

Stony Creek Watershed 2008 Summary Report

North, South, and Middle Fork Stony Creek

July 22-25, 2008



Heritage and Wild Trout Program
California Department of Fish and Game
Prepared by Jeff Weaver and Stephanie Mehalick

Introduction:

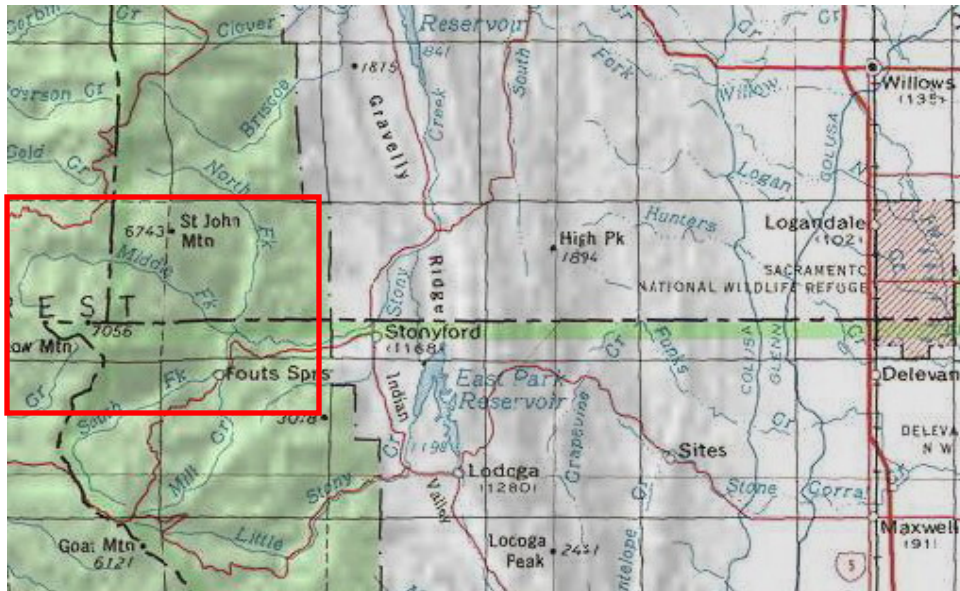
Stony Creek drains the eastern side of Snow Mountain in the central portion of California's Coast Ranges and supports wild populations of coastal rainbow trout (*Oncorhynchus mykiss irideus*). The North, South, and Middle Forks form the headwaters of Stony Creek in Mendocino National Forest and join together in the northwest corner of Colusa County, west of Stonyford, California (Figure 1). The California Department of Fish and Game's (DFG) Heritage and Wild Trout Program (HWTP) is currently considering the Stony Creek watershed for designation as a Heritage Trout Water and, in July of 2008, the HWTP conducted an upper basin-wide Phase 2 assessment via direct observation snorkel surveys. HWTP Phase 2 (candidate water) assessments provide a comprehensive evaluation of the fishery, habitat, and angler use, including estimates of trout densities and delineation of species distribution. The HWTP also conducted hook-and-line surveys in the headwaters of the Middle Fork to assess catch per unit effort rates, size class distribution and to collect tissue samples for genetic analysis. In addition, HWTP staff examined data from an Angler Survey Box (ASB) located on the lower end of the Middle Fork (near Red Bridge) to better understand angler use and satisfaction.

Methods:

Direct observation surveys were conducted from July 22nd-25th, 2008 on the mainstem of Stony Creek and the North, Middle, and South Forks using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin & Reeves, 1988) (Figure 1). Sections were selected throughout the length of each stream segment based on habitat type. An initial reconnaissance of each stream identified dominant habitat types and sections were selected that represented those habitats. Sections were also spaced throughout each system to the greatest extent possible, in order to provide greater geographic distribution of sampling. Specific site boundaries were located at distinct breaks between habitat types and/or stream gradient. Surveys were conducted in an upstream direction and the number of divers per survey section was dependent upon wetted width, water visibility, and habitat complexity (see Results section for the specific number of divers per survey section).

