

Pit River and Rock Creek 2012 summary report

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Department of Fish and Wildlife

Heritage and Wild Trout Program



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Introduction

Rock Creek, located in northeastern California, is tributary to the Pit River approximately 3.5 miles downstream from Lake Britton (Shasta County; Figure 1). The native fish fauna of the Pit River is similar to the Sacramento River and includes rainbow trout (*Oncorhynchus mykiss* sp.), sculpin (*Cottus* spp.), hardhead (*Mylopharodon conocephalus*), Sacramento sucker (*Catostomus occidentalis*), speckled dace (*Rhinichthys osculus*) and Sacramento pikeminnow (*Ptychocheilus grandis*; Moyle 2002). In addition, the Pit River supports a wild population of non-native brown trout (*Salmo trutta*). It is unknown whether the ancestral origins of rainbow trout in the Pit River are redband trout (*O. m. stonei*) or coastal rainbow trout (*O. m. irideus*) and for the purposes of this report, we refer to them as rainbow trout.

The California Department of Fish and Wildlife Heritage and Wild Trout Program (HWTP) has evaluated the Pit River as a candidate for Wild Trout Water designation since 2008. Wild Trout Waters are those that support self-sustaining wild 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 (Bloom and Weaver 2008). The HWTP utilizes a phased approach to evaluate designation potential. In 2008, the HWTP conducted Phase 1 initial resource assessments in the Pit River to gather information on species composition, size class structure, habitat types, and catch rates (Weaver and Mehalick 2008). In addition, angler access locations and potential sites for Angler Survey Boxes (ASB) were evaluated. Voluntary data from ASB provide insights on angler use, catch rates and sizes, gear preferences, and angler satisfaction.

The results of this assessment recommended moving to a Phase 2 candidate water assessment including an evaluation of current fishing regulations in both the main-stem and tributaries. Phase 2 assessments provide a comprehensive evaluation of the fishery, habitat, and angler use including information on species distribution, size class structure, and abundance. These assessments generally occur over a multi-year period.

Rock Creek was previously identified as an important spawning tributary to the Pit River (May 1987). Following the removal of a diversion dam on Rock Creek in 1987 (Pacific Gas and Electric 2001), it was closed to fishing all year from the confluence with the Pit River upstream to Rock Creek Falls (approximately one mile) to protect spawning trout. It was believed that Rock Creek provided an important influx of juvenile wild trout to the main-stem Pit River. Rainbow trout exhibiting spawning behavior (in pairs and digging redds) were observed in Rock Creek each spring (April and May) between 1990 and 1992 (Pacific Gas and Electric 2001).

In 2012, the HWTP conducted Phase 2 candidate water assessments in Rock Creek to gather baseline data on the fishery, habitat, and angler use and to evaluate current fishing regulations. The 2012 assessments included direct

observation snorkel surveys in Rock Creek to gather baseline data on species composition, size class structure, fish abundance, and habitat conditions.

Methods

The HWTP conducted direct observation surveys at four locations in Rock Creek on October 9th, 2012 (Figure 2) using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin and Reeves 1988). Sections were spaced approximately every one-quarter mile and the start of each section was selected at random. Specific section boundaries were located at distinct breaks in habitat type and/or stream gradient. Individual sections were surveyed with either two or three divers; the number of divers per section was determined based on wetted width, water visibility, and habitat complexity. All surveys were conducted in an upstream direction.

Divers maintained an evenly-spaced line perpendicular to the current and counted fish by species. All observed trout were further categorized 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 is generally between zero and three inches in total length. If a trout was observed to be less than six inches in 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 (establishing a dominant side, determining the extent of their visual survey area, how and when to count (or not count) fish observed, safety considerations, etc.) prior to starting the survey. Surveyors measured water and air temperature ($^{\circ}\text{C}$), average wetted width and water depth (ft), and water visibility (ft). 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. 1998). Representative photographs were taken and geographic coordinates of the section boundaries were recorded using a Global Positioning System hand-held unit (North American Datum 1983). To estimate fish abundance, the HWTP summed all observed fish by species (all sections combined) and divided by the total survey length (fish/mi).

