

**Upper Piru Creek Summary Report  
Snowy, Buck, Piru, Alamo, and Mutau Creeks  
June 11-13, 2008**

**Heritage and Wild Trout Program  
California Department of Fish and Game**



Upper Piru Creek

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## Introduction:

Piru Creek, located approximately one hour north of Los Angeles (within Ventura and Los Angeles Counties), is a major tributary of the Santa Clara River (Figure 1). Tributaries to Piru Creek, including Lockwood, Snowy, Buck, and Cedar Creeks, form the headwaters of what is commonly referred to as “upper” Piru Creek and provide the majority of cold water input before Piru empties into the northwest corner of Pyramid Lake (Figures 2 and 3). “Middle” Piru Creek exits Pyramid Lake and flows in a southerly direction into Lake Piru and “lower” Piru Creek flows from Lake Piru into the Santa Clara River. Piru Creek and its tributaries are in southern end of the native distribution of coastal rainbow trout (*Oncorhynchus mykiss irideus*). Upper Piru Creek contains native and wild populations of coastal rainbow trout. However, due to stocking efforts by the California Department of Fish and Game (DFG), hatchery-strain rainbow trout have been planted throughout the Piru Creek drainage. DFG’s Heritage and Wild Trout Program (HWTP) has been conducting fisheries, habitat, and angler studies throughout the watershed since the 1980s. In June, 2008, the HWTP conducted fisheries assessments on Upper Piru Creek and several tributaries via direct observation snorkel surveys. Angler survey boxes (ASB) are installed throughout this watershed and examination of voluntary angler reports provides insight on the values of this system from an angler perspective, including catch rates, catch sizes, and satisfaction. Based on our long-term, comprehensive assessments of the Upper Piru Creek watershed, the HWTP recommended Upper Piru Creek for designation as a Heritage Trout Water and in September, 2008, the California Fish and Game Commission approved this designation.

Figure 1. Location of Piru Creek and Santa Clara River drainages



## Methods:

Direct observation surveys were conducted from June 11-13, 2008 on Snowy, Buck, upper Piru, Alamo, and Mutau Creeks using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin & Reeves, 1988). 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 these habitats. Sections were also spaced throughout each stream, to the extent possible, 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 in each survey section).

Diver(s) counted all fish within each section by species. All trout observed were also counted by size class. Size class ranges were divided into categories of young-of-year (YOY), small (< 5.9 inches), medium (6-11.9 inches), large (12-17.9 inches) and extra-large ( $\geq 18$  inches). YOY are defined by 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 but 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. For each of the survey sites, the HWTP measured thalweg/section length, water and air temperature (in the shade), average wetted width and water depth, and water visibility. We recorded habitat type (flatwater, riffle, or pool) and GPS coordinates for the section boundaries. Representative photographs were taken.

