0		0	No	riffle	15x15	30x15	RE03			
10/12/06	French - Smith	4		0	0		0		0	No	riffle	30x12	25x5	RE04			
10/12/06	French - Smith	5		0	0		0		5	No	riffle	20x10	18x6	RE05			
10/12/06	French - Smith	6		0	0		0		0	No	riffle	20x30	10x6	RE05			
10/12/06	French - Smith	7		0	0		17		0	No	riffle	40x30	20x8				
10/12/06	French - Smith	8		1	0		0		1	No	pool	15x20	10x14				
10/12/06	French - Smith	9		4	0		0		10	No	riffle	30x15	15x6	RE09		L Bank	
10/12/06	French - Smith	10		0	0		0		10	No	riffle	15x5	10x3	RE09		R Bank	
10/12/06	French - Smith	11	11	1	0		20		1	No	riffle	50x30	20x7				17
10/12/06	Cecil - Limestone	1		3	70	pool			50	No	riffle	30x10	16x5	RX01			
10/12/06	Cecil - Limestone	2		0	5	w. water			15	No	riffle	30x15	15x8	RD02			
10/12/06	Cecil - Limestone	3		6	0	w. water			40	No	riffle	12x6	8x5	RD02			
10/12/06	Cecil - Limestone	4	4	1	75	w. water			8	No	riffle	15x20	15x8	CD02			45
10/12/06	Little S. Fork - Blindhorse	0	0	0 N/A		N/A		N/A		N/A	N/A	N/A	N/A	N/A			4
10/12/06	Blindhorse - Petersburg	1		0	20	none		n/a		No	run	3x3	3x2			by trailhead parking lot	
10/12/06	Blindhorse - Petersburg	2		0	0	none		n/a		No	pool	8x3	5x3			just below parking lot	
10/12/06	Blindhorse - Petersburg	3	3	1	10	none		n/a		No	pool	6x4	3x2			between bridges	4

10/13/06	Idlewild - Whites	1	1	2	50	white water/ pool	10ft/ 25 ft	no	riffle	10x10	8x5			14
10/13/06	North Fork mile 16-14	1		1	0	boulder	1	Yes	pool tailout	30x40	4x8			
10/13/06	North Fork mile 16-15	2		0	0	boulder	3	Yes	pool tailout	25x60	3x6			
10/13/06	North Fork mile 16-16	3	3	4	0	boulder	2	Yes	riffle	20x30	4x14		Below Bridge	5
10/13/06	Sawyers Bar - Kelly Gl	1		0	5	pool	55	no		30x10	4.5x5		smaller but rounded	
10/13/06	Sawyers Bar - Kelly Gl	2		0	0	boulder	40	no	glide	100x10	7x4			
10/13/06	Sawyers Bar - Kelly Gl	3	3	3	15	none	n/a	no	glide to riffl	50x20	10x5.5		not sure if completed	7
10/13/06	Whites to 16 mile	1		0	0	Boulder	3	no	run	200x25	8x5		gorge	
10/13/06	Whites to 16 mile	2		0	0	Boulder	3	no	pool	20x20	3x4			
10/13/06	Whites to 16 mile	3	3	0	0	none	n/a	no	pool/ riffle	20x20	3x1.5			0
10/17/06	Little South Fork - Blindhorse	1		0	0	w. water	20	no	riffle	12x4	10x3	RA01		
10/17/06	Little South Fork - Blindhorse	2	2	0	0	pool	30	no	pool tailout	25x7	18x4	RA02		1
10/18/06	Big Creek - Mule Bridge	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a			0
10/18/06	Mule Bridge - Idlewild	1		0	5	wood	8	No	Pool	20x20	5x4			
10/18/06	Mule Bridge - Idlewild	2		1	35	boulder	6	No	Run	20x10	10x5			
10/18/06	Mule Bridge - Idlewild	3	3	0	35	boulder	6	No	Run	25x10	10x10			2
10/18/06	Idlewild - Whites	1		0	1	none	n/a	no (mining)	riffle	7x4	6x2.5		in a mound of smallish mine tailings, by large dredge hole	
10/18/06	Idlewild - Whites	2		0	0	pool	65	No	glide	13x6	6x4		just below confluence with russians	
10/18/06	Idlewild - Whites	3		0	5	pool, ledge	50	No	glide	40x15	10x4			
10/18/06	Idlewild - Whites	4		0	20	pool, ledge	45	No	glide	40x15	7x3.5			
10/18/06	Idlewild - Whites	5		0	10	pool, ledge	40	No	glide	40x15	6x3			
10/18/06	Idlewild - Whites	6	6	0	0	pools	40	No	riffle	13x5	9x4			0
10/19/06	Petersburg - Eastfork	1		0	40	pool	10	No	run	15x7	7x5			
10/19/06	Petersburg - Eastfork	2		0	45	pool	15	No	run	15x7	7x5			
10/19/06	Petersburg - Eastfork	3	3	1	20	n/a	n/a	No	riffle	8x5	5x3			1
10/19/06	East Fork	1		0	20	boulders	20	No	riffle	7x4	6x4			
10/19/06	East Fork	2	2	0	0	pool	20	No	riffle	30x15			two redds in same location, 1 previ	0
10/19/06	East Fork - Cecilville	1		0	50	w. water	8	No	riffle	6x5	6x3			
10/19/06	East Fork - Cecilville	2		1	45	pool	20	No	PTC	20x15	9x5			
10/19/06	East Fork - Cecilville	3		0	45	pool	20	No	PTC	20x15	7x3			
10/19/06	East Fork - Cecilville	4		0	45	pool	20	No	PTC	20x15	8x4			
10/19/06	East Fork - Cecilville	5	5	0	40	undercut willows	10	No	riffle	15x7	8x4			5
10/19/06	Cecil - Limestone	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a			0
? 10/15 or 9/	Smith Creek - Matthews	1		0	5	undercuts + pool	15-20 / 50ft	No		6x7	6x7			
? 10/15 or 9/	Smith Creek - Matthews	2		1	40	pool	20	No		10x7	5x7			
? 10/15 or 9/	Smith Creek - Matthews	3		0	35	pool	40	No		30x10	15x8			
? 10/15 or 9/	Smith Creek - Matthews	4		0	35	pool	40	No		30x10	15x8			
? 10/15 or 9/	Smith Creek - Matthews	5	5	0	35	pool	40	No		30x10	15x8			2

Total redds surveyed__________________________	190
# spring Chinook observed on redds______________	168
Total spring Chinook observed___________________	553
Miles surveyed:	
Days Surveyed:	12
Total Surveys conducted (1 reach on 1 day = 1 survey)	44
# of reaches:	16

	19-Sep	23-Sep	26-Sep	30-Sep	3-Oct	7-Oct	10-Oct	13-Oct	16-Oct	20-Oct	23-Oct	27-Oct	TOTAL
SOUTH FORK													
L.S. Fork - Blindhorse		1	3				10						14
Blindhorse - Petersburg	3	6	6	10		11		2					38
Petersburg - Cecil	2	6	16	9			12	6		5	2		58
Cecil - French	0	3		31		12	3	21		4	4		78
French - Matthews				22		10	24	11		3	33		103
East Fork		0				2							2
Indian Cr. - O'Farrill			0										0
Otter Bar - Nordheimer						1							1
NORTH FORK													
Mule Bridge - Idlewild													
Idlewild - Whites													
Whites - 16					3								3
16 - 12					1				19				20
12 mile - 8 mile					5				14				19
TOTAL REDDS	5	16	25	72	9	36	49	40	33	12	39		336

	15-Sep	18-Sep	22-Sep	25-Sep	29-Sep	2-Oct	6-Oct	9-Oct	12-Oct	19-Oct	22-Oct	26-Oct	29-Oct	2-Nov	TOTAL
SOUTH FORK															
L.S. Fork - Blindhorse	0		1		9	4	1	2	3					1	21
Blindhorse - Petersburg	0	0	0		5	5	1	3	3	0		0			17
Petersburg - Cecil	0	0	1		4	13	14	7	7	0		5		0	51
Cecil - French	0	0	0		4	6	5	6	3	0		5		0	29
French - Matthews	0	0	0		2	1				12		12			27
East Fork	0		0		1	0		2							3
NORTH FORK															
Mule Bridge - Idlewild											1				1
Idlewild - Whites				1							7		3		11
Whites - 16				0							1		2		3
16 - 12				0									4		4
TOTAL REDDS	0	0	2	1	25	29	21	20	16	12	9	22	9	1	167

Contact Name	**Email**
Tom Hotaling	fisheries@srrc.org

Data collected by the Salmon River Restoration Council and cooperators

Salmon River Restoration Council

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<u>Salmon iver Spring un Chinook scapement Survey – 2010-FISH I S-FP-07</u>
Agreement Number: 81333AG041
Time Period: uly 18, 2010 – March 1, 2011

March 1, 2011

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The Salmon iver estoration Council S C is submitting the enclosed final invoice for Agreement 81333AG041 Salmon iver Spring un Chinook scapement Survey 2010-FISH I S-FP-07. The S C led the coordination of these surveys with support from the California Department of Fish and Game, aruk Tribe of California, S Forest Service, Oregon State niversity, Northern California esource Center and local community volunteers.

The parties involved in these cooperative surveys have identified the need to assess the e isting spawning populations and protect the spawning grounds of Salmon iver Spring un Chinook salmon.

During the 2010 Spring un Chinook spawning season September through November , the S C led the coordination of cooperative efforts to provide training, materials, e uipment, supplies, and labor necessary to accomplish the tasks outlined in the Statement of Work for this agreement. All surveys were conducted following the established protocols and procedures of this agreement. The methods outlined in this agreement are identical to methods outlined for Cooperative Fall un Chinook scapement Surveys.

Surveys were conducted twice per week from September 14 to November 1, 2010 the S C coordinated collection of information on run timing, spawning distribution, abundance, and se for Spring un Chinook salmon in the Salmon iver, to determine escapement and hatchery straying rates. Samples from these surveys have been provided to the appropriate parties.

Please see the attached report summary, data spreadsheets and photographs for more information regarding the results of 2010 Spring un Chinook scapement Surveys.

These community-based surveys continue to be an integral part of restoring and protecting the last remaining wild population of Spring- un Chinook in the lamath.

We look forward continuing the success of this program. Thank you very much for your support.

espectfully,

Thomas Hotaling
Fisheries Coordinator

Summary of Activities and esults:

2010 Spring un Chinook scapement Surveys were completed with the invaluable participation of the California Department of Fish and Game CDFG , aruk Tribe of California, S Forest Service SFS , Oregon State niversity OS , Northern California esource Center NC C and local community volunteers. 2010 Salmon iver Spring un Chinook spawning survey training took place in Cecilville, CA on September 9, 2010. 25 people attended this training. 2010 Surveys began 9/14/2010 and ended 11/1/2010. Survey crews were provided by CDFG, aruk Tribe, SFS and NC C.

The survey area for 2010 Spring un Chinook Spawning Surveys was considered to be on the South Fork Salmon iver from Matthews Creek to ittle South Fork, including the ast Fork, and on the North Fork Salmon River from Kelly's Gulch to Big Creek. Surveys were also conducted outside the survey area to determine the e tent of overlap between Spring un and Fall un spawning.

Survey crews consisted of at least 2 people per reach. All spawning redds were enumerated and located on a survey map. When a carcass was located crew members identified species and gender, checked for marks or tags, obtained a fork length measurement, collected scale samples, and e amined females for spawning success. Data from 2010 spawning surveys is preliminary.

Scale samples were delivered to California Department of Fish and Game for determination of age composition of Salmon iver spring run Chinook. Tissue samples were collected for genetic analysis. Otolith samples were collected for analysis by ebecca uinones, S Forest Service. In addition, the Salmon iver estoration Council S C coordinated collection of intestine samples for Dr. erri artholomew and Oregon State niversity. Intestine samples will be analy ed to determine the affects of Ceratomy a Shasta on spring run Chinook, and investigate the appropriateness of spring run Chinook in the reintroduction to Oregon and the pper lamath asin. Intestine samples were stored in tubes of ethanol and delivered to Oregon State University's John L. Fryer Salmon Disease Laboratory.

For purposes of the mark-and-recapture estimate, each carcass was categori ed into one of four pathways. Fresh carcasses, those with clear eyes and/or firm flesh were designated as Path 1. Individually numbered aw tags were attached to the lower aw of all Path 1 carcasses and returned to the river for later recapture. Older carcasses, those with cloudy eyes and/or mushy flesh, were categori ed as Path 2. All Path 2 carcasses were cut in half and returned to the river once all of the biological data was collected. Path 3 carcasses included all of the Path 1 recaptured carcasses that were marked during previous surveys. Any carcasses that could be observed by a survey crew but could not be captured because they were located in inaccessible or unsafe locations were designated as Path 4.

A total of 187 Spring un Chinook carcasses were encountered for sampling during the survey period. 99 of these carcasses were marked for recapture and 30 of these marked carcasses were recaptured. A Peterson mark-and-recapture estimate for this population e uals 45 spring-run Chinook. A Schaeffer mark-and-recapture estimate for this population e uals 4 2 spring-run Chinook.

No fin-clipped salmon were observed during 2010 Salmon iver spring run Chinook spawning surveys. No coded wire tags were recovered. Interestingly, a spring Chinook carcass was found with a 6" trout in its stomach.

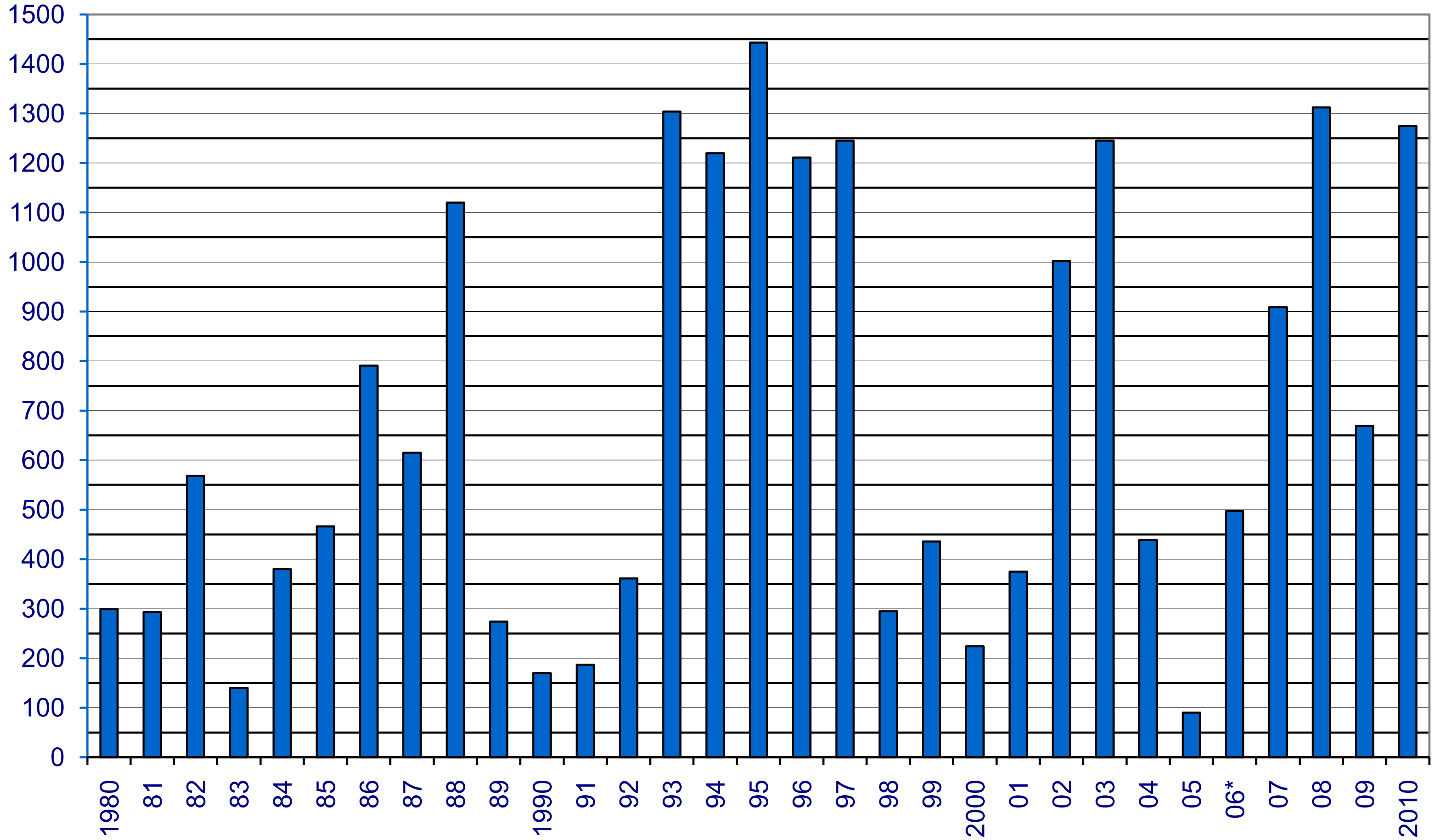
During the 2010 spawning survey period 378 Spring un Chinook spawning redds were observed in total. tili ing an e pansion rate of 2 adults per redd, the estimated number of adults is 75 . Spring-run

Chinook spawning redds were observed from ittle South Fork to Matthews Creek on the South Fork of the Salmon iver, and from ig Creek to 8 mile marker on the North Fork of the Salmon iver. Spawning began mid-September and ended near the end of October. The peak of spawning occurred October 1st. During the survey period one spawning red was observed less than 200 feet down river from Matthews Creek. No other spawning redds were discovered outside of the survey area.

The total number of spring run Chinook observed during the Salmon iver census dives on August 11, 2010 e ualed 1275. In addition, there were 8 spring-run Chinook observed in Wooley Creek 8/2 /11 . Therefore, 13 1 is determined to be the total spawning population of spring-run Chinook in the Salmon iver subbasin.

ased on survey results from the Salmon iver Spring Chinook and Summer Steelhead Dives, spawning surveys were focused largely on the South Fork of the Salmon iver in order to survey the bulk of the spring-run Chinook population. On 8/11/2010 there were 928 spring-run Chinook in the South Fork of the Salmon iver, 200 spring-run Chinook in the North Fork of the Salmon iver, and 147 spring-run Chinook in the Mainstem Salmon iver.

