

# **HOT SPRINGS CREEK**

Alpine County, California

## **2006 Stream Habitat Survey Report**



Prepared By:

Carson Ranger District: Humboldt-Toiyabe National Forest

## **Introduction**

Hot Springs Creek is located in Alpine County, California. The creek flows in a southeasterly direction for approximately 7.0 miles from Burnside Lake to the confluence with Pleasant Valley Creek. Combined, these two creeks form Markleeville Creek, which feeds into the East Fork Carson River approximately 1 mile downstream. Hot Springs Creek originates at an elevation of approximately 8200 feet and descends to 5500 feet at the confluence with Pleasant Valley Creek. Hot Springs Creek flows through federal, state, and private lands. The majority of the stream is located within the boundaries of the Humboldt-Toiyabe National Forest (See map for ownership).

## **Purpose and Need**

The 1995 Lahontan Cutthroat Trout Recovery Plan requires that ecosystem management plans be developed for the Truckee and Walker River basins in order to both determine objectives for the future desired conditions of these watersheds, and to create strategies for achieving these objectives. Similar management plans are recommended for the Carson and Humboldt River basins. In 1998 Truckee and Walker River Basin Recovery Implementation Teams were organized to develop strategies for Lahontan cutthroat trout (LCT) restoration and recovery efforts in the Truckee and Walker River basins. In August 2003 both recovery teams completed Short-Term Action Plans for Lahontan Cutthroat Trout Recovery in the Truckee and Walker River Basins. The short-term action plans outline specific tasks to be completed within five years. Many of the short-term tasks identified in the Truckee and Walker River Basin Short-Term Action Plans are similar to one another and are applicable to recovery of LCT in the Carson River basin. The Carson Ranger District adopted some of the short-term tasks identified in the Truckee and Walker River Basin Short-Term Action Plans and began implementing these actions under an informal plan for the Carson River basin. These tasks include: (1) identifying and evaluating fish passage and existing barriers within the Carson River basin, (2) developing a watershed analysis of the physical components of the Carson River basin, and (3) initiating habitat surveys to evaluate potential LCT introduction streams and validating against existing LCT inhabited streams.

The Carson River watershed historically provided an estimated 405 miles of stream habitat (Kling and Mellison 2008) for the native Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*). Populations of these salmonids within the watershed were interactive and interconnected, and therefore these metapopulations likely had high genetic diversity and were capable of long term persistence through adverse conditions.

At present, no self-sustaining populations of genetically pure LCT are known to occupy historic habitat within the Carson River basin and since all of the drainage has been surveyed it is doubtful that any such populations remain to be discovered.

The introduction of nonnative trout before the turn of the century is believed to be largely responsible for the extirpation of LCT within the Carson River drainage.

Although naturally occurring Lahontan cutthroat trout populations have been eliminated from the Carson River drainage, small populations have been established in the formerly fishless headwaters of the East Fork Carson River above Carson Falls and in the tributaries Murray Canyon Creek, Golden Canyon Creek, and Poison Flat Creeks above impassible barriers. Pure populations of LCT also occur in Red Lake, Heenan Lake, Heenan Creek, and possibly in Raymond Meadows Creek. Hybridized populations of LCT occur in Jeff Davis Creek and in Leviathan Creek upstream of Leviathan Mine. The artificially established pure populations of LCT in the East Fork Carson River watershed occupy about 17 miles of stream habitat: approximately 4.2% of the total miles that LCT presumably occupied historically.

The primary causes for the decline of LCT include: 1) reduction and alteration of stream discharge; 2) alteration of stream channels and morphology; 3) degradation of water quality; and 4) introductions of non-native fish species. The Carson River watershed downstream of Carson Falls is primarily inhabited by non-indigenous salmonids which include, but are not limited to: rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). These competitive and aggressive introduced fishes have displaced the endemic Lahontan cutthroat trout.

Long term survival and recovery of LCT within the Carson River watershed will require sustained cooperation and effort from multiple federal and state agencies, including the Forest Service and personnel of the Humboldt-Toiyabe National Forest. Gaining information through immediate action can aid in prioritizing future objectives for the restoration of LCT. The 2006 Carson River watershed surveys are being conducted to gain information about streams in the basin, and furthermore to provide an inventory of potential fish habitat for LCT. The surveys include the tasks of identifying potential fish passage barriers and evaluating physical characteristics that pertain to the success of the native LCT. Should recommendations be made to re-introduce LCT, these surveys can provide baseline information for future management of the fishery. Hot Springs Creek was surveyed by members of the Carson Ranger District of the Humboldt-Toiyabe National Forest on June 12 and June 14, 2006. The surveyors were Brian Hodge and Robert Omann.