Figure 2. Map of Piru Creek

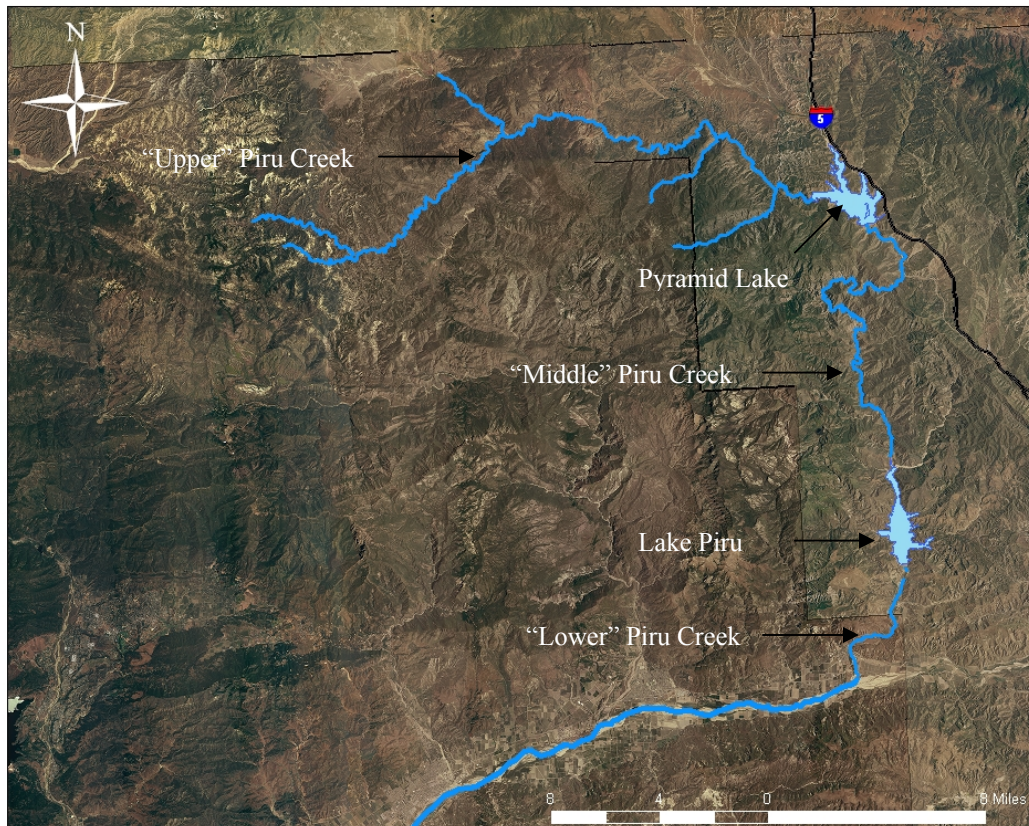
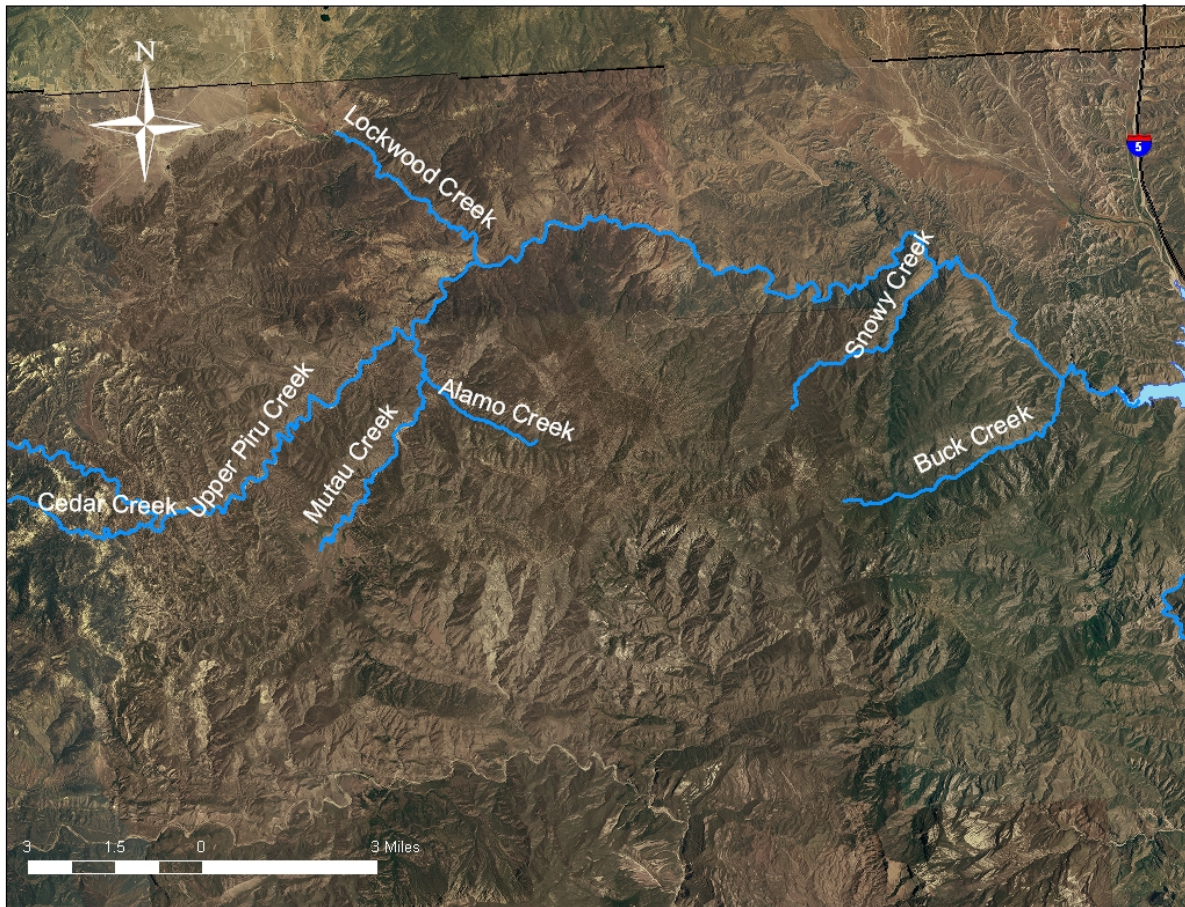