Salmon River Spring Chinook



Salmon River Spring Chinook and Summer Steelhead Dives 2010

8/10 and 8/11 2010 Total miles:80

Reach	STLHD ADULTS	STLHD 1/2 LB	SP CH ADUI	SP CH JACKS	
Mainstem					18 miles
Wooley-Mouth	12	7	20	8	
Grants-Wooley	4	10	4	4	
Nordheimer-Grants	12	13	43	6	
Forks- Nordheimer	32	32	51	11	
Mainstem Count	60	62	118	29	
South Fork					28 miles
Henry Bell-Forks	2	8	185	56	
O'Farrill-Henry Bell	4	5	29	11	
Indian-O'Farrill	3	5	145	28	
Mathews-Indian	4	0	29	13	
French-Mathews	9	13	68	29	
Cecil-French	4	16	58	25	
Petersburg-Cecil	4	21	97	19	
Blindhorse-Petersburg	7	7	50	7	
Little S. Fork-Blindhorse	0	1	58	2	
South Fork Count	37	76	719	190	
North Fork					29.5 miles
4 Mile-Forks	5	11	8	1	
8 Mile-4 Mile	2	6	23	6	
12 Mile-8 Mile	1	5	37	22	
16 Mile-12 Mile	6	2	20	8	
White's Gl-12 Mile	3	4	24	0	
Idlewild-Whites Gl	1	8	31	13	
Mule Bridge-Idlewild	0	2	0	0	
Big Creek-Mule Bridge	1	2	5	2	
North Fork Count	19	40	148	52	
East Fork					4.5 miles
Taylor-Confluence	0	0	5	0	
Shadow-Taylor	0	1	14	0	
East Fork count	0	1	19	0	
8/26/2010					
Wooley Creek					12.5 miles
Gates-Mouth	7	5	20	1	
Bridge-Gates	18	16	26	8	
Hancock-Bridge	11	5	31	0	
N.Fork-Hancock	1	1	0	0	
Wooley Creek count	37	27	77	9	
	153	206	1081	280	
Total Counts	359		1361		

Notes:
van in water at NF 4 mile
one sockeye adult seen in Petersburg to Cecil reach (Steve Gough USFWS)
Blindhorse - Petersburg: one unspawned carscass seen
Forks - Nordheimer: steelhead 1/2 lbr counts in mainstem likely incl. resident trout (P. Higgins)
a couple brown trout seen in mainstem

Cooperative Spring Chinook Spawning Ground and Carcass Survey

Crew:____ Stream:_________________________________

____ Reach:__________________________________

Date:____

Air Temp:_________ Water Temp:_________ Start Time:_________ End Time:__________

Weather: clear cloudy rain Turbidity: clear turbid very turbid

Sample #			Jaw Tag				Y/N	*Hatchery only*	**Y/N**					**Intestine**
e.g.:SA101210R10-1	Species	Path #	Applied	Recap	Sex M/F	F / L	Spawned	Head Tag #	Scales	Otilith	Tissue	Scar #	Disease #	**Sample #**
SA														
SA														
SA														
SA														
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Sample # = SA-date-reach-sample #-sample type (e.g. "SA-101210-R10-1-OTS" = Salmon River, October 12,2010 Reach 10 Sample 1 Otolith Tissue Scale)

Species Abbreviations: SPCH=Spring Chinook, STHD=Steelhead, SS=Silver Salmon (Coho)

Path #: 1=Fresh Carcass, 2=Decomposed Carcass, 3=Recapture, 4=Unretrievable

Fish Scar Codes: 1=lamprey, 2=gill net, 3=hook, 4=otter bite

Disease Assessment Codes: 1=Columnaris, 2=Icth, 3=C.Shasta

Spring Chinook Redd Location and Habitat Survey

Stream: ______________________________ Reach: ______________________________ Date: ______________

Crew: ____

Start Time : ____________ Water Temp: ________ Air Temp: _________ End Time: _________ Water Temp. __________

Air Temp.: _________ Weather: Clear Cloudy Rain Snow Method: Walk Dive Float

Turbidity: Clear Lightly Turbid Turbid Muddy

Redd #	# of fish on redd	% Canopy Over Redd	Instream Cover (none, wood, boulder, white water, undercut ledge, pool)	Proximity to instream cover in ft.	Habitat Type (pool, riffle, run,)	Spawning Area Available (L x W)	Spawning Area Used (L x W)	G.P.S. Reference #	Comments:

Total # of Redds ______________ Total # of Live Spring Chinook ________________ Total # of Live Steelhead ___________

Cooperative Spring Chinook Spawning Ground and Carcass Survey
2010 Spawning Redd Data & Final Field Data

	9/14	9/17	9/21	9/24	9/27	10/1	10/5	10/8	10/11	10/14	10/18	10/21	10/25	10/28	11/1	TOTAL
SOUTH FORK																
L.S. Fork - Blindhorse	3	5	8		15											31
Blindhorse - Petersburg	1	6	5	12	21	26	3	0			0					74
Petersburg - Cecil	1	1	0	11	15	7	26	4	0	1	0				0	66
Cecil - French	0	1	6	2	8	22	14	5	10	1	12					81
French - Matthews	0	0	2	2	10	16	13	22		0	0					65
Matthews - Indian					1											1
East Fork							11			4						15
subtotals:	5	13	21	27	70	71	67	31	10	6	12				0	333
NORTH FORK																
Big Cr. - Mule Bridge			1		5											6
Mule Bridge - Idlewild			0				10									10
Idlewild - Whites			0	3								4				7
Whites - 16		0	0			1						7				8
16 - 12						6										6
12 to 8						8										8
subtotals:		0	1	3	5	15	10					11				45
TOTAL REDDS	5	13	22	30	75	86	77	31	10	6	12	11				378

REACH		9/14	9/17	9/21	9/24	9/27	10/1	10/5	10/8	10/11	10/14	10/18	10/21	10/25	10/28	11/1	Total
South Fork:																	
Little South Fork-Blindhorse (A)	REDDS	3	5	8		15											31
	CARCASSES	0	0	0		0											
	LIVES	30	30	26		28											
Blindhorse-Petersburg (B)	REDDS	1	6	5	12	21	26	3	0		*	0					74
	CARCASSES	1	2	0	0	1	5	9	6		7	20					
	LIVES	*	6	21	43	37	45	37	28		12	5					
Petersburg-Cecil Cr. (C)	REDDS	1	1	0	11	15	7	26	4	0	1	0				0	66
	CARCASSES	0	0	0	0	0	2	3	7	14	17	13				0	
	LIVES	20*	26	12	17	18	23	34	31	*	15	*				5	
Cecil-French (D)	REDDS	0	1	6	2	8	22	14	5	10	1	12					81
	CARCASSES	1	0	1	0	0	0	3	16	14	14	12					
	LIVES	48	42	37	41	41	48	45	46	50	35	8					
French-Matthews (E)	REDDS	0	0	2	2	10	16	13	22		0	0					65
	CARCASSES	0	0	0	0	1	0	1	4		6	2					
	LIVES	60	89	8	29	18	70	*	43		20	8					
Matthews-Indian	REDDS					1											1
	CARCASSES					0											
	LIVES					45											
South Fork Totals:	REDDS	5	13	21	27	70	71	56	31	10	2	12					**318**
	CARCASSES	1	2	1	0	2	7	16	33	28	54	47					191
	LIVES	158	193	104	130	187	186	116	148	50	82	21					
East Fork:																	
Shadow-Taylor Cr. (F)	REDDS							5			0						5
	CARCASSES							0			0						0
	LIVES							7			1						
Taylor-South Fork Conf. (G)	REDDS							6			4						10
	CARCASSES							0			2						2
	LIVES							7			5						
East Fork Totals:	REDDS							11			4						**15**
	CARCASSES							0			2						2
	LIVES							14			6						
North Fork:																	
Big Cr.-Mule Bridge (I)	REDDS			1		5											6
	CARCASSES			0		0											
	LIVES			0		7											
Mule Bridge-Idlewild (J)	REDDS			0				10									10
	CARCASSES			0				3									
	LIVES			0				3*									
Idlewild-White's (J)	REDDS			0	3								4				7
	CARCASSES			0	0								0				
	LIVES			0	4								2				
White's-16 (K)	REDDS		0	0			1						7				8
	CARCASSES		0	0			1						0				
	LIVES		12	4			3						3				
16-12	REDDS						6										6
	CARCASSES						0										
	LIVES						6										
12 to 8	REDDS						8										8
	CARCASSES						*										
	LIVES						47										
North Fork Totals:	REDDS																**45**
	CARCASSES																
	LIVES																
Overall Spring Chinook Totals=	REDDS																**378**
	CARCASSES																

* = incomplete data
note: "CARCASSES" includes recaptures

REACH		9/14	9/17	9/21	9/24	9/27	10/1	10/5	10/8	10/11	10/14	10/18	10/21	10/25	10/28	11/1	Total
South Fork:																	
Little South Fork-Blindhorse (A)	REDDS	3	5	8		15											31
	CARCASSES	0	0	0		0											
	LIVES	30	30	26		28											
Blindhorse-Petersburg (B)	REDDS	1	6	5	12	21	26	3	0		47 (total)	0					74
	CARCASSES	1	2	0	0	1	5	9	6		7	20					
	LIVES	*	6	21	43	37	45	37	28		12	5					
Petersburg-Cecil Cr. (C)	REDDS	1	1	0	11	15	7	26	4	0	1	0				0	66
	CARCASSES	0	0	0	0	0	2	3	7	14	17	13				0	
	LIVES	20*	26	12	17	18	23	34	31	*	15	*				5	
Cecil-French (D)	REDDS	0	1	6	2	8	22	14	5	10	1	12					81
	CARCASSES	1	0	1	0	0	0	3	16	14	14	12					
	LIVES	48	42	37	41	41	48	45	46	50	35	8					
French-Matthews (E)	REDDS	0	0	2	2	10	16	13	22		0	0					65
	CARCASSES	0	0	0	0	1	0	1	4		6	2					
	LIVES	60	89	8	29	18	70	*	43		20	8					
Matthews-Indian	REDDS					1											1
	CARCASSES					0											
	LIVES					45											
South Fork Totals:	REDDS	5	13	21	27	70	71	56	31	10	2	12					**318**
	CARCASSES	1	2	1	0	2	7	16	33	28	54	47					191
	LIVES	158	193	104	130	187	186	116	148	50	82	21					
East Fork:																	
Shadow-Taylor Cr. (F)	REDDS							5			0						5
	CARCASSES							0			0						0
	LIVES							7			1						
Taylor-South Fork Conf. (G)	REDDS							6			4						10
	CARCASSES							0			2						2
	LIVES							7			5						
East Fork Totals:	REDDS							11			4						**15**
	CARCASSES							0			2						2
	LIVES							14			6						
North Fork:																	
Big Cr.-Mule Bridge (I)	REDDS			1		5											6
	CARCASSES			0		0											
	LIVES			0		7											
Mule Bridge-Idlewild (J)	REDDS			0				10									10
	CARCASSES			0				3									
	LIVES			0				3*									
Idlewild-White's (J)	REDDS			0	3								4				7
	CARCASSES			0	0								0				
	LIVES			0	4								2				
White's-16 (K)	REDDS		0	0			1						7				8
	CARCASSES		0	0			1						0				
	LIVES		12	4			3						3				
16-12	REDDS						6										6
	CARCASSES						0										
	LIVES						6										
12 to 8	REDDS						8										8
	CARCASSES						*										
	LIVES						47										
North Fork Totals:	REDDS																**45**
	CARCASSES																
	LIVES																
Overall Spring Chinook Totals=	REDDS																**378**
	CARCASSES																

* = incomplete data

note: "CARCASSES" includes recaptures

Cooperative Salmon River Spring Chinook Spawning Ground and Carcass Survey

2010 Carcass Data

Path #: 1=Fresh Carcass, 2=Decomposed Carcass, 3=Recapture, 4=Unretrievable

Disease #: 1=Columnaris, 2=Icth, 3=C.Shasta

Species: SPCH=Spring Chinook, STHD=Steelhead

Scar #: 1=lamprey, 2=gill net, 3=hook, 4=otter

#	Date	Species:	Path #	Applied	Recap	Sex M/F	F / L	SpawnedY/N	ScalesY/N	F ClipY/N	OtilithY/N	Tissue Y/N	Scar #	Disease #
1	14-Sep	SPCH	1	*	-	F	76	N	Y	N	Y	Y	-	1
2	14-Sep	SPCH	1	3670	-	F	94	N	Y	N	Y	Y	-	-
3	17-Sep	SPCH	1	*	-	M	97	N	Y	N	N	Y	-	-
4	17-Sep	SPCH	1	765	-	F	84	N	Y	N	Y	Y	-	-
5	21-Sep	SPCH	2	-	-	F	73	-	Y	N	N	N	-	-
6	28-Sep	SPCH	1	790	-	F	86	Y	Y	N	Y	Y	-	-
7	28-Sep	SPCH	1	1920	-	-	72	-	Y	N	-	Y	-	-
8	1-Oct	SPCH	2	-	-	M	34	-	N	N	N	N	-	-
9	1-Oct	SPCH	2	-	-	M	-	-	N	N	N	N	-	-
10	1-Oct	SPCH	2	-	-	F	72	-	Y	N	Y	Y	-	-
11	*1-Oct*	*SPCH*	*1*	*649*	-	*M*	*76*	-	*Y*	*N*	*Y*	*Y*	*1*	*
12	1-Oct	SPCH	2	-	-	M	-	-	N	-	N	N	-	-
13	1-Oct	SPCH	2	-	-	M	63	-	Y	N	N	Y	-	-
14	1-Oct	SPCH	1	744	-	F	77	-	Y	N	Y	Y	-	-
15	5-Oct	SPCH	1	1917	-	F	76	-	Y	N	Y	Y	-	-
16	5-Oct	SPCH	1	-	-	F	60	N	Y	N	Y	Y	-	-
17	5-Oct	SPCH	1	-	-	M	78	Y	Y	N	Y	Y	-	-
18	5-Oct	SPCH	1	-	-	M	63	N	Y	N	Y	Y	-	-
19	5-Oct	SPCH	2	-	-	F	82	Y	N	N	N	N	-	-
20	5-Oct	SPCH	1	1964	-	F	73	Y	Y	N	Y	Y	-	-
21	5-Oct	SPCH	1	761	-	F	67	Y		N	Y	Y	-	-
22	5-Oct	SPCH	2	-	-	-	70	-	-	-	-	-	-	-
23	5-Oct	SPCH	1	643	-	F	63	Y	Y	N	Y	Y	-	-
24	5-Oct	SPCH	1	759	-	M	72	-	Y	N	Y	Y	-	-
25	5-Oct	SPCH	1	775	-	M	71	-	Y	N	Y	Y	-	-
26	5-Oct	SPCH	1	1542	-	M	73	-	Y	N	Y	Y	-	-
27	5-Oct	SPCH	1	771	-	F	69	Y	Y	N	Y	Y	-	-
28	5-Oct	SPCH	2	-	-	-	43	-	-	-	-	-	-	-
29	5-Oct	SPCH	1	5714	-	F	85	Y	Y	N	Y	Y	-	-
30	5-Oct	SPCH	1	1967	-	F	71	Y	Y	N	Y	Y	-	-
31	5-Oct	SPCH	2	-	-	F	78	Y	-	-	-	-	-	-
32	8-Oct	SPCH	1	1532	-	F	75	Y	Y	N	Y	Y	-	-
33	8-Oct	SPCH	1	1939	-	M	78	Y	Y	N	Y	Y	-	-
34	8-Oct	SPCH	1	1530	-	F	59	Y	Y	N	Y	Y	-	-
35	8-Oct	SPCH	3	-	1917	-	-	-	-	-	-	-	-	-
36	8-Oct	SPCH	2	-	-	M	86	Y	N	N	N	N	-	-
37	8-Oct	SPCH	1	-	-	F	79	Y	Y	N	Y	Y	-	-
38	8-Oct	SPCH	1	-	-	F	84	Y	Y	N	Y	Y	-	-
39	8-Oct	SPCH	3	-	759	M	74	Y	-	-	-	-	-	-
40	8-Oct	SPCH	3	-	1542	M	72	Y	-	-	-	-	-	-
41	8-Oct	SPCH	1	-	-	M	46	Y	Y	N	Y	Y	-	-
42	8-Oct	SPCH	1	5952	-	M	80	-	Y	N	Y	Y	-	3?
43	8-Oct	SPCH	2	-	-	F	-	Y	N	N	N	N	-	-
44	8-Oct	SPCH	1	5722	-	M	94	Y	Y	N	Y	Y	-	-
45	8-Oct	SPCH	1	5723	-	F	67	Y	Y	N	Y	Y	-	-
46	8-Oct	SPCH	1	5947	-	F	78	Y	Y	N	Y	Y	-	-
47	8-Oct	SPCH	1	5717	-	F	72	Y	Y	N	Y	Y	-	-
48	8-Oct	SPCH	1	5718	-	F	72	Y	Y	N	Y	Y	-	-
49	8-Oct	SPCH	1	1656	-	F	72	Y	Y	N	Y	Y	-	-
50	8-Oct	SPCH	1	1659	-	F	86	Y	Y	N	Y	Y	-	-
51	8-Oct	SPCH	2	-	-	F	61	Y	Y	N	N	N	-	-
52	8-Oct	SPCH	1	1658	-	F	77	Y	Y	N	N	Y	-	-
53	8-Oct	SPCH	1	1660	-	M	78	-	Y	N	N	Y	-	-
54	8-Oct	SPCH	1	1663	-	F	76	Y	Y	N	N	N	-	-
55	8-Oct	SPCH	1	1667	-	F	77	Y	Y	N	N	N	-	-
56	8-Oct	SPCH	1	1633	-	M	57	-	Y	N	N	N	-	-
57	8-Oct	SPCH	2	-	-	M	-	-	-	-	-	-	-	-
58	8-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
59	8-Oct	SPCH	1	1671	-	F	63	Y	Y	N	N	N	-	-
60	8-Oct	SPCH	1	1665	-	F	79	Y	Y	N	N	N	-	-
61	8-Oct	SPCH	1	1662	-	F	74	Y	Y	N	N	N	-	-
62	8-Oct	SPCH	1	1631	-	F	69	Y	Y	N	N	N	-	-
63	8-Oct	SPCH	4	-	-	-	-	-	-	-	-	-	-	-
64	11-Oct	SPCH	1	5948	-	F	75	Y	Y	N	Y	Y	-	-
65	11-Oct	SPCH	1	5725	-	F	64	Y	Y	N	Y	Y	-	-
66	11-Oct	SPCH	3	-	5722	-	-	-	-	-	-	-	-	-
67	11-Oct	SPCH	1	5719	-	F	80	Y	Y	N	Y	Y	-	-
68	11-Oct	SPCH	1	5949	-	F	84	Y	Y	N	Y	Y	-	-
69	11-Oct	SPCH	1	5942	-	F	82	Y	Y	N	Y	Y	-	-
70	11-Oct	SPCH	1	5726	-	F	70	Y	Y	N	Y	Y	-	-
71	11-Oct	SPCH	1	5950	-	M	84	Y	Y	N	Y	Y	-	-
72	11-Oct	SPCH	3	-	5723	-	-	-	-	-	-	-	-	-
73	11-Oct	SPCH	1	5716	-	F	79	Y	Y	N	Y	Y	-	-
74	11-Oct	SPCH	1	5953	-	F	78	Y	Y	N	Y	Y	-	-
75	11-Oct	SPCH	1	5724	-	F	74	Y	Y	N	Y	Y	-	-
76	11-Oct	SPCH	1	5941	-	F	81	Y	Y	N	Y	Y	-	-

