

**State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME**

**2001-2002 ANNUAL REPORT
SUMMER STEELHEAD SNORKEL SURVEY
OF SOUTH FORK TRINITY RIVER
PROJECT Icl**

Prepared by

**Patrick Garrison
Northern California - North Coast Region**

**Steelhead Research and Monitoring Program
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ABSTRACT

Snorkel surveys were conducted on the South Fork Trinity River (SFTR) and Hayfork Creek on August 20 and 21, 2002. The survey of SFTR yielded 21 adult steelhead, 33 -1/2lb. steelhead, 293 spring-run Chinook salmon and 37 grilse. The survey of Hayfork Creek yielded 14 adult steelhead, 9 - 1/2 lb. steelhead, 56 adult spring Chinook and 0 grilse. A total of 17 sections were surveyed. Four adult spring Chinook carcasses were observed in the SFTR. Sections E and F were divided to ease logistical complications. Water visibility was excellent, and no active sediment discharge sites were encountered.

INTRODUCTION

The SFTR is the largest tributary of the Trinity River and supports natural and possibly endemic populations of spring-run Chinook salmon and summer steelhead. The status of these stocks are of concern because their numbers have declined dramatically from historical levels. Estimates for spring Chinook salmon have decreased from 11,604 fish in 1964 to 386 fish in 2002; estimates for steelhead show a similar trend. Snorkel surveys have been conducted on the South Fork Trinity River to estimate spring-run Chinook and summer steelhead since the early sixties (Healey, 1963). Until recently, snorkel surveys had been organized by the Department's Trinity River Project (CDFG, 1991-1996). This year's snorkel survey was organized by the Department's Steelhead Research and Monitoring Program. Two - three person snorkel crews were recruited

^{1/} *Steelhead Research and Monitoring Program report, available from: Department of Fish and Game, 50 Ericson Court, Arcata California 95521 (707) 825-4850*

from multiple agencies to minimize time needed to complete surveys. Traditionally, the survey of seventeen sections is completed in two to three days. This year's participants included personnel from CA Department Fish and Game, U.S. Forest Service, U.S. Fish and Wildlife Service, Hoopa Valley Tribal Fisheries Program, Yurok Tribal Fisheries Program, Americorps, the South Fork CRMP and the South Fork Land Conservancy.

