Salmon River Community “Weak Stocks” Fisheries Assessment and Protection Program
Grant Agreement #113334G021

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*SRRC employee measuring a spring Chinook carcass*

*Underwater photo of spring Chinook in cold water refugia, taken by SRRC*

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## I) Abstract

The Salmon River Restoration Council (SRRC) was funded by the Klamath Fisheries Task Force (KFTF) to monitor and assess fish species within the Salmon River referred to as “weak stocks”. The SRRC’s mission is to assess, protect, restore, and maintain the Salmon River ecosystems, focusing on the restoration of the anadromous fisheries resources. The importance of further research related to abundance, habitat requirements, and limiting factors for weak stocks in the Salmon River.has been recognized by the KFTF, California Department of Fish and Game (CDFG) Coho Recovery Strategy, Klamath Fisheries Management Council, and the National Research Council.

Through the Salmon River Community Weak Stocks Assessment program, the SRRC has provided information to regulating agencies that is critical to the survival of the Salmon River subbasin’s diverse fisheries. The program has focused on the assessment of freshwater life stages of “weak stocks” species, *i.e.*, spring Chinook, coho salmon, green sturgeon, lamprey species and steelhead trout. The program has identified the presence of these species within the sub-basin and documented their habitat use throughout the basin. As such, the program continues to provide baseline data, as well as expanding data sets for the under-studied species of the Klamath and Salmon Rivers.

The Salmon River Restoration Council (SRRC) has performed the tasks identified in our cooperative agreement for the Salmon River Community “Weak Stocks” Assessment and Protection Program for fiscal year 2004 (FY 04). In the Salmon River subbasin the SRRC has continued to provide leadership in heightening stakeholder awareness and enlisting support from numerous stakeholders to help recover the anadromous fisheries and their related resources.

Tasks in this project have been performed in cooperation with the CDFG, U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Karuk Tribe, Yurok Tribe, and the Klamath Salmon Anglers and Guides Association (KSAGA). This collaborative approach has been a major component of the program, providing technical oversight, as well as on the ground assistance. This project addresses and seeks to fill data gaps for weak stocks. Monitoring for this kind of information may prove invaluable to the recovery of the fisheries resource as cited by the National Research Council report Threatened and Endangered Species of the Klamath River (2003).

> “A small but growing stakeholder group is cooperating with state and federal agencies and tribal interests in the Salmon River basin. High priority has been placed on monitoring of salmon and steelhead runs, improvements in riparian habitat, management of fuels, and assessment and rehabilitation of logging roads (Elder et al. 2002). Given proper funding and agency participation, these efforts may be sufficient to improve conditions for coho and other salmon and steelhead in the watershed.”

## II) Background

The Salmon River Restoration Council (SRRC) has implemented and completed the tasks and projects set forth in the Salmon River Community Weak Stocks Assessment and Protection Program (Weak Stocks Program). The tasks in this program involve identifying habitat requirements for weak stocks and monitoring species distribution and life history. This type of data is currently lacking throughout the Klamath basin. The Salmon River’s year round clarity and SRRC’s close proximity to survey areas has enabled us to provide sound and efficient data sets that are rare and valued by fisheries managers in the Pacific Northwest.

SRRC’s winter and summer steelhead surveys are a prime example of this type of data. SRRC provides CDFG with the only long-term data set for the entire Klamath Basin. These data are then used by the California Fish and Game Commission to set regulations on the take of steelhead for Northern California and Southern Oregon.

Other examples of valuable weak stocks program data are the identification of spring Chinook holding or refugia areas and juvenile coho rearing areas. The identification of these sensitive areas has lead to protection from large-scale, dredge mining disturbance that occurs on the lower Salmon River.

Through the weak stocks program, the SRRC has collected data on life history, population size, range and health of target species. The data has been collected by fisheries technicians from SRRC, tribes, agencies and trained community volunteers. The Karuk Tribe, CDFG, USFS, National Oceanic and Atmospheric Administration (NOAA) Fisheries, and USFWS have provided technical oversight and review. The KSAGA and the Salmon River Spring Chinook Voluntary Recovery Group have acted through this project to further coordination between stakeholders in the recovery of anadromous fisheries. These groups and others, such as the KFTF Technical Work Group and the Klamath Basin Fish Health Assessment Team, have directed the goals of this project and will be involved in its review and further development.

Overwhelming support for the program within the surrounding community, along with increased support from agencies and tribes, has afforded us the ability to complete the project tasks under budget. Staff and community volunteerism contributed $33,877.07 to the program, which far exceeds the match requirement. Additional funding from the CDFG Fisheries Restoration Grants Program for ’04 –’05, and USFWS Screw Trapping ’02 &‘05 allows SRRC to continue implementing the weak stocks program assessment and protection objectives throughout the coming year. Appendix a.) provides a detailed breakdown of expenditures and in-kind contributions by line item.

The monitoring and assessment projects in the program that have been completed through funding provided by the KFTF are discussed further in the project summaries, and tasks accomplishments sections of this report. Raw data sets and Global Information System (GIS) maps are also provided in spreadsheet format in the appendices of the report.

The SRRC tracks its restoration work in various ways including the SRRC annual work plan development and review, restoration project reports, and photo points.

**Description of Study Area:**

The Salmon River is one of the most biologically intact watersheds in the western U.S. It is the largest cold-water contributor to the Klamath River, and known as one of the cleanest rivers in the state of California. The Salmon River hosts an excellent fisheries resource within the Klamath Basin possessing highly regarded runs of green sturgeon, spring Chinook, and winter steelhead. In fact, runs of all remaining anadromous fishes in the Klamath watershed occur in the Salmon River (NRC 2003, Moyle et al 1995, Moyle 2002). This 751 sq. mile watershed is entirely within the Klamath National Forest and is considered a key watershed by the Forest Service. Watershed analysis has been completed for the entire Subbasin, with the exception of Wooley Creek. The land base in the watershed is 98% Public Lands-USFS, with 45% in wilderness areas. Sixty seven percent of the watershed is within Karuk Ancestral Lands. It is difficult to determine the historical population size of the anadromous fisheries in the Salmon River subbasin, however fish numbers were sufficient to supply the primary subsistence food and be the basis for the economy of the indigenous people prior to the mid-1800s. Anadromous fish populations within the Klamath Basin were already significantly jeopardized by the mid-1930s (Taft and Shapovalov, 1935).

Within the Salmon River subbasin, there were several historical water diversions and dams, which blocked fish migration (Taft and Shapovalov 1935; Handley and Coots 1953). A dam near Sawyers Bar on the North Fork of the Salmon River prevented fish from migrating above the town until the 1950's. Another dam was located 4 to 5 miles above Forks of Salmon on the South Fork Salmon River, blocking migration for approximately 50 years or more.

