Stony Creek 2009 Summary Report

June 15-18, 2009

State of California

Natural Resources Agency

Department of Fish and Game

Heritage and Wild Trout Program

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Introduction:

Stony Creek drains the eastern side of Snow Mountain in the central portion of California's Coast Ranges (Figure 1) and supports wild populations of several fish species, including 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, CA (Figure 2). In 2008, the California Department of Fish and Game (DFG) Heritage and Wild Trout Program (HWTP) was considering Stony Creek for designation as a Heritage and Wild Trout Water and conducted a basin-wide fisheries assessment via direct observation on the main-stem and North, South, and Middle forks of Stony Creek. Wild Trout Waters are those that support a self-sustaining wild trout fishery, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers, size, or species of trout, and are open to public angling. Wild Trout Waters may not be stocked with catchable-sized hatchery trout. Heritage Trout Waters are a sub-set of Wild Trout Waters that highlight wild populations of California's native trout within their historic drainages (Bloom and Weaver 2008).

The 2008 Phase 2 candidate Heritage and Wild Trout Water assessments provided a comprehensive evaluation of the fishery including delineation of species distribution and estimates of trout densities. The findings showed that Stony Creek upstream of Mine Camp including the North, South, and Middle forks contains wild self-sustaining coastal rainbow trout populations in a scenic and semi-remote setting, is open to public angling, and is not stocked by the DFG with hatchery trout (Weaver and Mehalick 2008). 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. All portions of the system surveyed (but especially the main-stem downstream of North Fork Campground) also support large numbers of foothill yellow-legged frogs (*Rana boylii*) in all life stages.

Stony Creek (main-stem) and the Middle and North forks had relatively high densities of coastal rainbow trout (944-1520 trout per mile). Comparatively, the density of trout observed in the South Fork was low (43 trout per mile). The majority of trout observed during the direct observation surveys in 2008 were

small (< 6 inches total length). Stony Creek (main-stem) and the Middle Fork had higher percentages of larger fish (6-18 inches total length). No fish larger than 12 inches was observed in the North Fork and only two small trout (< 6 inches) were observed in the lower portion of the South Fork; the latter may have been due to warm water conditions, the influence of mineral springs and associated variations in water chemistry, and/or low flow conditions at the time of the survey. Based on these findings, the HWTP recommended the following:

1. Assess the South Fork at different times of the year and/or farther upstream in the system to better understand trout utilization of this tributary for residency, spawning, rearing, and/or over-wintering habitat.

2. Conduct multiple-pass electrofishing surveys on Stony Creek (main-stem) and the Middle, South, and North forks to gather more information on species distribution, composition, and abundance.

3. Install Angler Survey Boxes (ASB) on Stony Creek at Mine Camp and the North Fork Campground to better understand angling use and pressure.

Based on these recommendations, the HWTP continued Phase 2 surveys in 2009 and examined the South Fork for spawning activity, conducted multiple-pass electrofishing surveys at five locations on the North and South forks, and collaborated with the United States Forest Service (USFS) for ASB installation. This report summarizes the results of these efforts.

Figure 1. Overview map of study area showing location of Stonyford, CA (red circle) and Snow Mountain (blue circle).