Divers, maintaining an evenly-spaced line perpendicular to the current, counted fish by species. All observed trout were further separated and counted by size class. Size classes were divided into the following categories: young of year (YOY); small (< 6 inches); medium (6-11.9 inches); large (12-17.9 inches); and extra-large (\geq 18 inches). YOY are defined by the HWTP as age 0+ fish, emerged from the gravel in the same year as the survey effort. Depending on species, date of emergence, relative growth rates, and habitat conditions, the size of YOY varies greatly, but are generally between zero and three inches in total length. If a trout was observed to be less than six inches total length but it was difficult to determine whether it was an age 0+ or 1+ fish, by default it was classified in the "small" (<6 inches) size class.

Figure 1. Overview map of study area (red box), showing location of Stony Creek and North, Middle, and South Forks in relation to Stonyford, CA



Divers were instructed in both visual size class estimation and proper snorkel survey techniques prior to starting the survey. For each section, surveyors measured section length along the thalweg, water and air temperature (in the shade), average wetted width, water depth, and in-water visibility. Habitat type (flatwater, riffle, or pool) was identified and GPS coordinates were recorded for the section boundaries. Representative photographs were taken.

In addition, tissue samples were collected in the upper portions of the Middle Fork for cataloging and future genetic analyses. Tissue samples were collected at multiple sites across four miles of the Middle Fork in the vicinity of the U.S. Forest Service's West Crockett Campground (within Snow Mountain Wilderness). Surveyors collected as many tissue samples as possible, based on time constraints and capture efficacy. Fish were captured by hook and line. All fish captured were measured to the nearest inch using a calibrated landing net and tissue samples were collected by removing a portion of the caudal fin with a pair of scissors, per University of California at Davis's Genomic Variation Laboratory tissue collection protocols (Stephens, pers. comm.). Each tissue sample was placed in a labeled envelope with a unique identification number. Representative photographs were taken of the specimens collected. The HWTP has assumed responsibility of the tissue samples and is storing them until further analysis is necessary. During tissue acquisition, anglers recorded fishing effort, in hours, and this information was used to calculate catch rates (fish per hour).

Results:



The North Fork Stony Creek was surveyed on the afternoon of July 22nd, from the confluence with Stony Creek upstream approximately two miles (Figure 2). Two divers and one bank-side observer surveyed five sections with a combined linear distance of 507.1 feet (Sections 108-508). During the survey, the weather was hazy due to local wildfires; these smoky conditions persisted for the entire week. The air temperature was approximately 28° Celsius (C) and the water temperature was 21°C on the North Fork. Water visibility was greater than four feet in all sections with a combined average wetted width of 13.6 feet and average water depth of 1.4 feet. Substrate ranged from sand and gravel in the lower-gradient areas to cobbles and boulders in higher gradients. Divers observed coastal

rainbow trout, speckled dace (*Rhinichthys osculus*), sculpin (*Cottus* spp.), unknown species in the family Cyprinidae, and unknown species whose family could not be identified (labeled as non-salmonids) (Table 1). Habitat included flatwater, riffle, and pool. In addition to those fish species listed above, divers also observed 27 adult foothill yellow-legged frogs (*Rana boylei*) and numerous garter snakes (*Thamnophis* spp.). Based on the total number of trout observed (146) divided by the total linear distance of stream surveyed (507.1 feet), there are approximately 1520 coastal rainbow trout per mile in the lower two miles of the North Fork Stony Creek. Ninety-five percent of these fish fell in the small size class.

Figure 2. Map of North Fork Stony Creek 2008 direct observation section locations (Sections 108-508 indicated by orange dots)