Presently, water temperature is a concern for fish. Tributary temperatures are currently below lethal levels. However, the main-stem Salmon River can reach lethal temperatures. This was observed in the summer of 1994, a very low flow year. There were 23 dead spring Chinook adults observed during the annual spring Chinook/summer steelhead count in 2003. Mortality was observed in adult as well as juvenile fish, and Pacific giant salamanders. The largest accumulation of dead juvenile fish was observed below an area congested with suction-dredge gold miners. The SRRC actively participates in the Klamath Basin Fish Health Assessment Team to be better prepared to monitor epizootics and developing fish kill conditions, as well as to develop preventative measures.

Much of the subbasin is bedrock controlled, which reduces the amount of shade created by riparian vegetation on the North Fork, South Fork, and Mainstem Salmon Rivers. In addition, both bankfull and flood-prone widths are wide enough that even old growth trees would not provide effective shade. Another factor working against maintaining sub-lethal temperatures in the river is aspect. The North Fork, South Fork, and Mainstem flow west, leading to prolonged exposure to thermal input from the sun. In effect, this heats the water and creates a heat sink in the bedrock banks. Topography provides most of the shade to these main tributaries -- therefore, maintaining temperatures in smaller tributaries is critical, particularly in low flow years.

Seasonal migration barriers (natural and man made) are present in several tributaries and are most noticeable in low flow years. Some of the barriers appear to segregate the spring-run fish upstream from the mix of fall- and spring-run fish downstream. The consequences (good or bad) of modification to these seasonal barriers during the last two decades are unknown. However, the SRRC has helped to identify the man-made fish barriers and is taking steps, through the associated Work Group, to remove them. A bridge has replaced the culvert at Merrill Creek and SRRC and the Karuk Department of Natural Resources have documented steelhead spawning above the bridge. Currently, coordinated work is being done to remove man made barriers in Kelly's and Whites Gulches. Fish screens are also being installed on key water diversions.

Within the Salmon subbasin, coho salmon are listed as *Threatened* and steelhead are listed as a *Candidate* species under the Endangered Species Act (ESA); summer steelhead and spring Chinook are managed as *Sensitive* species by the Pacific Southwest Region Forest Service. There are also native populations present of fall Chinook salmon, green sturgeon, lamprey, Speckled dace, stickleback, and resident trout. Non-native fisheries species include: American Chad, German brown trout, and Eastern brook trout.

Several documents and entities have identified that the Salmon River is one of the premier watersheds for diverse populations of anadromous fisheries. The most significant impacts to anadromous fisheries are suspected to occur outside of the subbasin in the Klamath River during out-migration and while returning to spawn, as well as ocean conditions and fishing. More recently released reports and others documents include the "Salmon River Subbasin Restoration Strategy", "Endangered and Threatened Fishes in the Klamath River Basin - Causes of Decline and Strategies for Recovery" recently released by the Natural Research Council, and the Draft License Application for the Re-licensing of the PacifiCorp dams in the Klamath River- submitted to the Federal Energy Regulatory Commission in September of 2003.

## III) Task Accomplishments

During the 2004 fiscal year the SRRC performed all Tasks outlined in the Statement of Work, Attachment 1 of the agreement, including fulfilling its commitment for In-Kind Services. The participation of the KFTF funds in the facilitation of workshops has been acknowledged on signs, flyers, written communications, event notices, our web site, and in SRRC presentations. Identification of activities associated with each Task is provided in the following text, including Appendices Items. Some of the tasks were also supported by the CDFG, Karuk Tribe and US Forest Service, as well as by private contributions.

Task I: Coordination

- Coordinated Fisheries Assessment: The SRRC held 8 fisheries monitoring coordination meetings. Attendees included, USFS, CDFG, USFWS, Karuk and Yurok tribes, North Coast Regional Water Quality Control Board, KSAGA, Mid

Klamath Watershed Council, NOAA Fisheries and community members. These meetings served to coordinate monitoring projects relating to the target species of this program.

- The Salmon River spring Chinook Voluntary Recovery Group: During the project period the SRRC held three Voluntary spring Chinook Recovery Group meetings in cooperation with the USFS, CDFG, NCRWQCB, the Karuk and Yurok Tribes, USFWS, and NOAA Fisheries. The group acts to coordinate Salmon River spring Chinook research and has developed a limiting factors analysis for the species included in appendix C of the report.

- Coordinated Community Volunteerism: SRRC coordinated 25 volunteers from the community, agencies, staff, tribes and AmeriCorps, who donated a total of 2702 hours during 379 attendances of events associated with this agreement. Events associated specifically with the coordination of fisheries restoration in the Salmon River enlisted 638.00 hours of volunteer support from the community, agencies, tribes, and organizations.

Task II: Assessment

- Spring Chinook: Through this program the SRRC enlisted 1,107 volunteer hours towards the assessment and protection of spring Chinook. Research and monitoring projects included spring Chinook run timing assessments, the Salmon River Cooperative spring Chinook Population Dives, carcass and redd surveys, disease and mortality assessments, refugia monitoring and Otolith research.

- Coho Salmon: Through this program the SRRC enlisted 195 volunteer hours towards the assessment and protection of coho within the Salmon River. Research and monitoring projects included Salmon River juvenile coho presence / absence surveys and Salmon River adult coho spawning and redd surveys completed in cooperation with the USFS and CDFG.

- Winter and Summer Steelhead: Through this program the SRRC enlisted 426.5 volunteer hours towards the assessment and protection of winter steelhead. Research and monitoring projects included, winter steelhead spawning and redd surveys, and the Klamath Salmon Anglers and Guides Association Steelhead Monitoring Program. Technical and field assistance was provided by the CDFG Steelhead Research and Monitoring Program.

- Sturgeon: Through this program the SRRC enlisted 64 hours in volunteer support towards the assessment and protection of green sturgeon. Research and monitoring included, green sturgeon presence / absence dives on the lower Salmon River.

- Lamprey: Through this program the SRRC enlisted 80 hours in volunteer support towards the assessment and protection of lamprey species. Research and monitoring included length and developmental stage determination through

downstream migrant trapping.

- Water Quality Monitoring Relationship: Through this program the SRRC enlisted 155.50 hours in volunteer support toward monitoring water quality in the Salmon River. The SRRC placed temperature loggers in key refugia areas for spring Chinook and juvenile salmonids, loggers were also placed in the main river channel near refugia areas. Spring Chinook refugia areas were monitored throughout the summer for fish density and correlations between temperature and density this data was included in a report soon to be released by the Karuk Tribe and SRRC. Flow measurements were taken for tributaries where spring Chinook or juvenile salmonids had congregated. Turbidity measurements were made at these key sites and are expressed in terms of water clarity in the summary discussion.