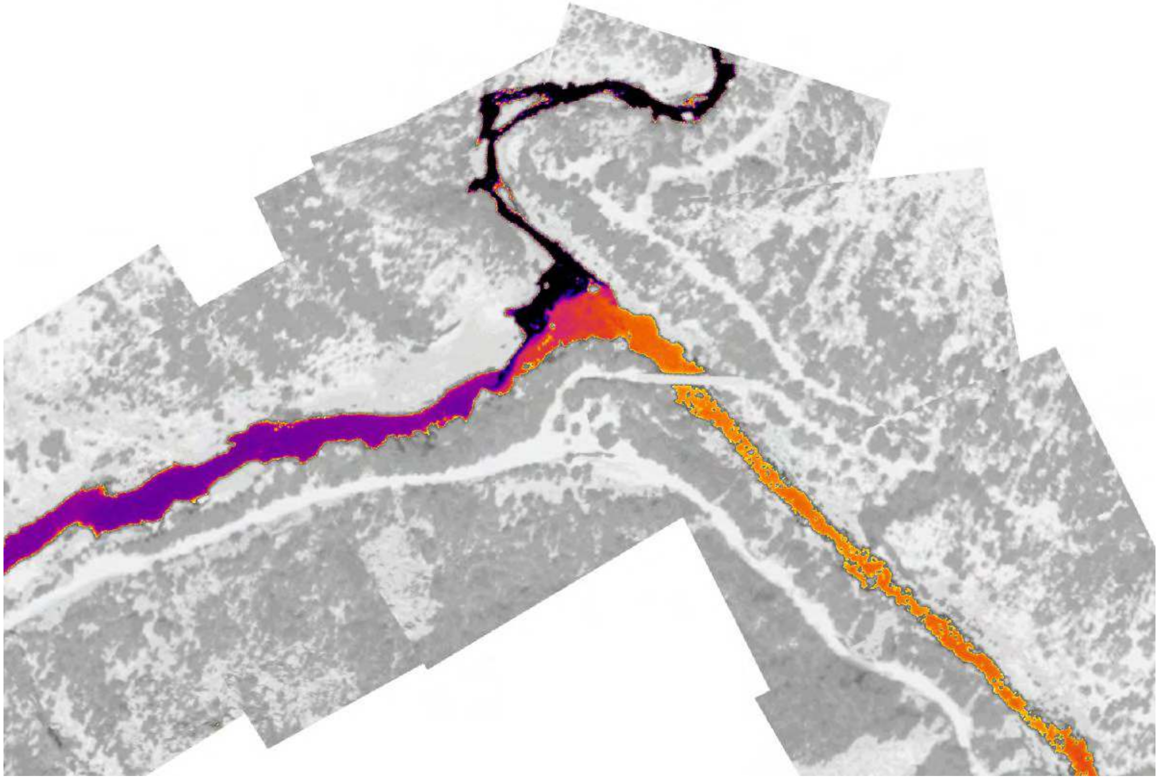
#	Date	Species:	Path #	Applied	Recap	Sex M/F	F / L	SpawnedY/N	ScalesY/N	F ClipY/N	OtilithY/N	Tissue Y/N	Scar #	Disease #
77	11-Oct	SPCH	3	-	5717	-	-	-	-	-	-	-	-	-
78	11-Oct	SPCH	3	-	1659	F	84	-	-	-	-	-	-	-
79	11-Oct	SPCH	1	646	-	F	81	Y	Y	N	Y	Y	-	-
80	11-Oct	SPCH	1	1900	-	F	73	Y	Y	N	Y	Y	-	-
81	11-Oct	SPCH	3	-	1667	F	78	Y	-	-	-	-	-	-
82	11-Oct	SPCH	2	-	-	F	77	Y	-	-	-	-	-	-
83	11-Oct	SPCH	1	1895	-	M	43	N	Y	N	Y	Y	-	-
84	11-Oct	SPCH	1	5983	-	M	77	Y	Y	N	Y	Y	-	-
85	11-Oct	SPCH	3	-	1671	F	63	Y	-	-	-	-	-	-
86	11-Oct	SPCH	2	-	-	F	72	-	-	-	-	-	-	-
87	11-Oct	SPCH	3	-	1662	F	75	Y	-	-	-	-	-	-
88	11-Oct	SPCH	1	1892	-	M	86	Y	Y	N	-	-	-	-
89	11-Oct	SPCH	2	-	-	M	58	Y	-	-	-	-	-	-
90	11-Oct	SPCH	1	1898	-	F	74	Y	Y	N	Y	Y	-	-
91	11-Oct	SPCH	1	5990	-	M	43	Y	Y	N	Y	Y	-	-
92	14-Oct	SPCH	1	5774	-	F	78	Y	Y	N	Y	Y	-	-
93	14-Oct	SPCH	2	-	-	M	84	Y	N	N	N	N	-	-
94	14-Oct	SPCH	1	5770	-	F	73	Y	Y	N	Y	Y	-	-
95	14-Oct	SPCH	3	-	1633	-	-	-	-	-	-	-	-	-
96	14-Oct	SPCH	1	4608	-	F	79	Y	Y	N	Y	Y	-	-
97	14-Oct	SPCH	1	4633	-	F	81	Y	Y	N	Y	Y	-	-
98	14-Oct	SPCH	1	4620	-	F	73	Y	Y	N	Y	Y	-	-
99	14-Oct	SPCH	1	4632	-	F	85	Y	Y	N	Y	Y	-	-
100	14-Oct	SPCH	1	4660	-	M	74	Y	Y	N	Y	Y	-	-
101	14-Oct	SPCH	1	4617	-	F	64	Y	Y	N	Y	Y	-	-
102	14-Oct	SPCH	1	4630	-	F	80	Y	Y	N	Y	Y	-	-
103	14-Oct	SPCH	2	-	-	F	83	Y	N	N	N	N	-	-
104	14-Oct	SPCH	1	4628	-	F	83	Y	Y	N	Y	Y	-	-
105	14-Oct	SPCH	1	4621	-	F	60	Y	Y	N	Y	Y	-	-
106	14-Oct	SPCH	1	1899	-	F	70	Y	Y	N	Y	Y	-	-
107	14-Oct	SPCH	3	-	5948	F	80	Y	-	-	-	-	-	-
108	14-Oct	SPCH	2	-	-	F	69	Y	-	-	-	-	-	-
109	14-Oct	SPCH	2	-	-	M	44	-	-	-	-	-	-	-
110	14-Oct	SPCH	3	-	5725	M	64	Y	-	-	-	-	-	-
111	14-Oct	SPCH	2	-	-	M	68	Y	-	-	-	-	-	-
112	14-Oct	SPCH	2	-	-	M	93	Y	-	-	-	-	-	-
113	14-Oct	SPCH	3	-	5719	M	78	Y	-	-	-	-	-	-
114	14-Oct	SPCH	1	1894	-	M	42	Y	Y	N	Y	Y	1	-
115	14-Oct	SPCH	2	-	-	M	58	Y	-	-	-	-	-	-
116	14-Oct	SPCH	3	-	5942	M	79	-	-	-	-	-	-	-
117	14-Oct	SPCH	2	-	-	M	45	Y	-	-	-	-	-	-
118	14-Oct	SPCH	1	5986	-	M	69	Y	Y	N	Y	Y	1	-
119	14-Oct	SPCH	3	-	5950	M	84	-	-	-	-	-	-	-
120	14-Oct	SPCH	1	5985	-	M	43	Y	Y	N	Y	Y	-	-
121	14-Oct	SPCH	1	1896	-	F	57	Y	Y	N	Y	Y	-	-
123	14-Oct	SPCH	2	-	-	F	70	Y	N	N	N	N	-	-
124	14-Oct	SPCH	2	-	-	F	60	Y	-	-	-	-	-	-
125	14-Oct	SPCH	2	-	-	F	69	Y	-	-	-	-	-	-
126	14-Oct	SPCH	1	5932	-	M	90	Y	Y	N	Y	Y	-	-
127	14-Oct	SPCH	1	5937	-	M	95	Y	Y	N	Y	Y	-	-
128	14-Oct	SPCH	2	-	-	F	77	Y	-	-	-	-	-	-
129	14-Oct	SPCH	1	1922	-	F	78	Y	Y	N	Y	Y	-	-
130	14-Oct	SPCH	1	5783	-	F	64	Y	Y	N	Y	Y	-	-
131	14-Oct	SPCH	1	5954	-	F	69	Y	Y	N	Y	Y	-	-
132	18-Oct	SPCH	2	-	-	F	73	Y	-	-	-	-	-	-
133	18-Oct	SPCH	1	5993	-	M	64	-	Y	N	Y	Y	-	-
134	18-Oct	SPCH	3	-	762	F	79	-	-	-	-	-	-	-
135	18-Oct	SPCH	1	5992	-	F	70	Y	Y	N	Y	Y	-	-
136	18-Oct	SPCH	3	-	747	F	-	-	-	-	-	-	-	-
137	18-Oct	SPCH	1	5988	-	F	71	Y	Y	N	Y	Y	-	-
138	18-Oct	SPCH	3	-	1963	F	73	-	-	-	-	-	-	-
139	18-Oct	SPCH	3	-	650	F	77	-	-	-	-	-	-	-
140	18-Oct	SPCH	1	1893	-	F	69	Y	Y	N	Y	Y	-	-
141	18-Oct	SPCH	2	-	-	M	-	-	-	-	-	-	-	-
142	18-Oct	SPCH	2	-	-	F	69	-	-	-	-	-	-	-
143	18-Oct	SPCH	2	-	-	F	-	-	-	-	-	-	-	-
144	18-Oct	SPCH	2	-	-	F	75	-	-	-	-	-	-	-
145	18-Oct	SPCH	3	-	1961	F	71	-	-	-	-	-	-	-
146	18-Oct	SPCH	2	-	-	F	-	-	-	-	-	-	-	-
147	18-Oct	SPCH	1	5984	-	M	41	Y	Y	N	Y	Y	-	-
148	18-Oct	SPCH	2	-	-	F	74	Y	-	-	-	-	-	-
149	18-Oct	SPCH	2	-	-	F	70	Y	-	-	-	-	-	-
150	18-Oct	SPCH	2	-	-	F	48	Y	-	-	-	-	-	-
151	18-Oct	SPCH	1	5789	-	F	71	Y	Y	N	Y	Y	-	-
152	18-Oct	SPCH	3	-	1899	F	70	Y	-	-	-	-	-	-
153	18-Oct	SPCH	2	-	-	-	-	-	-	-	-	-	1	-
154	18-Oct	SPCH	2	-	-	M	48	-	-	-	-	-	-	-
155	18-Oct	SPCH	2	-	-	F	77	Y	Y	N	N	Y	-	-
156	18-Oct	SPCH	2	-	-	M	43	Y	-	-	-	-	-	-
157	18-Oct	SPCH	3	-	1894	M	-	-	-	-	-	-	-	-
158	18-Oct	SPCH	2	-	-	-	-	-	-	-	-	-	-	-
159	18-Oct	SPCH	1	4636	-	F	57	Y	Y	N	Y	Y	-	-
160	18-Oct	SPCH	1	5786	-	M	89	Y	Y	N	Y	Y	-	-
161	18-Oct	SPCH	2	-	-	F	79	Y	Y	N	N	N	-	-
162	18-Oct	SPCH	3	-	1656	F	-	-	-	-	-	-	-	-
163	18-Oct	SPCH	2	-	-	F	78	Y	-	-	-	-	-	-
164	18-Oct	SPCH	3	-	5774	F	79	-	-	-	-	-	-	-
165	18-Oct	SPCH	2	-	-	F	73	-	-	-	-	-	-	-

#	Date	Species:	Path #	Applied	Recap	Sex M/F	F / L	SpawnedY/N	ScalesY/N	F ClipY/N	OtilithY/N	Tissue Y/N	Scar #	Disease #
166	18-Oct	SPCH	1	1925	-	F	83	Y	Y	N	Y	Y	-	-
167	18-Oct	SPCH	1	1918	-	F	73	Y	Y	N	Y	Y	-	-
168	18-Oct	SPCH	1	5934	-	M	51	-	Y	N	Y	Y	-	-
169	18-Oct	SPCH	3	-	1892	M	67	-	-	-	-	-	-	-
170	18-Oct	SPCH	3	-	4633	F	87	-	-	-	-	-	-	-
171	18-Oct	SPCH	3	-	4632	F	-	-	-	-	-	-	-	-
172	18-Oct	SPCH	3	-	4617	F	64	-	-	-	-	-	-	-
173	18-Oct	SPCH	3	-	4630	F	82	-	-	-	-	-	-	-
174	18-Oct	SPCH	1	5930	-	F	86	Y	Y	N	Y	Y	-	-
175	18-Oct	SPCH	1	5708	-	F	66	Y	Y	N	N	Y	-	-
176	18-Oct	SPCH	1	779	-	F	68	Y	Y	N	N	Y	-	-
NORTH FORK SALMON RIVER														
177	1-Oct	SPCH	2	-	-	M	76	-	-	-	-	-	-	-
178	5-Oct	SPCH	1	4641	-	M	71	Y	Y	N	Y	Y	-	-
179	5-Oct	SPCH	1	4649	-	M	63	N	Y	N	Y	Y	1	-
180	5-Oct	SPCH	1	4634	-	M	63	Y	Y	N	Y	Y	1&2	-

Total # SPCH Carcasses: 180
Total # Caracasses Tagged: 92
Total # Tags Recaptured: 30

* 6" rainbow trout in stomach (see pictures, A. Robinson)

Airborne Thermal Infrared emote Sensing
Salmon iver asin, California



Confluence of Wooley Creek and Salmon River

Submitted to:

Salmon iver estoration Council
P.O. o 1089
Sawyers ar, CA 9 027

Submitted by:

Watershed Sciences, Inc.
257 Madison Avenue
Corvallis, O 97333

Survey Date: uly 22-23, 2009
Delivery Date: anuary 8, 2010

Airborne Thermal Infrared Remote Sensing
Salmon River Basin, California

Table of Contents

Introduction

Project Overview

In 2009, the Salmon iver estoration Council contracted with Watershed Sciences, Inc. to provide thermal infrared TI imagery for appro imately 85 river miles in the Salmon iver asin. The TI ac uisition included the mainstem Salmon iver, North Fork Salmon iver and the South Fork Salmon iver *Figure 1, Table 1* . True color image frames were co-ac uired along the flight path.

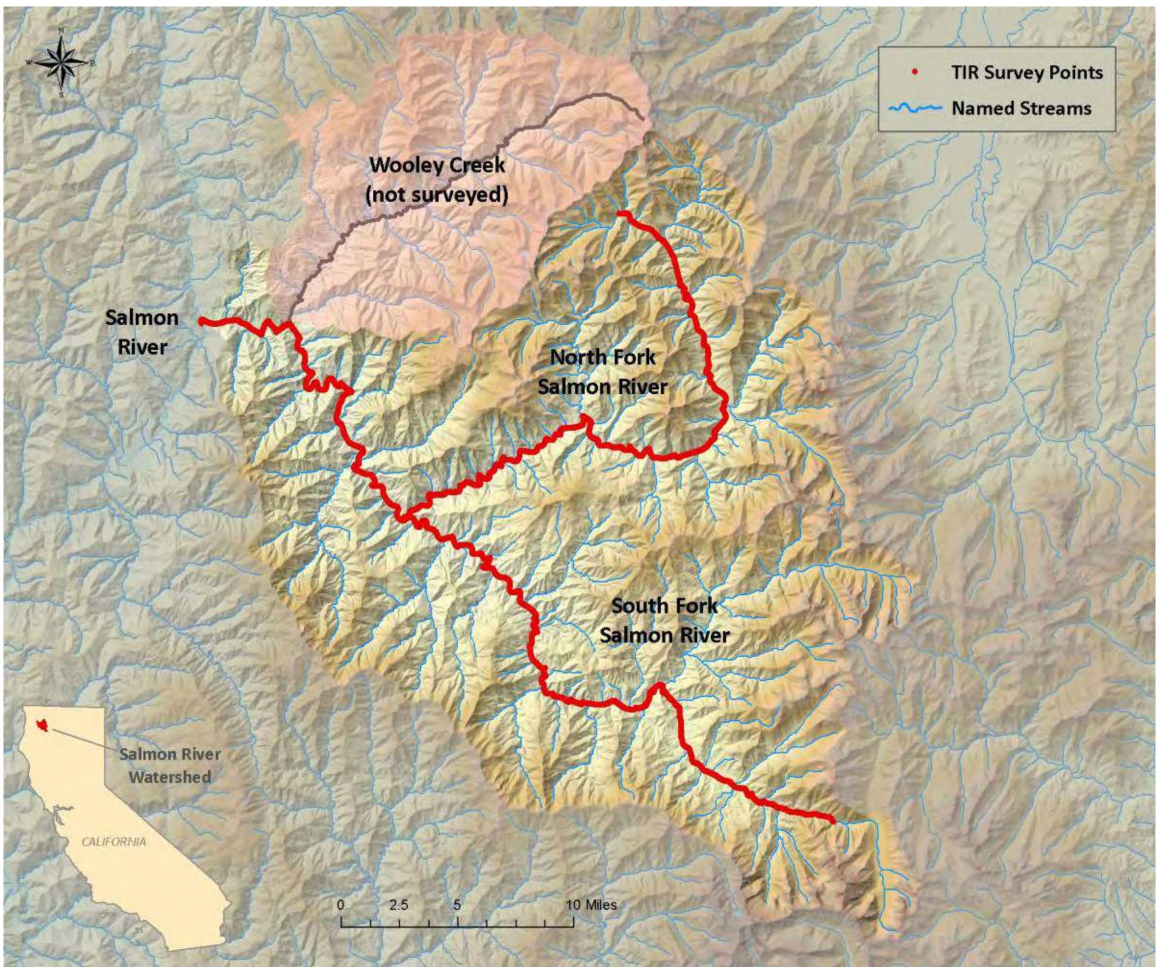


Figure 1 – Thermal infrared (TIR) survey locations in the Salmon River Basin conducted July 22-23, 2009.

Airborne TI remote sensing has proven to be an effective method for mapping spatial temperature patterns in rivers and streams. These data are used to establish baseline conditions and direct future ground level monitoring. The TI imagery illustrates the location and thermal influence of point sources, tributaries, and surface springs. When combined with other spatial data sets, the TI data also illustrates reach-scale thermal response to changes in morphology, vegetation, and land-use.

Table 1 – Stream segments surveyed in the Salmon River basin.

River Name	Date Flown	Miles Flown	Location
Salmon	7/22/2009	19.1	Mouth to NF/SF confluence
North Fork Salmon	7/22/2009	32.5	Mouth to Snowslide Gulch
South Fork Salmon	7/23/2009	32.3	Mouth to rowns Gulch

Project Objectives

The specific ob ectives of the TI image ac uisition were:

- Spatially characteri e surface temperatures and stream flow conditions in the Salmon iver basin.
- Develop longitudinal temperature profiles which illustrate basin-scale stream temperature patterns.
- Identify and map cool water sources and thermal refugia.
- Create GIS compatible data layers e.g. thermal image mosaics, spring locations, etc. that can be used to plan future research, direct ground based monitoring and analysis, and protect and restore critical habitat.

Data Collection

Instrumentation: Images were collected with a FLIR system's SC6000 sensor (8-9.2µm mounted on the underside of a ell et anger Helicopter *Figure 2* . The SC 000 is a calibrated radiometer with internal non-uniformity correction and drift compensation. General specifications of the thermal infrared sensor are listed in Table 2. The natural color images were collected with a Nikon D2 12.4 Megapi el digital S camera with 30mm lens that was co-located with the TI sensor.

Figure 2 – Bell Jet Ranger equipped with a thermal infrared radiometer. The sensor is contained in a composite fiber enclosure attached to the underside of the helicopter and flown longitudinally along the stream channel.

Table 2 - Summary of TIR sensor specifications

Sensor:	F I System SC 000 WI
Wavelength:	8-9.2 µm
Noise uivalent Temperature Differences N TD	0.035°C
Pi el Array	40 H 512
ncoding evel:	14 bit
Hori ontal Field-of- iew:	18.2°

Thermal infrared images were recorded directly from the sensor to an on-board computer as raw counts, which were then converted to radiant temperatures. The individual images were referenced with time, position, and heading information provided by a global positioning system GPS *Figure 3* .