Figure 3. Map of Upper Piru Creek and tributaries



## Results:

### Buck Creek



Buck Creek is a medium- to high-gradient system of riffles (bedrock sheets) interspersed with pools. On June 11<sup>th</sup>, 2008, four sites were surveyed with one diver and two bank-side observers. The four sites were all within 1.3 miles of the confluence of Buck Creek with Piru Creek. A total of 543 feet of stream habitat was sampled, which averaged 13.4 feet in wetted width and one foot in water depth. The weather was clear and sunny and ambient air temperature ranged from 23° Celsius (C) (at 11:50 a.m.) to 28° C (at 2:40 p.m.). Water temperatures ranged from 16° to 18° C. A total of 98 coastal rainbow trout were observed, consisting of small to medium sized fish. Many of the small fish were

approximately one inch in total length. Due to early spring spawning in this system, they are likely young of year. However, at the time of the survey, it was unknown whether they were age 0+ or 1+ fish. Following protocol, all fish of this size were classified as small. Based on the total stream length



## Piru Creek

Piru Creek was surveyed on June 12<sup>th</sup>, 2008, from the confluence with Lockwood Creek downstream to the Hardluck crossing (near the U.S. Forest Service Hardluck Campground). Two teams surveyed a total of eight sites, with each team employing two divers and one bank-side observer. Weather was clear and windy with air temperatures ranging from 21° (at 10:45 a.m.) to 31° C (at 3:00 p.m.). Water temperatures were between 15° and 25° C. The average wetted width was 16.9 feet and the average water depth was .7 feet. Seventy-six coastal rainbow trout were observed throughout the course of the surveys and ranged in size class from small to large. It is likely some of the small fish were young of year; however, following HWTP protocol, they were classified as small. Piru Creek is a low to medium gradient system. Habitat surveyed consisted primarily of riffles, with some flatwater (runs) and one pool. Based on the total stream length surveyed (1211.4 feet) and the number of fish observed, trout densities are estimated at 331 fish per mile in this portion of Piru Creek (Table 3).

Table 3. 2008 Piru Creek direct observation survey data

Piru Creek 2008 Direct Observation Survey Results											
Section #	Section Length (ft)	Habitat Type	Average Wetted Width (ft)	Average Water Depth (ft)	Water Visibility (ft)	Number of Coastal Rainbow Trout Observed					Totals
						YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	148.60	Riffle	26.30	0.42	>10	0	7	0	0	0	7
208	178.00	Riffle	12.90	0.47	>10	0	12	10	1	0	23
308	186.00	Flatwater	19.90	0.40	>10	0	5	3	0	0	8
408	256.70	Riffle	16.30	0.37	>10	0	2	0	0	0	2
508	215.80	Flatwater	16.06	0.52	2.50	0	2	1	0	0	3
608	121.00	Riffle	22.20	0.70	3.00	0	12	4	1	0	17
708	30.30	Pool	9.50	1.65	4.00	0	0	1	0	0	1
808	75.00	Flatwater	11.76	0.68	2.00	0	15	0	0	0	15
<b>Total</b>	<b>1211.40</b>	<b>n/a</b>	<b>16.87</b>	<b>0.65</b>	<b>n/a</b>	<b>0</b>	<b>55</b>	<b>19</b>	<b>2</b>	<b>0</b>	<b>76</b>



## Alamo Creek

On June 13<sup>th</sup>, three sites on Alamo Creek were surveyed, from the confluence with Mutau Creek upstream approximately 0.5 miles. The weather was sunny and warm with air temperatures ranging between 30° and 37° C (measured at 12:30 p.m. and 1:30 p.m., respectively). Water temperatures were measured between 20° and 22° C. Habitat consisted of flatwater (runs) and pools. One diver and one bank-side observer tallied 95 coastal rainbow trout in the 189.4 feet sampled. Average wetted width was 10.7 feet and average water depth was .81 feet. Based on these data, there are approximately 2648 fish per mile in the lower portion of Alamo Creek (Table 4).