## IV) Summary Discussion

A. Methods and Materials

Task I: Coordination

Tasks and objectives of the Salmon River Weak Stocks Program were performed in cooperation with the aforementioned agencies, tribes, and organizations. USFS, CDFG, and Karuk Tribal Biologists provided oversight. Nat Pennington, Fisheries Program Coordinator for SRRC directed on-the-ground monitoring projects and also serves to document the programs activities.

SRRC held 5 trainings to increase community knowledge of fisheries monitoring activities within the basin. Training workshops were offered for topics such as winter steelhead surveys, juvenile salmonid identification, spring Chinook and summer steelhead dives, and coho surveys and identification.

Task II: Assessment

SRRC used protocols from CDFG and USFWS for sampling and monitoring activities. Example data sheets and survey maps are included in the appendices of this document. Survey crews consisted of SRRC fisheries technicians, and Karuk Tribal biologists and fisheries technicians. Most surveys were completed with equipment provided by either this project or as in kind donation from SRRC. Publications and mailers were used to coordinate with the community and agencies. We have included an example of a flyer for the coho surveys in appendix b. of this report.

Winter steelhead surveys in major tributaries of the Salmon River were performed by SRRC, Karuk Tribe, and USFS fisheries technicians from February – April 2004 and 2005, and were in cooperation with CDFG. Data was recorded using CDFG protocol and GPS units provided by this project. Surveys were completed by snorkeling the river and

walking streambeds. We quantified number of fish observed, number of redds observed, location of fish and redds, redd length and width, habitat type, and temperature data.

Spring Chinook spawning surveys in the upper South and North Forks of the Salmon River were performed by SRRC, Karuk Tribe, and USFS fisheries technicians from September 15 – October 15, 2004. Data was recorded using CDFG protocol and GPS units provided by this project. Spawning surveys were completed by snorkeling the river and walking streambeds looking for live Chinook, carcasses and redds. The protocol was developed from the Klamath River Cooperative Chinook Spawning and Carcass Surveys Protocol (CDFG). Several fields were added to this protocol including disease infection information, and GPS location of redds out of a desire to better understand disease in Salmon River spring Chinook and its relationship to spawning success. Other data fields in the protocol included: numbers of fish observed, number of redds observed, location of fish and redds, redd length and width, habitat type, carcass fork length in mm., sex, scars, percent of eggs spawned, scale samples and temperature data. Two sets of scale samples were collected for each carcass when enough scales were available. These samples are analyzed by Jack West of the USFS and George Kautsky of the Klamath Fisheries Management Council and Hoopa Tribe. Information from scale analysis is used to classify fish length by age and is helpful in determining life history as well as cohort reconstruction and run size predictions.

Coho surveys were performed in suspected habitat by SRRC, Karuk Tribe, and USFS fisheries technicians in November – January 2002-2004. Data was recorded using CDFG protocol and GPS units provided by this project. Juvenile coho surveys were done while snorkeling. Adults were surveyed by walking streambeds looking for live adults, carcasses and redds. Adult coho survey protocol involved recording data on: numbers of fish observed, number of redds observed, location of fish and redds, redd length and width, habitat type, carcass fork length in mm., sex, scars, percent of eggs spawned, tissue samples for genetic analysis by CDFG, scale samples and temperature data.

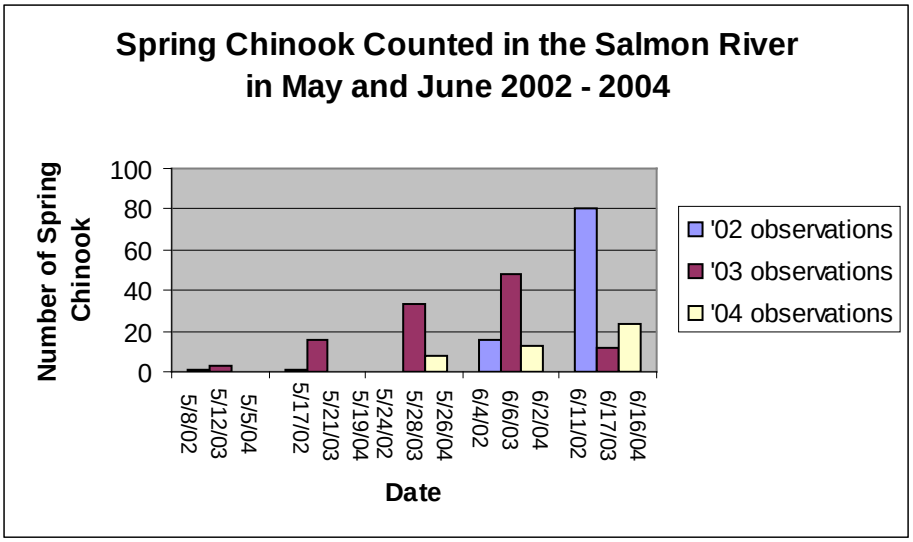
a. Spring Chinook

This year’s Spring Chinook timing, holding, and population surveys took place from May through August 2004. The initial surveys involved six snorkel surveys of the lower Salmon River (Brannons Bar to the Mouth) in May and June 2004 to determine run timing and the head of the spring Chinook run.

The Spring Chinook run timing surveys have taken place since 2002. The surveys involve 3- 4 surveyors -- 2 swimming in the river and one person in a raft or cataraft as a safety. The entire stretch of river is surveyed from Brannon’s Bar to the mouth of the river. The divers are trained and experienced in snorkel survey techniques. Spring Chinook observed during the survey are enumerated by the rower and recorded by sub sections of the reach. Surveyors reported that visibility was good for all but one survey day and were confident that they had seen the majority of Spring Chinook that were present. This year was a below average year for the Salmon River Spring Chinook run. This affected the number of fish that were observed and therefore affected the amount representing the Head of the run. The last 3 years data showing the head of the Spring Chinook run is put

into graph form and shown below in Chart 1. The data has been compiled, analyzed, and quality control checked. This data is currently available for revue at www.srrc.org upon request. An example of press outreach for the recovery of spring Chinook and other fisheries in the Salmon River can be found in appendix c.