## **Materials and Methods**

Forest Service personnel surveyed Hot Springs Creek by hiking the watercourse in an upstream manner from the upper private property boundary to Burnside Lake. Interesting and relevant features were documented, photographed, and recorded into a Trimble GPS unit. These features included but were not limited to: road crossings, trail crossings, fish sightings, permanent fish barriers, seasonal fish barriers, tributaries, springs, beaver dams, areas of erosion concern, grazing impacts, dispersed campsites, etc.

Fish passage barriers were noted and categorized into one of four categories: natural-permanent, natural-seasonal, artificial-permanent, and artificial-seasonal. A permanent barrier is categorized as an obstacle, waterfall, or drop in excess of 5ft that would prevent passage of fish year-round (specifically LCT). A stadia rod was used to measure barriers where applicable. Barriers categorized as permanent barriers may actually be seasonal barriers, and some seasonal barriers may actually act as a permanent barrier.

## **Results**

Approximately 6.3 miles of Hot Springs Creek were surveyed. The gradient of the stream is approximately 7.6 percent. At the private property boundary near Markleeville, the temperature of Hot Springs Creek was 8° C on June 12. Three permanent fish barriers were documented on the upper portion of the stream (Sites 25, 26, & 31). Six tributaries were identified (Sites 2, 3, 19, 21, 22, & 28). Two road-stream crossings were noted (Sites 15 & 20), and two trail crossings were noted (Sites 23 & 30). Five campsites were observed (Sites 8, 9, 11, 12, & 18). Three points of erosion concern were recorded (Sites 6, 14, & 16). Photo points were taken at Sites 4, 5, 7, 10, 13, 17, 24, & 32. Non-native salmonids were seen at Site 29.

## **Discussion**

Hot Springs Creek provides 3.1 miles of favorable potential LCT habitat between Site 1 and Site 25 and 0.7 miles between Site 31 and Site 33 (3.8 miles total). Between Site 1 and Site 25, Hot Springs Creek is a low gradient stream with an extensive network of pools and riffles. Zero fish barriers were recorded within this reach. Erosion concerns, though observed, were not prevalent enough to have a substantial impact on the stream. Non-native salmonids were not observed in this reach; however, this could be attributed to increased fishing pressure and human impact from the town of Markleeville. The diversion canal that runs parallel to the stream between Sites 4 and 7 is an example of human impact in the area. Dispersed camping is also prevalent along the reach (evidenced by the campsites located at Sites 8, 9, 11, 12, and 18). In general, human interaction due to the streams proximity to a road and the state park seems to be the largest concern for this section of stream.

Between Sites 25 and 31, Hot Springs Creek has a high gradient with documented barriers at Sites 25, 26, & 31. The photo associated with Site 31 effectively illustrates the gradient and presence of several barriers between Site 25 and Site 31. One group of salmonids was observed in this region at Site 29. However, their location in small isolated pools provided limited connectivity with the rest of the drainage. Therefore, the reach between Sites 25 and 31 could be inhabited by LCT only by incidental downstream movement.

