

## **Little Kern golden trout (*Oncorhynchus mykiss whitei*) Survey**

**Upper Soda Spring Creek and Quinn Meadow Creek,  
Sequoia National Park,  
28 August 2013**



I. Chellman – NPS

## Introduction

Isaac Chellman, Sequoia and Kings Canyon National Park (SEKI) aquatic ecosystems lead biological technician, was tasked by Danny Boiano (SEKI Aquatic Ecologist) to conduct a survey of putative Little Kern golden trout (*Oncorhynchus mykiss whitei*; hereafter “LKGT”) populations in southern Sequoia National Park (SNP). Given historic detections and geographic location, observed trout were presumed to be LKGT, in the absence of additional information (e.g., expert identification and genetic testing). The purpose of this survey was to:

1. Determine whether LKGT were still present following the Lion Fire (summer 2011) and two years (2012 and 2013) of below average rainfall and snow pack,
2. Obtain information on current LKGT relative abundance and age class distribution, and
3. Investigate basic habitat composition of the stream channel and immediately surrounding area.

This work will help inform both NPS resource managers and the California Department of Fish and Wildlife (CDFW) about the current status of LKGT populations in SNP.

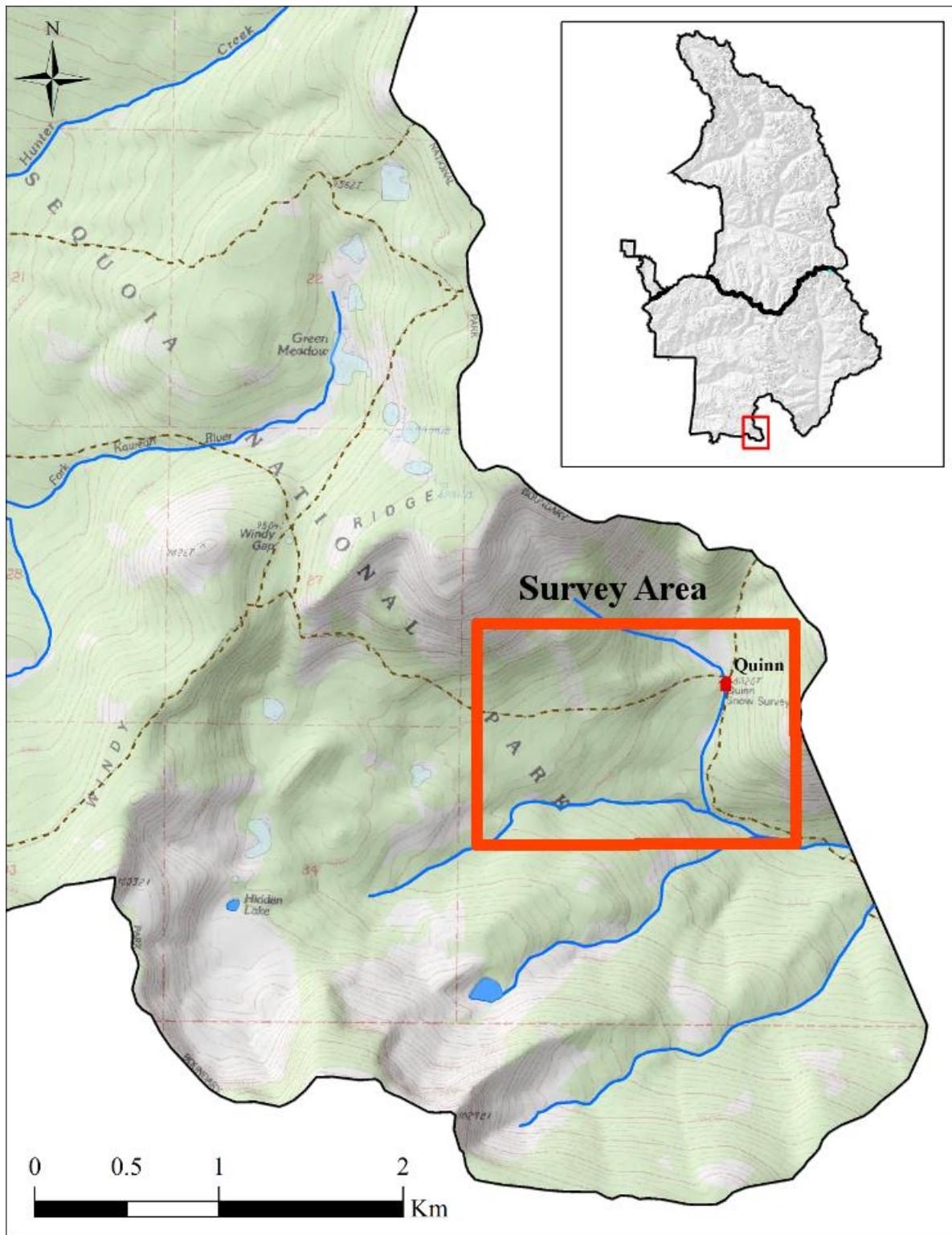
## Methods

Surveys were conducted on three stream segments, south of Quinn Peak and due west of Soda Butte (**Figures 1 and 2**). The stream segments are known as Quinn Meadow Creek and Upper Soda Springs Creek (Christenson 1984; **Figure 3**). Both areas are small headwater streams of the Little Kern River drainage in the extreme southwest section of SNP, west of the Golden Trout Wilderness of Sequoia National Forest.

LKGT were observed visually from above the water surface. The water was clear with relatively little disturbance at the surface, so fish were easy to see. Polarized glasses were used to further improve visibility. Basic habitat conditions were noted and photos were taken to document the general conditions in the survey area. Given limited time and the generalized goals of this survey, precise measurements of substrate composition, channel depth, vegetative species, and flow were not recorded.