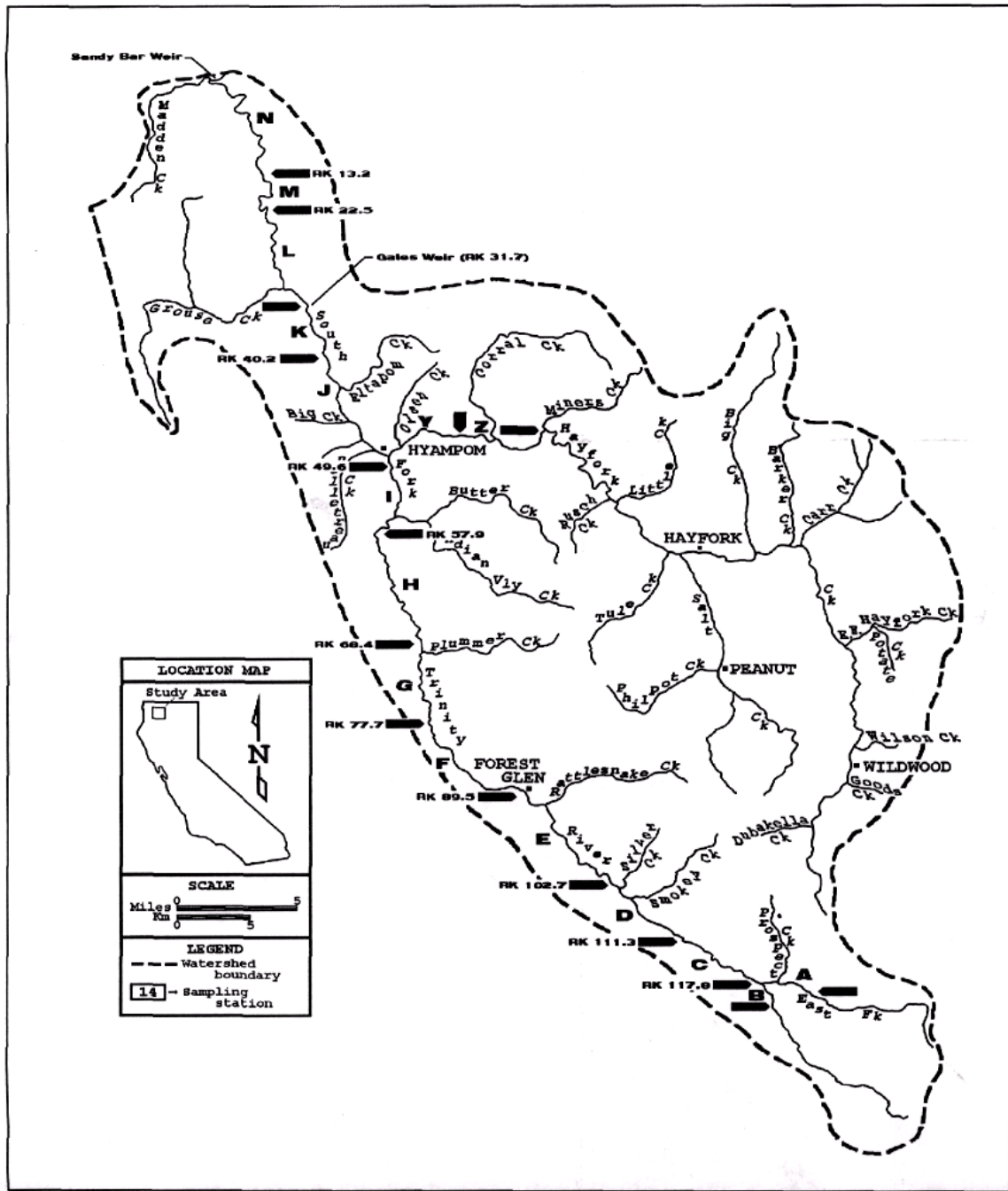


Figure 1. Map of South Fork Trinity River with snorkel survey sections indicated.

METHODS

Two-three person teams of snorkel surveyors examined portions of the SFTR basin to count spring-run Chinook salmon and summer steelhead from August 20 through August 21, 2002. A total of 17 sections were surveyed on the SFTR from the East Fork of the SFTR downstream to Sandy Bar, near the confluence with the Trinity River and three adjacent sections of Hayfork Creek from approximately RK 21.0 downstream to the confluence with the SFTR.

Snorkel surveyors were given a safety lecture and instructed to record sightings of adult steelhead, ½ lb. steelhead, spring-run Chinook and spring-run Chinook grilse. Surveyors were also asked to record fish habitat preference, size of schools, and water visibility. To clarify size class parameters, surveyors were shown models steelhead and salmon of each size. An additional request was made by the Yurok Tribal Fisheries Program to look for Petersen disk tags on radio tagged spring-run Chinook, which they had marked downriver on the Klamath.

Prior to the start of the survey, crews were given the following instructions:

1. Flag start point of reach in obvious location.
2. Record starting water temperature and start time.
3. Proceed snorkeling in a downstream manner recording all sighting of adult salmonids.
4. In wider units, split into lanes and add observation totals of each diver. In narrower units, take the highest confident number for each species and size-class.
5. Size ranges for steelhead are 14 to 18 inches for ½ lb. steelhead, and any steelhead over 18 inches is considered an adult. Grilse are classified as all non-juvenile salmon under the length of 22 inches. Any salmon over 22 inches is considered an adult.
5. If uncertainty between divers exists, re-dive unit.
6. Minimize extraneous observations, i.e. looking for juveniles, land disturbances, etc.
7. At end of survey, record water temperature and remove start flagging. Report to dive coordinator with results.

Crews were also given the following instructions concerning fish habitat preference. Fish are poikilothermic and react accordingly with concerns to water temperature. In the morning, especially with colder water temperatures, adult fish will be "hunkered down" utilizing any available cover. Chinook salmon usually occupy the deepest part of the habitat, while steelhead prefer woody cover or large cobbles and boulders. As the water warms and the sun creates glare (usually around 11am), fish become more active. Chinook salmon tend to school in pools, while steelhead prefer riffles and pool margins. steelhead are often found throughout the day utilizing deep cover, specifically large wood and undercut bank crevices, where a good hiding spot could yield 5-10 adult fish. When adequate in-stream cover is unavailable, adult steelhead are frequently observed holding adjacent to deep pool substrate.

