Tuolumne River 2009 Summary Report

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State of California

Natural Resources Agency

Department of Fish and Game

Heritage and Wild Trout Program

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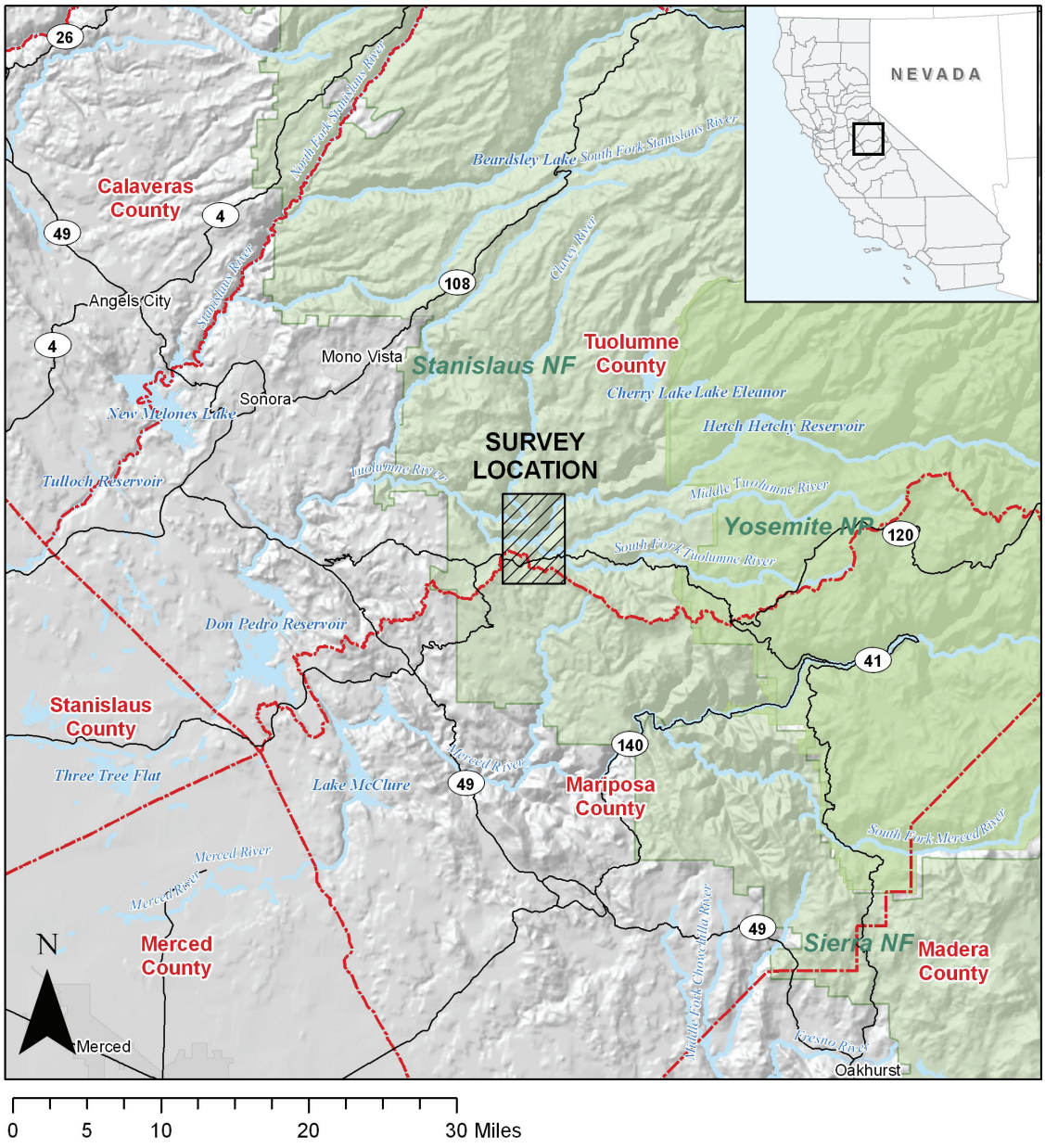
Introduction:

The Tuolumne River is a west-slope Sierra Nevada stream which originates in Yosemite National Park (Tuolumne County) and flows in a westerly direction into the San Joaquin River in the Central Valley of California (Figures 1 and 2). In 1984, the Tuolumne River was designated as a Wild and Scenic River from its headwaters downstream approximately 83 miles. Prior to 2008, the Tuolumne River was designated a "catch and release" water by the California Department of Fish and Game (DFG) Heritage and Wild Trout Program (HWTP). In 2008, the HWTP removed the "catch and release" designation from all waters statewide (this term lead to assumptions and confusion regarding angling regulations) to better facilitate the management of wild trout waters. Instead, the HWTP evaluates candidate waters throughout California for potential designation as Wild and/or Heritage Trout Waters and is required by law to provide yearly recommendations of waters that fit designation criteria to the California Fish and Game Commission.