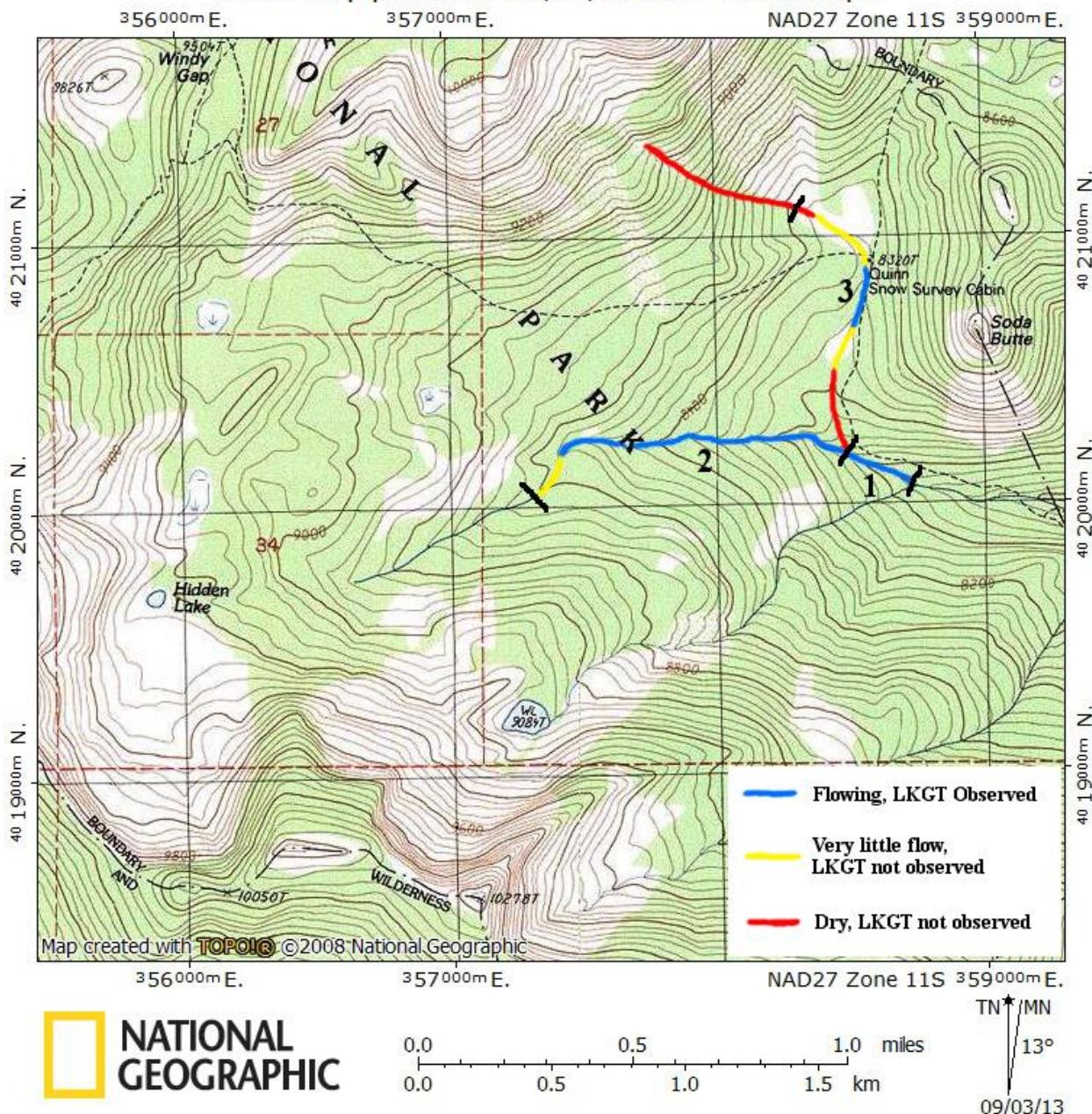
## Data Collected

1. Number and size classes of putative LKGT observed.
2. Photos of fish and surrounding habitat.
3. General notes on habitat composition in stream channel and immediately surrounding area.
4. GPS coordinates of beginning and end points of survey reaches.
5. Natural history observations in stream channel.



**Figure 1.** Area surveyed for Little Kern golden trout in Sequoia National Park. Surveyed sections included upper Soda Spring Creek and Quinn Meadow Creek.

TOPO! map printed on 09/03/13 from "Untitled.tpo"



**Figure 2.** Three stream segments (numbered 1, 2, and 3, in black), surveyed for Little Kern golden trout on 28 August 2013, demarcated by a black bars crossing perpendicular to the stream. The area above the upstream black bar of segment 3 could be observed from below and appeared completely dry. Therefore, the headwaters of segment 3 were not surveyed directly.

