

Pauley Creek Direct Observation Survey

August 7 through 9, 2018

State of California

Natural Resources Agency

California Department of Fish and Wildlife



Prepared by John Hanson

Environmental Scientist

North Central Region

Heritage and Wild Trout Program

January 2019

INTRODUCTION

Pauley Creek is in Sierra County north of Downieville, California. This stream is approximately 15 miles (mi) in length, flowing from Hawley Lake at 6620 feet (ft) elevation above mean sea level to its confluence with the Downie River, at 2960 ft elevation above mean sea level, in the town of Downieville, California. The Downie River is a tributary to the North Fork Yuba River. Except for 0.5 mi of stream in a private inholding around Hawley Lake, Pauley Creek is situated completely within the Plumas National Forest (Figure 1).

The California Fish and Game Commission (CFGF) designated Pauley Creek a Wild Trout water in 2014. CFGF policy is that designated Wild Trout waters are defined as: 1) open to public angling; 2) given appropriate 2018 angling regulations, able to support wild trout populations of sufficient magnitude to provide satisfactory trout catches (in terms of number or size of fish); and 3) domestic strains of catchable-size trout shall not be planted; however, suitable hatchery-produced wild or semi-wild strains may be planted in designated waters, but only if necessary to supplement natural reproduction (Fish & G. Code 2018). Pauley Creek is opened to public angling from the last Saturday in April through November 15 with a limit of five trout per day and 10 trout in possession. Pauley Creek supports a wild population of Rainbow Trout *Oncorhynchus mykiss* (RT) and the management goal is to maintain this wild trout population to provide a fast action wild RT fishery (Hanson 2017).

METHODS

Direct observation surveys were conducted to count all trout observed through snorkeling (Flosi et al. 1998). All observed trout were identified to species and sorted into five total length size classes: young of the year (YOY); one - 5.9 in (small); six - 11.9 in (medium); 12 - 17.9 in (large); and ≥ 18 inches (X-large). Any unidentified species were recorded under unknown species and under the estimated size class.

Habitats were classified as either pool, flatwater (pocket water, run, step run, glide, and edge water), or riffle (Flosi et al 1998). Each sampled habitat was selected by using a stop watch to randomly generate a number between zero and 9 and then hiking upstream that number of habitats. Stream lengths and an average width (based on five measurements) were taken for each selected habitat. The stream lengths were used to estimate the number of trout by species observed per mile (mi) using the equation:

$$N/HL * 5280$$

Where N = Number of Trout by Species Observed and HL = Habitat Length in feet (ft).

RESULTS

A total of 14 habitats with a combined total distance of 1546.3 ft (2.0 % of the total stream length) were sampled (Figure 2 and Table 1). The 14 habitats averaged 110.5 ft long (range 37.3 - 240.6) with an average width of 26.7 ft (range 18.4 - 52.0). Of the 14 habitats, seven (50%) were flatwater, three (21%) were pools, and four (29%) were riffles. Flatwaters averaged 116.5 ft long (range: 67.0 - 198.5) and 25.4 ft wide (range: 23.4 - 29.0); riffles averaged 137.1 ft long (range: 64.5 to 240.6) and 29.3 ft wide (range: 18.4 to 52.0); and pools averaged of 60.8 ft long (range 37.3 - 80.0) and 24.6 ft wide (range: 21.0- 34.6).

Rainbow trout were the only trout observed and RT were present in all sections (Table 2). Overall, YOY (39%), small (51%), medium (8%), and large (2%) were observed in Pauley Creek. YOY, small, and medium size classes of RT were observed in all sample sections of Pauley Creek except PC05, where only

YOY and small RT were observed. Large RT were observed in nine (64 %) of the sample reaches (Table 2 and Figure 3). RT in the x-large size class were not observed in any section.