Table 4. 2008 Alamo Creek direct observation survey data

Alamo Creek 2008 Direct Observation Survey Results											
Section #	Section Length (ft)	Habitat Type	Average Wetted Width (ft)	Average Water Depth (ft)	Water Visibility (ft)	Number of Coastal Rainbow Trout Observed					Totals
						YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	30.00	Pool	15.16	1.59	>4	9	15	0	0	0	24
208	93.40	Flatwater	9.12	0.53	>4	8	37	2	0	0	47
308	66.00	Flatwater	7.88	0.30	>4	5	19	0	0	0	24
<b>Total</b>	<b>189.40</b>	<b>n/a</b>	<b>10.72</b>	<b>0.81</b>	<b>n/a</b>	<b>22</b>	<b>71</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>95</b>



**Mutau Creek**

Mutau Creek was also surveyed on June 13<sup>th</sup>; four sites totaling 426.2 feet were surveyed with one diver and one bank-side observer. All four sections were located in the lower stretch of Mutau Creek, from the confluence with Alamo Creek downstream to Piru Creek. This area is low-gradient and habitat consisted primarily of shallow flatwater with some riffles. Water temperatures ranged from 22° to 23° C. The average wetted width was 9.1 feet and average water depth was 0.29 feet. Twenty-seven small to medium sized coastal rainbow trout were observed. Based on the stream length surveyed and the number of fish observed, there are approximately 334 coastal rainbow trout per mile in this lower stretch of Mutau Creek (Table 5).

Table 5. 2008 Mutau Creek direct observation survey data

Mutau Creek 2008 Direct Observation Survey Results											
Section #	Section Length (ft)	Habitat Type	Average Wetted Width (ft)	Average Water Depth (ft)	Water Visibility (ft)	Number of Coastal Rainbow Trout Observed					Totals
						YOY	Small < 5.9"	Medium 6" - 11.9"	Large 12" - 17.9"	Xlarge > 18"	
108	95.00	Riffle	8.80	0.31	10	0	0	2	0	0	2
208	93.00	Riffle	7.00	0.42	10	0	2	2	0	0	4
308	153.50	Flatwater	9.44	0.25	10	5	4	3	0	0	12
408	84.70	Flatwater	11.18	0.17	10	8	0	1	0	0	9
<b>Total</b>	<b>426.20</b>	<b>n/a</b>	<b>9.11</b>	<b>0.29</b>	<b>n/a</b>	<b>13</b>	<b>6</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>27</b>

## Discussion:

The Upper Piru Creek watershed flows through mid-elevation sandstone canyons and is surrounded by sagebrush, willows, and patches of mixed conifers and cottonwoods. Home to dynamic populations of native coastal rainbow trout and the federally-listed (Endangered) arroyo toad (*Bufo californicus*), upper Piru Creek has a truly remote feel to it, despite its proximity to the Los Angeles metropolitan area. Just east of the Los Padres National Forest and adjacent to the upper Piru Creek drainage lies the Hungry Valley State Vehicular Recreational Area, one of the largest off-road vehicle parks in California, with numerous trails crossing the landscape and streams. The U.S. Forest Service has been taking actions to close down and reroute off-highway vehicle trails that traverse sensitive habitats (including Lockwood Creek) and areas supporting arroyo toad populations. Mining, logging, and grazing have also impacted this watershed.

In addition to these anthropogenic impacts, the upper Piru Creek drainage also exhibits environmental conditions that likely add stressors to its trout populations. The area is prone to high temperatures, frequent wildfires, periods of drought, and localized sedimentation. In the summer and fall, water temperature is a critical limiting factor for trout, especially in low water years (Bloom 2002). Fire frequents this upland basin and, in 2006, one of the longest burning fires in California state history was ignited in the Los Padres National Forest (Day Fire). The Day Fire burned over 140,000 acres, including areas within the headwaters of the Piru drainage. The geology and hydrology of the area is conducive to a high degree of sediment movement, potentially negatively affecting spawning habitat, pool depth, water temperature, available instream cover, and diversity of macroinvertebrates (Bloom and Lentz 2002).