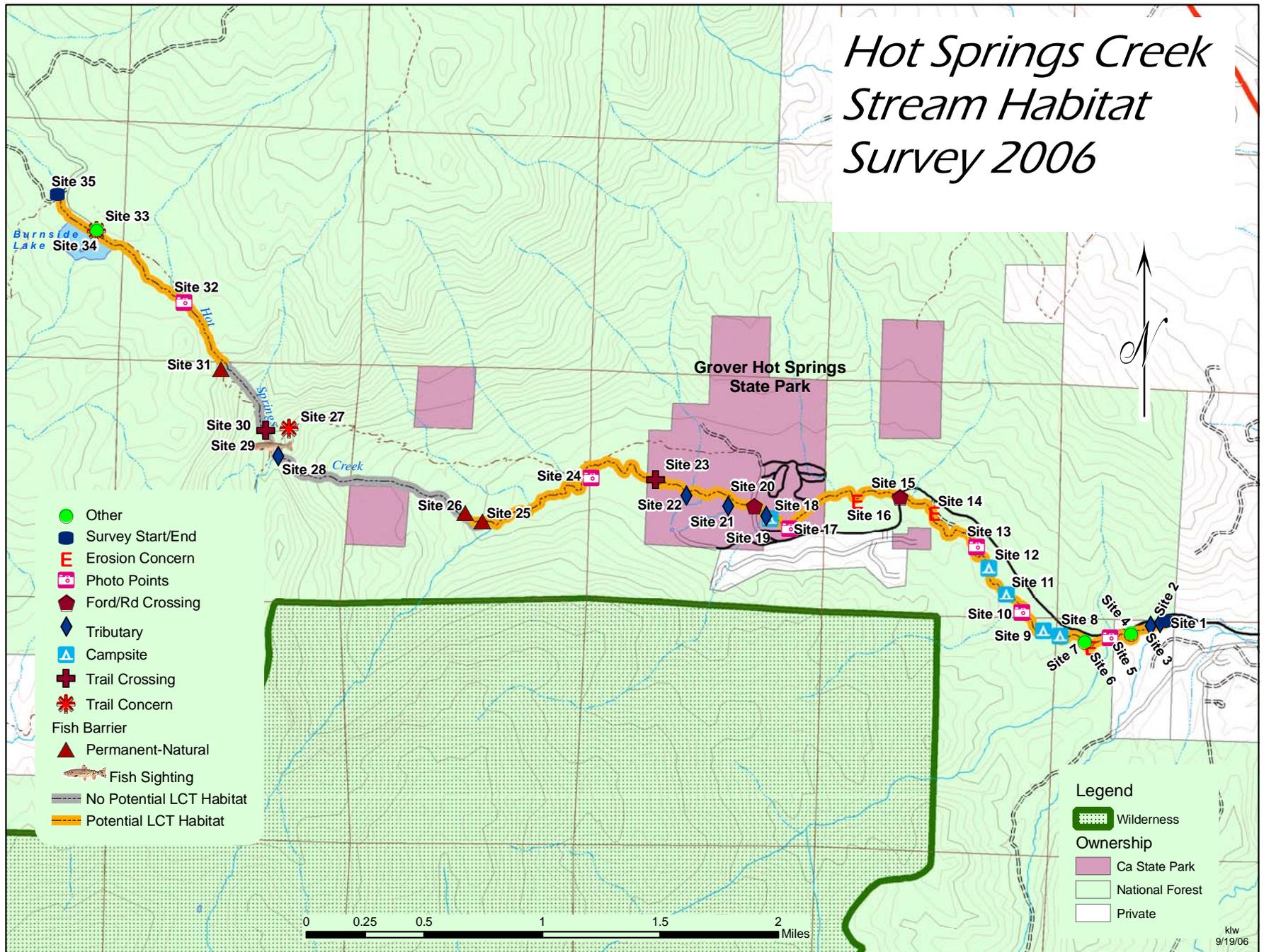
Between Site 31 and Site 33 the stream flows through a low gradient meadow and forest. Small salmonids were observed in this upper reach, which is approximately

0.7 miles long including Burnside Lake. This finite amount of water could provide potential LCT habitat, though due to the isolation and limited length, this section is unfavorable for any long-term persistence excluding a lacustrine population.

### **Recommendations**

1. Consider the 3.1 mile section of Hot Springs Creek between Site 1 and Site 25 and the 0.7 mile section between Site 31 and Site 33 as potential LCT habitat. The section of stream between Sites 25 and 31 could inhabit LCT that reach this section through incidental downstream movement, but their connectivity with the rest of the drainage would be limited. Consider Hot Springs Creek a high candidate for restoration. Hot Springs Creek could contribute towards restoring a metapopulation of LCT in the area (See 2008 Carson River Summary Report).
2. Assess the efficiency and impact of the diversion canal (Site 7), making sure it is not acting as a one-way fish trap, nor diverting a quantity of water that exceeds the adjudicated rights.
3. Decommission those campsites located directly adjacent to the stream (within 100 ft), and close roadways allowing vehicle access into these camps. (See Sites 8, 9, 11, & 12).

# Hot Springs Creek Stream Habitat Survey 2006



- Other
- Survey Start/End
- E Erosion Concern
- 📷 Photo Points
- 🚗 Ford/Rd Crossing
- ◆ Tributary
- ⛺ Campsite
- ✚ Trail Crossing
- ✚ Trail Concern
- Fish Barrier
- ▲ Permanent-Natural
- 🐟 Fish Sighting
- No Potential LCT Habitat
- - - Potential LCT Habitat

- Legend**
- 🌿 Wilderness
  - 🏞️ Ca State Park
  - 🌲 National Forest
  - 🏠 Private



klw  
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**Site 1:** Hot Springs Creek, Carson Ranger District. Start point of survey looking upstream through some underbrush. This photo portrays the general characteristics of this reach. This site is located at UTM: N: 4286067 & E: 256133, Elev. 5620 ft (1713 m).