Overall, the 14 sections averaged 1400 non-YOY RT observed per mi (range: 425 - 3236) while the adult (≥ 6.0 inches) RT observed averaged 231 RT per mi (range 0 to 453 RT). On average, the largest number of RT observed were in pools with 1644 non-YOY RT per mi (range 425 to 3236); however, the lowest number of adults, 189 RT per mi (range 142 to 254), were also observed in the pools (Table 3). On average, the fewest number of RT observed occurred in riffles with 893 non-YOY RT per mi observed (range 720 to 988). The greatest number of adult RT, 266 adult RT observed per mi (range 79 to 453), were observed in flatwater with an average of 1586 non-YOY RT per mi observed (range 665 to 3171).

DISCUSSION

The RT population in Pauley Creek appears to be abundant and stable with all size classes represented in most of the sample sections. However, when compared to a direct observation survey conducted in 2010 a larger proportion of YOY were observed in 2018 with a smaller proportion of small and medium size RT (Weaver and Mehalick 2010). The proportion of large RT were the same during the two surveys. Variations in the numbers of YOY and small RT may be result of sampling error, environmental fluctuation and year class strength, or both. Also, no X- Large RT were observed in either survey. The 2018 survey occurred two years after a significant drought that could have impacted the RT population in Pauley Creek.

Direct observation offers an accepted method to count trout populations in a remote and relatively inaccessible stream such a Pauley Creek relatively inexpensively and can cover more ground than electrofishing. However, an electrofishing survey, either one or multi-pass, could be combined with future direct observation surveys to calibrate diver observations of RT and provide precise length and weight data to population and biomass estimates (especially with multi-pass sampling) in Pauley Creek.

RECOMMENDATIONS

1. Use direct observation to monitor the RT population in Pauley Creek every five years;
2. Establish electrofishing reaches in direct observation sections to calibrate direct observation counts and size classes;
3. Conduct surveys in the upper reaches in Pauley Creek; and
4. Install Angler Survey Box or Boxes.

REFERENCES

California Fish and Game Code. 2018. In Policies Adopted by the California Fish and Game Commission Pursuant to Section 703 of the Fish and Game Code. Pages 478-479.

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

Hanson, J. 2017. Pauley Creek Fishery Management Guidelines (Draft). State of California Natural Resources Agency. Department of Fish and Wildlife. North Central Region.

Weaver, J. and S. Mehalick. 2011. Pauley Creek Summary Report. California Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program.