Wild Trout Waters are those that support self-sustaining trout populations, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers or size of trout, and are open to public angling. Wild Trout Waters may not be stocked with catchable-sized hatchery trout (Bloom and Weaver 2008). Heritage Trout Waters are a sub-set of Wild Trout Waters and highlight wild populations of California's native trout that are found within their historic drainages. To evaluate candidate fisheries for potential designation, the HWTP conducts fishery and habitat assessments of the water, typically over a multi-year period, and the results of these surveys are used to design adaptive management plans for the fishery. The HWTP utilizes a phased approach when evaluating waters for potential designation.

HWTP Phase 1 surveys are an initial resource assessment to evaluate whether the fishery meets the minimum qualifications for designation as a Wild and/or Heritage Trout Water. HWTP Phase 1 assessments are designed to provide baseline information on fish species composition, relative abundance and size of fishes (specifically trout), public access, aesthetics of the fishery, basic habitat attributes, and whether the trout present are of wild or hatchery origin. In 2009, the HWTP conducted a Phase 1 initial resource assessment of the Tuolumne River via direct observation snorkel surveys within the Stanislaus National Forest (Figure 2). Sections were selected in the vicinity of United States Forest Service (USFS) Lumsden Campground, approximately 50 miles to the northeast of Modesto, California (Figure 3). In addition, two Angler Survey Boxes (ASB) are located on the Tuolumne River in the vicinity of the USFS Lumsden Campground (Figure 3). Data collected from ASB provide further insight into a fishery from an angler perspective including catch rates, catch sizes, and angler satisfaction.

Figure 1. Vicinity map of Tuolumne River 2009 direct observation snorkel surveys.



Methods:

Direct observation surveys were conducted by HWTP personnel (from Headquarters and Central Region) at three locations on the Tuolumne River on October 12, 2009 using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin and Reeves 1988; Figure 3). Surveys were limited to one day's effort due to inclement weather encountered on October 13, 2009 (heavy rain) which increased flows and decreased instream visibility. Survey sections were selected

based on feasibility of access. Specific section boundaries were located at distinct breaks in habitat type and/or stream gradient. Surveys were conducted in a downstream direction with six divers. The number of divers was determined based upon wetted width, water visibility, habitat complexity, and the availability of divers trained in snorkel survey techniques. Divers maintained an evenly-spaced line perpendicular to the current and 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 (≥ 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 is 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.

Divers were instructed in both visual size class estimation and proper snorkel survey techniques prior to starting the survey (establishing diver lanes, determining the extent of their visual survey area, how and when to count (or not count) fish observed, safety considerations, etc.). For each section, surveyors measured section length along the thalweg, water and air temperature (in the shade), average wetted width and water depth, and water visibility. Habitat type (flatwater, riffle, or pool) was identified following Level 2 protocol as defined in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1988). Representative photographs were taken and GPS coordinates were recorded for the section boundaries.

Figure 2. Map of upper Tuolumne River watershed above Don Pedro Reservoir.