Results

Rock Creek from the confluence with the Pit River upstream approximately one mile was characterized mainly by riffle habitat with some flatwater. Substrate was dominated by cobble and gravel with lesser amounts of boulder and sand. During the survey effort, water visibility ranged from one to four feet. Weather was clear

and sunny; however, a majority of the sections were shaded by canopy cover which decreased water visibility. Water temperature ranged from 8 to 10 °C and air temperature was measured between 10 and 15 °C, depending on the time of day. A total of 336.0 feet of stream habitat were surveyed (four sections combined) with an average wetted width of 31.3 feet and average water depth of 0.5 feet.

Among the four sections, 85 rainbow trout, 5 brown trout, and 2 unknown trout were observed (Table 1). Divers also noted crayfish and snails (not identified to species), as well as numerous macroinvertebrates. Upstream of Section 212, a small oval depression of clean, light-colored gravel was observed, presumably a trout redd. No trout were observed spawning. Fish abundance was estimated at 1336 rainbow trout/mile, 79 brown trout/mile, and 31 unknown trout/mile. Size class distribution of rainbow trout was 14% YOY, 72% small-, 12% medium-, and 2% large-sized fish (Figure 3). Size class distribution of brown trout consisted of 80% small- and 20% medium-sized fish. Both unknown trout were in the small-size class.

Discussion

Rock Creek appears dominated by rainbow trout in the small size class. Neither the Pit River nor Rock Creek are currently stocked with hatchery trout; all observed trout were presumably wild. Rainbow trout typically spawn in the spring, whereas brown trout are fall spawners. Due to the timing of the survey (October), the potential redd observed was presumably that of a brown trout. Rainbow trout YOY were observed during the survey effort in Rock Creek, whereas zero brown trout YOY were observed. The extent to which Rock Creek contributes to the overall trout population in the main-stem Pit River is unknown.

During the direct observation surveys on Rock Creek, angler use on the Pit River was being evaluated using Reconyx HyperFire infrared remote cameras. These were installed at six angler access locations between October 9th and 11th, 2012. The remote cameras, installed in trees, were aimed along trails or roads at known angler access points. The remote cameras were removed between October 21st and 24th, 2013. Photographs collected from these cameras will be analyzed to quantify angler use in the Pit River and the results will be documented in a report written by HWTP Headquarters personnel. This report will also include analysis and summarization of the ASB data.

Conclusion

Rock Creek and the Pit River meet multiple criteria for Wild Trout Water designation including the presence of wild trout populations with multiple size classes, no stocking of hatchery fish, suitable habitat, and public access. However, Rock Creek is currently closed to fishing from its confluence with the Pit River to Rock Creek Falls.

Current angling regulations on the Pit River differ by location and season. From Pit No. 3 (Britton Dam) downstream to the outlet of the Pit No. 3 Powerhouse, fishing regulations allow for year-round angling. There is a two-fish bag limit (18-inch minimum size limit) in this reach from the last Saturday in April through November 15th and a zero-fish bag limit from November 16th through the Friday preceding the last Saturday in April (no size restrictions). Only artificial lures with barbless hooks may be used. From Pit No. 3 Powerhouse downstream to Pit No. 7 dam there is a five-fish bag limit from the last Saturday in April through November 15th. This reach, from November 16th through the Friday preceding the last Saturday in April, has a zero-fish bag limit and only artificial lures with barbless hooks may be used. The Pit River from Pit No. 7 dam downstream to Shasta Lake is open to sport fishing all year with no gear restrictions and a daily and possession bag limit of five. The remaining portions of the Pit River fall under the Sierra District General Regulations.

There are numerous roadside access points from Britton Dam to Pit No. 6 Reservoir although, in some areas, access is limited as the Pit River flows through deep canyon areas. The Pit River is notoriously difficult to wade due to large unstable boulders and dense riparian vegetation. Recent flow changes on the Pit River have raised concern by anglers that fishing opportunities will decrease due to higher flows, more difficult wading, and restricted access. The HWTP recommends continued monitoring of the Pit River fishery and angler use:

1. Continued data collection from the ASBs to better understand angler use, catch rates, species composition, gear preferences, and angler satisfaction.
2. Evaluate angling regulations in the Pit River and Rock Creek and consider simplification and standardization throughout the entire reach between Britton Dam and Shasta Lake.
3. Analyze and document results of angler use study using remote cameras on the Pit River.
4. Recommend the Pit River for designation as a Wild Trout Water to the California Fish and Game Commission.