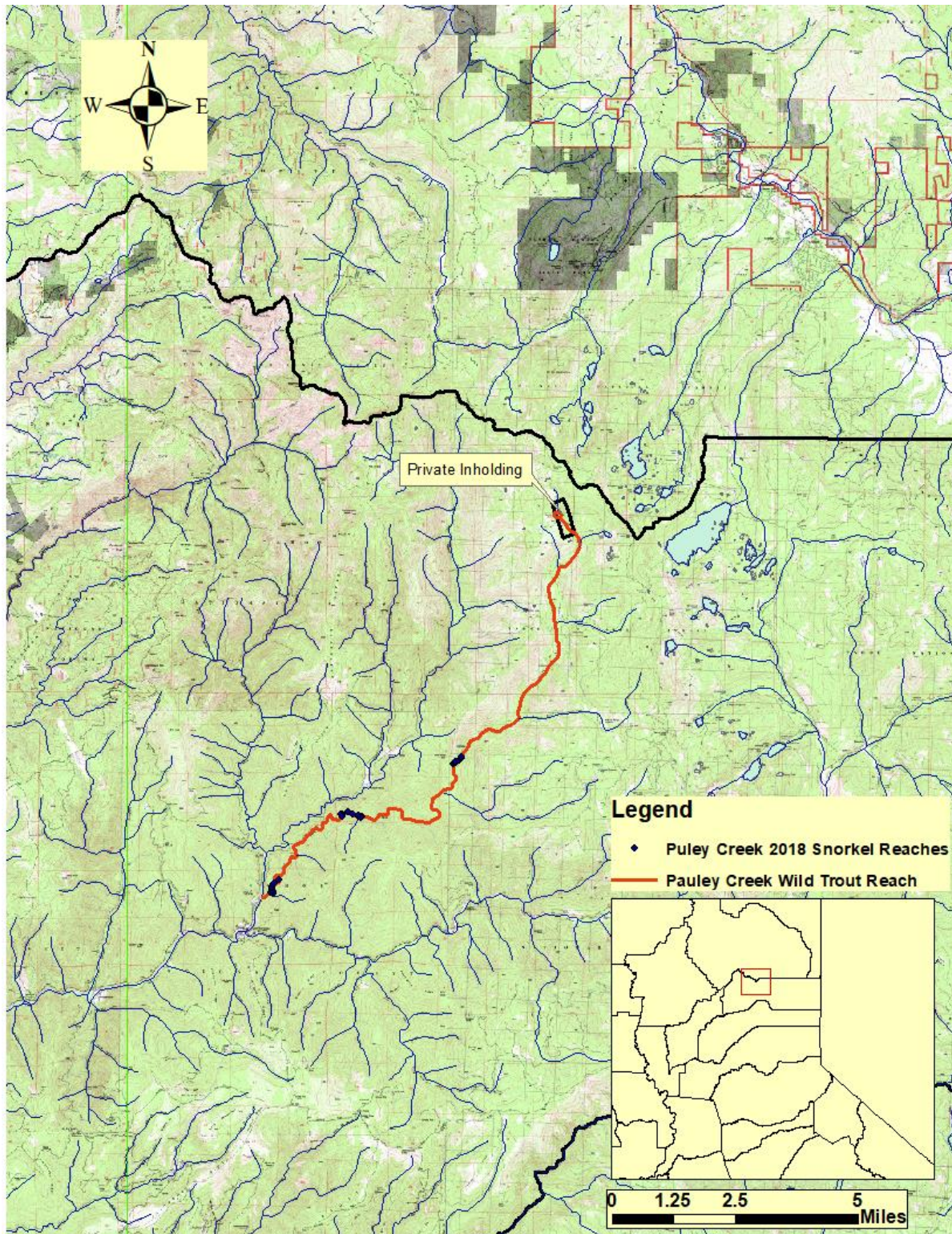


Figure 1. Pauley Creek, Sierra County, California Fish and Game Commission designated Wild Trout water.