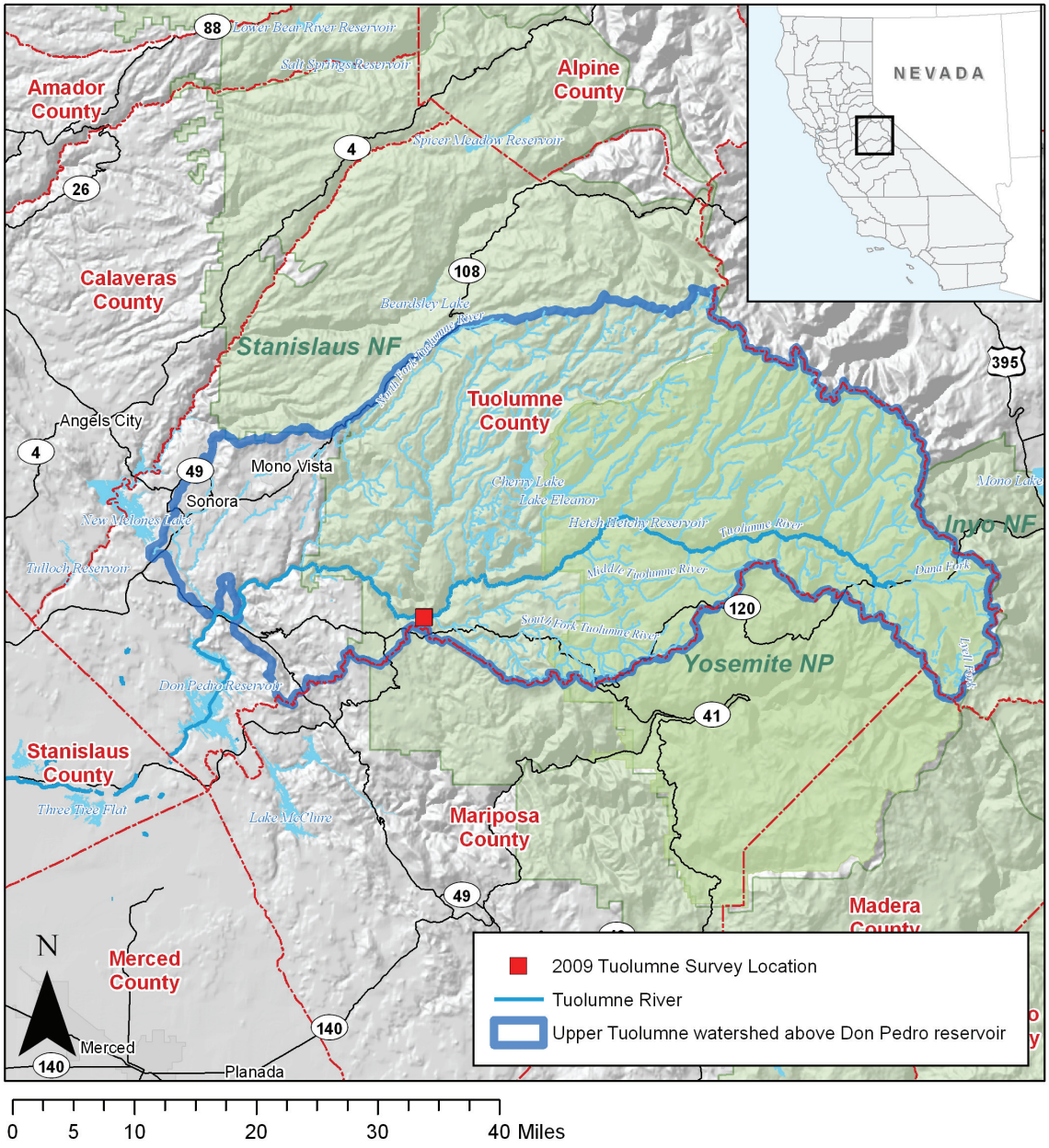


Figure 3. Detail map of Tuolumne River Angler Survey Box locations and 2009 direct observation snorkel survey sections.

Quad: Jawbone Ridge (7.5')

Results:

The weather was overcast on October 12, 2009. The air temperature was approximately 16 ºC and water temperature was 13 ºC (both measured in the afternoon). Section 109 was located approximately one-half mile downstream of

the USFS Lumsden Campground and consisted of flatwater habitat dominated by boulders, sand, and cobbles (Figures 4 and 5). Section length was 503.0 feet with an average wetted width of 79.8 feet and an average water depth of 4.9 feet. Water visibility was 15 feet. A total of 92 coastal rainbow trout (*Oncorhynchus mykiss irideus*), 11 brown trout (*Salmo trutta*), five kokanee salmon (*Oncorhynchus nerka*), and two Chinook salmon (*Oncorhynchus tshawytscha*) were observed in Section 109 (Table 1). HWTP personnel noted that five of the coastal rainbow trout observed had eroded dorsal and caudal fins and appeared "skinny." In addition, two dead brown trout were observed during the snorkel surveys and a sucker (*Catostomus* spp.) was observed during the habitat analysis portion of the survey (after the snorkel survey was conducted).

Section 209 was located approximately one-quarter mile downstream of Section 109 and consisted of riffle habitat with faster water and substrate dominated by boulders (Figures 4 and 5). This section was 232.0 feet in length with an average wetted width of 117.5 feet and average water depth of 1.0 foot. Water visibility was 10 feet. Field notes indicate that habitat complexity from the presence of large boulders in combination with faster water velocities may have limited detectability of fish in this section. A total of 55 coastal rainbow trout were observed in Section 209 (Table 1).