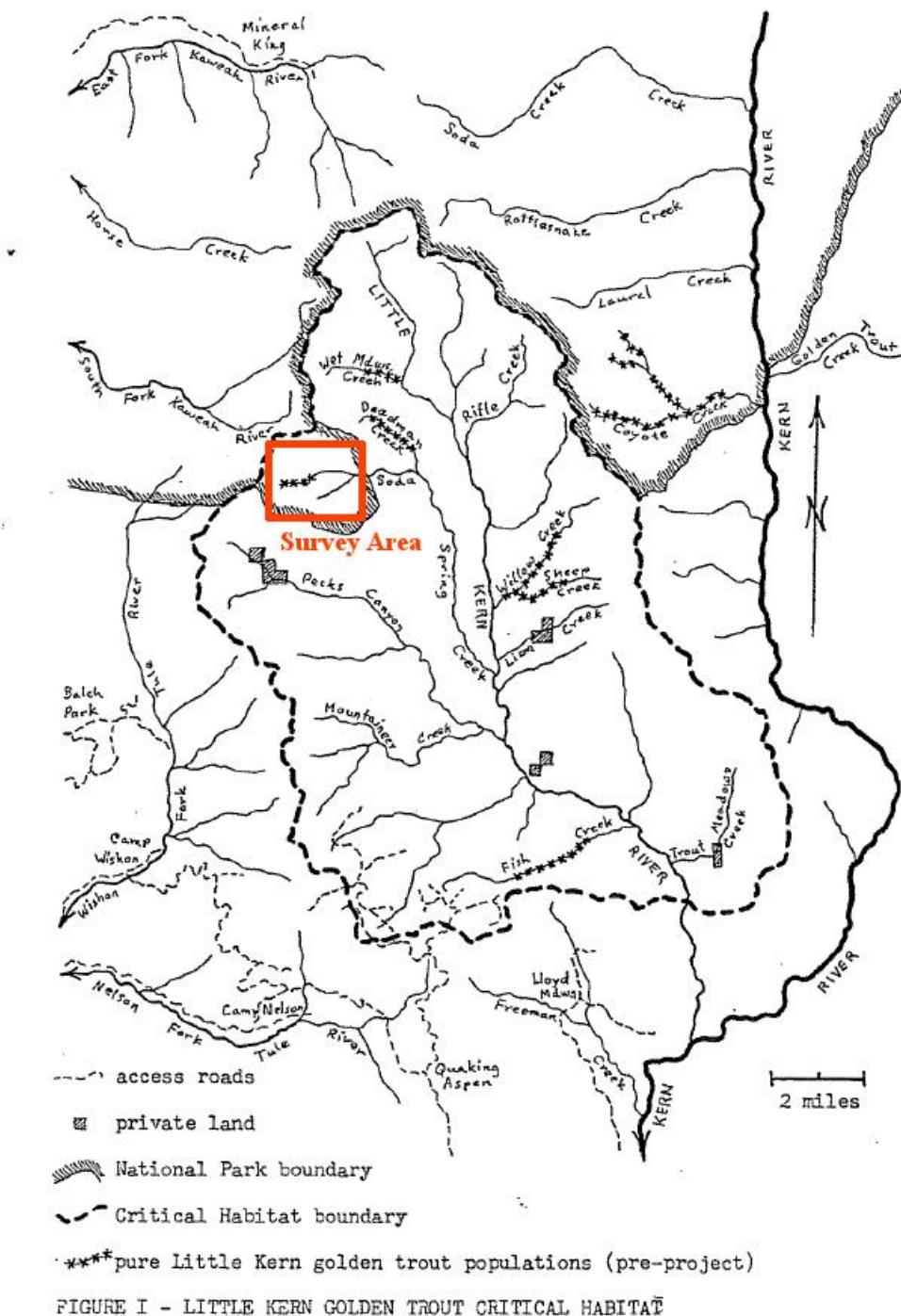


FIGURE I - LITTLE KERN GOLDEN TROUT CRITICAL HABITAT

**Figure 3.** From Christenson (1984), Figure 1, Pg. 5, depicting historic locations of presumed pure Little Kern golden trout populations prior to the early 1980's.

## Results

Counts of LKGT (**Figures 4 and 5**) by stream segment and size class observed on 28 August 2013 are shown in **Table 1**.

**Table 1.** Little Kern golden trout (LKGT; *Oncorhynchus mykiss whitei*) observations by stream segment and size class.

	YOY	1+/Up to 10 cm	10–20 cm	20–30 cm	TOTAL
<b>Soda Spring Creek (below confluence)</b>	7	46	62	0	115
<b>Soda Spring Creek (above confluence)</b>	32	33	92	0	157
<b>Quinn Meadow Creek</b>	0	1	18	0	19



**Figure 4.** Adult LKGT in Soda Spring Creek.



**Figure 5.** 1+ LKGT in Soda Spring Creek.

## **Habitat Composition of Surveyed Stream Segments**

### **Segment 1:**

UTM 358673E, 4020262N upstream to 358409E, 4020391N (Zone 11N, NAD83)

Start Time: 0830    End Time: 0952    Stream distance surveyed: ~400 m

The stream channel is deeply entrenched (~3 m) and eroded, especially on the southern bank (**Figure 6**), through this whole segment. However, the northern bank is more moderate, ~1 m adjacent to the stream, before sloping gradually up to the trail (see left side of **Figure 7**). Toward the upstream end of Segment 1, both banks are high, but not as steep or eroded as farther downstream. Small deciduous trees, shrubs, and herbaceous vegetation are thick in the downstream end of this segment (**Figure 8**). Although more open than the downstream half, the upstream end of Segment 1 contains a large amount of herbaceous and woody vegetation.