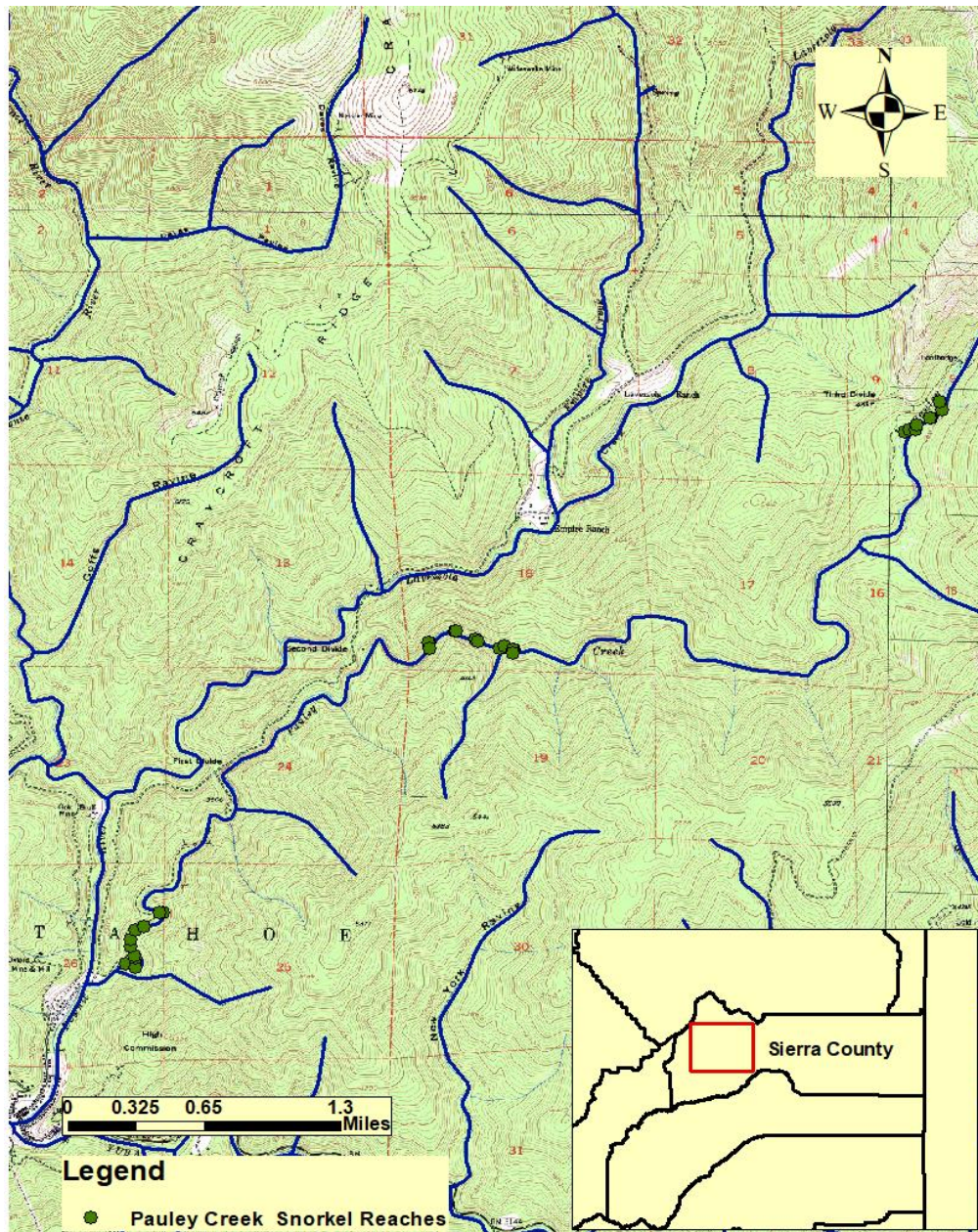


Figure 2. Sample sections in Pauley Creek, Sierra County California. The survey was conducted on August 7 through 9, 2018.

Table 1. Direct observation section locations, habitat types, and lengths in Pauley Creek, Sierra County California. The survey was conducted August 7 through 9, 2018.

Section	Upstream		Downstream		Habitat Type	Length (ft)	Average Width (ft)
	North	West	North	West			
PC 01	39.57091	120.81798	39.57116	120.81875	Riffle	240.6	52.0
PC 02	39.57172	120.81811	39.57157	120.81799	Flatwater	89.3	23.48
PC 03	39.5729	120.81843	39.57239	120.81844	Flatwater	198.5	24.86
PC 04	39.57375	120.81726	39.57351	120.81796	Riffle	170.0	21.8
PC 05	39.57481	120.81585	39.57479	120.8155	Riffle	73.3	25.1
PC 06	39.59426	120.79199	39.59386	120.79192	Pool	83.0	21.0
PC 07	39.59505	120.78958	39.59509	120.78971	Riffle	64.5	18.4
PC 08	39.59434	120.78761	39.59453	120.7878	Flatwater	88.0	23.4
PC 09	39.59407	120.78529	39.59388	120.78568	Pool	62.0	23.7
PC 10	39.59355	120.78449	39.5938	120.78455	Flatwater	67.0	26.2
PC 11	39.60969	120.74922	39.60952	120.74966	Flatwater	171.5	29.0
PC 12	39.6101	120.74857	39.60976	120.74868	Flatwater	84.7	25.0
PC 13	39.61052	120.74741	39.61058	120.7473	Pool	37.3	34.6
PC 14	39.61177	120.74656	39.61116	120.74641	Flatwater	116.6	25.7

Table 2. Number and size classes of Rainbow Trout observed in Pauley Creek, Sierra County California. The survey was conducted from August 7 through 9, 2018.