Section 309 was located approximately one-quarter mile downstream of Section 209 and consisted of flatwater habitat with substrate dominated by large boulders with some sand and bedrock (Figures 4 and 5). This section was 828 feet in length with an average wetted width of 113.6 feet and average water depth of 4.2 feet. Water visibility was approximately 10 feet. Divers observed 185 coastal rainbow trout, 27 brown trout, five kokanee salmon, one Chinook salmon, nine Sacramento pikeminnow (*Ptychocheilus grandis*), and one Sacramento sucker (*Catostomus occidentalis*; Table 1). Five of the rainbow trout observed were believed to be of hatchery origin due to the presence of eroded caudal and dorsal fins; divers also noted that numerous fish observed in this section had signs of possible hooking injuries (torn maxillae and scar marks in the vicinity of the mouth). Two anglers were observed upstream of the section prior to the start of the survey and one reported catching a 17-inch coastal rainbow trout.

Figure 4. Detail map of Tuolumne River 2009 direct observation snorkel survey locations using satellite imagery.

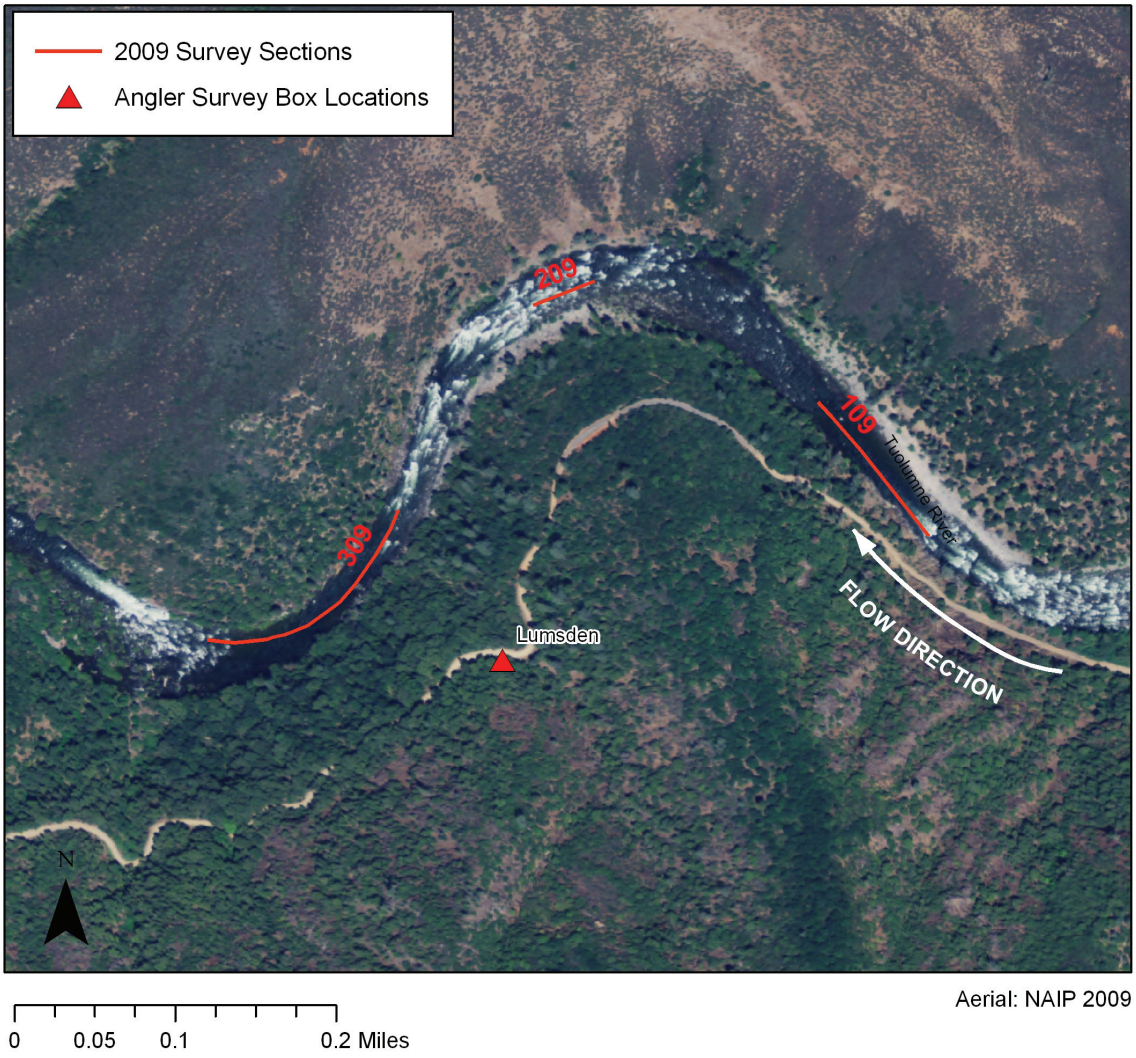


Figure 5. Site photographs of Tuolumne River 2009 survey sections (Section 109 top photo; Section 209 middle photo; and Section 309 bottom photo).

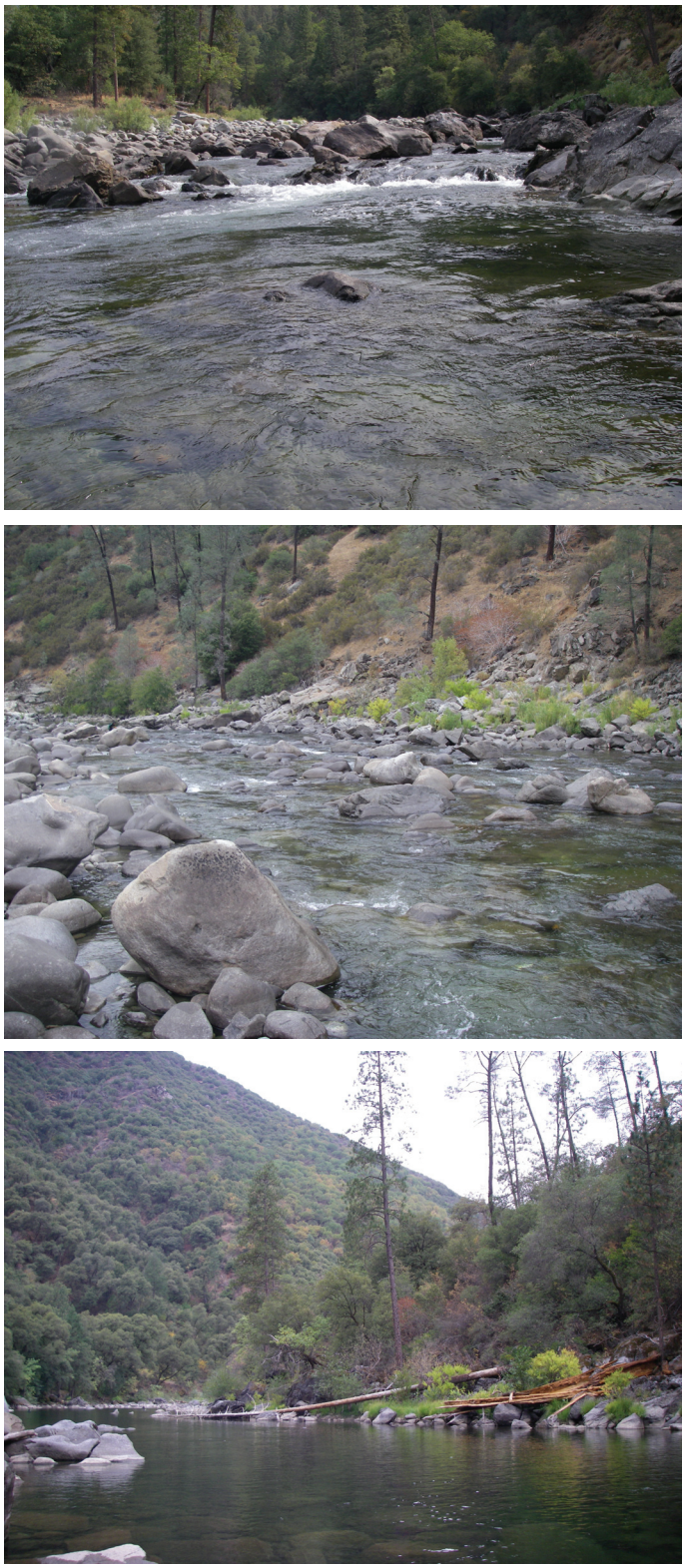


Table 1. Summary of 2009 Tuolumne River direct observation survey data including the number of fish observed by species, size class, and section, with estimated densities.