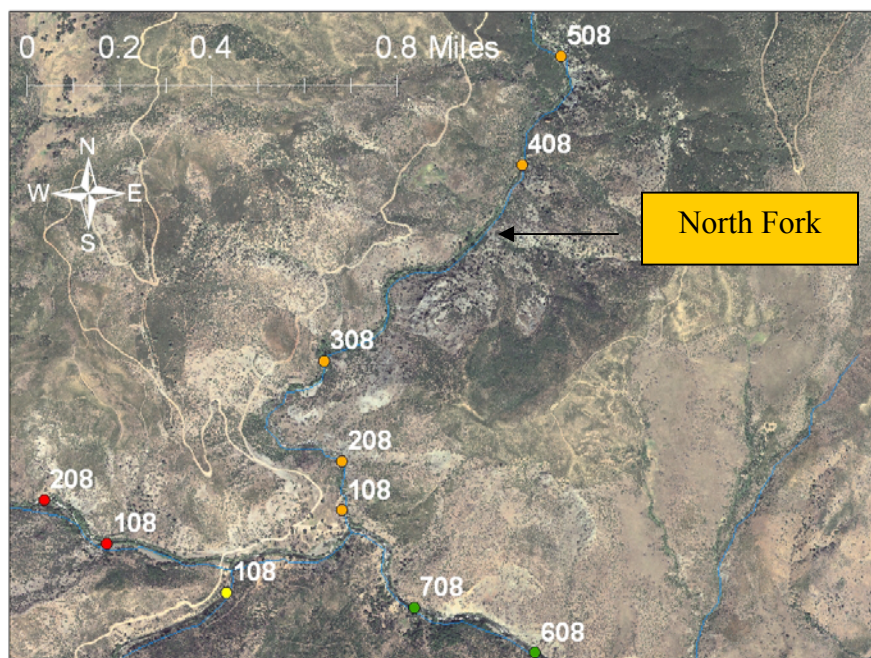


Table 1. North Fork Stony Creek 2008 direct observation survey data

Section #	Section Length (ft)	Species	Number of Fish Observed					Totals
			YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	115.5	coastal rainbow trout	2	31	3	0	0	36
		unknown cyprinid	-	-	-	-	-	165
208	69.0	coastal rainbow trout	0	23	2	0	0	25
		speckled dace	-	-	-	-	-	73
		unknown cyprinid	-	-	-	-	-	100
308	113.6	coastal rainbow trout	0	16	1	0	0	17
		unknown cyprinid	-	-	-	-	-	228
408	148.0	coastal rainbow trout	0	51	0	0	0	51
		unknown cyprinid	-	-	-	-	-	325
		unknown non-salmonid	-	-	-	-	-	27
508	61.0	coastal rainbow trout	0	17	0	0	0	17
		unknown cyprinid	-	-	-	-	-	109
		<i>Cottus</i> spp.	-	-	-	-	-	1
Total	507.1	n/a	2	138	6	0	0	1174
Total number of trout observed =								146
Estimated density (trout per mile) =								1520

The Middle Fork Stony Creek was surveyed from July 22nd through 24th (Figure 3). A team of three began at the confluence with the mainstem of Stony Creek (near Red Bridge) and surveyed upstream approximately two miles (Sections 108-708) (Figure 4). Simultaneously, a team of two hiked in from West Crockett Campground and surveyed a four-mile stretch of river in the headwaters (Sections 1108-2808) (Figure 5). The down-stream most section that the upper team surveyed (Section 1108) was located approximately eight miles upstream from Red Bridge. In addition to direct observation surveys, this upper team conducted an angling assessment to acquire tissue samples and quantify catch rates of coastal rainbow trout in the headwaters of the Middle Fork (in the vicinity of Sections 708-2808). Anglers captured 36 coastal rainbow trout in 12.08 hours of effort from July 22nd through 24th; tissue



Middle Fork Stony Creek-100 foot waterfall

samples were collected from all 36 fish. The catch rate for this effort was approximately three fish per hour.