**Site 2:** Hot Springs Creek, Carson Ranger District, looking down at a small tributary on the river's left bank. This tributary contributes less than 1% of total volume. Site 2 is located at UTM: N: 4286056 & E: 256097, Elev. 5627 ft (1715 m).



**Site 3:** Hot Springs Creek, Carson Ranger District, a cross-stream photo looking at a tributary on the river's right bank. This tributary contributes 20% of the volume to Hot Springs Creek. This site is located at UTM: N: 4286040 & E: 256032, Elev. 5627 ft (1715 m).



**Site 4:** Hot Springs Creek, Carson Ranger District, a downstream photo looking at an irrigation canal located on the river's left bank. This site is located at UTM: N: 4285987 & E: 255900, Elev. 5652 ft (1723 m).



**Site 5:** Hot Springs Creek, Carson Ranger District. Photo of a culvert and stagnant water pool located on the river's left bank. This site is located at UTM: N: 4285942 & E: 255750, Elev. 5656 ft (1724 m).



**Site 6:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo taken of an erosion concern located river right. This site is located at UTM: N: 4285894 & E: 255625, Elevation 5646 ft (1721 m).



**Site 7:** Hot Springs Creek, Carson Ranger District. Downward photo taken of the diversion canal gate. Note that the canal is diverting 3% of flow from the stream. This site is located at UTM: N: 4285933 & E: 255583, Elev. 5676 ft (1730 m).



**Site 8:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of a campsite located on the rivers left bank. This site is located at UTM: 4285968 & E: 255410, Elev. 5663 ft (1726 m).



**Site 9:** Hot Springs Creek, Carson Ranger District. Photo of a dispersed campsite located on the river's left bank. This site is located at UTM: N: 4286003 & E: 255257, Elev. 5669 ft (1728 m).



**Site 10:** Hot Springs Creek, Carson Ranger District. Upstream photo of the habitat characteristic of this reach.



**Site 11:** Hot Springs Creek, Carson Ranger District. Campsite located 5 m from the stream on the river's left bank. This site is located at UTM N: 4286260 & E: 255045, Elev. 5686 ft (1733 m).



**Site 12:** Hot Springs Creek, Carson Ranger District. Photo of a dispersed campsite. This site is located at UTM: N: 4288433 & E: 254924, Elev. 5692 ft (1735 m).



**Site 13:** Hot Springs Creek, Carson Ranger District. Upstream photo of characteristic habitat. Note that it is a meandering stream. This site is located at UTM: N: 4286585 & E: 254847, Elev. 5679 ft (1731 m).



**Site 14:** Hot Springs Creek, Carson Ranger District. Photo of an erosion concern occurring on the river's left bank. The dimensions of the eroding bank are 1 m high by 30 m long. This site is located at UTM: N: 4286805 & E: 254554, Elev. 5712 ft (1741 m).



**Site 15:** Hot Springs Creek, Carson Ranger District. Upstream shot of a bridge-type road-stream crossing. This site is located at UTM: N: 4286919 & E: 254320, Elev. 5735 ft (1748 m).



**Site 16:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of an erosion concern. The dimensions of the eroding bank are 2 m high by 30 m long. This site is located at UTM: N: 4286919 & E: 254320, Elev. 5735 ft (1748 m).



**Site 17:** Hot Springs Creek, Carson Ranger District. Upstream photo of potential LCT habitat: pools and riffles are characteristic of this section. This site is located at UTM: N: 4286711 & E: 253567, Elev. 5797 ft (1767 m).



**Site 18:** Hot Springs Creek, Carson Ranger District. Photo point of the campground located on the stream banks of Grover Hot Springs State Park, on the river right bank.



**Site 19:** Hot Springs Creek, Carson Ranger District. Photo of a small tributary entering on river right. The tributary contributes 3% to the volume in Hot Springs Creek.



**Site 20:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of a bridge over Hot Springs Creek. This site is located at UTM: N: 4286864 & E: 253324, Elev. 5850 ft (1783 m) taken from bridge.



**Site 21:** Hot Springs Creek, Carson Ranger District. Photo of a small tributary flowing in from the hot springs on the creek's right bank. This tributary contributes 1% of flow. This site is located at UTM: N: 4286878 & E: 253165, Elev. 5837 ft (1779 m).



**Site 22:** Hot Springs Creek, Carson Ranger District. Photo of a small tributary on the river's right bank that contributes less than 1% of flow. This site is located at UTM: N: 4286929 & E: 252867, Elev. 5840 ft (1780 m).



**Site 23:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of a footbridge crossing the stream. This site is located at UTM: N: 4287041 & E: 252657, Elev. 5846 ft (1782 m).