Chart 1




The Cooperative Salmon River Spring Chinook and Summer Steelhead Dives event successfully assessed the population of spring Chinook salmon present in the Salmon River for the 2004 season. The event enlisted and involved a total of 63 dive participants and an additional 24 event staff or family member participants. Training, which 22 agency and community participants attended, was provided for first year participants. A training video was produced by the Salmon River Restoration Council, Karuk Tribe and the Mid-Klamath Watershed Council and was shown at the training and during the event. Food for the event was provided by the Salmon River Restoration Council and consisted of two dinners and two breakfasts. The Karuk Tribe contributed food services consisting of a traditional salmon bake, which was a highlight of the event. The Forks of Salmon School donated the use of its kitchen and cafeteria facilities for the event. An educational presentation was provided for all participants. Green sturgeon, spring chinook, and summer steelhead were the presentation topics. The presenters were Josh Israel, green sturgeon scholar at UC Davis, and Nat Pennington, SRRC Fisheries Program Coordinator. Camping and bathroom facilities were donated by the USFS Klamath National Forest and USFS Six Rivers National Forest. The USFS Klamath National Forest also coordinated the collection and compilation of data. A total of 439 Spring Chinook and 476 Summer Steelhead were observed. Spring Chinook numbers were below average as shown in Chart 2 below and summer steelhead numbers were above average as shown in Chart 3 below. The total volunteer days contributed towards this event are shown below in Table 1. The complete data set for reaches surveyed during the event is shown below in table 2.