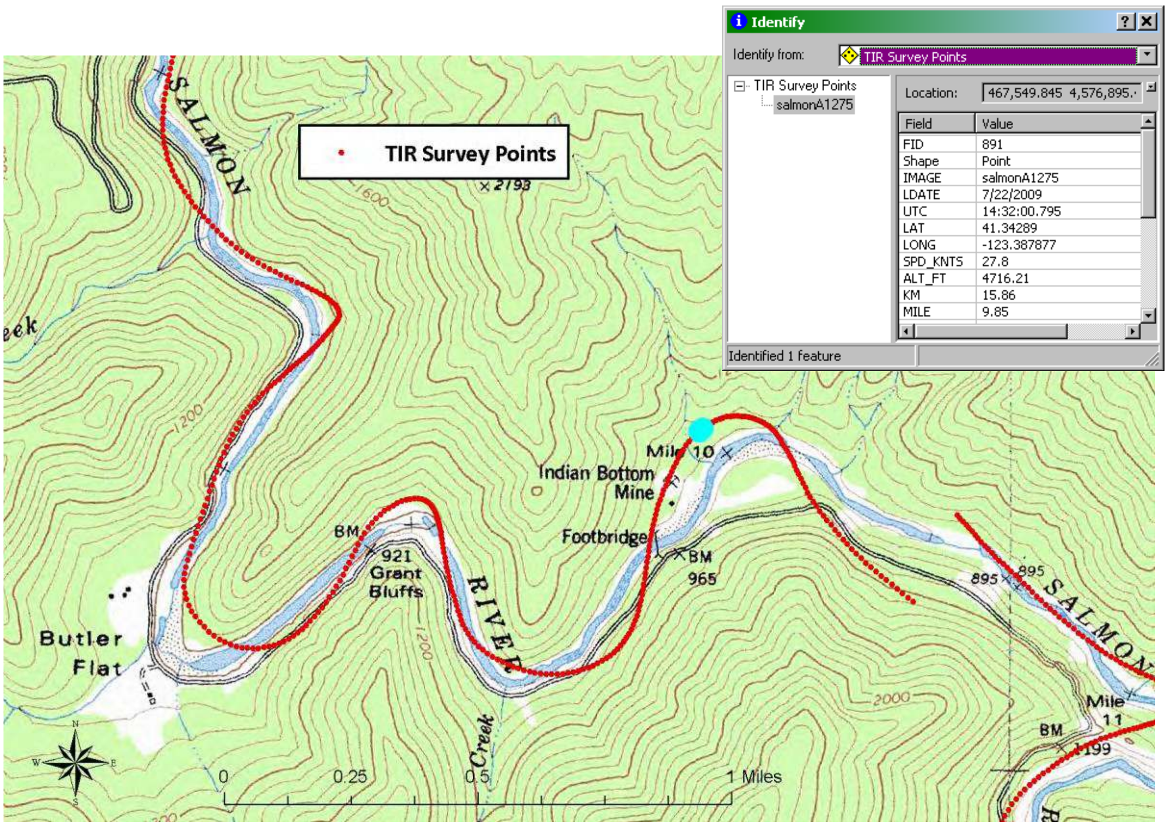


Figure 3 –Each point on the map represents a thermal image location. The inset box shows the information recorded with each image point during acquisition. River measures were calculated based on the NHD stream layer.

<u>Image Characteristics:</u> The aircraft was flown longitudinally along the stream corridor in order to capture the river in the center of the display. The ob ective was for the stream to occupy 30- 0 of the image. The TI sensor is set to ac uire images at a rate of 1 image every second resulting in 40-70 vertical overlap between images.

A flight altitude of 4000 ft 1219 m was selected for the pro ect which resulted in a native pi el ground sample distance of 0.   m 2.0 ft . The flight altitude was selected in order to optimi e resolution while providing an image ground footprint wide enough to capture the active channel *Table 3* .

Table 3 - Summary of Thermal Image Acquisition Parameters

Flight Above Ground evel AG :	4000 ft 1219 m
Image Footprint Width:	1280 ft 390 m
Pi el esolution:	0. m 2.0 ft

The airborne survey attempted to cover all surface water within the floodplain including side channels and tributary unctions. Surface water not captured in the image field of view was flown separately to ensure complete coverage.

<u>Ground Control</u>: The Salmon   iver   estoration Council provided Watershed Sciences, Inc. with data from 13 in-stream sensors deployed throughout the summer months by various organi ations working in the basin. In-stream temperatures were assessed at the time frame of the flight for calibrating and verifying the thermal accuracy of the TI imagery. The sensor data were generally recorded at 1-hour intervals and values were interpolated between readings to determine stream temperatures at the time of image ac uisition. The data logger locations are illustrated in Figure 4.

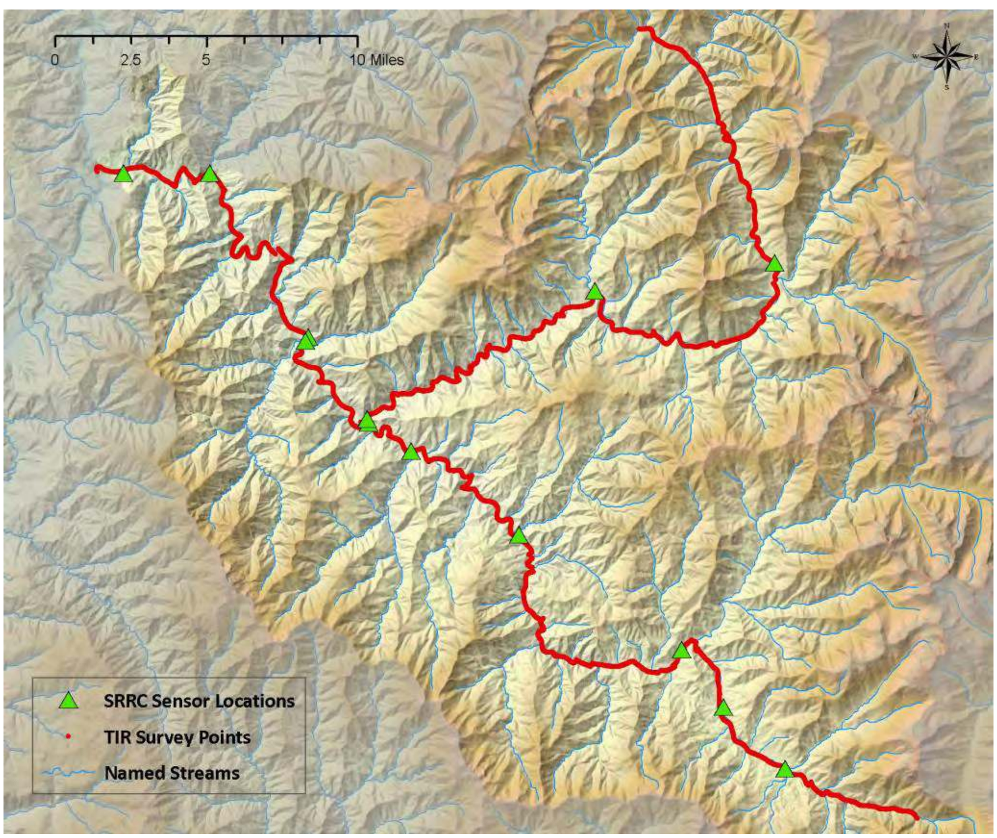


Figure 4 – Location of sensors deployed by the Salmon River Restoration Council.

Data Processing

Calibration: Prior to the season, the response characteristics of the TI sensor are measured in a laboratory environment. The response curves relate the raw digital numbers recorded by the sensor to emitted radiance from the black body. The raw TI images collected during the survey initially contain digital numbers which are then converted to radiance temperatures based on the pre-season calibration.

The calculated radiant temperatures are ad usted based on the kinetic temperatures recorded at each ground truth location. This ad ustment was performed to correct for path length attenuation and the emissivity of natural water. The in-stream data were assessed at the time the image was ac uired, with radiant values representing the median of ten points sampled from the image at the data logger location.

Interpretation and Sampling: Once calibrated, the images were integrated into a GIS in which an analyst interpreted and sampled stream temperatures. Sampling consisted of uerying radiant temperatures pi el values from the center of the stream channel and saving the median value of a ten-point sample to a GIS database file. The temperature of detectable surface inflows i.e. surface springs, tributaries was also sampled at their mouths. During sampling, the analyst provided interpretations of the spatial variations in surface temperatures observed in the images.

Temperature Profiles: The median temperatures for the stream in each sampled image were plotted versus the corresponding river mile to develop a longitudinal temperature profile. The profile illustrates how stream temperatures vary spatially along the stream gradient. The location and median temperature of all sampled surface water inflows e.g. tributaries, surface springs, etc. are included on the plot to illustrate how these inflows influence the main stem temperature patterns. adiant temperatures were only sampled along what appeared to be the main flow channel in the river.

Geo-referencing: The images are tagged with a GPS position and heading at the time they are ac uired *Figure 3* . Since the TI camera is maintained at vertical down-look angles, the geographic coordinates provide a reasonably accurate inde to the location of the image scene. Due to the relatively small footprint of the imagery and independently stabili ed mount, image pi els are not individually registered to real world coordinates. The image inde is saved as an S I point shapefile containing the image name registered to an and position of sensor location at time of capture. In order to provide further spatial reference, the TI images were assigned a river mile based on a routed stream layer.

Geo- ectification: The individual TI frames were manually geo-rectified by finding a minimum of si common ground control points GCPs between the image frames and the NAIP imagery. oth 2005 and 2009 NAIP imagery were used. The images were then warped using a 1st order polynomial transformation. Images were not corrected for terrain displacement. The true color images were not rectified.

Thermal Image Characteristics

Surface Temperatures: Thermal infrared sensors measure TI energy emitted at the water's surface. Since water is essentially opaque to TIR wavelengths, the sensor is only measuring water surface temperature. Thermal infrared data accurately represents bulk water temperatures where the water column is thoroughly mi ed however, thermal stratification can form in reaches that have little or no mi ing. Thermal stratification in a free flowing river is inherently unstable due to variations in channel shape, bed composition, and in-stream ob ects i.e. rocks, trees, debris, etc. that cause turbulent flow and can usually be detected in the imagery.

  pected Accuracy: Thermal infrared radiation received at the sensor is a combination of energy emitted from the water's surface, reflected from the water's surface, and absorbed and re-radiated by the intervening atmosphere. Water is a good emitter of TI radiation and has relatively low reflectivity 4 to . However, variable water surface conditions i.e. riffle versus pool , slight changes in viewing aspect, and variable background temperatures i.e. sky versus trees can result in differences in the calculated radiant temperatures within the same image or between consecutive images. The apparent temperature variability is generally less than 0.5^{o}C.[1] However, the occurrence of reflections as an artifact or noise in the TI images is a consideration during image interpretation and analysis. In general, apparent stream temperature changes of 0.5^{o}C are not considered significant unless associated with a surface inflow e.g. tributary .

Differential Heating: In stream segments with flat surface conditions i.e. pools and relatively low mi ing rates, observed variations in spatial temperature patterns can be the result of differences in the instantaneous heating rate at the water's surface. In the TI images, indicators of differential surface heating include seemingly cooler radiant temperatures in shaded areas compared to surfaces e posed to direct sunlight.

Feature Si e and esolution: A small stream width logically translates to fewer pi els "in" the stream and greater integration with non-water features such as rocks and vegetation. Conse uently, a narrow channel relative to the pi el si e can result in higher inaccuracies in the measured radiant temperatures. This is a consideration when sampling the radiant temperatures at tributary mouths and surface springs.

Temperatures and Color Maps: The TI images collected during this survey consist of a single band. As a result, visual representation of the imagery *(in a report or GIS environment* re uires the application of a color map or legend to the pi el values. The selection of a color map should highlight features most relevant to the analysis i.e. *spatial variability of stream temperatures* . For e ample, a continuous, gradient style color map that incorporates all temperatures in the image frame will provide a smoother transition in colors throughout the entire image, but will not highlight temperature

[1] Torgersen, C. ., . Fau , .A. McIntosh, N. Poage, and D. . Norton. 2001. "Airborne thermal remote sensing for water temperature assessment in rivers and streams." *Remote Sensing of Environment* 7 3 : 38 -398.

differences in the stream. Conversely, a color map that focuses too narrowly cannot be applied to the entire river and will washout terrestrial and vegetation features *Figure 5* .

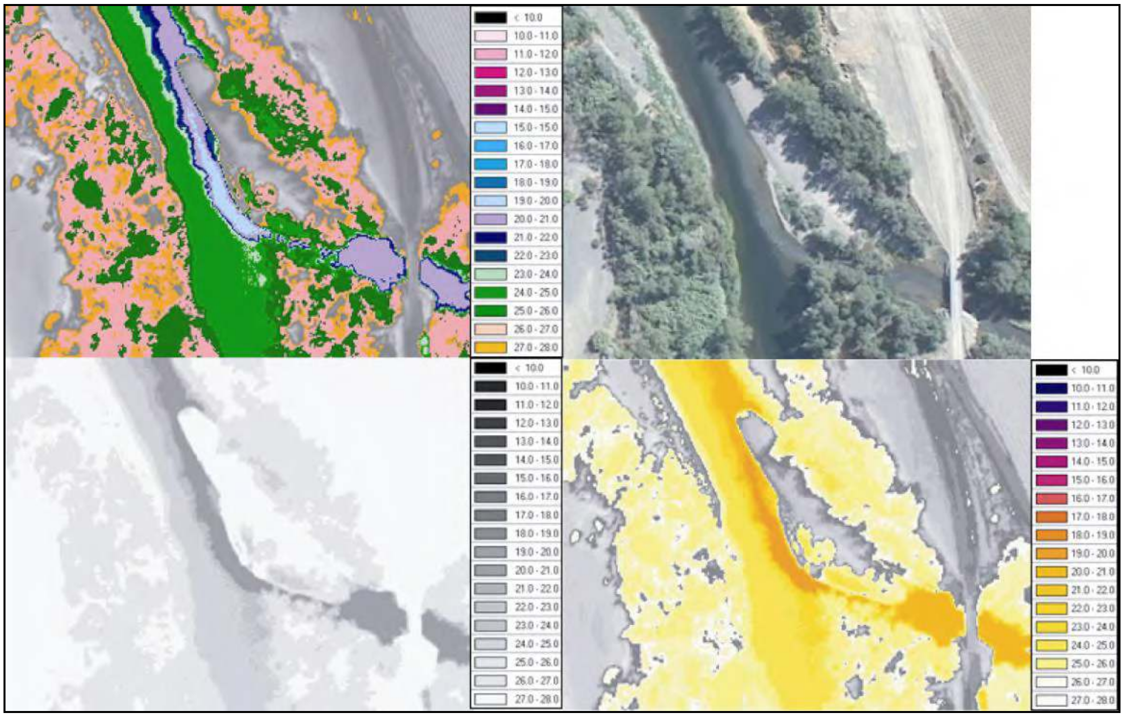


Figure 5 - Example of different color maps applied to the same TIR image.

Image   niformity: The TI   sensor used for this study uses a focal plane array of detectors to sample incoming radiation. A challenge when using this technology is to achieve uniformity across the detector array. The sensor has a correction scheme which reduces non-uniformity across the image frame. However, differences in temperature typically   0.5^{o}C can be observed near the edge of the image frame. The uniformity differences within frames and slight differences from frame-to-frame are often most apparent in the continuous mosaics.

Weather Conditions

Weather conditions on the dates of the survey were considered ideal with warm temperatures, low humidity and clear skies. Data from seasonal in-stream thermographs will be needed to assess how water temperatures on the day of the flight compare to average and ma imum summer temperatures. Table 4 summari es the weather conditions observed at Sawyers ar, California on uly 22-23, 2009.

Table 4 – Weather conditions on July 22-23, 2009 measured at Sawyers Bar/Forks of Salmon (RAWS Station: MSWBC1) (http://www.wunderground.com)

PDT	Air Temp (°F)	Air Temp (°C)	Relative Humidity	Wind Speed (mph)	Wind Direction
Salmon/North Fork Salmon: 7/22/2009					
14:13	94.0	34.4	13	7.0	WSW
14:33	94.0	34.4	13	7.0	WSW
14:43	94.0	34.4	13	7.0	WSW
15:13	98.0	3 .7	12	8.0	WSW
15:23	98.0	3 .7	12	8.0	WSW
15:33	98.0	3 .7	12	8.0	WSW
15:43	98.0	3 .7	12	8.0	WSW
1 :13	98.0	3 .7	12	8.0	WSW
1 :23	98.0	3 .7	12	8.0	WSW
1 :33	98.0	3 .7	12	8.0	WSW
1 :43	98.0	3 .7	12	8.0	WSW
South Fork Salmon: 7/23/2009					
14:13	95.0	35.0	19	.0	WSW
14:23	95.0	35.0	19	.0	WSW
14:33	95.0	35.0	19	.0	WSW
15:12	97.0	3 .1	13	8.0	WSW
15:33	97.0	3 .1	13	8.0	WSW
15:43	97.0	3 .1	13	8.0	WSW
1 :12	101.0	38.3	13	7.0	WSW
1 :22	101.0	38.3	13	7.0	WSW
1 :33	101.0	38.3	13	7.0	WSW
1 :42	101.0	38.3	13	7.0	WSW

Thermal Accuracy

The Salmon iver estoration Council provided temperature data from 13 in-stream data loggers that were active during the time frame of the flight *Figure 4* . Table 5 summari es a comparison between the kinetic temperatures recorded by the in-stream data loggers and radiant temperatures derived from the TI images.

Table 5 – Comparison of radiant temperatures derived from the TIR images and kinetic temperatures from the in-stream sensors

Stream	Serial	Image	Mile	Km	Time	In-Stream	Radiant	Difference
Mainstem Salmon River (7/22)								
Salmon	SMS01 0	salmonA0192	0.91	1.4	14:12	22.4	22.3	0.1
Salmon	SMS05 0	salmonA0710	4.85	7.81	14:22	19.2	22.0	-2.8
Salmon	SMS13 0	salmonA1821	14.38	23.15	14:41	22.1	22.4	-0.3
Salmon	SMS13 5	salmonA1841	14.57	23.44	14:41	22.9	22.5	0.4
SF Salmon	SSF00 2	salmonA2351	19.17	30.8	14:51	22.5	22.	-0.1
NF Salmon	SNF00 1	salmonA2357	19.27	31.03	14:51	23.	23.3	0.3
North Fork Salmon River (7/22)								
SF Salmon	SSF00 2	salmonA2351	0.00	0.00	14:51	22.5	22.5	0.0
NF Salmon	SNF00 1	salmonA2357	0.10	0.17	14:51	23.	23.5	0.1
NF Salmon	SNF11 4	salmonA4305	11.53	18.5	15:29	23.8	23.8	0.0
NF Salmon	SNF20 5	salmonA5413	21.84	35.15	15:49	20.	20.	0.0
South Fork Salmon River (7/23)								
SF Salmon	SSF02 5	salmonb0550	2.3	3.79	14:07	23.3	23.5	-0.2
SF Salmon	SSF08 5	salmonb1 17	8.44	13.58	14:2	21.7	21.9	-0.2
SF Salmon	SSF19 1	salmonb3 92	19. 5	31. 3	22:05	22.3	22.	-0.3
SF Salmon	SSF22 5	salmonb4547	23.20	37.34	15:19	22.2	21.5	0.7
SF Salmon	SSF2 0	salmonb4855	2 .55	42.73	15:25	19.9	19.5	0.4

In general, the differences between radiant and kinetic temperatures were consistent with other airborne TI surveys conducted by Watershed Sciences in the Pacific Northwest and within the target accuracy of 0.5°C. However, two sensors were outside the target range of measured radiant temperatures.