RESULTS

A total of 386 Chinook salmon and 35 adult summer steelhead were observed during the 2002 SFTR snorkel survey (Table 1). The majority of steelhead and salmon were observed holding in pools. The highest count of spring Chinook in one pool was 45 fish, observed in the Klondike Mine pool (Section F). steelhead were dispersed sporadically throughout the South Fork, with no more than three fish observed in any one pool. Four spring Chinook carcasses were observed in the South Fork; Two in section C and one each in sections E and I, carcasses are included in adult Chinook totals. Water visibility was good to excellent in all sections, ranging from 10 to 40 feet.

Snorkel crews also noted other incidental observations. Many crews noted abundant juvenile steelhead. Section M on the lower SFTR noted abundant juveniles including large groups of juvenile coho salmon. No Petersen tagged Chinook from the Yurok's radio telemetry study were observed during the survey. A variety of other wildlife were noted included beaver, black bear, western pond turtle, bald eagle and a variety of snakes.

Table 1. South Fork Trinity River summer steelhead and spring Chinook survey results by section.

Section	Adult Chinook	Chinook Grilse	Steelhead	½lb Steelhead
A (East Fork South Fork Trinity River)	0	0	0	1
B (Raspberry Creek to East Fork confluence)	0	0	0	0
C (East Fork confluence to Red Mountain Creek)	7 ¹	0	0	0
D (Red Mountain Creek to Silver Creek)	0	1	0	2
E (Silver Creek to Scott's Flat)	26 ²	0	1	10
F (Scott's Flat to Hidden Valley Ranch)	97	6	5	8
G (Hidden Valley Ranch to River Spirit)	37	3	6	6
H (River Spirit to Hitchcock Creek)	23	3	3	0
I (Hitchcock Creek to Lover' s Leap)	5 ²	0	1	0
J (Lover's Leap to Big Slide campground)	47	3	1	0
K (Big Slide campground to old Gates weir)	47	20	2	2
L (Old Gates weir to Surprise Creek)	4	0	1	2
M (Surprise Creek to Low Bridge)	0	1	1	2
N (Low Bridge to Sandy Bar)	0	0	0	0
Total South Fork Trinity	293	37	21	33

¹Two adult Chinook carcass observed within section; carcasses included in adult total

² One adult Chinook carcass observed within section; carcasses included in adult total

Table 2. Hayfork Creek summer steelhead and spring Chinook snorkel survey results by section.

Section	Adult Chinook	Chinook Grilse	Steelhead	½lb Steelhead
X (Little Creek to Miners Creek)	9	0	6	6
Y (Miner's Creek to Bar 717 Ranch)	39	0	7	1
Z (Bar 7 17 Ranch to Mouth)	8	0	1	2
Total Hayfork Creek	56	0	14	9

DISCUSSION

The one-pass snorkel survey of the SFTR is the one of the only sources of adult summer steelhead and spring Chinook trend data in the SFTR basin. Surveys have been conducted annually back to pre-1960. Historically, salmon and steelhead numbers in the South Fork Basin were significantly higher. The last pre-1964 flood mark-recapture escapement estimate reported 11,604 spring Chinook in the South Fork Trinity, not including Hayfork Creek (La Faunce, 1967). From 1964 through 1979, walking surveys of the South Fork were the primary method of enumerating anadromous fish. After 1979, snorkel surveys were employed as the primary method to estimate Chinook and steelhead numbers. A mark-recapture methodology was employed by the Department's Trinity River Investigation Project in the early nineties to estimate numbers of spring Chinook and summer steelhead. Fish were marked at Alaskan style weir on the lower SFTR at Sandy Bar and recoveries were made by an upstream weir, creel surveys, and snorkel surveys. Efforts to produce a mark-recapture estimate were terminated because of problems associated with violated assumptions during the marking phase of the study (CDFG, 1995). Due to the complex and labor intensive nature of mark-recapture estimates, and problems associated previous efforts, the Department will continue to rely on a one-pass snorkel survey of the SFTR to monitor spring Chinook and summer steelhead trends.