A total of 25 sections were surveyed on the Middle Fork via direct observation snorkel surveys (Sections 108-708 and 1108-2808); these sections averaged 17.4 feet in wetted width and 1.1 feet in water depth. Water visibility ranged from four to greater than ten feet and water temperatures were between 11° and 16° C. Air temperatures were between 14° and 27°, depending on the time of day. The Middle Fork Stony Creek drains of the highest peak in Snow Mountain Wilderness (Snow Mountain) and is influenced by numerous small tributaries and springs. In many areas, the gradient is steep as the Middle Fork flows through canyon sections and over waterfalls. In particular, there was a 100-foot waterfall directly upstream of Section 2408. Tissue samples were collected both upstream and downstream of this waterfall. Habitat varied along the length of the stream and included flatwater, riffles, and deep pools. All habitat types were sampled. With the exception of three sculpin observed in Section 108 near the confluence with the main-stem of Stony Creek, all fish observed were coastal rainbow trout (Table 2). In total, 353 coastal rainbow trout were counted in 1794.0 feet of stream habitat (the total length of all 25 sections surveyed along the Middle Fork); these ranged in size from one inch to 18 inches. No extra-large trout were observed. The coastal rainbow trout density estimate for the Middle Fork Stony Creek was approximately 1039 trout per mile.

Figure 3. Overview map of Middle Fork Stony Creek (red box represents locations of Sections 108-608; blue box represents locations of Sections 708-2808)

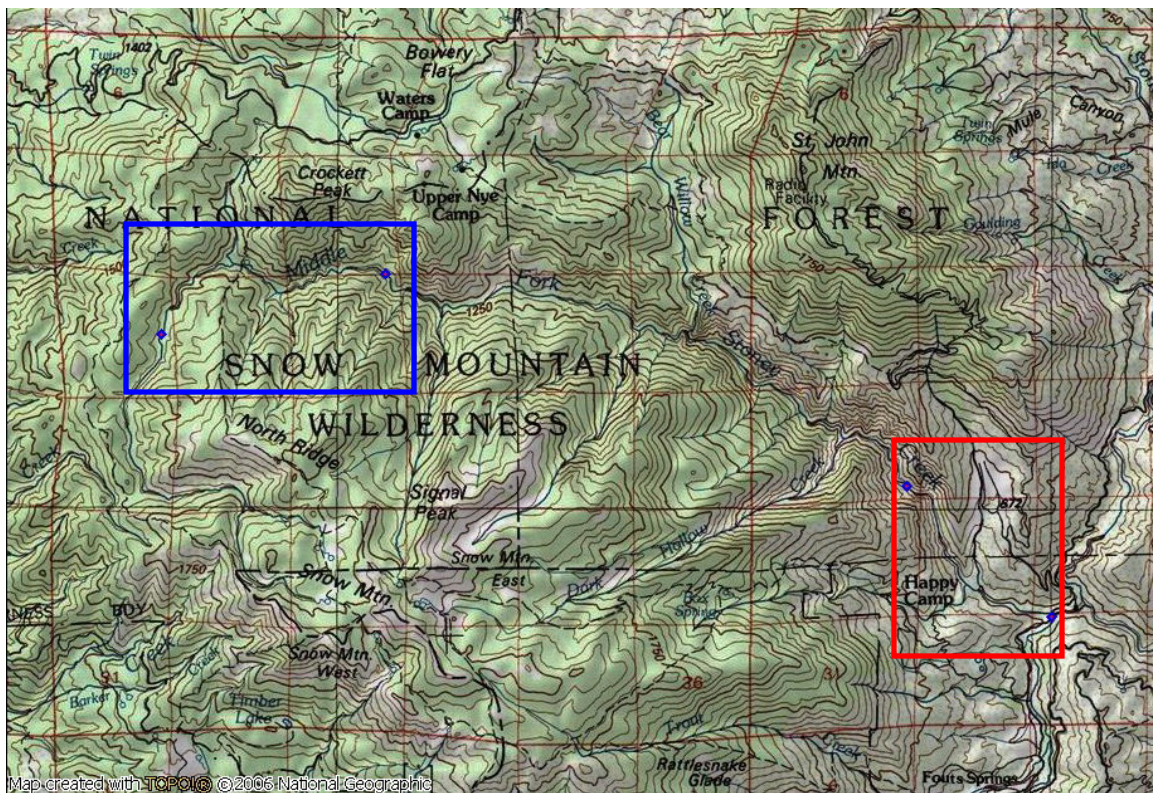


Figure 4. Map of Middle Fork Stony Creek 2008 direct observation section locations (Sections 108-708 indicated by red dots; map is enlarged image of red box from Figure 3)