References

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Figure 1. Vicinity map of Pit River and Rock Creek survey location



Figure 2. Detail map of 2012 Rock Creek direct observation survey locations and 2012-2013 Pit River camera locations from Lake Britton to Pit No. 4 Reservoir

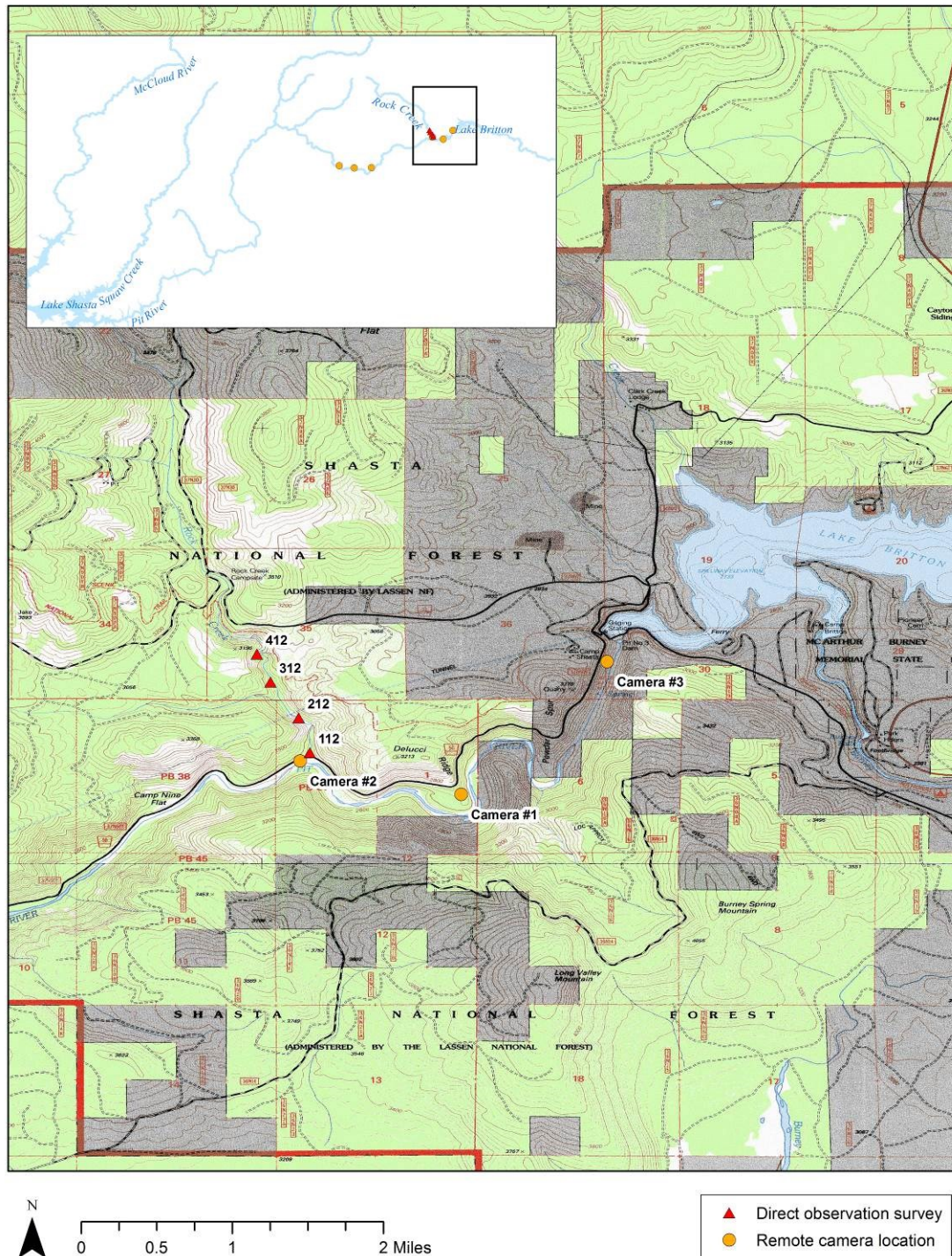


Figure 3. Trout size class distribution observed in the Rock Creek 2012 direct observation surveys