Adult steelhead numbers for the South Fork and Hayfork Creek were down substantially compared to last year, and below the ten-year average of 43 adult fish. Spring-run Chinook numbers rose this year, approaching the ten-year average of 401 fish.

Four adult spring-run Chinook carcasses were encountered during the 2002 survey of the SFTR. Carcass numbers are included in total numbers of adult fish observed. Pre-spawn mortality at the time of the survey was calculated at 1.03%. Note that additional mortality after the survey but before spawning is probable.

Table 3. Total number of adult summer steelhead and spring Chinook counted in the South Fork of the Trinity River and Hayfork Creek during previous year's snorkel surveys.

Year	Total Adult steelhead	Total Chinook (including grilse)
1992	21	166
1993	23	284
1994	22	243
1995	42	579
1996	11	1097
1997	95	655
1998	37	172
1999 ¹	38	175
2000	76	256
2001	76	166
2002	35	386

¹1999 numbers are incomplete due to excessive turbidity caused by Hitchcock Creek slide. Five reaches were left unsurveyed.

Turbidity is historically a problem that complicates surveying during the SFTR snorkel surveys. The combination of loose underlying geological terrains (South Fork Mountain schist and Galice) and a high-density road matrix cause chronic mass-wasting, which exacerbates problems with excessive sediment discharge. In 1999, Hitchcock Creek was discharging so much sediment (blue goo) that surveys of the river below section I were cancelled due to poor visibility. Section I was again not surveyed in 2000 due to discharge from Hitchcock Creek. This year (2002), no active sediment discharges were identified on the SFTR during the survey. Visibility was excellent, nearing 40 feet in some sections. Surveyors on sections K and L did note some visibility problems late in the day, when glare from the sun obscured visibility in deep pool areas. Section Y on Hayfork Creek encountered visibility problems in the early morning, which quickly cleared to 15 feet.

Several possible sources of bias need to be recognized when interpreting the results of a large-scale one-pass snorkel survey; the most predominant being an inherent observational bias between snorkelers. Different observers have differing levels of snorkeling experience, swimming ability, fish identification skill, and physical fitness. Additionally, each reach is snorkeled by different observers further increasing observational bias. Another apparent source of bias stems from size classification between observers. Steelhead and salmon are classified by size as either adults or grilse ½ lbers. Observers must make individual determinations for large schools of fish, often with only a "quick glance." Experience divers tend to identify more grilse and ½ lbers, while inexperienced divers usually just see salmon or steelhead, not being able to discern size class for large groups of fish.

RECOMMENDATIONS

I have found that each additional year's experience on the SFTR leads to a smoother running survey; this is my third year coordinating the survey and my fifth year participating. Many logistical and safety improvements have been made. Still, several logistical improvements could be made to improve the safety and efficiency of the annual SFTR snorkel survey. First, it is important to obtain strong commitments from survey volunteers as to the number of people coming from their agency. Once you receive a commitment, it is a good idea to send maps and reach assignments out several weeks in advance. Also, it would be prudent to require that survey participants commit to both days of the survey and bring a suitable vehicle. This year, we had ample participation on both survey days, necessitating four surveyors on some sections.

A biologist or technician should be nominated survey coordinator/camp host, and not receive a reach assignment. The survey coordinator has to deal with shuttle logistics, changing reach assignments, and safety issues. He or she should be available at base camp, should any problems arise.

Ideally, each crew should contain a fisheries biologist with previous experience on that reach. In absence of that, I would recommend that at the minimum, at least one member of the crew has previous knowledge of the specific reach. This should reduce the danger of crews getting lost or not finishing on time. Also, at least one member of the crew should be at the minimum a fisheries technician with experience in adult salmonid identification. I believe that the addition of these few recommendations would lead to a smoother running and safer SFTR summer snorkel survey.

ACKNOWLEDGEMENTS

We would like to thank all the volunteers who participated in this year's survey. Volunteers were enlisted from a variety of federal, state and tribal agencies including, but not limited to the US Forest Service, US Fish and Wildlife Service, Hoopa Valley Tribal Fisheries Program, US Bureau of Land Management, SF CRMP, and Americorps. I would also like to give special thanks to David Rose of the South Fork Land Conservancy, his cooperation with access and providing extra volunteers is greatly appreciated.

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