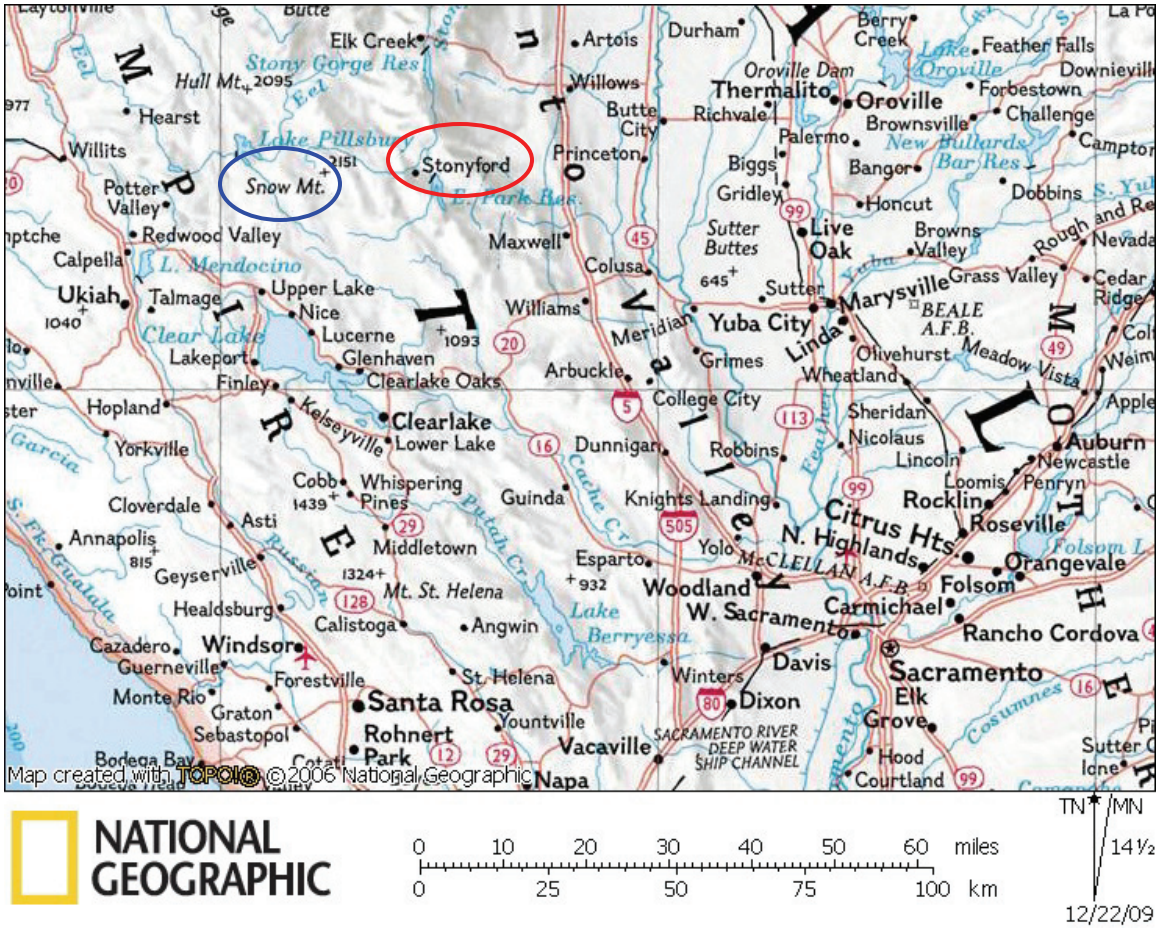
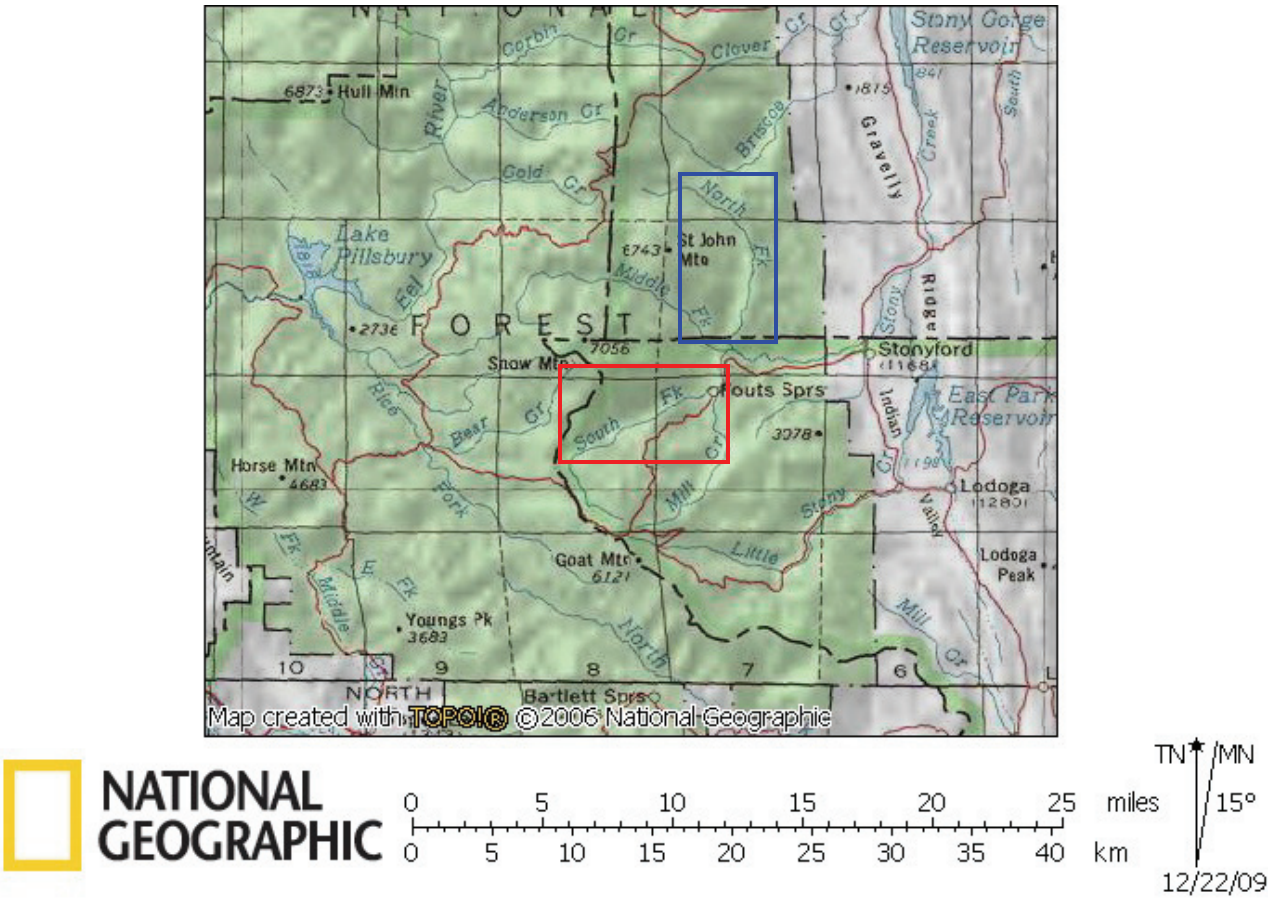