**Chart 2**

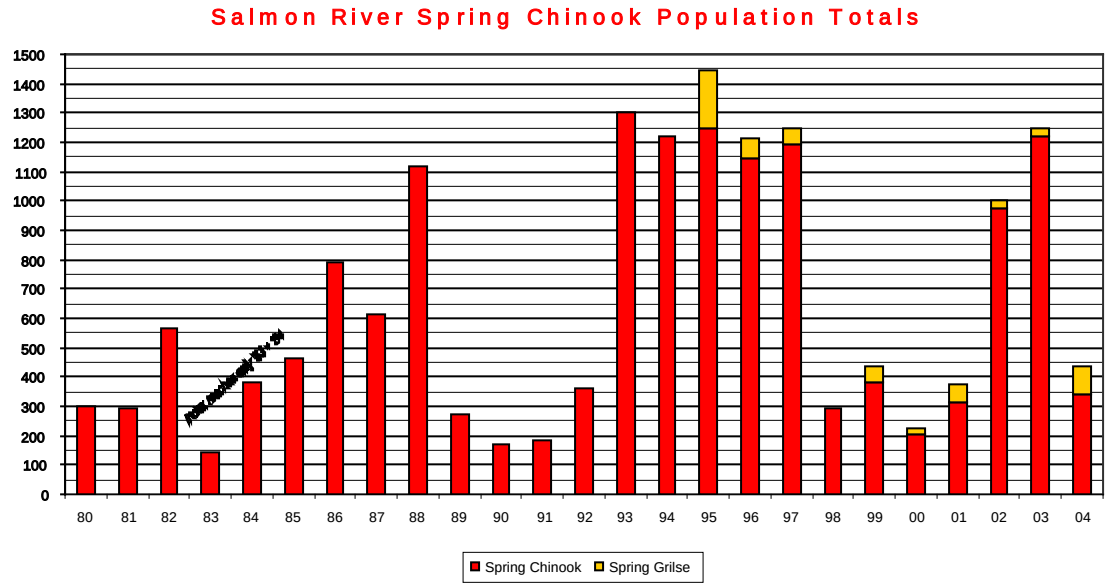



**Chart 3**

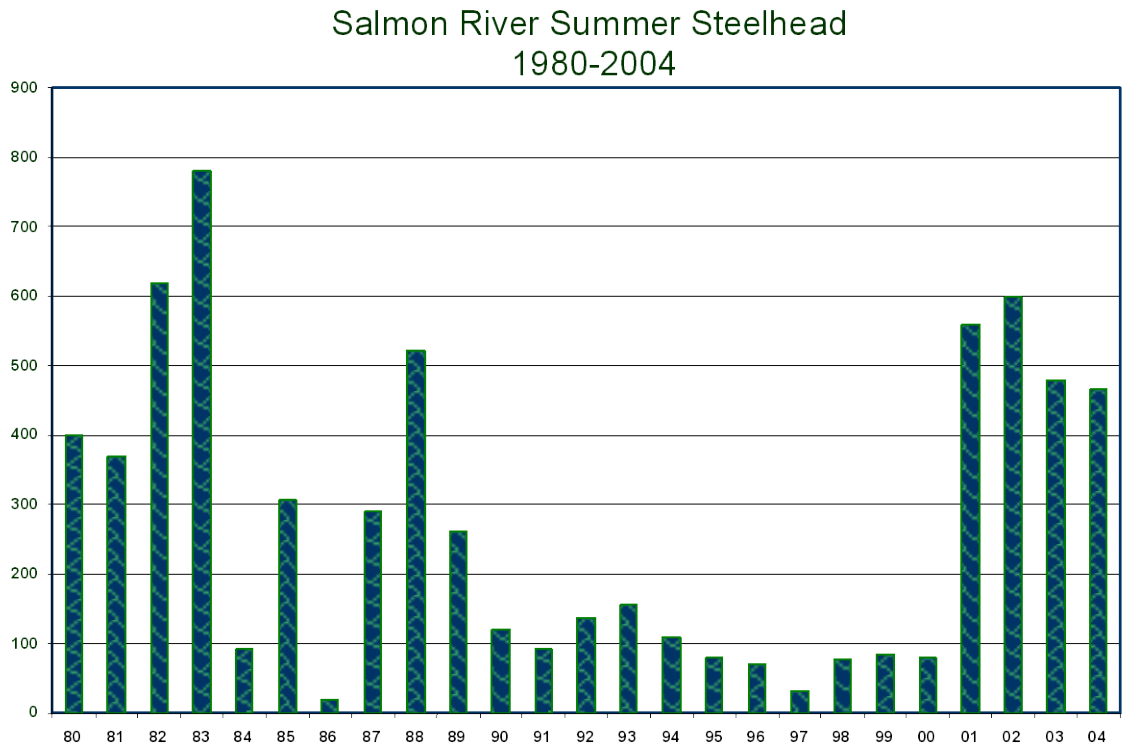


Table 1

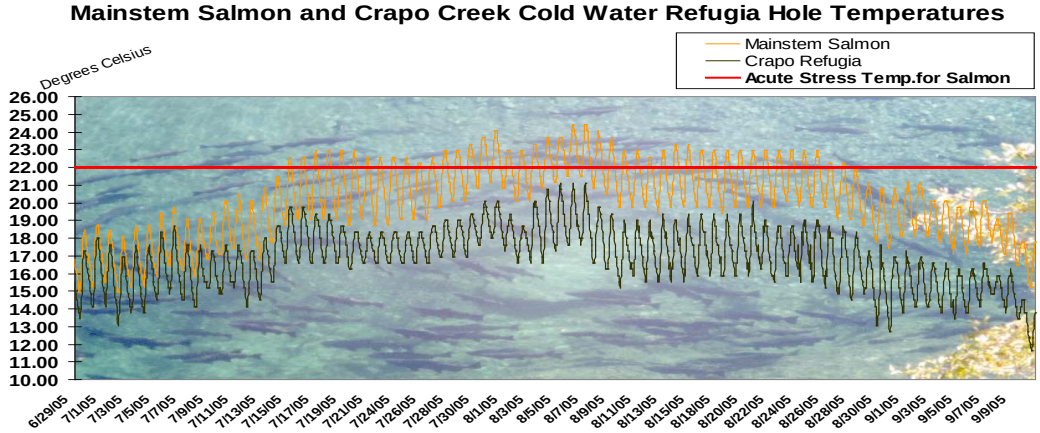
| Event Name | Start Date | # Volunteer Attendees | Evaluation |
|---|---|---|---|
| Sp Chin Survey 04 Training | 8/17/2004 | 22 | Annual Spring Chinook, Summer Steelhead Survey, Training Day |
| Sp Chin Survey 04 | 8/18/2004 | 63 | Annual Spring Chinook, Summer Steelhead Survey, Survey Day One |
| Sp Chin Survey 04 | 8/19/2004 | 7 | Annual Spring Chinook, Summer Steelhead Survey, Survey Day Two |

Table 2

| REACH | DATE | SKILL RATING | MILES | STEELHEAD ADULTS | STEELHEAD ½ POUNDERS | SPRING CHINOOK ADULTS | SPRING CHINOOK JACKS | MORTALITIES (SPRING CHINOOK) |
|---|---|---|---|---|---|---|---|---|
| **MAINSTEM** | | | | | | | | |
| Wooley Ck - Mouth | 8/19 | ADVANCED ONLY | 4.5 | 17 | 42 | 27 | 33 | |
| Grants - Wooley | 8/19 | ADVANCED ONLY | 4 | 1 | 0 | 0 | 1 | |
| Nordheimer – Grants | 8/19 | ADVANCED ONLY | 5 | 13 | 17 | 12 | 2 | |
| Forks – Nordheimer | 8/19 | ADVANCED ONLY | 4.5 | 25 | 23 | 36 | 19 | |
| **MNSTM COUNT** | | | 18 | 56 | 82 | 75 | 55 | |
| **SOUTH FORK** | | | | | | | | |
| Henry Bell - Forks | 8/18 | EASY | 3 | 6 | 6 | 39 | 2 | 2 |
| O'Farril - Henry Bell | 8/18 | EASY | 2 | 1 | 1 | 1 | 0 | |
| Matthews - O'Farril | 8/18 | MODERATE | 5 | 9 | 9 | 37 | 3 | 1 chin, 1 ½ lber |
| French - Matthews | 8/18 | ADVANCED ONLY | 4 | 6 | 12 | 55 | 12 | |
| Cecil – French | 8/18 | EASY | 4 | 4 | 11 | 37 | 5 | |
| INDEX - Timber Gl - Limestone Gl | 8/18 | | 3 | 6 | 36 | 5 | | |
| Petersburg - Cecil | 8/18 | EASY | 4 | 1 | 7 | 16 | 6 | 1 ½ lber |
| Blindhorse – Petersburg | 8/18 | EASY | 3 | 0 | 0 | 14 | 1 | 2 |
| Little South Fk – Blindhorse | 8/18 | MODERATE | 3 | 1 | 0 | 5 | 0 | |
| **SFK COUNT** | | | 28 | 34 | 82 | 209 | 29 | 5 chin 2 ½ lber |
| **NORTH FORK** | | | | | | | | |
| 4 – Forks | 8/18 | EASY | 4 | 3 | 39 | 7 | 0 | |
| Index - China Pt. - Deadhorse Gl | 8/18 | EASY/MOD | 3 | 0 | 5 | 4 | 0 | |
| 8 – 4 | 8/18 | MODERATE | 4 | 1 | 5 | 6 | 4 | |
| 12 – 8 | 8/18 | MODERATE | 4 | 5 | 14 | 12 | 4 | |
| 16 – 12 | 8/18 | EASY | 4 | 8 | 15 | 8 | 2 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Whites Gl – 16 | 8/18 | MODERATE | 2 | 1 | 1 | 2 | 2 | |
| Idlewild - Whites Gl | 8/18 | EASY | 2.5 | 0 | 4 | 2 | 1 | |
| Mule Br. - Idlewild | 8/18 | MODERATE | 3 | 0 | 1 | 0 | 0 | |
| Big Ck - Mule Br. | NS | MODERATE | 3 | NS | NS | NS | NS | |
| **NFK COUNT** | | | 29.5 | 18 | 84 | 41 | 13 | |
| **EAST FORK** | | | | | | | | |
| George's – confluence | 8/19 | EASY | 2 | 0 | 1 | 0 | 0 | |
| Shadow Ck - George's | NS | EASY | 2.5 | NS | NS | NS | NS | |
| **EAST FK COUNT** | | | 4.5 | 0 | 1 | 0 | 0 | |
| Wooley Creek | | | 12.6 | 75 | 35 | 13 | 4 | |
| **Count w/o Wooley** | | | 77 | 108 | 249 | 325 | 97 | |
| **FINAL COUNT** | | | 89.6 | 183 | 284 | 338 | 101 | 5 chin<br>2 ½ lber |
| | | | | | | | | |

The summertime temperatures in the Salmon often reach stressful levels for Chinook salmon in the months of June and July. Spring Chinook can be at risk of disease infection and eventual mortality during these periods. Through the weak stocks program SRRC has monitored and identified key refugia locations within the Salmon River where spring Chinook hold in the summer. These locations are critical to spring Chinook as they spend the summer in fresh water. Threats to these key sites, *e.g.*,recreational mining, are being monitored and eliminated by SRRC coordination with specific user groups like the New 49ers mining association. During the spring Chinook Population Census and in other Restoration Council activities, the SRRC and community members observed 15 spring Chinook pre spawn mortalities. Research is needed to address whether this level of die off is within the range of natural variability or if it may be heightened by current habitat conditions. Data was collected for the Boulder gulch refugia, the Crapo creek refugia, and the Little South Fork refugia. Temperature data for the Crapo refugia, charted with the mainstem Salmon River temperature, as well as the stress threshold for Salmonids, is shown below.



Surveys in '02, '03 and '04 showed lowered numbers of spring Chinook in the lower Salmon River during the months of August and September. Although in '02 a high number of spring Chinook were observed in tributaries in the Mid Klamath watershed during the month of August, it is thought that these fish may have been held up during migration to the Salmon by high temperatures and low flows in the Mainstem Klamath. These fish showed obvious signs of disease and were present throughout the summer in the lower stretches of Klamath tributaries and cold-water refugia areas. The SRRC has worked in collaboration with Josh Strange and the Yurok Tribe to perform radio telemetry on spring Chinook. The Restoration Council assisted in the maintenance of a radio tracking station located at the mouth of Wooley Creek, four river miles from the confluence with the Klamath. The tracking period extended from early June to late July.