The radiant temperatures in the Salmon iver at mile 4.85 SMS05 0 e hibited a large difference 2.8°C compared to the in-stream measurements. However, the radiant temperatures were within tolerance for both the immediate lower SMS01 0 and upper SMS13 0 sensors using the same image calibration parameters. Inspection of the imagery shows the large cooling influence of Wooley Creek immediately downstream of the sensor location. We suspect that the sensor readings are being influenced by the mi ing of Wooley Creek with the mainstem and sub-surface temperatures measured by the in-stream sensor were not indicative of surface temperatures measured by the thermal camera.

Results

Median channel temperatures were plotted versus river mile for the streams in the survey area. Tributaries, seeps and springs sampled during the analysis are included on the longitudinal profiles to provide additional conte t for interpreting spatial temperature patterns. iver miles were based on a routed version of the NHD stream layer[2]. The routes of Salmon and the South Fork Salmon were slightly modified to give more accurate river mile measures, particularly in areas of tight bends. The ad usted routes are included in the data.

While the natural morphology of rivers e ists on a continuum, for the purposes of this analysis, features were grouped into defined categories. Seeps and springs were differentiated mainly by si e. arger cold water sources with a defined source were considered springs, while smaller more diffuse features were designated as seeps. Hyporheic flow is a particular type of seep typically seen originating from the downstream end of sandbars as surface flows mingle with shallow groundwater resulting in cooler temperatures. On occasion, it is not possible to determine the source of a feature based on the available imagery, particularly in areas of deep shadow high in the watershed. Care should be taken to verify features of interest in the field.

Due to the nature of the pro ect, the focus of the survey was to depict thermal conditions during peak summer temperatures. Given the warm temperatures on the days of the survey, features such as hot springs or warm sloughs and ponds may have been ‘washed out’ in comparison to the surrounding terrestrial landscape. Figures , 7, and 8 contain the longitudinal temperature profiles for the Salmon, North Fork Salmon, and South Fork Salmon ivers respectively. Tables , 7, and 8 show the thermal features for each river. ach longitudinal profile and table is followed by a discussion of the thermal trends of the stream and sample images for each. The discussion and images contained in this report are not meant to be comprehensive, but provide a description of the ma or thermal trends and e amples of river features and interpretations.

[2] .S. Department of the Interior, .S. Geological Survey. : http://nhd.usgs.gov/inde .html

Salmon River

Longitudinal Temperature Profile

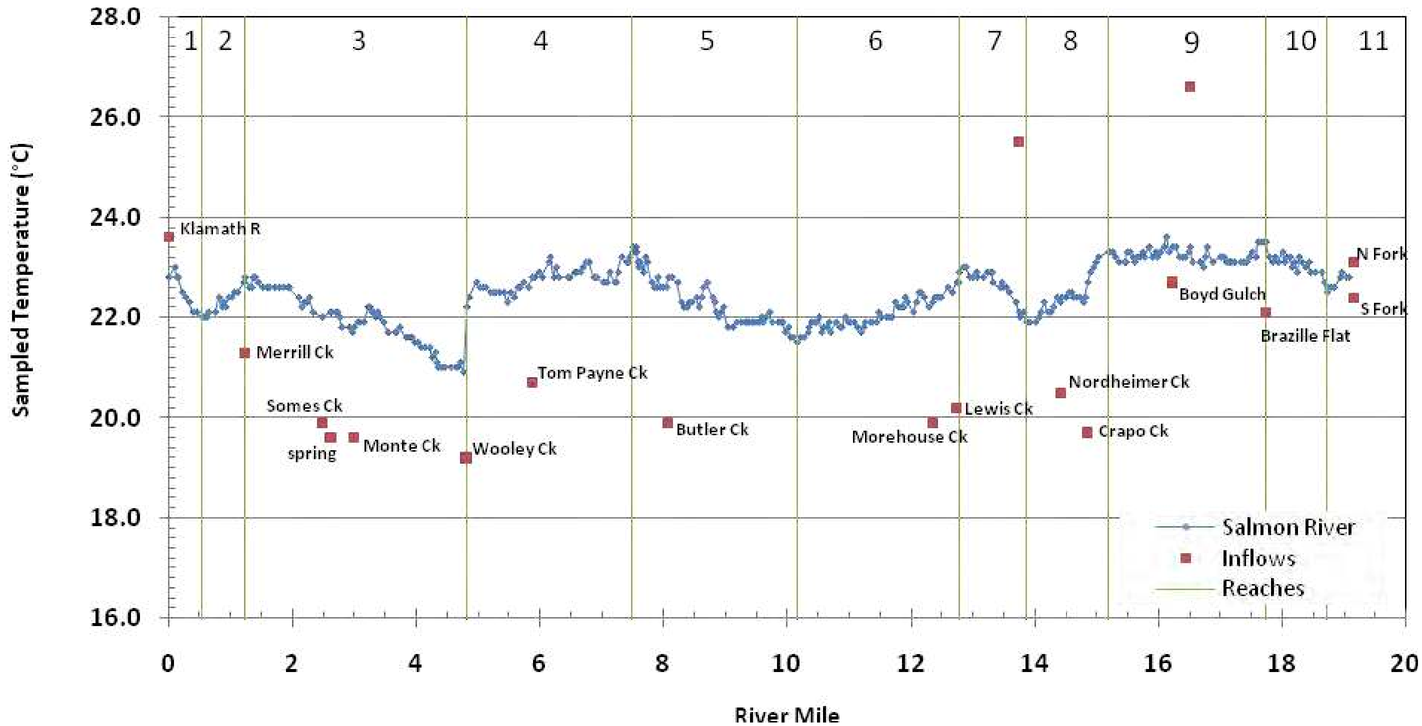


Figure 6 - Median channel temperatures plotted versus river mile for the Salmon River. The locations of detected surface inflows are illustrated on the profile and listed in Table 6.

Table 6 - Tributaries, inflows and selected side channels sampled along the Salmon River (with left or right bank designation looking downstream) are listed.

Tributaries	Kilometer	River Mile	Tributary Temp (°C)	Mainstem Temp (°C)	Difference
lamath iver	0.00	0.00	23.	22.8	0.8
Merrill Creek	1.98	1.23	21.3	22.8	-1.5
Somes Creek	3.99	2.48	19.9	22.0	-2.1
spring	4.22	2. 2	19.	22.1	-2.5
Monte Creek	4.81	2.99	19.	21.8	-2.2
Wooley Creek	7.75	4.81	19.2	22.2	-3.0
Tom Payne Creek	9.45	5.87	20.7	22.8	-2.1
utler Creek	12.99	8.07	19.9	22.8	-2.9
Morehouse Creek	19.85	12.34	19.9	22.3	-2.4
ewis Creek	20.50	12.74	20.2	22.7	-2.5
Nordheimer Flat	22.13	13.75	25.5	22.0	3.5
Nordheimer Creek	23.20	14.42	20.5	22.4	-1.9
Crapo Creek	23.90	14.85	19.7	22.7	-3.0
oyd Gulch	2 .10	1 .22	22.7	23.4	-0.7
Otter ar pond	2 .5	1 .50	2 .	23.4	3.2
ra ille Flat	28.54	17.73	22.1	23.5	-1.4
South Fork Salmon	30.82	19.15	22.4	22.9	-0.5
North Fork Salmon	30.83	19.1	23.1	22.9	0.2

Observations

The entire 19 miles of the Salmon iver were surveyed for thermal features on uly 22, 2009 from the mouth at the lamath iver to the confluence of the North Fork and South Fork Salmon ivers. Stream temperatures were uite stable ranging from 20.9°C at the confluence with Wooley Creek M 4.81 to 23.7°C at Fong Wah ar. Fifteen tributaries, 1 pond, and 1 spring were sampled in the imagery. Flow rates on the day of the survey were well below the historic average at the only active SGS monitoring gage in the watershed *Appendix A* . The daily discharge at Somes ar was 278 cubic feet per second.

In general, the Salmon iver flows through a narrow forested canyon with steep chutes, pool/riffle reaches, and sandbars. Only Wooley Creek M 4.81 and Nordheimer Creek M 14.42 contribute significant surface flow to the mainstem. Wooley Creek is the only point source to have a significant impact on the thermal profile, dropping bulk water temperatures by 1.7°C 22.7→21.0°C *Salmon Image 1* .

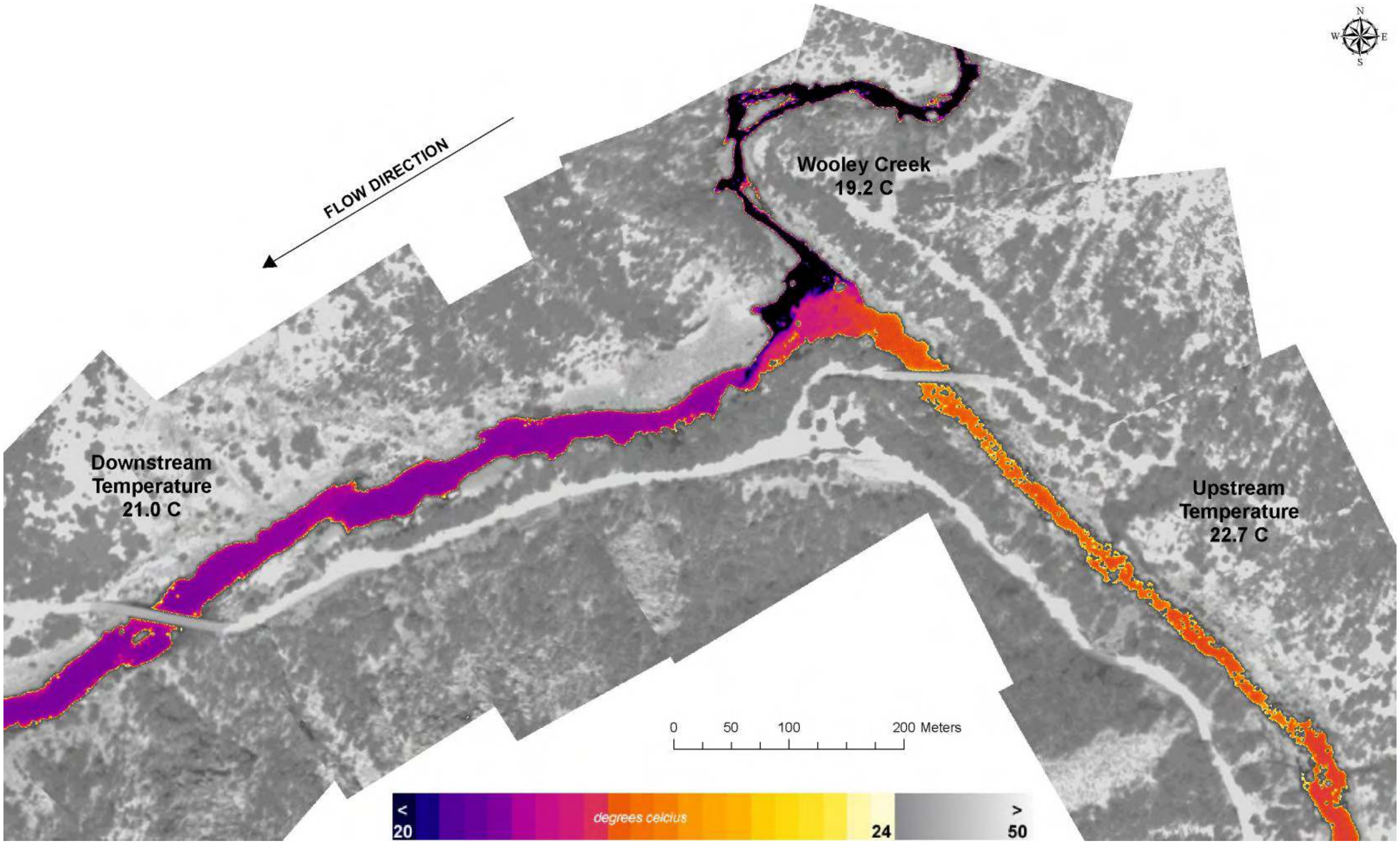
At the watershed scale, in the absence of point sources, three types of thermal trends can be seen in the longitudinal profile: increasing temperatures, stable temperature plateaus, and decreasing temperatures. On a warm summer day with temperatures in the mid-nineties, radiant water temperatures would be e pected to increase as the river flows downstream. eaches with stable temperatures or decreasing temperatures indicate ones of groundwater influence in the absence of cool surface inflows such as Wooley Creek. Subsurface contributions commonly appear in areas where there are changes in river morphology, geology or valley type. These groundwater interactions may result in detectable point sources i.e. seeps and springs or they may be more diffuse.

On the Salmon, reaches 1, 3, 5, 7, and 10 as noted on the longitudinal profile had temperature increases of one degree or more over varying distances. This type of warming indicates that diurnal heating is controlling the thermal profile in these reaches. each 3 warms rapidly after the confluence with Wooley Creek. The valley is wider and more e posed along this reach allowing for more direct radiant heating. each 10 is also more open than other sections of the river which may e plain the increased temperatures. each 7 appears to flow through a bedrock area denuded of vegetation which may be preventing groundwater interactions *Salmon Image 2* . It is not immediately apparent from the available imagery why there is warming in reaches 1 and 5.

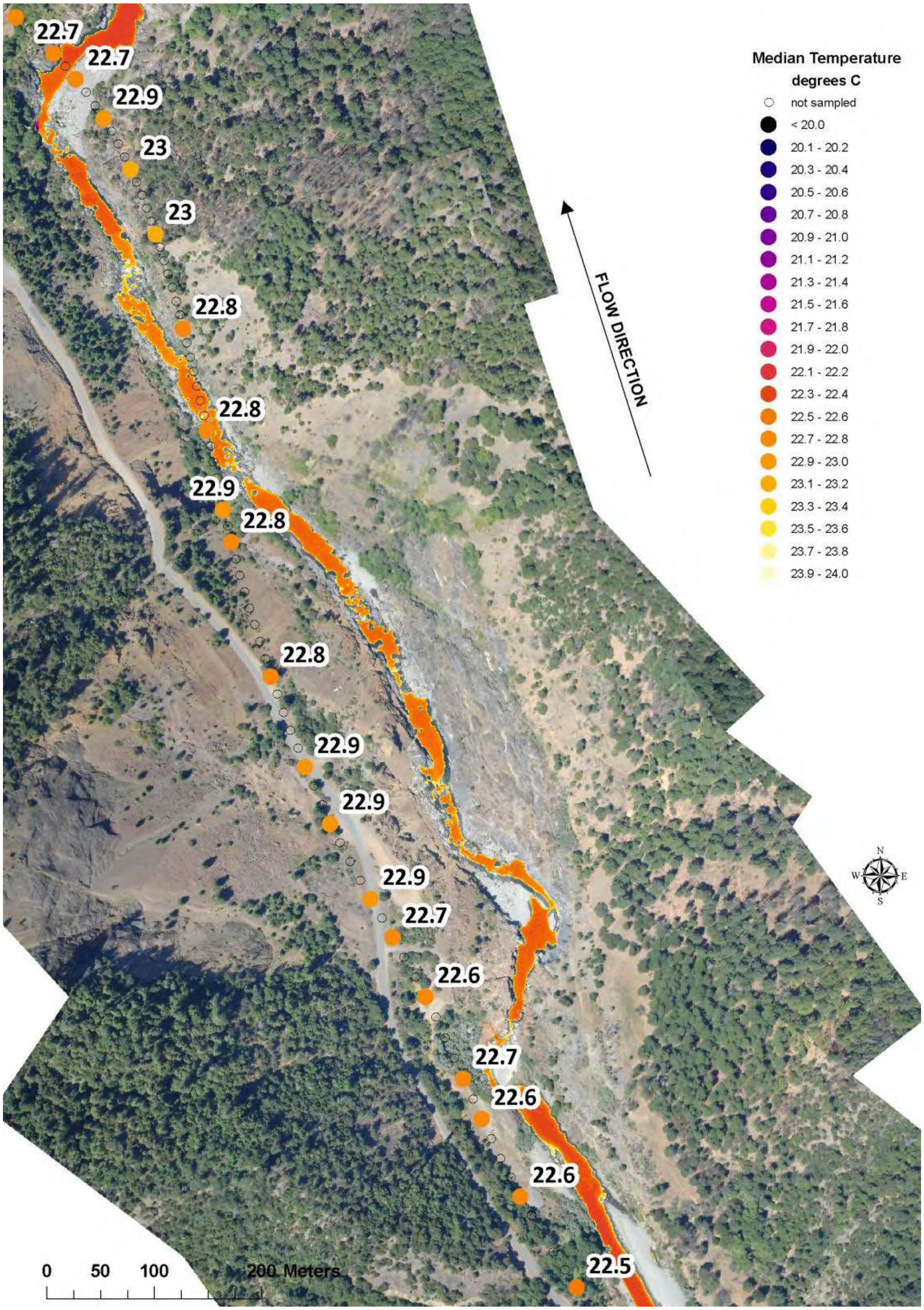
each 9 M 15.18-17.73 has relatively stable temperatures over a 2.5 mile distance (23.1→23.7°C . This type of thermal plateau indicates that daytime heating is being tempered by cooling influences. No large surface inflows were seen in this reach however, several ma or gulches intersect the river in this location: Fong Wah Gulch, ogan Gulch, and oyd Gulch. oyd Gulch, though small, sampled cooler than the mainstem at 22.7°C, as did a small pool seen on ra ille Flat 22.1°C . ogan Gulch and Fong Wah Gulch were too small to be sampled. In areas where drainages intersect, it is common to see subsurface interactions resulting in cooler temperatures. Though they were too small to be sampled, the seep at river mile 1 .12 and the hyporheic flow M 1 . are indicators of groundwater interactions.

In reaches where the subsurface interactions outpace diurnal heating, cooling trends can be seen. eaches 2, 4, , 8, and 11 are all e amples of this type of cooling. The cooling in reach 11 is likely due to subsurface interactions caused by the confluence of the North Fork and South Fork drainages. Merrill Creek impacts each 2 by contributing a point source seep 21.3°C and likely more diffuse groundwater not visible in the imagery. eaches 4 and both flow through very narrow sections of the canyon and likely have a great deal of subsurface interaction. each 8 is being heavily influenced by Crapo Creek and Nordheimer Creek *Salmon Image 3* . The continued cooling trend downstream of Nordheimer Creek suggests some continued subsurface influence that could not be directly detected in the imagery.