Section	Species	Wild (Y/N)	Size Classes					Total Non YOY	Total $\geq 6"$
			YOY	1-5.9"	6"-11.9"	12"-17.9"	XL > 18"		
PC 01	RT	Y	15	37	7	1		45	8
PC 02	RT	Y	27	10	5	2		17	7
PC 03	RT	Y	54	17	6	2		25	8
PC 04	RT	Y	30	24	6	1		31	7
PC 05	RT	Y	19	10				10	0
PC 06	RT	Y	13	16	2	2		20	4
PC 07	RT	Y	1	6	3	2		11	5
PC 08	RT	Y	20	19	4	1		24	5
PC 09	RT	Y	5	36	2			38	2
PC 10	RT	Y	9	13	1			14	1
PC 11	RT	Y	12	94	8	1		103	9
PC 12	RT	Y	31	30	2			32	2
PC 13	RT	Y	16	2	1			3	1
PC 14	RT	Y	9	28	8	2		38	10

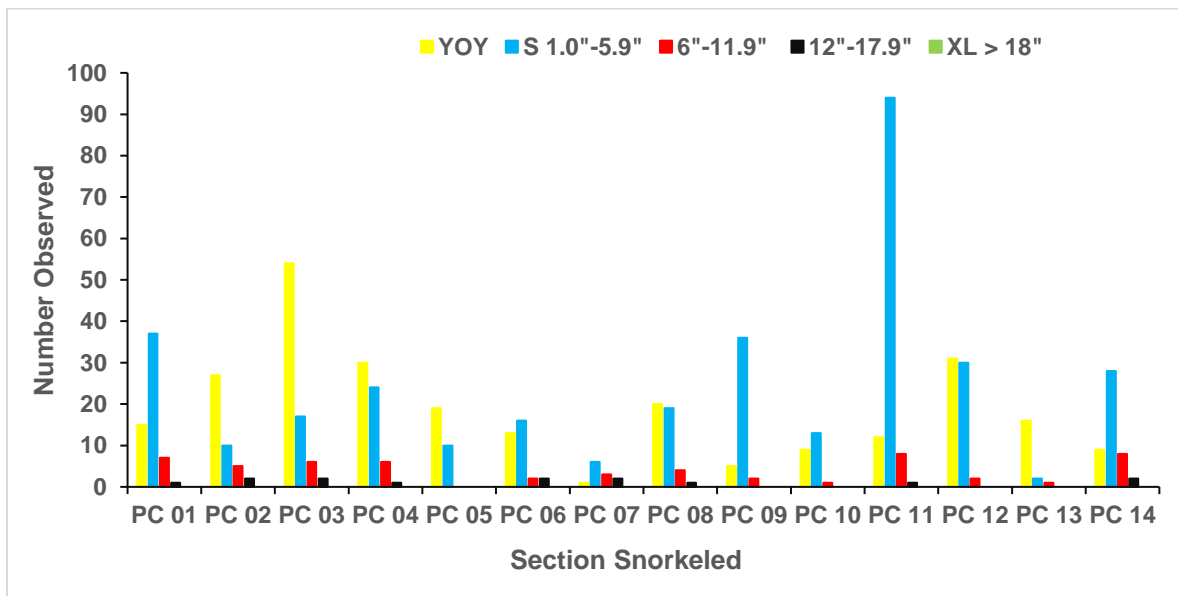


Figure 3. Length frequency histogram of the size classes of Rainbow Trout observed in Pauley Creek, Sierra County California. The survey was conducted from August 7 through 9, 2018.

Table 3. The number of Rainbow Trout observed and estimate of the density of Rainbow Trout per mile observed in Pauley Creek, Sierra County California. The survey was conducted from August 7 through 9, 2018.

Section	Habitat Type	RT Observed			Non YOY RT/Mile	Adult $\geq 6"$ RT/Mile
		YOY	Number	Adult (>6")		
PC 01	Riffle	15	45	8	988	176
PC 02	Flatwater	27	17	7	1005	414
PC 03	Flatwater	54	25	8	665	213
PC 04	Riffle	30	31	7	963	217
PC 05	Riffle	19	10	0	720	0
PC 06	Pool	13	20	4	1272	254
PC 07	Riffle	1	11	5	900	409
PC 08	Flatwater	20	24	5	1440	300
PC 09	Pool	5	38	2	3236	170
PC 10	Flatwater	9	14	1	1103	79
PC 11	Flatwater	12	103	9	3171	277
PC 12	Flatwater	31	32	2	1995	125
PC 13	Pool	16	3	1	425	142
PC 14	Flatwater	9	38	10	1721	453