The SRRC and cooperators collected spawning and carcass data from the Upper South Fork and Upper N. Fork of the Salmon River. These surveys took place from September 12th through Oct 17th. Crews recorded the location of fish and redds, redd length and width, habitat type, carcass fork length, sex, scars, percent of eggs spawned, scale samples and temperature data. Two sets of scale samples were collected for each carcass when enough scales were available. Redds were recorded with GPS units and carcasses were measured, sex determined, and analyzed for signs of disease. During disease assessments trained fish technicians examine the carcasses for external characteristics of Columnaris, Icth, and C.Shasta. During the '03 survey season examination of 179 spring Chinook carcasses revealed that 53% had Columnaris lesions. This information has been provided to the USFWS Fish Health Center and the Klamath Basin Fish Health Assessment Team. Spring Chinook data and GIS maps showing GPS redd locations are in appendix h. and i. of the report.

The SRRC, USFWS and Karuk tribe were funded by the task force to collect and analyze otoliths of Salmon River spring Chinook. This project was implemented in March of 2004. The otoliths were collected from juveniles and adult carcasses during the spring Chinook redd surveys. The otoliths are given to the USFWS to be analyzed. The growth rings that are imbedded in the otoliths can be used to identify conditions and growth rates for Salmon River spring Chinook and may also allow stock identification for selective harvest of particular stocks.

The Salmon River cooperative spring Chinook salmon carcass and redd surveys took place from September 15 – October 22, 2004. The surveys were performed through funding from this program and volunteer or cooperative support from the USFS Orleans and Salmon River Ranger Districts, USFWS, the Karuk Tribe and the California Dept. of Fish and Game- Klamath River Project. The survey training was held by the Salmon River Restoration Council (SRRC) on September 15th at the Cecilville Community Club. Each survey crew consisted of at least two surveyors trained in survey protocol, redd and fish identification. Crews recorded the location of fish and redds, redd length and width, habitat type, carcass fork length sex, scars, percent of eggs spawned, scale samples and temperature data. Two sets of scale samples were collected for each carcass when enough scales were available. Redds were recorded with GPS units and carcasses were measured, sex determined, and analyzed for signs of disease. During disease assessments, trained fish technicians examine the carcasses for external characteristics of *Columnaris*, Icth,

and *C. shasta*. The Surveys took place on 16 continuous miles of the South Fork Salmon River and 8 continuous miles of the North Fork. Repeat surveys occurred on most reaches. A total of 66 miles of the South and North Fork Salmon River were surveyed including repeat surveys. A total of 77 redds were surveyed and mapped during the 2004 season. A total of 8 carcasses were examined for biological information and sample collection. Data from the 2004 spring Chinook carcass and redd surveys is presented in summary format below. A publication distributed by SRRC as an informational flyer for volunteers and cooperators is included in appendix j. of this report.

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 | | | | 10/22/2004 | | 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 | | | | 10/11/2004 | | 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 | | | | 10/14/2004 | | 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 | | | | 10/7/2004 | | 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 | | | | 10/7/2004 | | 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 | | | | 10/7/2004 | | 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 | | | | 10/4/2004 | | River: South Fork Salmon Reach: Cecil Creek -French Creek | | | | |
| **1** | SPCH | M | 80 | Y | Y | N | Y | N | N | None |

b. Coho Salmon

The SRRC in cooperation with CDFG, Karuk Tribe, USFS and USFWS has completed two years of coho presence / absence surveys in suspected areas and tributaries of the

Salmon River. These surveys were successful at identifying 20 coho salmon in areas where coho were previously undocumented within the subbasin. The 2004 – 2005 spawning season run size was larger than the previous year. A total of 14 adult coho observations were made by SRRC and cooperators in November and December 2004. The Restoration Council has provided this data to USFS and CDFG fisheries biologists. Both juvenile and adult coho surveys took place in '03 and '04. Juvenile coho surveys were completed in the months of July and August 2004 and 2003. Below is the survey data summary, and a GIS map showing locations of adult and juvenile coho sightings for '03 – '04. Coho data tables, and several photos taken of Adult and Juvenile coho are located in appendix d. and e. of the report.

2002 – 2004 Salmon River Adult Coho Salmon Spawning Survey Data Summary

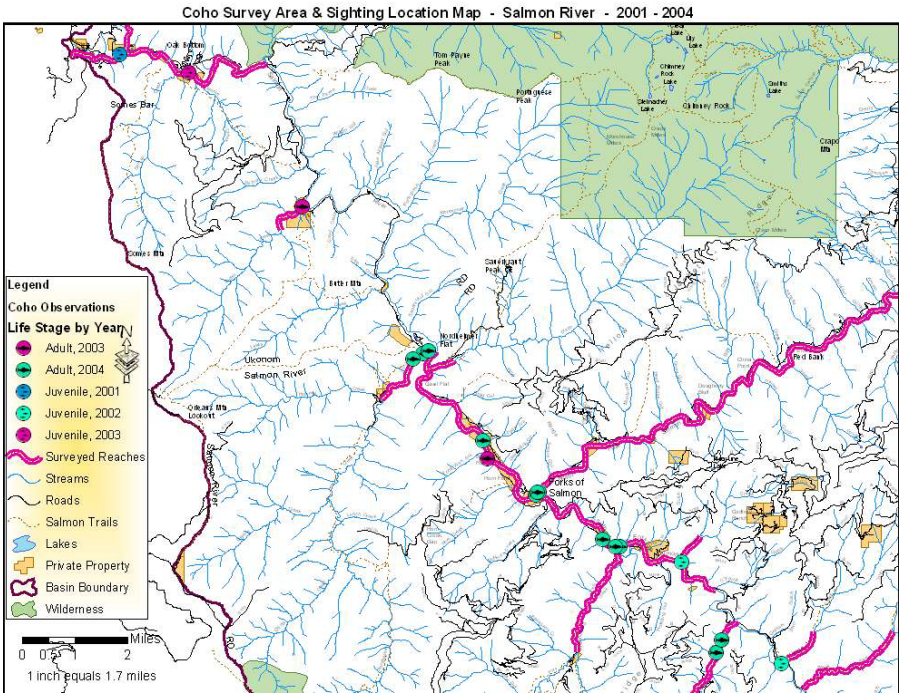
| Stream | Reach | Date | # of Redds | # of Lives | # ofCarcasses | Total Coho Observations |
|---|---|---|---|---|---|---|
| Main Stem | Forks to Nordhiemer | 11/24/2003 | 0 | 2 | 0 | 2 |
| East Fork | Georges to Confluence | 12/16/2003 | 0 | 0 | 0 | 0 |
| Knownothing Cr. | East Fork to Mouth | 12/9/2003 | 0 | 0 | 0 | 0 |
| Methodist Creek | Sign Cr. To Mouth | 12/9/2003 | 0 | 0 | 0 | 0 |
| Nordhiemer Cr. | Hammel Cr to Mouth | 12/9/2003 | 0 | 0 | 0 | 0 |
| Butler Creek | Falls to Mouth | 12/9/2003 | 0 | 0 | 0 | 0 |
| Knownothing Cr. | East Fork to Mouth | 12/16/2003 | 0 | 0 | 0 | 0 |
| South Fork | Knownothing to Missouri Bar | 12/16/2003 | 0 | 0 | 0 | 0 |
| Methodist Creek | Sign Cr. To Mouth | 12/16/2003 | 0 | 0 | 0 | 0 |
| Butler Creek | Private Prop to Mouth | 12/30/2003 | 0 | 1 | 0 | 1 |