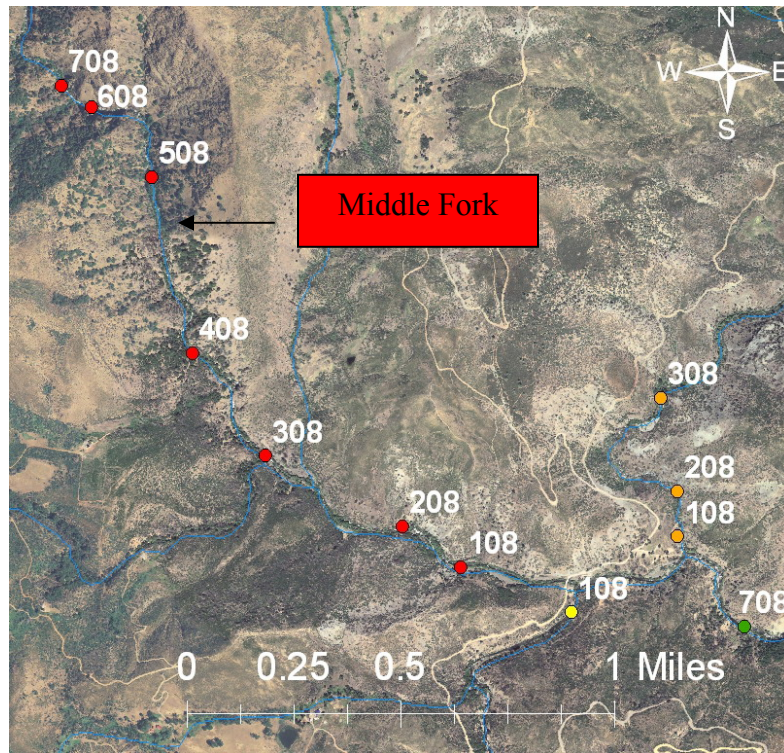


Figure 5. Map of Middle Fork Stony Creek 2008 direct observation section locations (Sections 1108-2808 indicated by red dots; map is enlarged image of blue box from Figure 3)