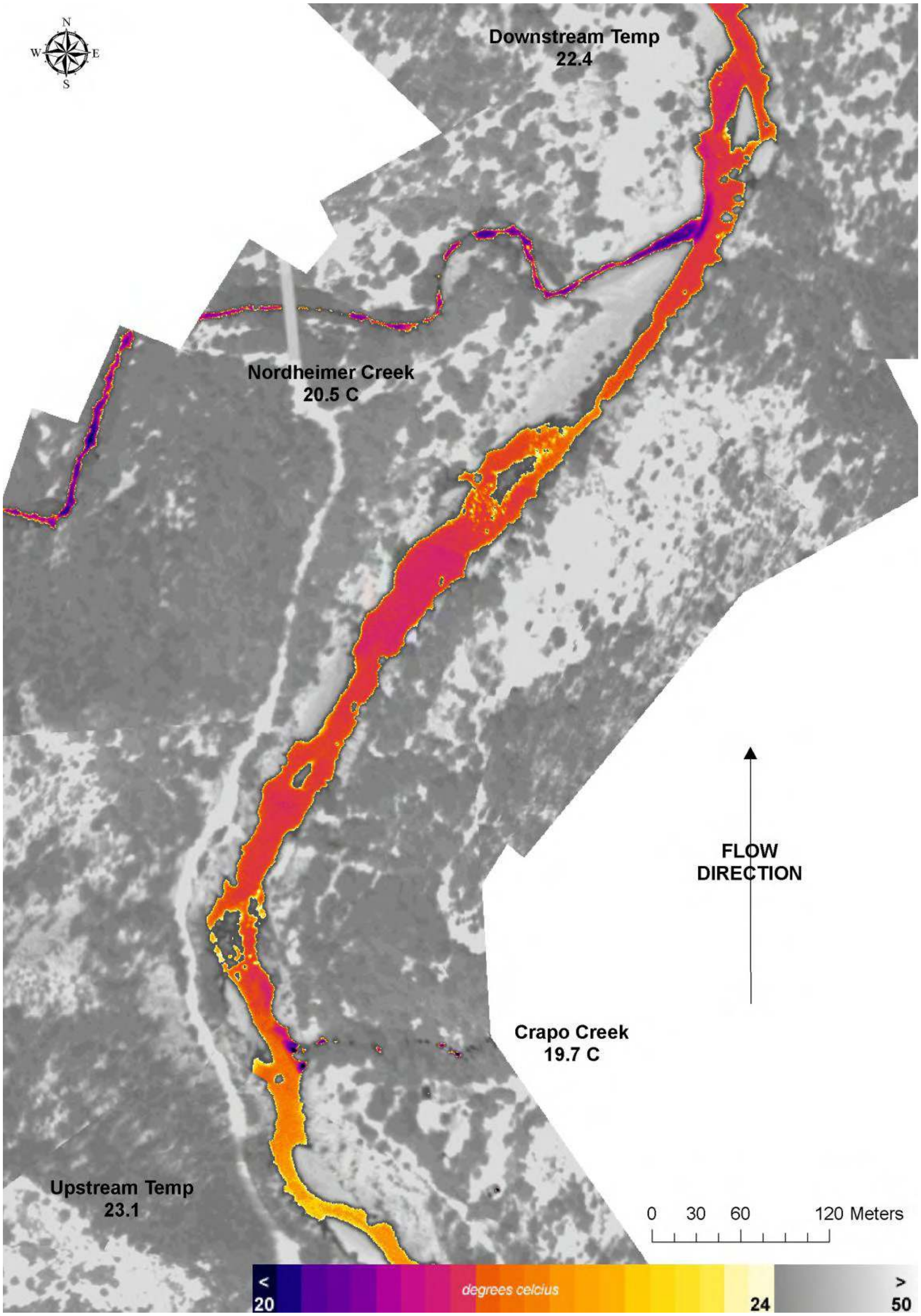
Sample Images



Salmon Image 1 – The TIR mosaic below shows the confluence of the Salmon River and Wooley Creek. Wooley Creek acts as a cooling source to the Salmon dropping bulk temperatures by 1.7°C.



Salmon Image 2 – The TIR/true color image above shows the bedrock chute at river mile 13 in Reach 7 of the longitudinal profile. Temperatures rise along this reach indicating that diurnal heating is controlling the thermal signature. Because the riverbed is bedrock at this point, it is unlikely that there is any hyporheic interaction in this location.



Salmon Image 3 – The TIR image above shows the confluence of Crapo Creek (RM 14.85) and Nordheimer Creek (RM 14.42) with the Salmon River. Both tributaries act as cooling influences to the mainstem dropping the bulk water temperatures along Reach 8.

North Fork Salmon River

Longitudinal Temperature Profile

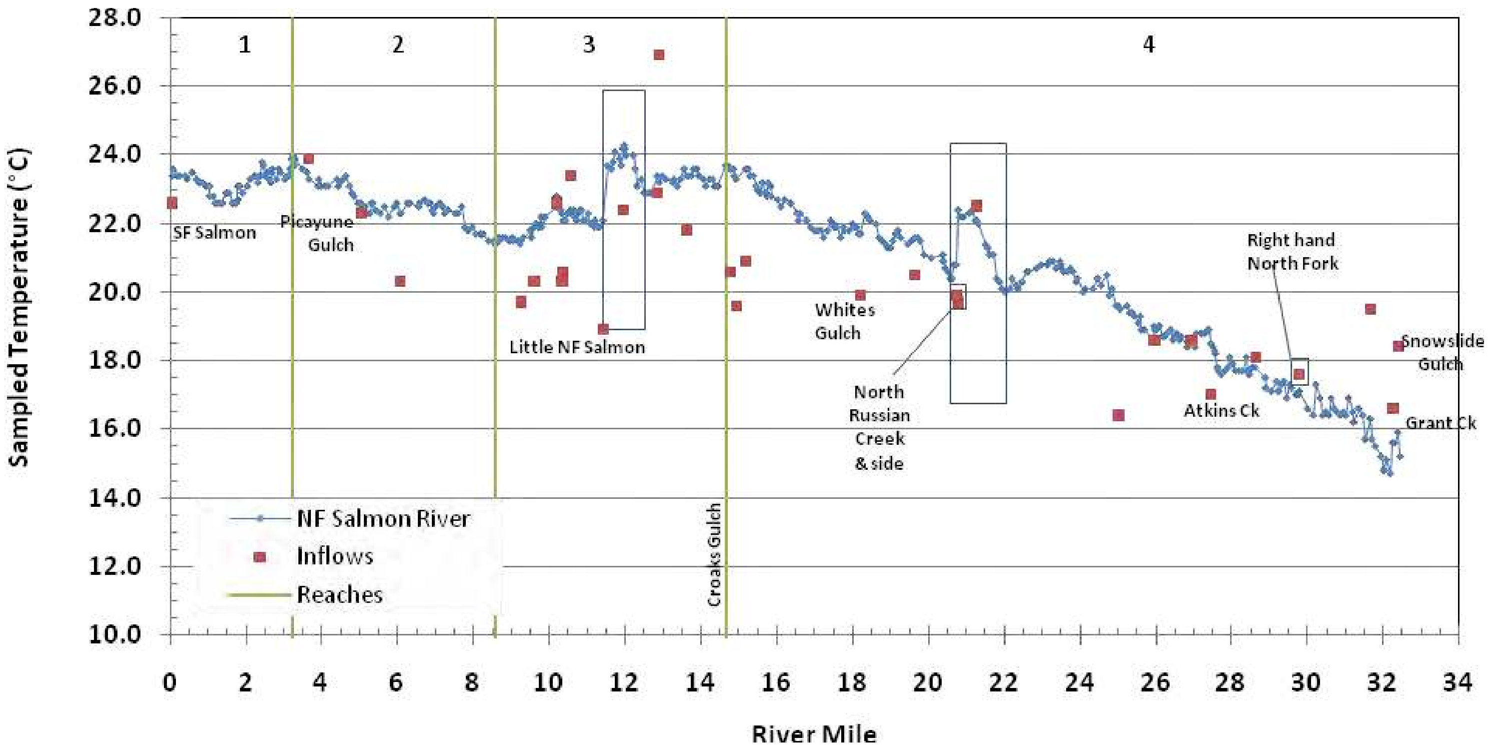


Figure 7- Median channel temperatures plotted versus river mile for the North Fork Salmon River. The locations of detected surface inflows are illustrated on the profile and listed in Table 7.

Table 7 – Tributaries, inflows and selected side channels sampled along the North Fork Salmon River (with left or right bank designation looking downstream) are listed.

Inflows	Kilometer	River Mile	Inflow Temp (°C)	Mainstem Temp (°C)	Difference
SF Salmon iver	0.10	0.0	22.	23.4	-0.8
side channel	5.89	3.	23.9	23.3	0.
Picayune Gulch	8.09	5.03	22.3	22.	-0.3
nnamed Gulch	9.75	.0	20.3	22.3	-2.0
spring	14.88	9.25	19.7	21.5	-1.8
Peck Gulch	15.45	9. 0	20.3	21.9	-1.
side channel	1 .41	10.20	22.	22.8	-0.2
Cronan Gulch	1 . 4	10.34	20.3	22.3	-2.0
seep/side channel	1 . 9	10.37	20.	22.1	-1.5
wetland	1 .98	10.55	23.4	22.4	1.0
ittle NF Salmon	18.38	11.42	18.9	22.1	-3.2
seeps	19.21	11.94	22.4	24.2	-1.8
Glasgow Gulch	20. 7	12.84	22.9	23.4	-0.5
wetland	20.7	12.90	2 .9	23.2	3.7
side channel	21.92	13. 2	21.8	23.4	-1.
hyporheic flow/side chan	23.80	14.79	20.	23.	-3.0
spring on side channel	24.03	14.93	19.	23.3	-3.7
essups Gulch	24.45	15.19	20.9	23.	-2.7
Whites Gulch	29.33	18.22	19.9	21.7	-1.8
side channel	31. 1	19. 4	20.5	21.	-1.1
N ussian Creek	33.37	20.73	19.9	20.8	-0.9
side channel	33.4	20.79	19.7	22.4	-2.7
nnamed	34.24	21.28	22.5	22.1	0.4
nnamed	40.27	25.02	1 .4	19.	-3.2
ig Twin Creek	41.77	25.9	18.	19.0	-0.4
ig Creek	43.35	2 .94	18.	18.	0.0
Atkins Creek	44.20	27.4	17.0	18.5	-1.5
Deer Pen Creek	4 .07	28. 3	18.1	17.8	0.3
ight Hand NF Salmon	47.94	29.79	17.	17.1	0.5
Deer ick Creek	50.95	31.	19.5	1 .3	3.2
Grant Creek	51.90	32.25	1 .	15.	1.0
Snowslide Gulch	52.14	32.40	18.4	15.9	2.5

Observations

The North Fork Salmon iver was flown on uly 22, 2009 from the mouth to Snowslide Gulch for a total of 32.5 river miles. Nineteen tributaries, 5 seeps and springs, 2 wetlands, and 5 side channels were sampled as inflows. Several do en drainages were seen in the imagery but were not sampled due to lack of water or small si e. No active SGS flow gages were found for the river.

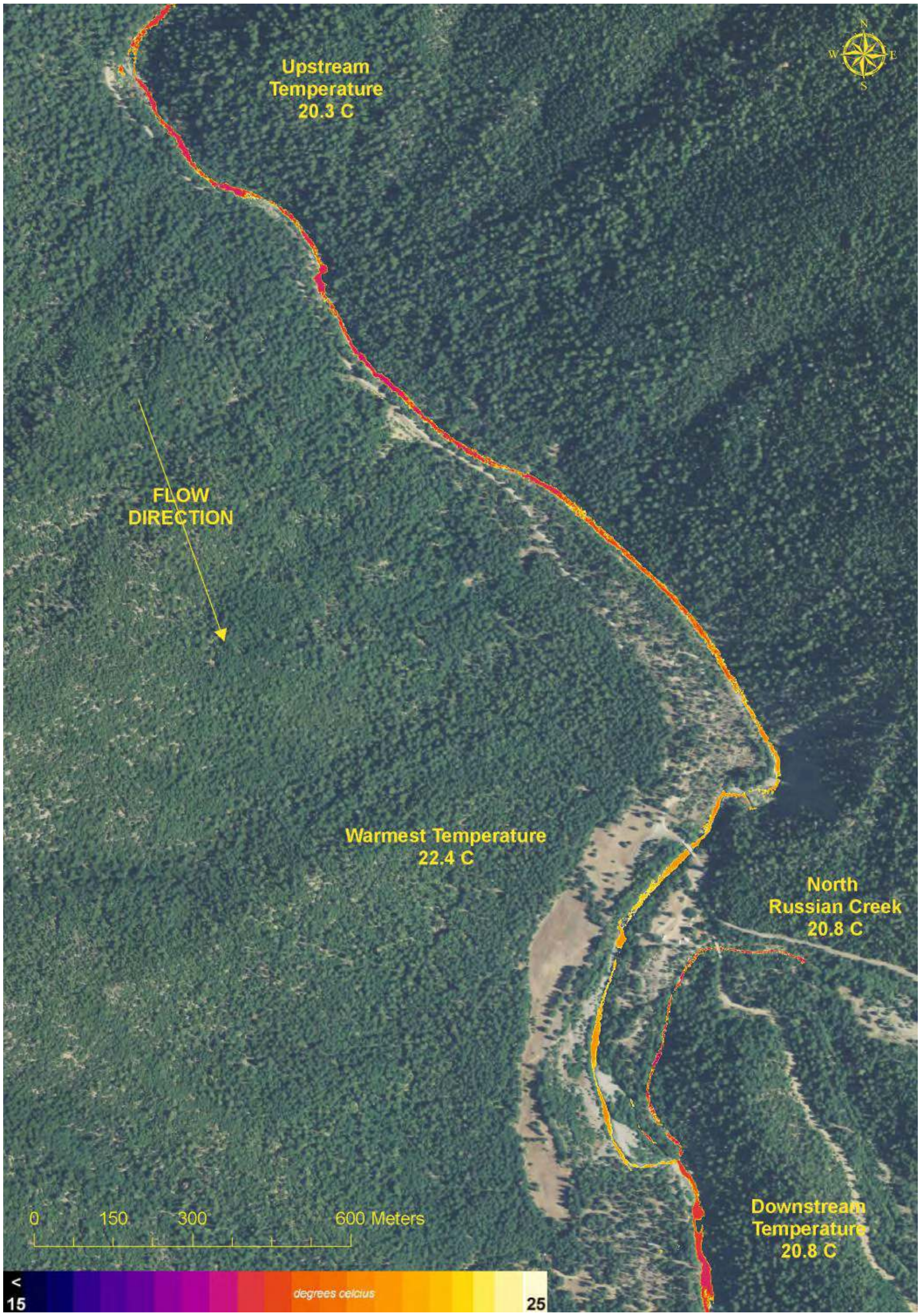
A steady warming trend is seen along each 4 in the upper watershed from Snowslide Gulch M 32.40 downstream to Croaks Gulch M 14. (14.8→23.7°C). The ma or deviation along this reach occurs from river mile 20.57-22.03. In this short reach, temperatures ump from 20.0°C to 22.4°C, and then drop back to 20.4°C in short succession. In the NAIP imagery, it appears that the river flows from a narrow confined canyon into a wider open valley at Idlewild Campground likely allowing for more direct radiant heating *North Fork Image 1* . The river returns to a more stable temperature pattern below the confluence of North ussian Creek M 20.73 .

Downstream of Croaks Gulch each 3 , temperatures decrease two degrees over miles 23.7→21.4°C . A similar thermal trend as the one seen near Idlewild Campground can be seen from river mile 11.42 to 12.50, with a widening of the valley resulting in rapid warming. Temperatures then cool 1. °C at the confluence with the ittle North Fork Salmon iver (23.7→22.1°C . The overall decreasing temperatures are caused both by the point source influence of the ittle South Fork and assumed subsurface interactions from the numerous drainages along this reach of stream. Several small seeps were also seen along this reach.

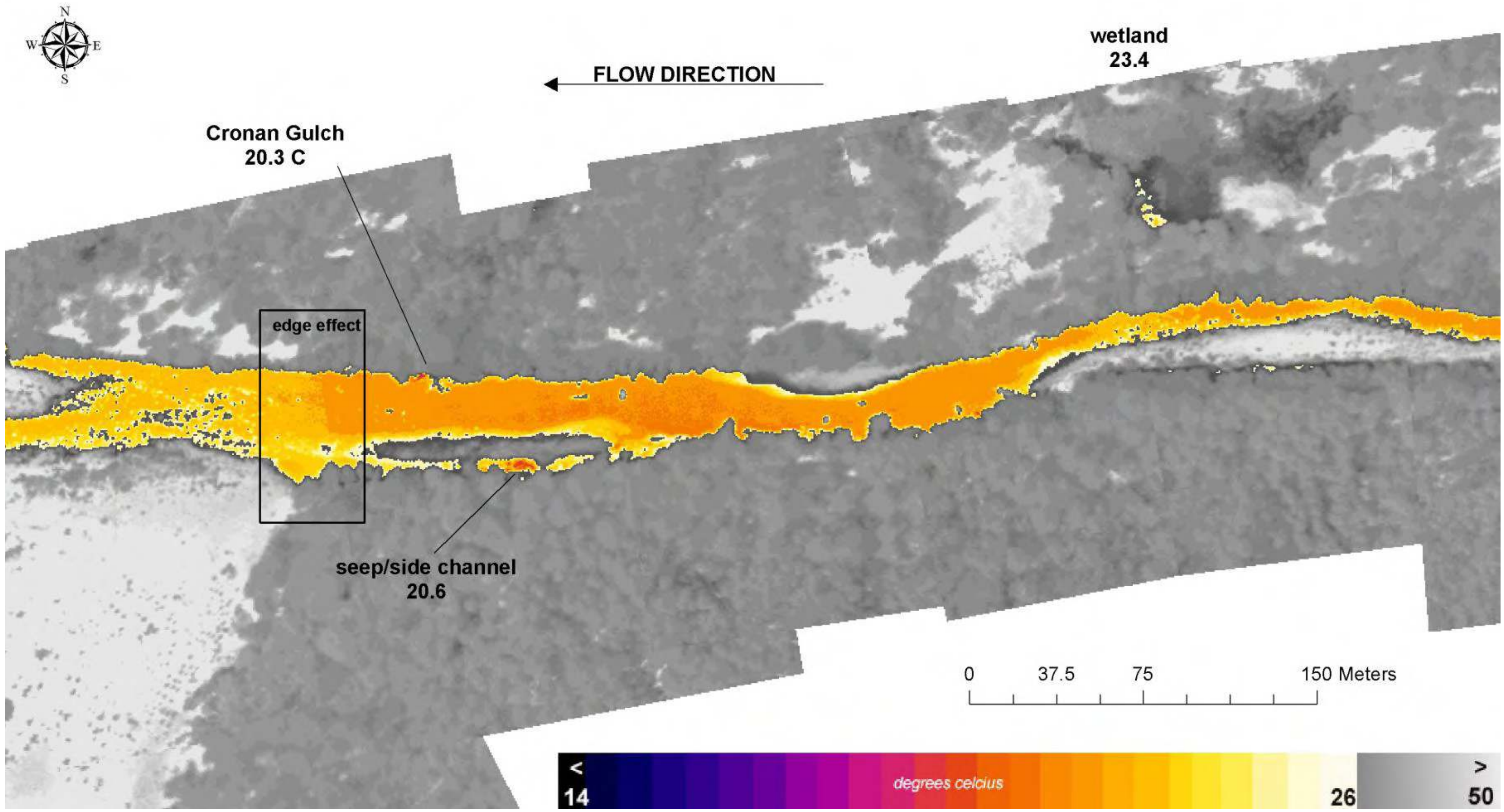
From river mile 8.57 downstream to river mile 3.24, a 2.5°C warming is seen indicating a lack of subsurface influence throughout this reach. There is no visible evidence in the imagery to e plain this shift in the thermal profile. Further morphological studies would be needed to assess what causes the inflection in temperatures seen at river mile 8.57 each 2 .