| Merrill Creek | 2miles to Mouth | 12/16/2003 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|
| Knownothing Cr. | 1 Mile to Mouth | 12/23/2003 | 0 | 0 | 0 | 0 |
| Stream | Reach | Date | # of Redds | # of Lives | # ofCarcasses | Total Coho Observations |
| St. Clair Creek | 2miles to Mouth | 12/13/2004 | 0 | 0 | 0 | 0 |
| Knownothing Cr. | 3 Mile to Mouth | 12/10/2004 | 0 | 0 | 0 | 0 |
| Salmon River S. Fork | Cecil-French | 12/3/2004 | 0 | 0 | 0 | 0 |
| Nordheimer | Hammel Cr to Mouth | 12/3/2004 | 0 | 0 | 0 | 0 |
| Salmon River S. Fork | Taylor Creek-Cecilville | 12/3/2004 | 0 | 0 | 0 | 0 |
| Black Bear Creek | 2 Mile to Mouth | 12/10/2004 | 0 | 0 | 0 | 0 |
| Knownothing Cr. | Lloyds-Mouth | 12/10/2004 | 0 | 0 | 0 | 0 |
| Salmon River S. Fork | Indian-Ofarrel | 12/6/2004 | 0 | 0 | 0 | 0 |
| Methodist Creek | Johnson-mouth | 12/13/2004 | 2 | 1 | 0 | 1 |
| Methodist | Johnson-mouth | 12/13/2004 | 0 | 0 | 0 | 0 |
| Negro | 2 Mile to Mouth | 12/13/2004 | 0 | 0 | 0 | 0 |
| Eastfork | Georges to Confluence | 12/20/2004 | 0 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Plummer Creek mouth 1/4 mile US | 2 Mile to Mouth | 12/6/2004 | 0 | 0 | 0 | 0 |
| Nordheimer | Hammel Cr to Mouth | 12/20/2004 | 3 | 1 | 0 | 0 |
| Butler Creek | Falls to Mouth | 12/6/2004 | 0 | 0 | 0 | 0 |
| East Fork | Georges to Confluence | 12/3/2004 | 0 | 0 | 0 | 0 |
| Knownothing Cr. | Lloyds-Mouth | 11/17/2004 | 0 | 0 | 0 | 0 |
| Main Stem | Forks to Nordhiemer | 11/23/2004 | 1 | 1 | 0 | 1 |
| St. Claire Cr. | 3 Mile to Mouth | 11/23/2004 | 0 | 0 | 0 | 0 |
| North Fork | 16 Mile - 12 Mile | 12/6/2004 | 0 | 0 | 0 | 0 |
| Specimen Cr. | 2 Mile to Mouth | 11/26/2004 | 0 | 0 | 0 | 0 |
| South Fork | Henry Bell to Forks | 11/26/2004 | 1 | 2 | 0 | 2 |
| North Fork | 4 Mile to Forks | 11/23/2004 | 0 | 3 | 0 | 3 |
| North Fork | 4 Mile to Forks | 12/6/2004 | 0 | 4 | 0 | 4 |
| South Fork | Henry Bell to Forks | 12/13/2004 | 0 | 3 | 0 | 3 |

Total 2003 Observations---------- 3

Total 2004 Observations---------- 14




c. Winter and Summer Steelhead

During the 2004 - 2005 winter and summer steelhead spawning seasons SRRC and cooperators performed 68 stream surveys to identify presence / absence and population trends of steelhead in the Salmon River and tributaries. These surveys have been performed by SRRC and cooperators since 1999. Project cooperators include; USFS, CDFG, USFWS, NOAA, and the Karuk Tribe. Training was held on February 25th at the Forks of Salmon Community Club. The Data from these surveys, the GIS map, and an example of a steelhead data sheet can be found in appendices f. and g..

Salmon River Restoration Council, Weak Stocks Assessment Program
Cooperative Winter Steelhead Redd Survey Results