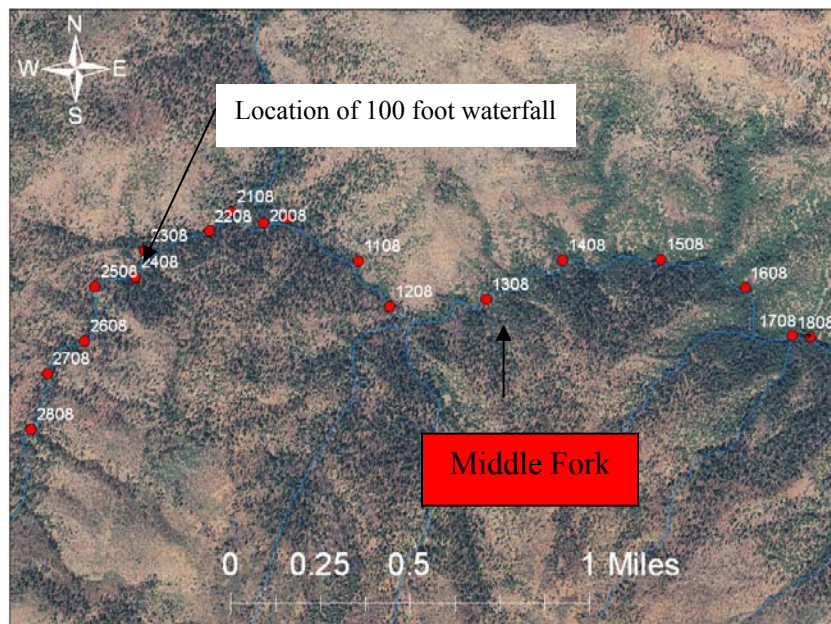


Table 2. Middle Fork Stony Creek 2008 direct observation survey data

Middle Fork Stony Creek 2008 Direct Observation Survey Results								
Section #	Section Length (ft)	Species	Number of Fish Observed					Totals
			YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	182.3	coastal rainbow trout	0	22	5	3	0	30
		<i>Cottus</i> spp.	-	-	-	-	-	3
208	64.4	coastal rainbow trout	0	6	17	1	0	24
308	87.4	coastal rainbow trout	0	10	5	0	0	15
408	60.0	coastal rainbow trout	0	18	3	0	0	21
508	69.4	coastal rainbow trout	0	5	28	2	0	35
608	158.0	coastal rainbow trout	0	5	14	2	0	21
708	213.0	coastal rainbow trout	0	0	11	1	0	12
1108	39.5	coastal rainbow trout	0	1	0	0	0	1
1208	19.5	coastal rainbow trout	0	7	0	0	0	7
1308	76.7	coastal rainbow trout	0	31	4	0	0	35
1408	42.5	coastal rainbow trout	0	3	1	0	0	4
1508	30.1	coastal rainbow trout	0	10	5	0	0	15
1608	102.4	coastal rainbow trout	0	1	0	0	0	1
1708	43.8	coastal rainbow trout	0	3	0	0	0	3
1808	35.6	coastal rainbow trout	0	3	1	0	0	4
1908	65.0	coastal rainbow trout	0	7	1	0	0	8
2008	53.5	coastal rainbow trout	0	2	0	0	0	2
2108	51.8	coastal rainbow trout	0	4	0	0	0	4
2208	23.7	coastal rainbow trout	0	5	0	0	0	5
2308	59.5	-	-	-	-	-	-	0
2408	43.7	coastal rainbow trout	0	100	3	0	0	103
2508	75.9	coastal rainbow trout	0	2	0	0	0	2
2608	48.5	-	-	-	-	-	-	0
2708	47.0	coastal rainbow trout	0	1	0	0	0	1
2808	100.8	-	-	-	-	-	-	0
Total	1794.0	n/a	0	246	98	9	0	356
Total number of trout observed =							353	
Estimated density (trout per mile) =							1039	



Seven sections on the main-stem of Stony Creek were surveyed on July 23rd between Mine Camp and Red Bridge (approximately three miles) (Figure 6). Depending on stream width, there were either four or five divers participating in the survey effort. Water visibility ranged from four to greater than ten feet. The average wetted width of these seven sections was 39.1 feet and the average water depth was 2.1 feet. Water temperature was approximately 18° C during the survey and air

temperatures ranged from 23° to 31° C, depending on the time of day. Species observed included coastal rainbow trout, golden shiner (*Notemigonus crysoleucas*), speckled dace, sculpin, and unknown non-salmonids (Table 3). The stream length of all seven sections surveyed totaled 1297.3 feet. Two hundred and thirty two coastal rainbow trout were observed with an estimated density of 944 trout per mile. Trout ranged in size from small to large, with the majority falling into the small size class. In addition to the direct observation surveys, HWTP staff counted the number of foothill yellow-legged frogs observed while walking the stream between survey sections. A total of 31 frogs were counted on Stony Creek between Sections 108 and 608.

Figure 6. Map of Stony Creek 2008 direct observation section locations (Sections 108-708 indicated by green dots)