Figure 2. Map of Stony Creek watershed showing North Fork survey area (blue square) and South Fork survey area (red square).



Methods:

A hook and line angling assessment was conducted on the South and North forks on May 12, 2009 to provide information on catch rates and size classes and to investigate spawning activity and trout occupancy. Two HTWP staff (from Headquarters and North Central Region) participated in the effort with fly fishing gear and recorded the total angling effort (hours) and the number of fish captured by species and size (total length to the nearest inch measured with a calibrated landing net).

Multiple-pass electrofishing surveys were conducted on the North Fork (Sections 1-2) and South Fork (Sections 1-3) from June 15 through 18, 2009 and were

used to generate population-level data including species composition, size and age class structure, and estimates of abundance (Figure 3) . These data can be compared over time to study trends in the population. Personnel included HWTP staff (from Headquarters and North Central Region), North Central Region Scientific Aides, and volunteers. All sections were newly established in 2009 and were selected based on access and survey feasibility. In order to provide the greatest geographic distribution of sampling possible, section locations were spaced throughout each portion of the system to the extent possible based on access points. At a minimum, each section was 300 feet in length (measured along the thalweg) and section boundaries were chosen at areas where mesh block nets could effectively be installed and maintained throughout the survey effort. Section location was also limited by water depth. Streamflow was too high at the time to safely backpack electroshock either the main-stem or the Middle Fork.

At each section boundary, nylon mesh block nets were installed across the wetted width, effectively closing the population within the section. Both ends of the nets were secured above bankful, heavy rocks were placed side by side along the bottom of the nets, and the nets were secured in such a way as to hold the top of the net out of the water. These nets were routinely monitored and inspected throughout the survey to ensure their integrity and to prevent fish from moving into or out of the section during the course of the survey.