A short cooling followed by warming is seen in the lower 3 miles of river each 1 resulting in an overall temperature swing of 1.4°C (24.0→22.6→23.4°C .

Sample Images



North Fork Image 1 – The TIR/NAIP image above shows the local spatial thermal variability at Idlewild Campground. At this location, the river emerges from a narrow forested canyon into a more open meadow area for a short distance. Temperatures warm significantly through this reach perhaps due to the increased solar exposure. Temperatures return to a more stable thermal profile below the confluence with North Russian Creek.



North Fork Image 2 - .The TIR image above shows a short section of Reach 3 at Cronan Gulch (RM 10.64). The decreasing temperatures in Reach 3 indicate subsurface interactions like what is seen at the intersection of the North Fork and Cronan Gulch, and the small seep on the side channel on river left. The wetland seen along this reach indicates a shallow water table which allows for more hyporheic exchange and ultimately cooler temperatures. This image also shows an example of the edge effect seen when mosaicing the individual thermal frames. It is no unusual to see ±0.2°C variability between frames which can be visible in the mosaic. We choose not to blend or feather the imagery in order to maintain the native temperature values.

South Fork Salmon River

Longitudinal Temperature Profile

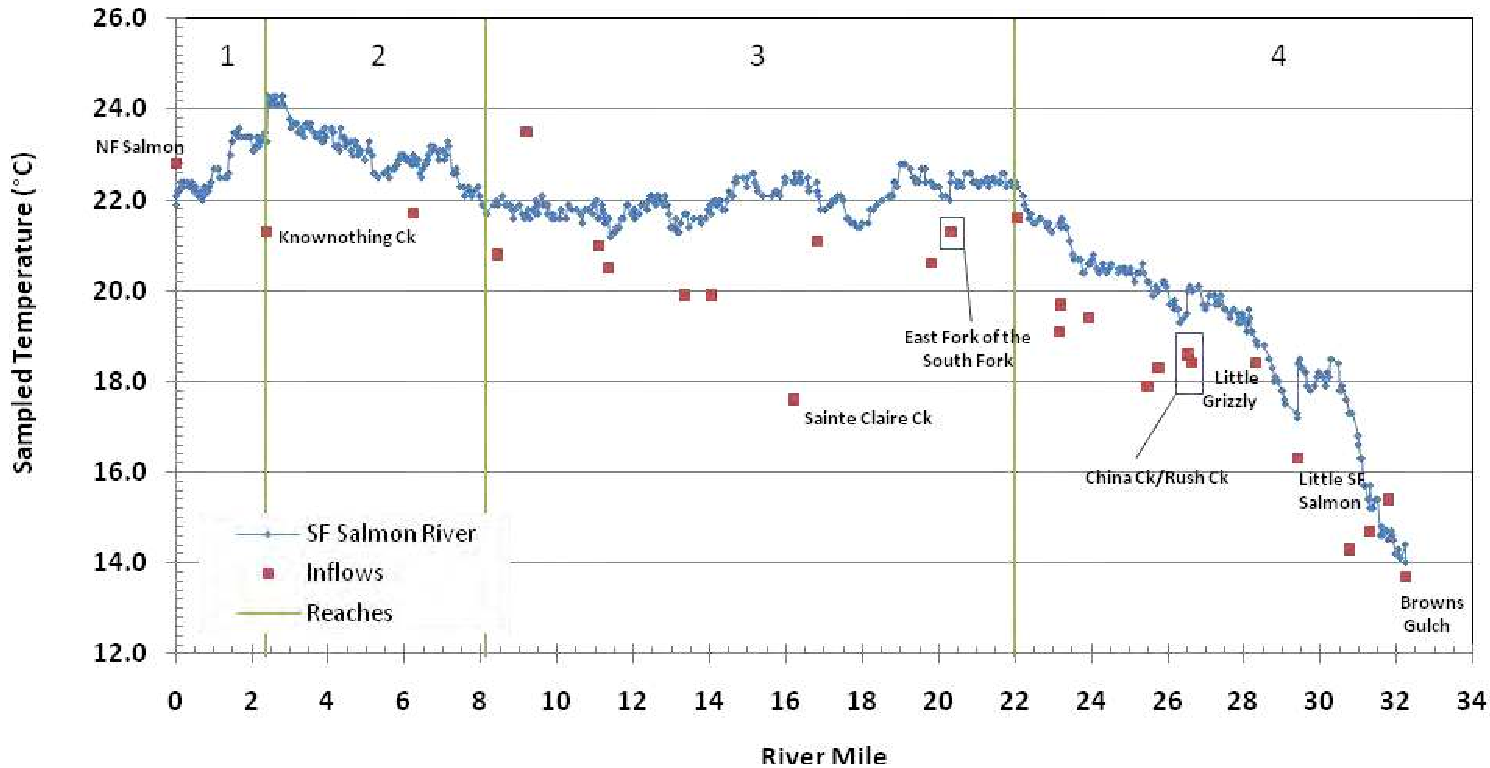


Figure 8 - Median channel temperatures plotted versus river mile for the South Fork Salmon River. The locations of detected surface inflows are illustrated on the profile and listed in Table 8.

Table 8 – Tributaries, inflows and selected side channels sampled along the South Fork Salmon River (with left or right bank designation looking downstream) are listed.

Tributary	Kilometer	River Mile	Trib Temp (°C)	Mainstem Temp (°C)	Difference
Salmon iver	0.00	0.00	22.3	21.9	0.4
North Fork Salmon	0.00	0.00	22.8	22.1	0.7
nownothing Creek	3.83	2.38	21.3	23.3	-2.0
Methodist Creek	10.01	.22	21.7	23.0	-1.3
lack ear Creek	13.58	8.44	20.8	21.9	-1.1
side channel	14.79	9.19	23.5	21.7	1.8
seep	17.85	11.09	21.0	21.	-0.
Smith Creek	18.27	11.35	20.5	21.	-1.1
Plummer Creek	21.45	13.33	19.9	21.7	-1.8
seep	22.58	14.03	19.9	21.7	-1.8
Sainte Claire Creek	2 .11	1 .22	17.	22.	-5.0
side channel/ nnamed	27.05	1 .81	21.1	22.2	-1.1
side channel	31.85	19.79	20.	22.4	-1.8
F SF Salmon iver	32.71	20.32	21.3	22.	-1.3
side channel/ nnamed	35.50	22.0	21.	22.3	-0.7
seep	37.29	23.17	19.1	21.5	-2.4
seep	37.34	23.20	19.7	21.4	-1.7
lack Gulch	38.53	23.94	19.4	20.	-1.2
side channel	40.99	25.47	17.9	20.2	-2.3
seep	41.44	25.75	18.3	20.0	-1.7
China Creek	42. 9	2 .53	18.	20.0	-1.4
ush Creek	42.84	2 . 2	18.4	20.0	-1.
ittle Gri ly Creek	45.58	28.32	18.4	18.9	-0.5
ittle SF Salmon	47.34	29.42	1 .3	18.4	-2.1
nnamed	49.49	30.75	14.3	17.3	-3.0
seep	50.37	31.30	14.7	15.2	-0.5
nnamed	51.15	31.78	15.4	14.5	0.9
rowns Gulch	51.88	32.24	13.7	14.0	-0.3

Observations

Thirty-two miles of the South Fork Salmon iver were surveyed on uly 23, 2009 from the mouth upstream to rowns Gulch. Stream temperatures ranged from 14.0°C at rowns Gulch to 24.3°C above nownothing Creek. Fifteen tributaries, seeps, and 5 side channels were detected in the imagery. The ma ority of the sampled inflows had very low flows, and do ens of side drainages were seen in the imagery that did not have sufficient flows for accurate sampling. No active SGS flow gages were found on the South Fork Salmon iver.

For the entire length of the survey, the South Fork Salmon iver flows through a narrow steep forested canyon with numerous intersecting drainages. Four watershed scale reaches can be seen in the longitudinal temperature profile. The upper 10 miles of river each 4: M 22.00-32.24 showed a rapid warming trend as e pected on a hot summer day 14.0→22.4 C . each 3, from river mile 22.00 downstream to river mile 8.12, shows a fairly stable thermal profile with temperatures fluctuating only 1. C 21.2→22.8 C over

14 miles. Further warming is seen in each 2 from river mile 8.12 downstream to nownothing Creek M 2.38 , and then a final cooling is seen to the confluence with the North Fork Salmon iver each1 .

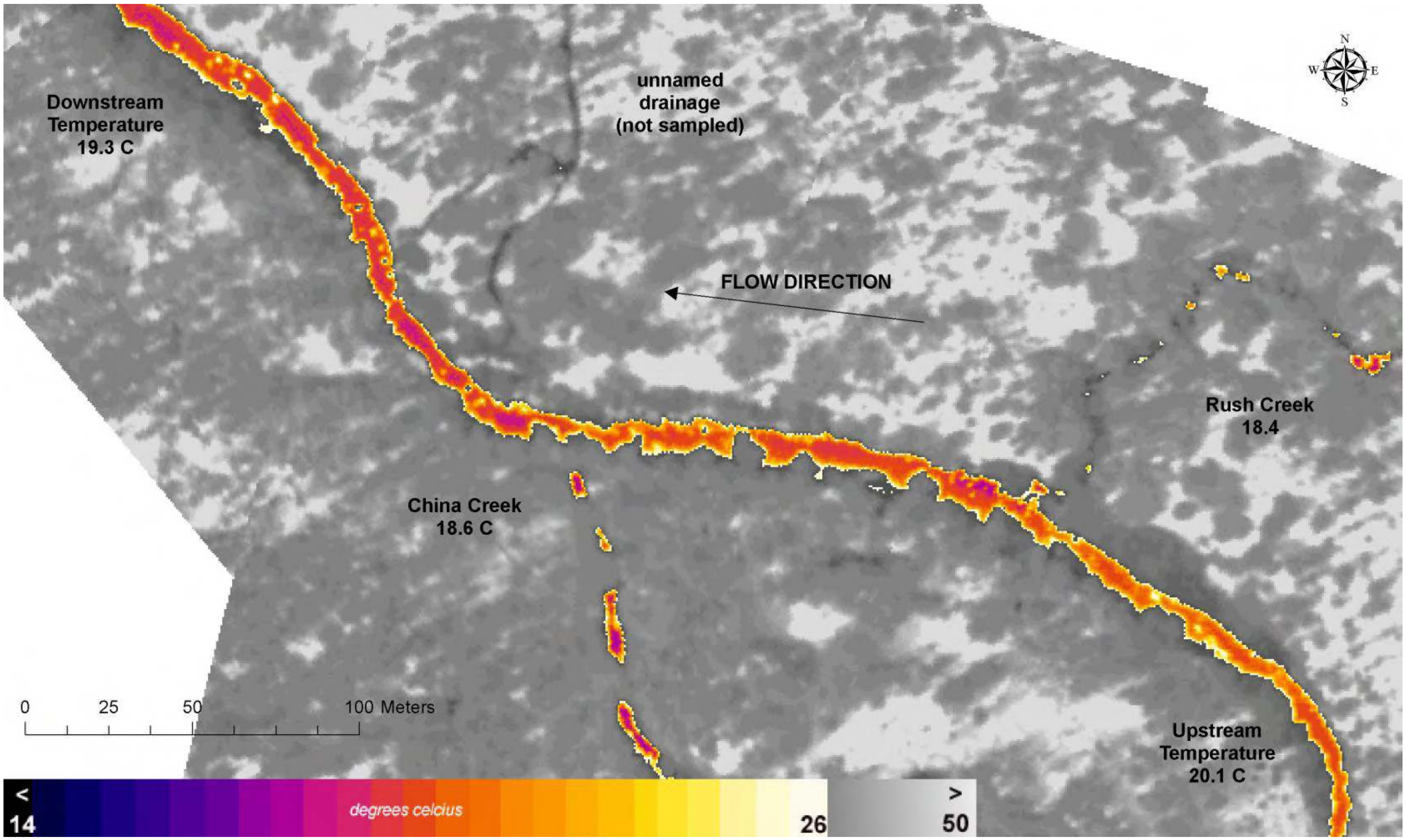
ocali ed fluctuations can be seen within each reach. At river mile 28.32 at the confluence of ittle Gri ly Creek, a decrease in the rate of warming occurs causing an inflection point in the longitudinal profile. This inflection point indicates a shift in the thermal e uilibrium, likely as a result of increased subsurface interaction.

Temperature changes of less than 0.5°C should be interpreted with caution due to the accuracy limitations of the thermal imagery. However, four point source impacts of 0.5°C or more can be seen in the profile at the confluences with the ittle SF Salmon M 29.42 , China and ush Creeks M 2 .53 *South Fork Image 1* , ast Fork of the South Fork Salmon iver M 20.32 and nownothing Creek M 2.38 .

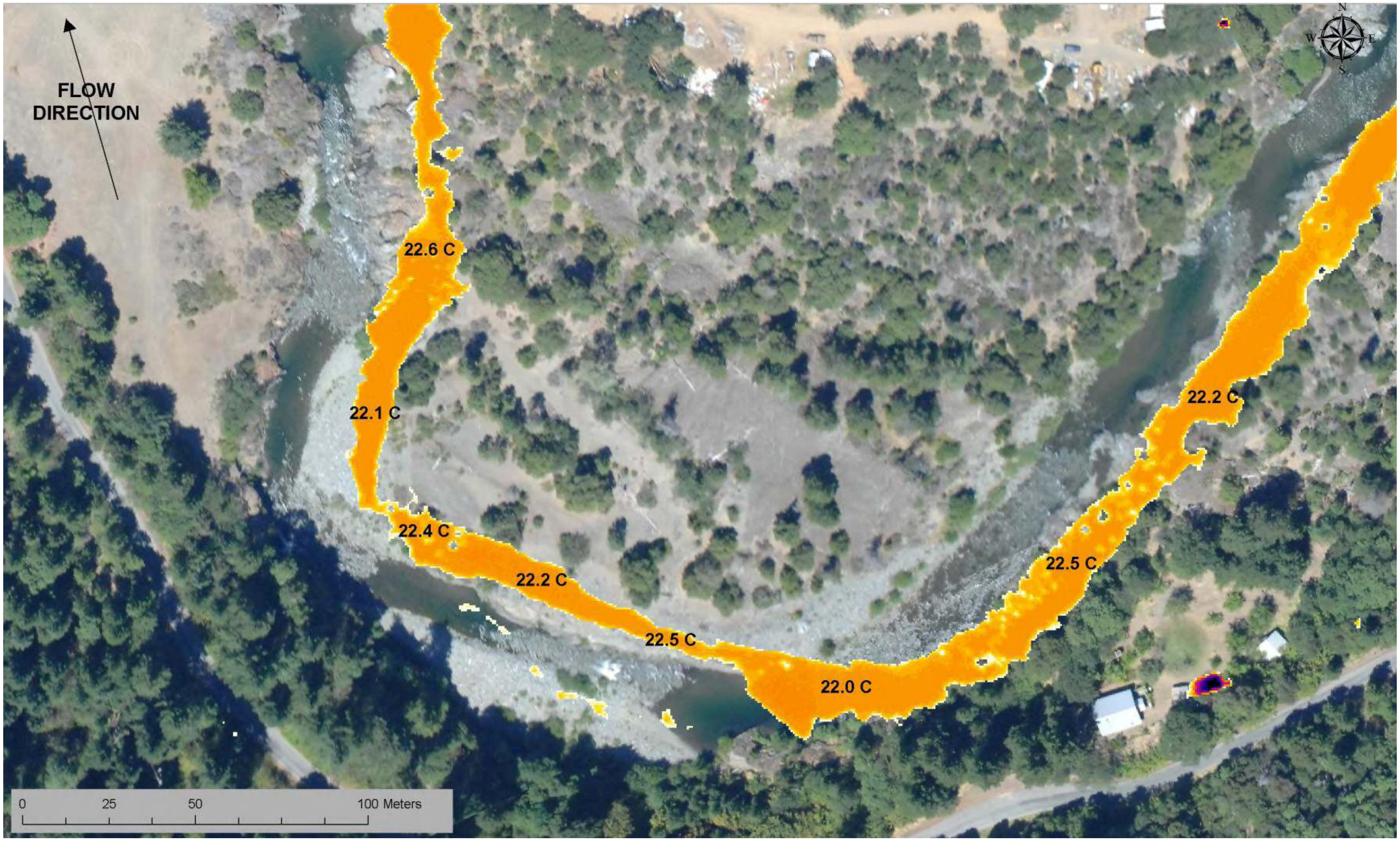
Some of the local spatial variability observed in this profile appears to be due to differences in pool/riffle se uences along the South Fork. Torgersen et al.[3] documented a potential 0.5°C radiant temperature variability between pools and riffles due to differences in spectral versus diffuse reflectance at the water surface pool versus riffle . The e perience of Watershed Sciences, Inc. over the past ten years confirms this observation, but the level of variability depends on the sensor wavelength and observation angle *South Fork Image 2* .

[3] Torgersen, C. ., . Fau , .A. McIntosh, N. Poage, and D. . Norton. 2001. "Airborne thermal remote sensing for water temperature assessment in rivers and streams." *Remote Sensing of Environment* 7 3 : 38 -398.

Sample Images



South Fork Image 1- The TIR image above shows the confluence of China Creek, Rush Creek, and an unnamed drainage with the South Fork Salmon River at river mile 26.53. The cumulative effect of these three drainages drops the bulk water temperature of the South Fork from 20.1°C to 19.3°C in 0.5 miles. Rush Creek is a good example of a stream that appears to have little to no surface water flow, but is providing cold water to the main channel.



South Fork Image 2 – The TIR/true color image pair at river mile 0.58 shows the type of variability seen in pool/riffle sequences.. The images are offset in order to show the location of the pools and riffles in the true color imagery.

Deliverables

The TI imagery is provided in two forms: 1 individual un-rectified frames and 2 a continuous geo-rectified mosaics at 0. -m. The mosaic allows for easy viewing of the continuum of temperatures along the stream gradient, but also shows edge match differences and geometric transformation effects. The un-rectified frames are useful for viewing images at their native resolutions and are often better for detecting smaller thermal features. A GIS point layer is included which provides an inde of image locations, the results of temperature sampling, and interpretations made during the analysis.