| **South Fork** | 1999 Redds | 2000 Redds | 2001 Redds | 2002 Redds | 2003 Redds | # of '99-'03 Surveys | 2004 Redds | # of 2004 Surveys | 2005 Redds | # of 2005 Surveys | **Total Redds identified in surveys 99'-05'** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East Fork | 24 | 36 | 15 | N/A | 10 | 11 | 8 | 1 | 2 | 1 | 95 |
| Knownothing | 17 | 6 | 0 | N/A | 1 | 12 | 13 | 2 | 10 | 3 | 47 |
| St.Clare | | 2 | 0 | 4 | 9 | 7 | 5 | 2 | 8 | 2 | 28 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Blindhorse-Petersburg | N/A | N/A | 0 | N/A | 18 | 3 | 5 | 1 | 5 | 2 | 28 |
| Blacks Gulch Creek | N/A | N/A | 0 | 0 | 0 | 2 | N/A | 0 | N/A | 0 | 0 |
| Petersburg-Cecil Creek | 5 | 16 | 0 | N/A | 12 | 7 | 9 | 1 | 6 | 1 | 48 |
| Black Bear | 7 | 0 | 0 | N/A | 1 | 8 | 2 | 1 | 3 | 2 | 13 |
| Indian Creek | N/A | 0 | N/A | N/A | 0 | 2 | 0 | 1 | 0 | 1 | 0 |
| Negro Creek | N/A | 0 | N/A | N/A | 2 | 2 | 0 | 1 | 0 | 1 | 2 |
| Crawford Creek | 1 | N/A | 0 | 0 | 23 | 5 | 12 | 2 | 9 | 2 | 45 |
| Methodist | 2 | 3 | 0 | 0 | 0 | 13 | 6 | 2 | 7 | 2 | 18 |
| Matthews | N/A | N/A | N/A | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 |
| Cecil Creek | 0 | N/A | N/A | N/A | 0 | 2 | 0 | 1 | 1 | 1 | 1 |
| Plummer Creek | N/A | N/A | 0 | N/A | 11 | 2 | 5 | 1 | 4 | 1 | 20 |
| Hotelling Creek | N/A | N/A | N/A | 0 | 0 | 5 | N/A | 0 | N/A | 0 | 0 |
| **Mainstem** | 1999 Redds | 2000 Redds | 2001 Redds | 2002 Redds | 2003 Redds | # of '99-'01 Surveys | 2004 Redds | # of 2004 Surveys | 2005 Redds | # of 2005 Surveys | **Total Redds identified in surveys 99'-05'** |
| Butler Creek | N/A | 2 | 0 | 3 | 0 | 4 | 0 | 1 | 0 | 1 | 5 |
| Merrill Creek | N/A | N/A | N/A | 0 | 9 | 4 | 3 | 4 | 2 | 2 | 14 |
| Somes Creek | N/A | N/A | N/A | N/A | 0 | 0 | N/A | 0 | N/A | 0 | 0 |
| 1mi. North Fork to Nordhiemer | N/A | N/A | 6 | N/A | 0 | 1 | N/A | 0 | N/A | 0 | 6 |
| Nordhiemer Creek | 2 | 15 | 0 | N/A | 0 | 10 | 13 | 2 | 9 | 0 | 39 |
| Crapo | N/A | N/A | N/A | 0 | 0 | 1 | N/A | 0 | N/A | 0 | 0 |
| **North Fork** | 1999 Redds | 2000 Redds | 2001 Redds | 2002 Redds | 2003 Redds | # of '99-'01 Surveys | 2004 Redds | # of 2004 Surveys | 2005 Redds | # of 2005 Surveys | **Total Redds identified in surveys 99'-05'** |
| North Russian(3mile-Mouth) | 10 | 23 | 0 | 3 | 6 | 11 | 9 | 2 | 4 | 2 | 55 |
| Specimen (LogJam-Mouth) | 1 | 9 | 0 | 3 | 23 | 12 | 4 | 2 | 7 | 2 | 47 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Little NF (Specimen-Mouth) | 4 | 5 | 0 | N/A | 12 | 9 | 6 | 1 | 8 | 1 | 35 |
| Kelly's Gulch | N/A | N/A | N/A | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 |
| Jackass | 0 | N/A | N/A | N/A | 0 | 2 | 0 | 1 | 1 | 1 | 1 |
| South Russian | N/A | N/A | N/A | N/A | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| White's Gulch | N/A | N/A | N/A | 4 | 0 | 3 | 1 | 1 | 0 | 1 | 5 |
| Eddy's Gulch | N/A | N/A | 0 | N/A | 0 | 2 | 3 | 1 | 2 | 1 | 5 |
| Mule Bridge - Whites | 1 | 2 | N/A | N/A | 3 | 6 | N/A | 0 | N/A | 0 | 6 |
| Redd & Survey Totals 99' - 05' | 74 | 119 | 21 | 17 | 140 | 151 | 104 | 35 | 88 | 33 | 563 |

d. Sturgeon

The SRRC and Karuk Tribe held Sturgeon Dives in the months of April and May 2003. During the dives a total of 13 green sturgeons were observed in the lower Salmon River. During the months of April and May 2004 a total of only 6 green sturgeons were observed in the lower Salmon River. SRRC and the Karuk tribe also cooperated to sample the lower Salmon River for Larval green sturgeon. In 2003 there were 123 larval green sturgeons caught during the sampling period. In 2004 during the trapping season only 45 larval sturgeons were caught. Larval Sturgeon early in the year were usually 20 – 30mm. Rapid growth of the Sturgeon was noted during 2003 surveys, when crews began catching Juvenile Sturgeon several months later that measured 100mm. or more. The Yurok Tribal Fisheries Program tagged and tracked adult green sturgeon in the Klamath River during 2002, 2003, and 2004 (Belchik, 2005). The SRRC assisted in the maintenance of a radio tracking station located at the mouth of Wooley Creek, four river miles from the confluence with the Klamath.

above: green sturgeon larvae 20-30mm.

above: green sturgeon juveniles 100+ mm.

e. Lamprey

The SRRC monitored stretches of the Lower Salmon for the presence of pacific lamprey. Lamprey presence was determined in areas of the river by the evidence of lamprey spawning activity. These lamprey nests were recorded during spring Chinook dives. SRRC also contributed to the operation of a Downstream Migrant Trap, which catches juvenile Lamprey. Data from the down stream migrant trap is being compiled by USFWS and will be released in report form. A photo of a rare brook lamprey caught during rotary screw trapping in the lower Salmon River is shown below.

# V) Recommendations

- The SRRC and cooperators should continue to monitor key habitats within the basin for presence and abundance of Weak Stocks. Efforts should be continued to protect these habitats.

- The SRRC should continue the Weak Stocks Program and prioritize continuous monitoring of areas within the basin with historical and relatively recent data sets.

- The SRRC should continue to work with agencies tribes and stakeholders to monitor and restore species in high risk or of high value for fisheries recovery.

- The SRRC should continue to create and foster groups like the Salmon River Voluntary Spring Chinook Recovery Team, which is working towards collaborative restoration of the Salmon River fisheries resource.

- The SRRC should continue to develop individual programs and partnerships such as: fisheries protection, fish barrier removal, riparian assessment, watershed and restoration monitoring.

- The SRRC should continue to enlist community members to serve as program and project managers. SRRC should seek specific funding for each of these programs and projects and develop, expand, and diversify respective funding sources.

- The SRRC should continue to foster stakeholder-coordinated resource management planning and recovery work groups.

- The SRRC should continue to expand the effectiveness of the more recently formed Anadromous Fish Barrier Removal Committee, Roads Stewardship Work Group, Forest and Fire Management Roundtable, and Suction Dredging Awareness Work Group involving as many of the respective stakeholders as possible.

- The SRRC should continue to educate and enlist cooperation and support from many more stakeholders, including funding sources, decision makers and experts, regarding the significance of the Salmon River in the recovery of a number of anadromous fish runs in the Klamath Basin and of our local community based effort.

## VII) Acknowledgements

The Salmon River Restoration Council would like to acknowledge the following organizations and individuals for their contributions to the implementation of this project.

The Klamath Fisheries Restoration Task Force
The U.S. Fish and Wildlife Service
The California Dept. of Fish and Game
The U.S. Forest Service, Ukonom and Salmon River Ranger Districts
The Karuk Tribe
The Mid- Klamath Watershed Council
The Klamath Salmon Anglers and Guides Association
The Salmon River Community

## VIII) References

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