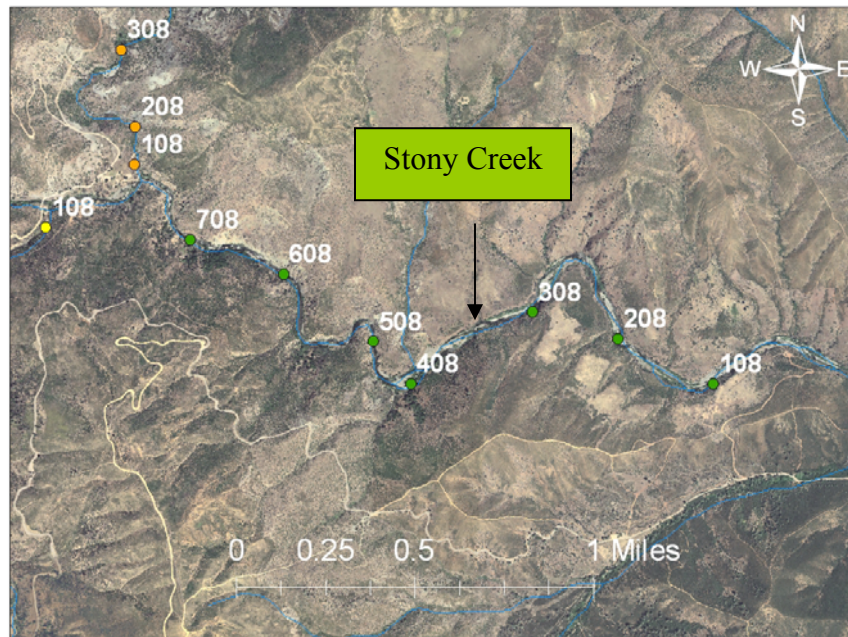
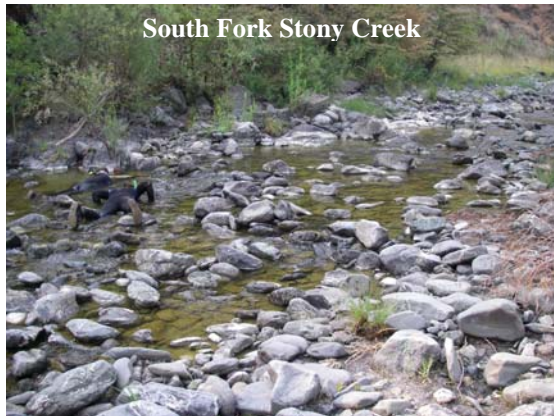


Table 3. Stony Creek 2008 direct observation survey data

Section #	Section Length (ft)	Species	Number of Fish Observed					Totals
			YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	97.3	coastal rainbow trout	0	8	4	0	0	12
208	235.0	golden shiner	-	-	-	-	-	93
308	289.0	coastal rainbow trout	0	10	3	1	0	14
		golden shiner	-	-	-	-	-	54
		speckled dace	-	-	-	-	-	1
		unknown non-salmonid	-	-	-	-	-	5
408	110.0	coastal rainbow trout	0	5	15	0	0	20
		golden shiner	-	-	-	-	-	83
		<i>Cottus</i> spp.	-	-	-	-	-	1
508	240.0	coastal rainbow trout	0	3	6	2	0	11
608	157.2	coastal rainbow trout	0	4	22	5	0	31
708	168.8	coastal rainbow trout	0	125	17	2	0	144
		speckled dace	-	-	-	-	-	1
		<i>Cottus</i> spp.	-	-	-	-	-	3
Total	1297.3	n/a	0	155	67	10	0	473
Total number of trout observed =								232
Estimated density (trout per mile) =								944

Three sections of South Fork Stony Creek (Figure 7) were surveyed on the morning of July 25th.



South Fork Stony Creek

The air temperature was 24° C. Although the surveys were conducted in the morning, water temperatures in the South Fork were noticeably warmer than those during the previous days' efforts. The water temperature was 23° C at 10:30 a.m. Water visibility was greater than four feet in the three sections. The average wetted width was 21.7 feet and average water depth was 1.1 feet. Habitat consisted of riffle, pool, and flatwater; Section 308, the upstream-most section, was an artificial pool formed

by a rock dam. There are several streamside campgrounds in this area and campers have constructed numerous man-made pools for swimming. Species observed included coastal rainbow trout, golden shiner, speckled dace, sculpin, unknown non-salmonids, foothill yellow-legged frog (1), and a turtle (unidentified species) (Table 4). Only two trout were observed in the three sections (a total of 247 feet of stream) which yielded a density of approximately 43 trout per mile.

This aerial map shows the South Fork of the River flowing through a mountainous region. Sampling points are marked with colored dots and labeled: 108 (red), 208 (yellow), 308 (yellow), 508 (green), 608 (green), and 708 (green). A yellow box with an arrow points to the river, labeled "South Fork". A compass rose in the top left indicates North (N), South (S), East (E), and West (W). A scale bar at the bottom shows distances of 0, 0.25, 0.5, and 1 mile.