Despite these stressors, trout in Upper Piru Creek are self-sustaining and exhibit some of the highest growth rates of trout in California (Bloom 2002). The wild coastal rainbow trout located within this watershed are native and should be managed accordingly. Prior to 1979, DFG stocked rainbow trout in Piru Creek; however, recent genetic analysis of trout captured in upper Piru Creek shows that these fish appear to share little ancestry with hatchery strains of rainbow trout (Girman and Garza 2006). Current regulations allow a two-bag limit with gear restrictions (only artificial lures with barbless hooks may be used).

Direct observation survey data from 2008 show that Alamo Creek has the highest density of trout in the Upper Piru Creek watershed. Snowy and Buck Creeks appear to be the most heavily affected by the 2006 Day Fire and this may have significantly impacted Snowy Creek coastal rainbow trout populations. In 2007, it was noted that Snowy Creek was dry approximately ½ mile upstream from the confluence with Piru Creek. The extent of dewatering beyond the area surveyed was undetermined. In 2008, the HWTP resurveyed the same stretch of Snowy Creek, but continued upstream an additional mile. Flow was continuous; however, zero fish were observed in 2008. Low flow conditions in 2007, coupled with the 2006 fire, may explain the apparent absence of coastal rainbow trout in Snowy Creek in 2008. Due to the high-gradient nature of Snowy Creek, especially in the vicinity of Piru Creek, low flows may create barriers to upstream fish migration. These barriers may slow the rate of recolonization of Snowy Creek via fish moving upstream from Piru Creek. Further surveys in the upper reaches of the watershed are needed in order to assess whether isolated refugia populations exist in the very upper extent of Snowy Creek. Buck Creek showed relatively high fish density estimates (953 coastal rainbow trout per mile), compared to the other tributaries surveyed within the upper Piru drainage. However, in 2007, the HWTP estimated 1863 coastal rainbow trout per mile, nearly double that of the 2008 estimate. The total survey distance was 410.9 feet in 2007 and 543.0 feet in 2008 and the size class structure across both years remained nearly the same (except that small numbers of YOY were observed in all but one section



in 2007, but none were observed in 2008). This decrease in fish numbers in Buck Creek raises concerns over the status of this population and should be closely monitored.

Data on angler catch rates show this to be a fast action fishery (approximately two fish per hour). Since the 1980s, various analyses and fisheries assessments have been conducted throughout this watershed, including direct observation and electrofishing surveys, angler creel census, collection of tissue and scale samples, and habitat assessments.

## **Conclusion:**

The wild coastal rainbow trout found in the upper Piru drainage are genetically unique and provide an important recreational resource. The close proximity of this fishery to California's largest metropolitan area makes the watershed and its trout populations all the more valuable. The small tributaries of upper Piru Creek appear to be the lifeblood of the system and provide critical spawning habitat and thermal refugia. All size classes of trout were encountered (except extra-large fish) throughout the watershed. Based on voluntary reports and creel census, anglers appear satisfied with their recreational experiences on these waters, have high catch-per-unit efforts, and tend to release the trout caught here. The Upper Piru Creek watershed is a popular southern Californian fishery that merits long-term monitoring by the HWTP. Since the June, 2008 survey efforts, the HWTP recommended to the California Fish and Game Commission that the entire upper Piru Creek watershed be designated as a Heritage Trout Watershed. In September of 2008, the California Fish and Game Commission officially adopted Piru Creek, upstream of Pyramid Lake including all tributaries, as a designated California Heritage Trout Water.

## **References:**

Bloom, Roger K. 2002. Upper Piru Creek Wild Trout Management Plan (Unpublished Draft). State of California, Department of Fish and Game.

Flosi, Gary; S. Downie; J. Hopelain, et al. 1998. California Salmonid Stream Habitat Restoration Manual. State of California Resources Agency. 3<sup>rd</sup> Edition. Department of Fish and Game. Vol 1.

Girman, D. and J. Garza. 2006. Population structure and ancestry of *O. mykiss* populations in South-Central California based on genetic analysis of microsatellite data. Final Report for California Department of Fish and Game Project No. P0350021 and Pacific States Marine Fisheries Contract No. AWIP-S-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.

Rosgen, D.L., 1994. A Classification of Natural Rivers. Catena Vol 22 169-199.