Section	Section length (ft)	Species	Number of fish observed						Estimated density (fish/mi)
			YOY	Small 0"-5.9"	Medium 6"-11.9"	Large 12"-17.9"	XLarge >18"	Total	
109	503.0	coastal rainbow trout	0	45	30	17	0	92	966
		brown trout	0	2	1	7	1	11	115
		kokanee	0	0	0	5	0	5	52
		Chinook salmon	0	0	0	2	0	2	21
209	232.0	coastal rainbow trout	0	44	9	2	0	55	1252
309	828.0	coastal rainbow trout	0	83	58	38	6	185	1180
		brown trout	0	6	10	8	3	27	172
		kokanee	0	0	0	5	0	5	32
		Chinook salmon	0	0	0	1	0	1	6
		Sacramento pikeminnow	0	4	0	5	0	9	57
		Sacramento sucker	0	1	0	0	0	1	6
Total	**1563.0**	**coastal rainbow trout**	**0**	**172**	**97**	**57**	**6**	**332**	**1122**
		brown trout	**0**	**8**	**11**	**15**	**4**	**38**	**128**
		kokanee	**0**	**0**	**0**	**10**	**0**	**10**	**34**
		Chinook salmon	**0**	**0**	**0**	**3**	**0**	**3**	**10**
		Sacramento pikeminnow	**0**	**4**	**0**	**5**	**0**	**9**	**30**
		Sacramento sucker	**0**	**1**	**0**	**0**	**0**	**1**	**3**

Estimated fish densities were calculated for each species and section and were then averaged across the three sections (Table 1). The total estimated density of each species was obtained by adding all fish observed by species in the three sections, dividing by the total length of stream surveyed (1563.0 feet), and converting feet to miles. Coastal rainbow trout ranged in size from small to extra-large and estimated densities ranged from 966 fish per mile to 1,252 fish per mile with an average of 1,122 fish per mile. Brown trout ranged in size from small to extra-large with estimated fish densities between 115 fish per mile and 172 fish per mile (average of 128 fish per mile). Surveys were conducted in the fall and it was difficult to differentiate YOY from small-sized fish; all fish less than six inches were classified as small. This area of the Tuolumne River had high species diversity and was dominated by coastal rainbow trout in relatively high densities. All size classes of trout were present, including extra-large fish. Both kokanee

and inland Chinook salmon are stocked in Don Pedro Reservoir and had likely moved upstream into the Tuolumne to spawn.

Conclusion:

The Tuolumne River is a premier whitewater rafting river in California and Lumsden is a popular put-in spot for rafting trips; the two USFS campgrounds located here support recreational activities including rafting and angling. The Tuolumne is a designated Wild and Scenic River and is relatively remote and aesthetically pleasing. Although limited information exists on angling pressure, catch rates, or catch sizes, the presence of extra-large sized trout in the system allows for the potential of a trophy trout fishery. Based on the results of this survey, the HWTP recommends initiating a Phase 2 candidate water assessment on the Tuolumne River to further assess its potential for designation as a Wild Trout Water. HWTP Phase 2 assessments provide a more comprehensive evaluation of the fishery, habitat, and angler use. Surveys conducted in 2009 were limited in scope and relegated to a small portion of the Tuolumne River.

A significant portion of the Tuolumne River's recreational fishery is within Yosemite National Park boundaries (from its headwaters to approximately seven miles downstream of Hetch Hetchy Reservoir). The HWTP coordinated with the National Park Service (NPS) to obtain necessary permits for conducting research within park boundaries. Since trout are not native to the Tuolumne River upstream of Preston Falls (located near Mather downstream of Hetch Hetchy reservoir), the NPS does not support Wild Trout designation in this portion of the river (McKenny, personal communication, 2010). There is approximately 20 miles of habitat from the confluence of the Clavey River upstream to the Yosemite National Park boundary and the HWTP recommends pursuing this portion of the Tuolumne River for designation as a Wild Trout water.

References:

Bloom, R. and J. Weaver. 2008. The California Heritage and Wild Trout Program Handbook (Draft). State of California. Natural Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California Salmonid Stream Habitat Restoration Manual. State of California Resources Agency. 3rd Edition. Department of Fish and Game. Vol. 1.

Hankin D.G. and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Canadian Journal of Fisheries and Aquatic Sciences. 45:834-844.