Prior to electrofishing, physical measurements of the stream and environmental conditions were taken, including air and water temperature (in the shade) and conductivity (both specific and ambient). These factors were used to determine appropriate electroshocker settings. GPS coordinates were recorded for both the upstream and downstream boundaries of the survey. Current weather conditions were noted and the area was scouted for any species of concern prior to commencing the surveys.

Personnel needs were determined based on stream width, habitat complexity, and water visibility. For each of the surveys, individuals were assigned to shock, net, and tend live cars for the duration of the effort. Surveys were initiated at the lower block net and proceeded in an upstream direction, with netters capturing fish and placing them in live cars to be held until processed. Live cars are 32-gallon plastic trash bins, perforated with holes to allow water circulation. Three to

four passes were conducted within each section, with fish from each pass stored separately. Over the course of the survey, fish were handled carefully to minimize injury and stress. Fish were processed separately by pass number. Each fish was identified to species and was measured from head to tail (total length in millimeters). Using a digital scale, weights were recorded (in grams). Fish were then recovered in live cars secured in the stream (with fresh flowing water) and released back into the section.

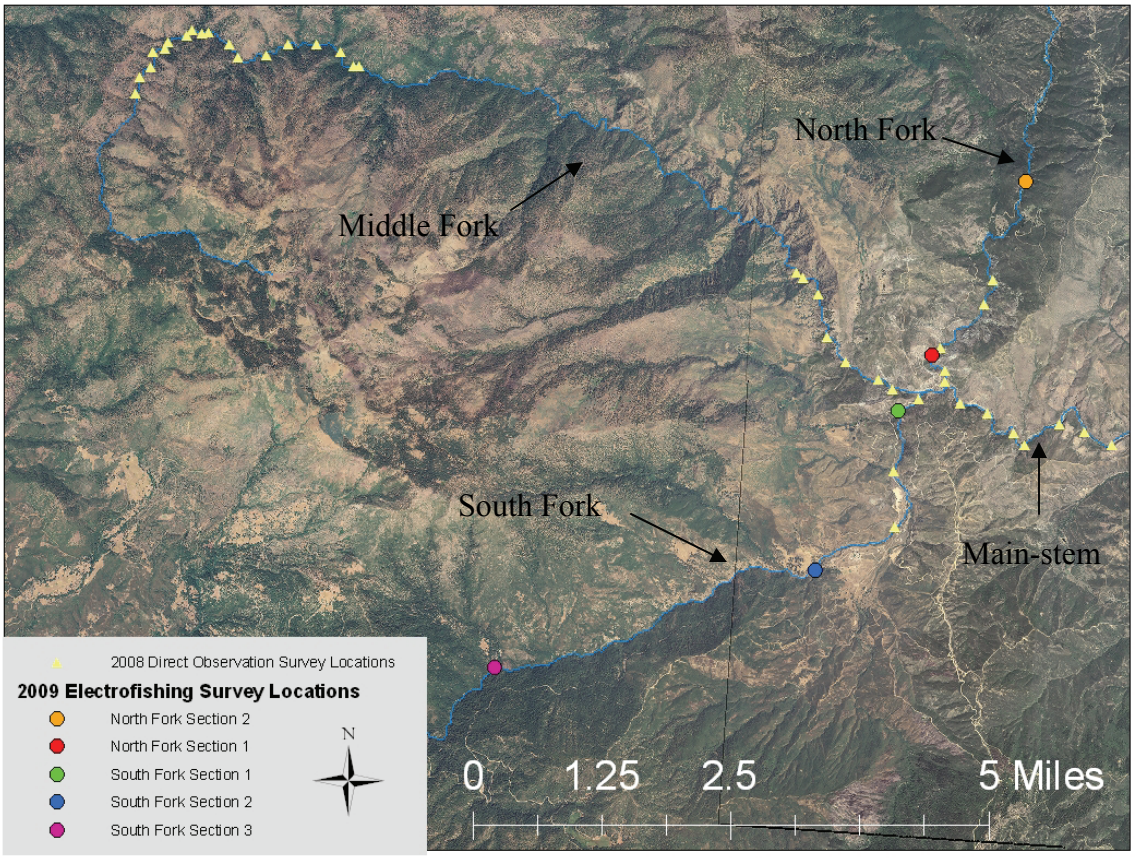
A habitat assessment was conducted to document resource condition by collecting base-line data on habitat types and quality, water conditions, substrate, discharge, bank condition, and other attributes. The HWTP habitat assessment is a pared down synthesis of Rosgen (1994) and the California Salmonid Stream Habitat Restoration Manual (CSSHRM; Flosi et al. 1988). Section length was measured along the thalweg. The length of the section was then divided into five cells of equal length. Wetted widths were measured at the center of each of the five cells. Across each width transect, five depths were taken (also at the center of five evenly divided cells), and both widths and depths were averaged for each section.