**Site 24:** Hot Springs Creek, Carson Ranger District. Upstream photo of habitat characteristic of this reach. This site is located at UTM: N: 4287050 & E: 252216, Elev. 5889 ft (1795 m).



**Site 25:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of a permanent fish barrier. The waterfall was estimated to be 50 ft tall. This site is located at UTM: N: 4286751 & E: 251478, Elev. 5978 ft (1822 m).



**Site 26:** Hot Springs Creek, Carson Ranger District. Upstream view of a permanent fish barrier: the waterfalls are an estimated 20 ft high.



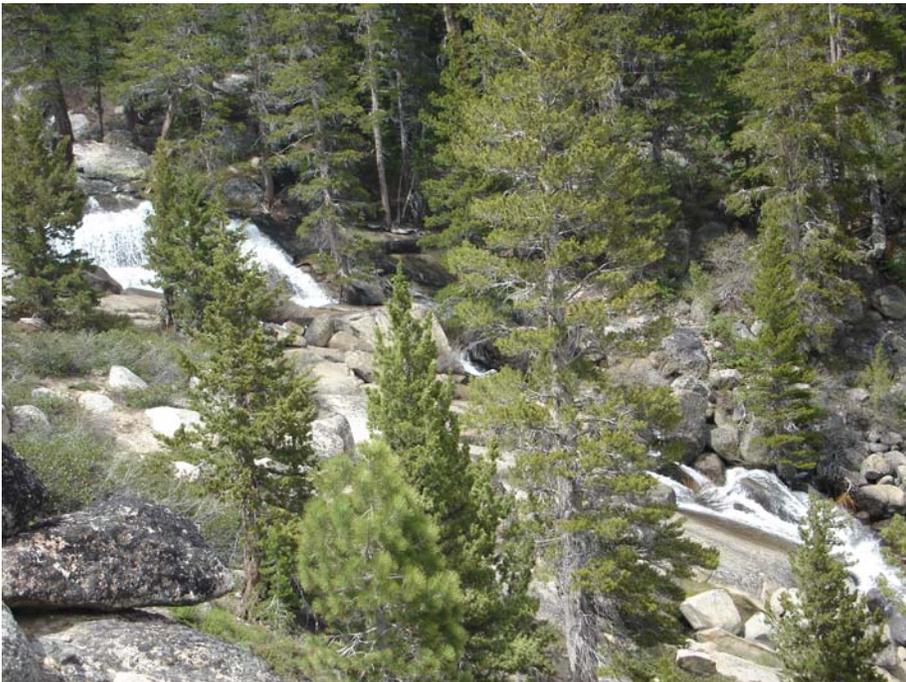
**Site 28:** Hot Springs Creek, Carson Ranger District. The tributary Charity Valley Creek contributes approximately 66% of flow to Hot Springs Creek. Hot Springs is located on the right hand side of the photo. This site is located at UTM: N: 4287194 & E: 250084, Elev. 7100 ft (2164 m).



**Site 29:** Hot Springs Creek, Carson Ranger District. Photo of a small salmonid observed in a pool just above the confluence of Hot Springs and Charity Valley Creeks.



**Site 30:** Hot Springs Creek, Carson Ranger District. Photo of a trail-stream crossing open to foot traffic only. This site is located at UTM: N: 4287384 & E: 250004, Elev. 7362 ft (2244 m).



**Site 31:** Hot Springs Creek, Carson Ranger District. Cross-sectional photo of a permanent fish barrier formed by a waterfall. This site is located at UTM: N: 4287789 & E: 249694, Elev. 7927 (2416 m).



**Site 32:** Hot Springs Creek, Carson Ranger District. Upstream photo of Hot Springs Creek. The stream goes through a low gradient marsh and forest. This site is located at N: 4288249 & E: 249439, Elev. 8120 ft (2475 m).



**Site 33:** Hot Springs Creek, Carson Ranger District. Photo of Burnside Lake. This site is located at UTM: N: 4288738 & E: 248847, Elev. 8143 ft (2482 m).



**Site 34:** Hot Springs Creek, Carson Ranger District. Trailhead of path down to Grover Hot Springs State Park. Note the absence of a sign, which is one reason that this trail is difficult to follow between Site 32 and Site 34. This site is located at UTM: N: 4288738 & E: 248847, Elev. 8143 ft (2482 m).



**Site 35:** Hot Springs Creek, Carson Ranger District. Survey endpoint above Burnside Lake, where the headwaters of Hot Springs Creek enter the basin. This site is located at UTM: N: 4288981 & E: 248573, Elev. 8140 ft (2481 m).