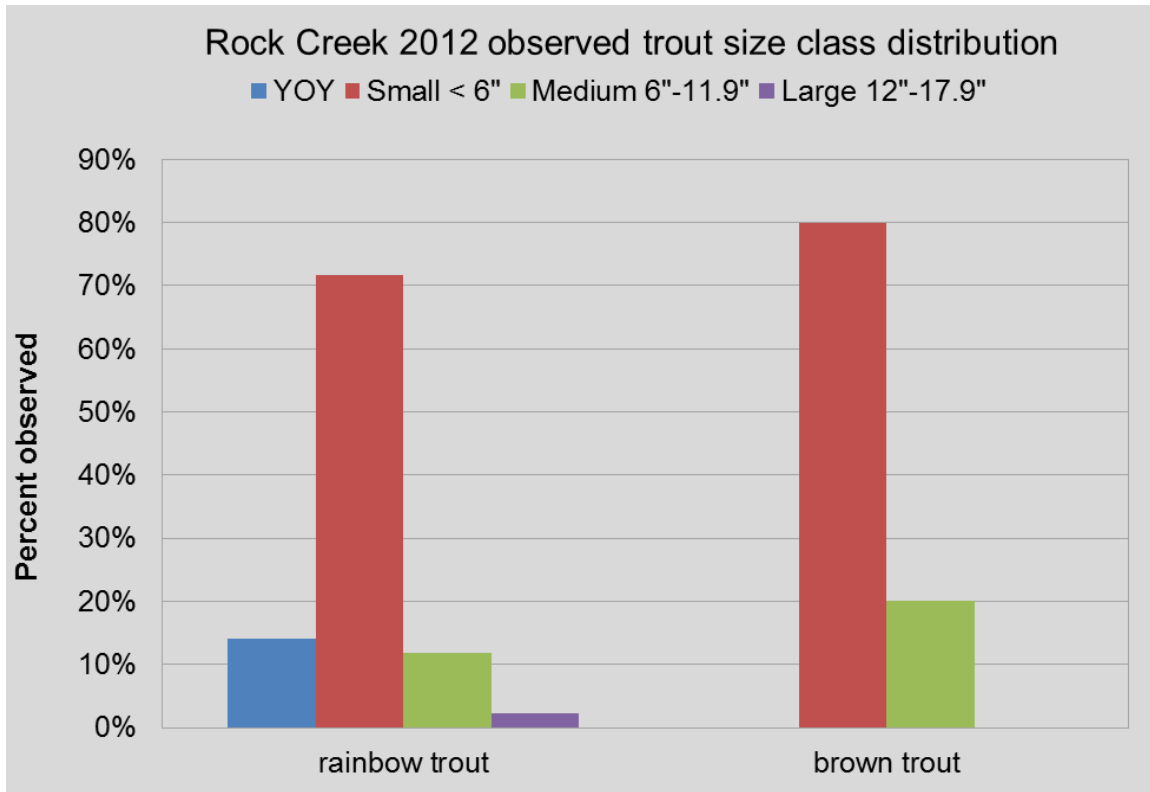


Table 1. Rock Creek 2012 direct observation survey data

Section	Section length (ft)	Habitat type	Species	Number of fish observed					Estimated density (fish/mi)
				YOY	Small	Medium	Large	Total	
					< 6"	6"-11.9"	12"-17.9"		
112	117.5	riffle	rainbow trout	0	15	4	0	19	854
			unknown trout	0	1	0	0	1	45
212	43.5	riffle	rainbow trout	2	6	0	0	8	971
			brown trout	0	1	0	0	1	121
312	122.7	flatwater	rainbow trout	9	34	6	2	51	2195
			brown trout	0	3	1	0	4	172
			unknown trout	0	1	0	0	1	43
412	52.3	riffle	rainbow trout	1	6	0	0	7	707