Stream characteristics, including active erosion (erosion occurring in the present), erosion at bankful, and canopy closure were measured as percentages of either the total stream area (canopy cover) or bank area (erosion). Section percentages were defined for each habitat type (riffle, flatwater, and pool) following Level II protocols as defined by the CSSHRM. Using visual observation, substrate size classes and the percentage of each class relative to the total bottom material within the wetted width were quantified. A rating (between poor and excellent) was given to the instream cover available to fish and cover types were identified and defined as percentages of total instream cover. The change in water surface elevation (section gradient) and streamflow were measured. Representative photographs of the section were taken.

Fish measurements were entered into DFG's Fisheries Information Sharing Host (FISH) database and were extracted into MicroFish (MicroFish Software). Based on the capture rate (number of fish captured per pass) and probability of capture, a population estimate was determined for each species in each section. MicroFish also calculated the average weight of each species by section. The population estimate was used to determine biomass (pounds per acre) and

density (fish per mile) of each species. Fish biomass estimates incorporate habitat parameters such as section length, average wetted width, and average weight of fish (by species) and density estimates are determined based on section length and the estimated population. To examine overall productivity of each stream, biomass and density estimates were average across all sections for both the North and South forks separately.

Figure 3. Map of 2009 multiple-pass electrofishing section locations on the North and South forks and 2008 direct observation survey sections on Stony Creek (main-stem) and North, South, and Middle forks.



Results:

South Fork Stony Creek

The May 12, 2009 angling effort took place on the South Fork near the

confluence with the Middle Fork, in the vicinity of the South Fork multiple-pass electrofishing Section 1 (Figure 3). Two anglers fished for four hours each (total of eight hours of effort) and each captured one coastal rainbow trout with an average (and individual) capture rate of 0.25 fish per hour (Table 1). The trout were six and 13 inches in total length. Nine adult foothill yellow-legged frogs were observed, along with two egg masses. No actively spawning coastal rainbow trout were observed, however redds were seen in the South Fork.

South Fork Section 1 was surveyed on June 15, 2009. The section was located approximately 0.3 miles upstream from the confluence with the Middle Fork in the vicinity of numerous USFS roads, campgrounds and off-highway vehicle (OHV) trails (Figures 3 and 4). Section 1 was low-gradient, 339.1 feet in length, and consisted of 95% flatwater and 5% riffle. Both the air and water temperature were measured in the morning and were 25 ºC and 18 ºC, respectively. Overall instream fish cover was rated as good; fish cover was provided mostly by boulders and water depth and there was 23% canopy closure. The majority of substrate included larger-sized material (boulder, cobble, and bedrock). The average wetted width was 20.56 feet, water depth averaged 0.9 feet, and discharge was approximately 13 cubic feet per second (cfs). Specific conductivity was high in this section and was measured at 615 microsiemens (µS). In three passes, a total of 20 coastal rainbow trout, 103 California roach (*Lavinia symmetricus*), 87 speckled dace (*Rhinichthys osculus*), and 72 sculpin (*Cottus* spp.) were captured (Table 2). Surveyors noted that fish were difficult to capture and were not drawn to the electric field until they were very close to either the anode or cathode of the electrofisher. This was likely due to high conductivity. Coastal rainbow trout abundance in Section 1 was estimated at 420 fish per mile and 6.43 pounds per acre. Captured coastal rainbow trout ranged in size from 46 mm to 213 mm total length with an average of 87 mm. One California roach measured at 84 millimeters in total length released eggs during handling and was presumably in spawning condition. In addition, adult foothill yellow-legged frogs, two species of garter snake (*Thamnophis elegans and T. couchii*), one unidentified snake, western pond turtles (*Clemmys marmorata*), and crayfish (not identified to species) were observed.