The stream was shallow (<0.2 m) with occasional pools up to 1 m deep. Most LKGT were observed within the deeper pooled areas. Stream substrate was predominantly cobble and boulder, with a smaller proportion of pebbles and gravel (**Figure 7**). No substantial siltation was observed, but there were several areas in which dense filamentous algae was present (**Figure 9**). Water was clear, cool, and flowing at ~0.5 m/s through the entire segment.



**Figure 6.** Eroded banks along southern shore of Segment 1, Soda Spring Creek, SNP



**Figure 7.** General view of Segment 1, Soda Spring Segment 1, Soda Spring Creek, SNP.



**Figure 8.** Thick vegetation in channel of Segment 1, Soda Spring Creek, SNP.



**Figure 9.** Filamentous algae in Segment 1, Soda Spring Creek, SNP.

### Segment 2:

UTM 358409E, 4020391N upstream to 357256E, 4020253N (Zone 11N, NAD83)

Start Time: 1005    End Time: 1150    Stream distance surveyed: ~1500 m

The lower reach of Segment 2 is wider and more open than Segment 1. The stream channel is deeply entrenched on both banks (~3.5 m banks on both shores) for the first ~250 m of the Segment, beginning at the confluence with Quinn Meadow Creek (similar to **Figure 6**). In the first 250 m proceeding upstream from the confluence, the stream channel is wide and deciduous vegetation is sparser than in Segment 1 (**Figures 10 and 11**). Above ~250 m, the banks gradually lower, until there is very little entrenchment (**Figure 11**). Approximately 1 km upstream of the confluence of Quinn Meadow Creek and Soda Springs Creek, the banks are low (~0.5 to 1 m) and the surrounding landscape plateaus. The vegetation is much thicker in this low gradient, upstream section (**Figure 12**). Upstream of this plateau area, the stream divides into two branches, both flowing from the west. No LKGT (**Figure 13**) were seen in the stream from this point upstream. The main stream channel becomes smaller and continues up a steep gradient through thick woody vegetation. Above this point, the landscape plateaus again at a swampy meadow with large conifers. Surveying was terminated at this point since no fish had been seen for several hundred meters.

The stream was shallow (0.2–0.5 m) with occasional pools up to 1.5 m deep. As with Segment 1, most fish were observed within the deeper pooled areas. Stream substrate was predominantly cobble and boulder (**Figure 10**), with a smaller proportion of pebbles and gravel. Water was clear, cool, and flowing at ~0.5 m/s through the entire segment.



**Figure 10.** Wide, eroded section of Segment 2, Soda Spring Creek, SNP.



**Figure 12.** Thick vegetation in stream channel, Upper section of segment 2, Soda Spring Creek, SNP.



**Figure 11.** Stream channel approximately 500 m up Segment 2, Soda Spring Creek, SNP.



**Figure 13.** Adult LKGT in Segment 2, Soda Spring Creek, SNP.

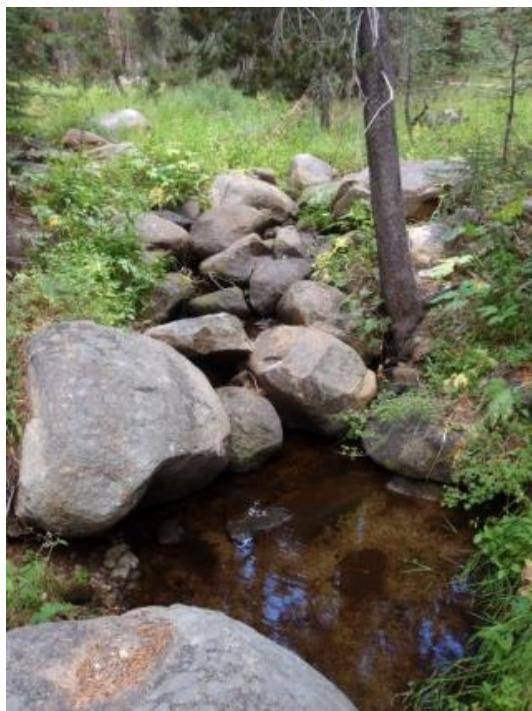
Segment 3:

UTM 358409E, 4020391N upstream to 358207E, 4021322N (Zone 11N, NAD83)

Start Time: 1220    End Time: 1300    Stream distance surveyed: ~1200 m

Segment 3 is deeply entrenched for ~200 m upstream from the confluence with Soda Spring Creek. Surveying upstream, the banks lower and the surrounding landscape slope becomes more gradual prior to the first meadow (~300 m south of Quinn Cabin). No water was flowing between the confluence with Soda Spring Creek upstream to the first meadow. A few very small, stagnant pools were present, but no fish were observed. Shallow water was present in the meadow; however, the herbaceous vegetation in the meadow was very dense and no fish were seen.

Just upstream of the meadow, Quinn Meadow Creek is flowing and contains intermittent pools  $\leq 0.5$  m deep (**Figure 14**). Stream substrate was predominantly boulder, sand, and gravel, but there was more detritus and silt present than observed in Soda Spring Creek (**Figure 14**). The water in this segment was cold and there was very little flow. However, there were LKGT present in several small pools for the next ~150 m upstream from the meadow. Approximately 50 m from Quinn Cabin, the flow was further reduced and no additional LKGT were observed. After crossing the trail, a small, thickly vegetated channel with a tiny amount of water proceeded along the south side of Quinn Cabin Meadow, flowing down from the northwest. However, no LKGT were observed in Quinn Cabin Meadow and the water appeared far too shallow and sparse to support any fish. Above Quinn Cabin Meadow, the stream stopped flowing completely and there was no sign of water along the steep hill from which the stream seasonally flows along the southeast side of Quinn Peak.



**Figure 14.** A pool approximately 100 m upstream from the meadow south of Quinn Cabin. This is within the only area of Segment 3 that contained flowing water.

### **General Upland Habitat Notes and Natural History Observations**

In the sections of stream Segments 1 and 2 where LKGT were observed, fish were seen consistently along the stream. LKGT occurred more frequently in pools, but fish were also observed in stream riffles, runs, and other non-pool areas. Although 2013 was one of the driest seasons on record, and followed another exceptionally dry season in 2012, there was still steady flow along the section of Soda Spring Creek where LKGT were observed. The water supply was far more restricted in Segment 3. However, LKGT were still present in small pools, connected by a tiny stream, through a segment ~150 m long between the first meadow south of Quinn Cabin and Quinn Cabin Meadow. The trout observed in Segment 3 were surprisingly large (many nearly 20 cm total length), particularly given the limited water supply available. The water flowing into the section of Segment 3 below Quinn Cabin appeared to be groundwater (likely held in the water table below Quinn Cabin Meadow). Despite the small quantity and nearly complete lack of flow, the water was very cold, which is probably why the LKGT were able to survive with such limited habitat.

The surrounding upland all through the survey area was burned during the 2011 Lion Fire. There was still clear evidence of fire in the forest surrounding all three stream Segments. However, the most obvious evidence of burning was on Segment 2, for approximately 500 m, beginning ~250 m upstream from the confluence with Quinn Meadow Creek. Many downed trees were crossing the stream channel and present in the surrounding forest. There was evidence of erosion (e.g., steep banks, limited bankside vegetation, recently exposed boulders) in Soda Spring Creek, although it is not clear how recent the erosion occurred or if it was related to the vegetation lost during the Lion Fire. Although erosion was evident, thick, healthy herbaceous and woody vegetation was found throughout the stream channels.

No other fish species were observed in the surveyed stream segments. As expected, no Southern Mountain Yellow-legged Frogs (*Rana muscosa*) were seen in any of the streams or meadows. A large number of yellow jackets were observed foraging in the downstream half of Segment 1. One American dipper (*Cinclus mexicanus*) was observed in Segment 2.

### **Literature Cited**

Christenson, D.P. 1984. The revised fishery management plan for the Little Kern Golden Trout. California Department of Fish and Game. Available from:  
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=56393>