Deliverables are provided on a Passport storage drive:

Geo-Corrected Mosaics, surveys, and shapefiles are pro ected in: **Universal Transverse Mercator, Zone 10, NAD 1983, Meters**

1. Hydrography – elevant hydrography shapefiles

2. ongprofiles - cel spreadsheet containing the longitudinal temperature profiles

3. Thermal Mosaics - Continuous image mosaic of the geo-rectified TI image frames at 0. -m resolution in DAS Imagine img format . Cell value radiant temperature 10

4. Thermal Surveys - Point layers showing image locations, sampled temperatures, and image interpretations

5. Thermal nrectified - Calibrated TI images in DAS Imagine img format. Cell value radiant temperature 10. adiant temperatures are calibrated for the emissive characteristics of water and may not be accurate for terrestrial features. These images retain the native resolution of the sensor

. True Color Images – nrectified true color Nikon frames

7. True Color Surveys – Point shapefiles showing the appro imate image location of the uncertified true color frames

8. Salmon iver TI uly 2009.m d – An AcrMap pro ect containing all the thermal mosaics and survey shapefiles displayed with pre-defined color ramps

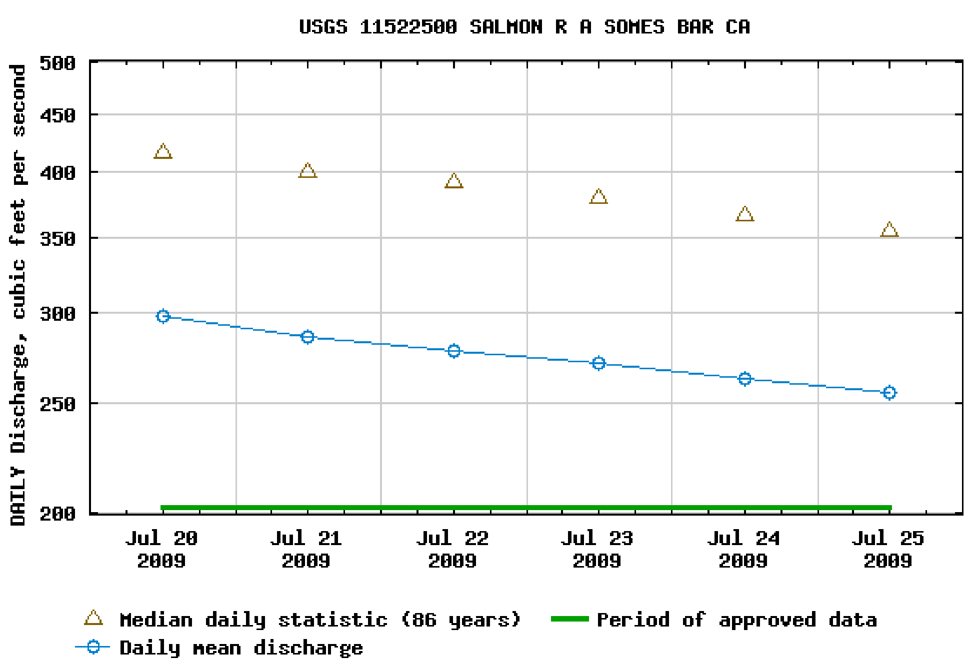
9. Salmon iver TI eport.pdf - A PDF copy of this report

Appendix A –Daily Discharge Rates

Source: SGS Surface-Water Daily Data for the Nation
URL: http://waterdata.usgs.gov/nwis/dv

Salmon River at Somes Bar (USGS 11522500)

DATE	Daily Mean Discharge (cubic feet per second)
July-20	298 [A]
July-21	28 [A]
July-22	278 [A]
July-23	271 [A]
July-24	2 3 [A]
July25	255 [A]
[A] - Approved for publication -- Processing and review completed.	



Subject: Mill Creek Plumas County
Date: Thursday, May 5, 2011 11:06:27 AM PT
From: Tom Wess
To: mstopher@dfg.ca.gov

Mark,

I met with you in March prior to the Redding meeting regarding the “Class A” restriction on Mill Creek in Plumas County. Most of our conversation was regarding the higher altitude (above 6000’) which is commonly accepted as the habitat for the Sierra Nevada Mountain Yellow Legged Frog, the Bucks Lake Wilderness line, and how it affected our claim.

I will finish my comments tonight regarding the Sierra Nevada Mountain Yellow Legged Frog and would like a short meeting with you to present the information.

There is a couple of issues within the information I would like to bring your attention to which would have a major impact on the decision regarding Mill Creek.

I need to be in San Francisco tomorrow at 5 but would like to meet with you early in the morning if at all possible. As before I promise to keep the meeting short.

I also left a message on your phone.

I have attached a some information for your use showing the location of the frogs and the watershed boundary.

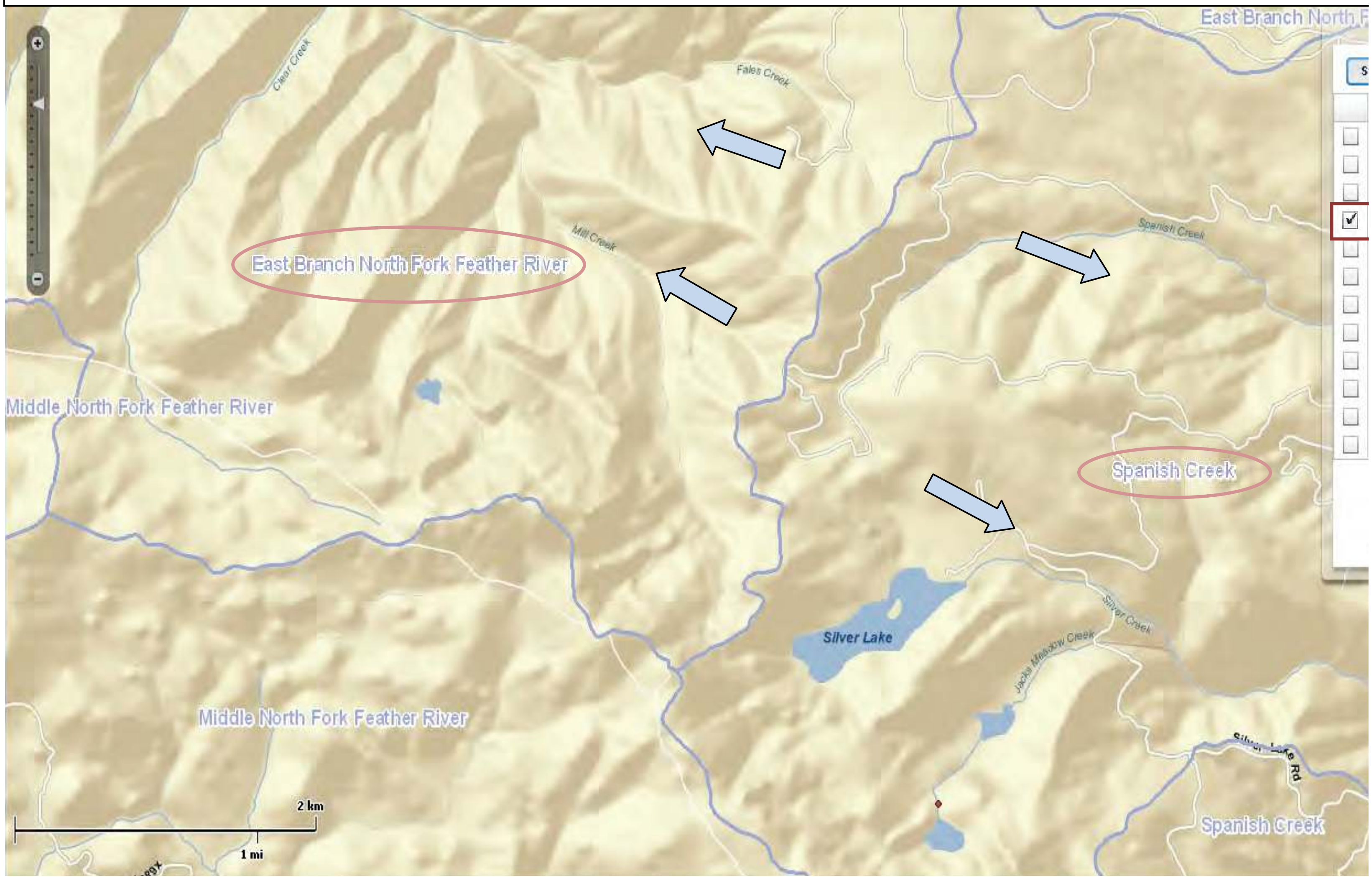
Please let me know if you can meet.

Thank,

Tom Wess
530 385-1462 x 3026 (work)

US Fish and Wildlife Service shows the division line between Watersheds.

Silver Lake, Gold Lake, Rock Lake, Mud Lake and Jacks Meadows, where the Sierra Nevada Yellow Legge
Sierrae, *Formerly* Rana muscosa - *Mountain Yellow-legged Frog*) were located, <u>all drain</u> into the Spanish Creek Wate
<u>from Mill Creek</u> and the East Branch North Fork Feather River Watershed.



Fire and Forest Ecology

Sierra Nevada Mountain Yellow-Legged Frog (*Rana sierrae* and *Rana muscosa*)

Threats

Once the most abundant frog in the Sierra Nevada, the mountain yellow-legged frog is now critically endangered in the Range of Light. Populations of mountain yellow-legged frogs have declined dramatically and they are now found in fewer than 7 percent of their historic localities. This decline is due to a number of factors, including the stocking of fish in high elevation lakes, many of which did not contain fish historically. As a result of these fish stocking efforts, which continue today, more than 90% of Sierra Nevada lakes which were naturally fish-less now contain introduced trout. There is abundant scientific evidence that predation by non-native trout on mountain yellow-legged frog tadpoles, as well as adults, is a major factor in the decline of this amphibian. Other factors leading to declines in population include toxins from pesticides and herbicides, livestock impacts, chytrid fungal infection, and off-highway vehicle (OHV) recreation.

Habitat

The habitat of the mountain yellow-legged frog consists of glaciated lakes, ponds, tarns, springs, and streams in the upper elevations (above 6,000 feet generally) of the Sierra Nevada. The adaptations that allow them to live at these high elevations and cold temperatures have made them highly vulnerable to introduced fish species. The species is usually associated with montane riparian habitats in lodgepole pine, yellow pine, sugar pine, white fir, whitebark pine, and wet meadow vegetation types, and range from southern Plumas County to southern Tulare County.

Conservation

Nearly all the remaining populations of mountain yellow-legged frog occur on public lands, and studies have demonstrated that in the absence of disease, it is possible to bring these species back to recovery. Recent surveys, however, have shown an increase in the deadly disease, chytridiomycosis. The Sierra Nevada Framework Plan provides strategies to reduce all the factors causing a decline in mountain yellow-legged frog populations including prohibition of pesticides from frog habitat, removing livestock near lakes and pond areas, prohibiting development of new recreation trails that would affect known frog sites, and the identification of Critical Aquatic Refuges to protect sensitive species. It also calls for the removal of exotic fish from frog habitat. The 2004 revisions to the Framework have weakened the protections for the mountain yellow-legged frog by failing to maintain grazing restrictions for amphibian species in key habitats. A return to a robust monitoring and restoration program as promoted and required by the original Sierra Nevada Framework is vital to protect the species from disappearing from the Sierra Nevada altogether.

Status

Until recently, the mountain yellow-legged frog in the northern and central Sierra Nevada, and those in the mountains of southern California, were thought to be the same species. Today the Sierra Nevada mountain yellow-legged frog--specifically, those frogs north of Mather Pass--is recognized as a unique species, *Rana sierrae*. The species are thought to have diverged more than 2 million years ago. Both species are critically endangered with extinction. Surveys have shown that 93% of the *R. sierrae* and 95% of *R. muscosa* historical populations are now extinct.

In 2003 the U.S. Fish and Wildlife Service (USFWS) determined that the Sierra Nevada population of the mountain yellow-legged frog should be protected under the Endangered Species Act, but that listing the species under the Act is "warranted but precluded" by the agency's backload of priorities and budget constraints. Subsequent legal action on behalf of the species resulted in a 2007 USFWS 12-month petition finding (see below, in Supporting Documents) that the mountain yellow-legged frog is still precluded from listing under the Endangered Species Act, basically due to the agency's lack of funds and priority allocation. Such administrative delaying is pushing the species closer to extinction throughout the Sierra Nevada.

On September 15, 2010, the California Fish and Game Commission accepted a petition from the Center for Biological Diversity to list all populations of the mountain yellow-legged frog (*Rana muscosa* and *Rana sierrae*) as "endangered" under the California Endangered Species Act. As a result, on October 1 both species were listed as "candidate" species and will be managed as "endangered" until the final decision on whether to list the species is made.

For more information about the mountain yellow-legged frog, visit the mountain yellow-legged frog website of Dr. Roland Knapp, at http://www.mylfrog.info.

Scientific Research

Bradford, D. F. 1991. Mass mortality and extinction in a high-elevation population of *Rana muscosa*. *Journal of Herpetology* 25(2) 174-177. (321KB PDF)

Briggs, C.J., et. Al. 2005. Investigating the Population-level Effects of Chytridiomycosis: An Emerging Infectious Disease of Amphibians. *Ecology* 86(12) 3149-3159. (242KB PDF)

Davidson, C. and R.A. Knapp. 2007. Multiple stressors and amphibian declines: dual impacts of pesticides and fish on yellow-legged frogs. *Ecological Applications* 17(2):587-597. (256KB PDF)

Fellers, G.M., Bradford, D.F. et al. 2007. Demise of Repatriated Populations of Mountain Yellow-legged Frogs (*Rana Muscosa*) in the Sierra Nevada of California. *Herpetological Conservation and Biology* 2(1) 5-21. (562KB PDF)

Knapp, R.A. and K.R. Matthews. 2000. Non-native fish introductions and the decline of the mountain yellow-legged frog from within protected areas. *Conservation Biology* 14:428-438. (180KB PDF)

Knapp, R.A., D.M. Boiano, and V.T. Vrendenburg. 2007. Removal of nonnative fish results in population expansion of a declining amphibian (mountain yellow-legged frog, *Rana muscosa*). *Biol. Cons.* 135:11-20. (497KB PDF)

Knapp, R.A. and J.A.T. Morgan. 2006. Tadpole mouthpart depigmentation as an accurate indicator of chytridiomycosis, an emerging disease of amphibians. *Copeia*. 2:188-197. (110KB PDF)

Macey, J.R., J.L. Strasburg, J.A. Brisson, V.T. Vredenburg, M. Jennings, and A. Larson. 2001. Molecular phylogenetics of western North American frogs of the *Rana boylii* species group. *Molecular Phylogenetic Evolution* 19(1) 131–143. (137KB PDF)

Matthews, K.R. and K.L. Pope, 1999. A Telemetric Study of the Movement Patterns and Habitat Use of *Rana muscosa*, the Mountain Yellow-legged Frog, in a High-elevation Basin in Kings Canyon National Park, California. *Journal of Herptology* 33(4) 615-624. (276KB PDF)

Pope, K.L. and K.R. Matthews. 2001. Movement ecology and seasonal distribution of mountain yellow-legged frogs, *Rana muscosa*, in a high-elevation Sierra Nevada basin. *Copeia* 2001(3) 787-793. (177KB PDF)

Pope, K.L. and K.R. Matthews. 2002. Influence of anuran prey on the condition and distribution of *Rana muscosa* in the Sierra Nevada. *Herpetologica* 58(3) 354-363. (161KB PDF)

Vredenburg, V.M. 2004. Reversing introduced species effects: Experimental removal of introduced fish leads to rapid recovery of a declining frog. *Proceedings of the National Academy of Sciences* 101(20) 7646-7650. (340KB PDF)

Vredenburg, V., Fellers, G.M., and C. Davidson. 2005. *Rana muscosa* Camp 1917, Mountain Yellow-legged Frog. Pp. 563-566. In: Michael Lannoo (Ed.), *Amphibian Declines: The Conservation Status of United States Species*. Volume 2: *Species Accounts*. University of California Press, Berkeley, California. (172KB PDF)

Vredenburg, V.T., R. Bingham, R. Knapp, J.A.T. Morgan, C. Moritz, and D. Wake. 2007. Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. *J. Zoology* 271(361-374). (423KB PDF)

Supporting Resources

2007 Finding by USFWS of Warranted but Precluded listing under ESA (69KB PDF)

2006 9th Circuit Court of Appeals ruling requiring USFWS to substantiate Warranted but Precluded listing (57KB PDF)

2003 Finding by USFWS of Warranted but Precluded listing (126KB PDF)

2003 Complaint to USFWS challenging delay of listing by Earthjustice on behalf of the Center for Biological Diversity and Pacific River Council (139KB PDF)

2000 Petition to USFWS to list as Endangered by the Center for Biological Diversity and Pacific Rivers Council (230KB PDF)

California Department of Fish and Game Natural History Information (URL) --This California state website contains rather limited and old information but is a good basic background composite for the species. Choose from a drop-down list to select the animal you are interested in.

BerkeleyMapper Point Mapping Service - Windows Internet Explorer

http://berkeleymapper.berkeley.edu/run.php?ViewResults=tab&tabfile=http%3A%2F%2Famphibiaweb.org%2Ftmpfiles%2F685332&configfile=http%3A%2F%2Famphibiaweb.org%2Ftmpfiles%2Fbm_config_581

File Edit View Favorites Tools Help

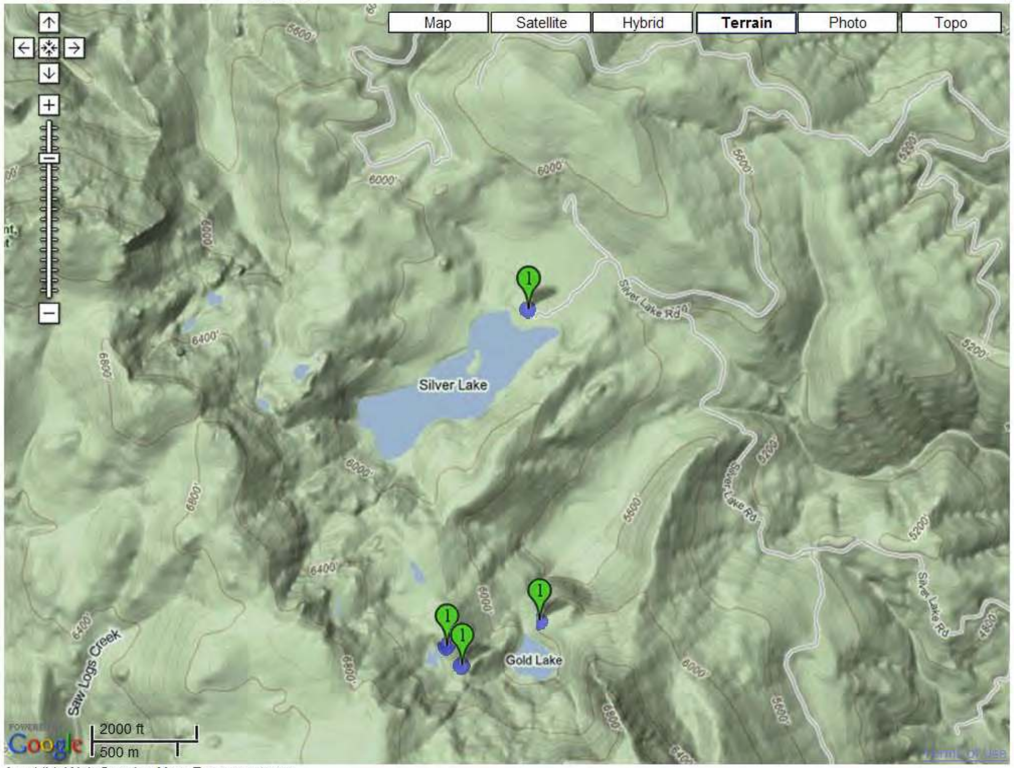
BerkeleyMapper Point Mapping Service

To see detailed information about the specimen points below, go to HerpNET.

The shape files below (shaded maps) are from IUCN.

Refresh

Map | Satellite | Hybrid | Terrain | Photo | Topo



AmphibiaWeb Species Map: Rana muscosa

Legend | Layers | Options | Help | Tools

Map Controls

Pan: Click & drag to pan

Zoom by Box: Click Zoom-in icon to begin. Click once to start box. Click again to close zoom box.

Spatial Query: Click spatial query icon to begin digitizing. Click on map to define polygon points.

Markers

Click Marker: Click a marker symbol to see point information

One item at this location

More than one item at this location

Refresh populates markers or restores working state

Help document

Show Point Records

Done, but with errors on page. Internet 125%