Figure 4. Site photograph of South Fork Stony Creek Section 1.

South Fork Section 2, surveyed on June 18, 2009, was located approximately one mile upstream from the USFS Grey Pine Campground in the vicinity of Fouts Springs (Figure 3). Habitat consisted of 70% flatwater, 20% riffle, and 10% pool. The section was low to medium-gradient and had 5% canopy cover (Figure 5). The water temperature at 10:00 a.m. was 16 ºC and the air temperature was 25 ºC. Mineral springs entered into the South Fork within the section boundaries and conductivity fluctuated between 730 µS and 950 µS, depending on the location. The conductivity in one of the mineral spring heads was measured but was too high for the instrumentation to provide a reading. Section 2 was 443 feet in length with an average wetted width of 17.7 feet and average water depth of 0.8 feet. Streamflow was measured at 6.12 cfs. Instream fish cover was limited and complexity and was rated as fair. Substrate was dominated by gravel and cobble. A total of four passes were conducted and 12 coastal rainbow trout, 11 speckled dace, 54 sculpin, and four California roach were captured (Table 2). Coastal rainbow trout abundance was estimated at 155 fish per mile with a biomass of

10.79 pounds per acres. The total length of captured coastal rainbow trout ranged from 40 mm to 285 mm with an average of 144 mm. Also observed were adult foothill yellow-legged frogs, garter snakes, and tadpoles (not identified to species).

Figure 5. Site photograph of South Fork Stony Creek Section 2.

South Fork Section 3 was located farther upstream near Deafy Glade (approximately halfway between the headwaters on Goat Mountain and the confluence of the South and Middle forks) and was surveyed on June 17, 2009 (Figure 3). A decommissioned USFS road (8W26) provided access to this reach of the river. The section was 437.5 feet in length and was located within low-gradient forested habitat (65% canopy cover) with excellent fish cover (Figure 6). Habitat consisted of 80% flatwater, 15% riffle, and 5% pool and the substrate was dominated by gravel and sand. The average wetted width and water depth were 16.6 feet and 0.6 feet respectively. At 10:30 a.m., the water temperature was 10 ºC and the air temperature was 18 ºC. Specific conductivity was measured at 209 µS and streamflow was 4.25 cfs. Four passes were conducted

and 40 coastal rainbow trout were captured (Table 2). The total length of captured coastal rainbow trout ranged from 85 mm to 224 mm with an average of 125 mm. The estimated trout density was 543 fish per mile with a biomass of 13.21 pounds per acre. No other fish species were encountered. Also observed were adult foothill yellow-legged frogs, thousands of adult ladybugs (not identified to species), and numerous larval California giant salamanders (*Dicamptodon ensatus*).

Figure 6. Site photograph of South Fork Stony Creek Section 3.

North Fork Stony Creek

The angling effort on the North Fork occurred on May 12, 2009 within approximately one quarter-mile of the confluence with Stony Creek (main-stem). A total of 11 coastal rainbow trout were captured in two hours of combined effort (each angler fished for one hour) with an average catch rate of 5.5 fish per hour (Table 1). Sizes of trout captured ranged from three to eight inches in total length. Adult foothill yellow-legged frogs were present and no trout spawning

activity was observed.

North Fork Section 1 was surveyed on June 16, 2009; this section was located approximately one-half mile upstream of the confluence with the main-stem of Stony Creek (Figure 3). The section was 300 feet in length, low-gradient, and consisted of 50% flatwater, 35% riffle, and 15% pool (Figure 7). The majority of the section was shaded (70% canopy cover) and instream fish cover was rated as excellent. Most of the fish cover was provided by overhanging vegetation (65% of the total cover) but also included aquatic vegetation, boulders, large woody debris, water turbulence, undercut banks, and water depth (each at less than 10% of the total). Substrate was dominated by cobble with some gravel, boulders, and sand. The average wetted width was 13.3 feet, the average water depth was 0.9 feet, and streamflow was measured at 4.98 cfs. At 1:30 p.m., the water temperature was 18 ºC, the air temperature was 25 ºC, and specific conductivity was measured at 261 µS. Three passes were conducted in Section 1 and 18 coastal rainbow trout and 313 California roach were captured (Table 2). The total length of captured coastal rainbow trout ranged from 40 mm to 207 mm with an average of 130 mm. There were approximately 475 coastal rainbow trout per mile with a biomass of 18.85 pounds per acre. Adult foothill yellow-legged frogs were also observed.