Section #	Section Length (ft)	Species	Number of Fish Observed					Totals
			YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	76.0	coastal rainbow trout	0	1	0	0	0	1
		golden shiner	-	-	-	-	-	95
		speckled dace	-	-	-	-	-	32
208	97.0	coastal rainbow trout	0	1	0	0	0	1
		golden shiner	-	-	-	-	-	177
		speckled dace	-	-	-	-	-	152
		<i>Cottus</i> spp.	-	-	-	-	-	3
		unknown non-salmonid	-	-	-	-	-	51
308	74.0	golden shiner	-	-	-	-	-	413
		speckled dace	-	-	-	-	-	76
		<i>Cottus</i> spp.	-	-	-	-	-	1
Total	247.0	n/a	0	2	0	0	0	1002
Total number of trout observed =							2	
Estimated density (trout per mile) =							43	

An examination of voluntary survey forms from the angler survey box (ASB) located near Red Bridge on the Middle Fork provides catch rates and other angler-provided information for this system. We examined data from this ASB for the previous five years (2003-2007) to understand current fishing trends on this system (Table 5). At the time this report was written, 2008 data were not yet available for analysis. For this five year period, a total of 148 anglers provided reports and landed 1386 coastal rainbow trout. This yields an average catch rate of 2.2 fish per hour.

Table 5. Angler Survey Box data for Middle Fork Stony Creek (at Red Bridge) from 2003 to 2007. All fish captured were coastal rainbow trout.

Year	Number of Anglers	Total Hours Fished	Total Fish Caught	Catch per Hour
2003	30	157	329	2.1
2004	41	152.5	375	2.46
2005	34	147	306	2.08
2006	17	69	191	2.77
2007	26	102.25	185	1.81
Total (2004-2008)	148	627.75	1386	2.21

Discussion:

Stony Creek, including its three major forks, contains wild populations of coastal rainbow trout in a scenic and semi-remote setting. This is a unique fishery, in that few east-slope draining systems in California's Coast Ranges provide cold, perennial flows that can support resident salmonids. The highest densities of trout were observed in the Middle and North Forks. The majority of trout observed in the North Fork were small fish; it appears this part of the system may be important for both spawning and rearing habitat. Larger fish, including medium and large-sized fish, were observed in both the main-stem and Middle Fork. Only two trout were observed in the South Fork; this may be due, in part, to warm water conditions and low flows at the time of the survey. The HWTP recommends further analysis of the South Fork during different times of the year to better understand whether or not trout utilize this tributary seasonally for spawning, rearing, and/or over-wintering habitat. The HWTP conducted multiple pass electrofishing surveys on the Middle Fork Stony Creek near Red Bridge in 1988, 1989, 1992, and 2001. Data from these surveys produced coastal rainbow trout estimates between 886 and 3132 fish per mile (between 25 and 57 pounds per acre). The HWTP recommends replicating one or more of these historic electrofishing sections in 2009 to continue monitoring the population structure over time.

Angling pressure appears to be the highest on the Middle Fork and main-stem, with anglers accessing these parts of the system via Mine Camp, the North Fork Campground, and Red Bridge. The upper stretch of the Middle Fork is remote and difficult to access. It is presumed angling pressure is low in this area. The South Fork is readily accessible by roads and there are numerous streamside campgrounds in the vicinity of the confluence with the main-stem. Our survey efforts in 2008 were concentrated on the lower two

miles of the Middle Fork where recreational use is the highest; the HWTP recommends further analysis of the upper reaches of this part of the system. To better understand angling pressure on the main-stem, the HWTP recommends installing ASBs at both Mine Camp and North Fork Campground.

In addition to installing new ASBs, HWTP staff recommends conducting additional multiple-pass electrofishing surveys on Stony Creek and its three forks to generate biomass, density, and population estimates and to better understand recruitment and condition factor. These electrofishing sections could also be used to yield population trend data for long-term monitoring of these populations.

In conclusion, Stony Creek and the Middle, North, and South Forks support self-sustaining populations of native and wild coastal rainbow trout, are aesthetically pleasing, and are publicly accessible to angling. The HWTP recommends pursuing designation of this system as a Heritage Trout Water.

References:

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