Figure 7. Site photographs of North Fork Stony Creek Section 1.

North Fork Section 2 was also surveyed on June 16, 2009 and was located farther upstream near the crossing with USFS road 18N03 (Figures 3 and 8). The section was 684.3 feet in length, medium-gradient, and averaged 23.4 feet in wetted width and 0.6 feet in depth. Instream fish cover was limited in area and complexity and was rated as fair; 72% of the cover was due to water turbulence but also included aquatic and overhanging vegetation, boulders, undercut banks and water depth (each in small percentages). Habitat was 65% flatwater and 35% riffle. Substrate was dominated by gravel (60%) with some cobble (25%), canopy closure was 18%, and streamflow was measured at 4.63 cfs. Air and water temperatures were measured at 19 ºC and 16 ºC respectively at 11:35 a.m. Specific conductivity was measured at 241 µS. A total of 90 coastal rainbow trout were captured in four passes; both adult and larval foothill yellow-legged

frogs were also observed. It was noted that the capture efficiency of trout smaller than 50 mm in total length appeared low. The total length of captured coastal rainbow trout ranged from 32 mm to 230 mm with an average of 79 mm. Coastal rainbow trout abundance was estimated at 889 fish per mile with a biomass of 7.33 pounds per acre.

Figure 8. Site photograph of North Fork Stony Creek, Section 2.

Table 1. Summary of 2009 angling data on the South and North forks of Stony Creek.

Water	Angler	Total angling effort (hrs)	Number of coastal rainbow trout captured by size (inches)							Catch rate (fish/hour)
			3	4	5	6	8	13	Total	
South Fork	Bloom	4	0	0	0	0	0	1	1	0.25
	Hanson	4	0	0	0	1	0	0	1	0.25
North Fork	Bloom	1	0	0	3	3	1	0	7	7
	Hanson	1	1	2	1	0	0	0	4	4

Table 2. Summary of 2009 electrofishing data on the South and North forks of Stony Creek including estimated density and biomass by section and species.

Water	Section	Section length (ft)	Species	Total number captured	Estimated section population	Average weight (g)	Density (fish/mi)	Estimated biomass (lbs/acre)
South Fork	1	339.1	coastal rainbow trout	20	27	17.3	420.4	6.43
			California roach	103	331	3.8	5153.9	17.33
			speckled dace	87	100	3.0	1557.1	4.13
			sculpin	72	80	4.7	1245.7	5.18
	2	443	coastal rainbow trout	11	13	67.8	154.9	10.79
			California roach	4	4	7.3	47.7	0.36
			speckled dace	10	11	4.5	131.1	0.61
			sculpin	49	55	8.1	655.5	5.46
	3	437.5	coastal rainbow trout	35	45	22.2	543.1	13.21
South Fork coastal rainbow trout averages						**35.8**	**372.8**	**10.14**
North Fork	1	300	coastal rainbow trout	18	27	29.0	475.2	18.85
			California roach	313	648	2.9	11404.8	45.23
	2	684.3	coastal rainbow trout	79	115	10.6	887.3	7.31
North Fork coastal rainbow trout averages						**19.8**	**681.3**	**13.08**

Discussion:

The South and North forks of Stony Creek are low to medium-gradient and consist mainly of flatwater habitat with some riffles and even fewer pools. Abundance estimates in 2009 for coastal rainbow trout on the South Fork ranged from 154.9 fish per mile (Section 2) to 543.1 fish per mile (Section 3). Although Section 2 had the lowest estimated density of coastal rainbow trout, the coastal rainbow trout on average weighed more (the average weight in Section 2 was three times greater than in Sections 1 or 3). Section 3 had both the highest density and the highest biomass. An average of the three sections yields an overall density estimate of 372.8 coastal rainbow trout per mile (10.15 pounds per acre) on the South Fork. In 2008, the results of the direct observation snorkel survey estimated 43 coastal rainbow trout per mile on the South Fork. This

survey was conducted on July 25, 2008 when both the air and water temperatures were noticeably warmer than those observed during the 2009 surveys in June. The water temperature in 2008 was 23 ºC (73.4 ºF) in the morning. Temperature may be a limiting factor on trout occupancy in the lower extent of the South Fork and this portion of the system may only be utilized by trout seasonally. Due to time constraints in 2008, surveys on the South Fork were limited to the lower extent of the system. In 2009, surveys were expanded farther upstream in the South Fork. Section 3 had the lowest water temperature, highest fish cover rating, greatest amount of canopy cover, and the majority of substrate was smaller in size (gravels and sands as compared to boulders and cobbles). This habitat in the upper portion of the South Fork may be important spawning and rearing habitat and provide residency year-round as opposed to lower down in the system where water temperatures were much higher.

Abundance estimates in 2009 for the North Fork were 475.2 coastal rainbow trout per mile in Section 1 and 887.3 trout per mile in Section 2 with an average of 681.3 fish per mile. Section 2 had a higher density of trout observed; however, Section 1 had a higher biomass and the trout observed were larger on average. In 2008, the estimated density of coastal rainbow trout in the North Fork was much higher than in 2009. This may be a result of the use of different survey techniques (direct observation in 2008 and electrofishing in 2009). Capture probabilities on the North Fork in 2009 were very low. As mentioned in the results section of this report, it was noted that trout less than 50 mm in total length appeared difficult to capture using electrofishers. Additionally, in 2009, surveys were conducted earlier in the year than in 2008. As such, young of year may have been smaller in size in 2009 and more difficult to capture (and/or larger in 2008 and more readily observed using direct observation methods). Overall, in both 2008 and 2009, the majority of fish observed in the North Fork were less than six inches in total length (96% in 2008 and 89% in 2009). A combination of high densities of smaller fish, use of electrofishing survey methods, and low capture efficiency may account for low trout density estimates for the North Fork in 2009.

In both the North and South forks, there appears to be greater species diversity lower down in the system and higher trout densities farther upstream. In the upstream-most sections of both the North and South forks, only coastal rainbow

trout were captured.

Conclusion:

Stony Creek, including its three major forks, contains wild self-sustaining 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. Based on the results of both the 2008 and 2009 surveys, in September 2009, the DFG recommended to the California Fish and Game Commission that Stony Creek including all tributaries from Mine Camp upstream be designated as both a Heritage and Wild Trout Water (watershed-level designation). This designation was adopted and includes approximately 46 miles of stream habitat on Stony Creek (main-stem) and the North, South, and Middle forks (mileage does not include other tributaries).

The HWTP is currently collaborating with the USFS to install ASBs at Mine Camp, the North Fork Campground, and Deafy Glade to assess angler use, success, and satisfaction.

The HWTP recommends conducting a reevaluation of the angling regulations for this watershed. Currently, Stony Creek and tributaries from the headwaters downstream to the diversion dam west of Stonyford, but not including the Middle Fork from Red Bridge upstream, is open to fishing year-round. From the last Saturday in April through November 15, the bag limit allows the take of five fish per day with a possession limit of 10 fish. From November 16 through the Friday preceding the last Saturday in April, only artificial lures with barbless hooks may be used and there is a zero-bag limit. The Middle Fork from Red Bridge upstream also has a split season; from the last Saturday in April through November 15, only artificial lures with barbless hooks may be used and there is a two-fish bag limit. For the remainder of the year, the same gear restrictions apply but there is a zero-bag limit. Efforts should be made to provide consistency in these differing regulations and future monitoring should be structured to assess impacts (if any) to the fishery if different regulations are adopted.

In addition, a Fishery Management Plan needs to be written by 2012 and should provide a management strategy that establishes the frequency, location, and

survey methodology for long-term monitoring at the watershed level. Based on flow conditions in June of 2009 and the inability to conduct multiple-pass electrofishing at this time of year on either the main-stem or the Middle Fork, the HWTP recommends conducting these types of surveys in late summer or early fall when flows are lower and when surveys can be implemented effectively and safely in this portion of the drainage.

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