

LEVIATHAN CREEK

Alpine County, California

2006 Stream Habitat Survey Report



Prepared by

Carson Ranger District: Humboldt- Toiyabe National Forest

Introduction

Leviathan Creek is located in Alpine County, California. The mainstem of Leviathan Creek flows for approximately 4.0 miles in a northerly direction from an elevation of 7750 feet to the confluence with Mountaineer Creek at 6240 feet. Below this confluence, the stream is known as Bryant Creek, which flows approximately 6.0 miles to the East Fork Carson River. Leviathan Creek contributes 60 percent of the flow to Bryant Creek and Mountaineer Creek contributing the remaining 40 percent.

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. Leviathan Creek was surveyed on May 23rd, 2006 by members of the Carson Ranger District of the Humboldt-Toiyabe National Forest. The surveyors were Brian Hodge and Robert Omann.

Materials and Methods

Forest Service personnel surveyed Leviathan Creek by hiking the watercourse in an upstream manner. 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 1.58 miles of Leviathan Creek were surveyed from the confluence of Mountaineer and Leviathan Creeks up to a point just upstream of the permanent fish barrier found at Site 14. The gradient of the surveyed reach is approximately 4.7 percent. At the confluence of Mountaineer and Leviathan Creeks, the discharge of Leviathan Creek was approximately 2.5 cfs (cubic feet/second) on May 23, 2006. Two seasonal fish barriers were identified (Sites 8 & 10), though the road-stream crossing at Site 12 creates a seasonal barrier as well. One permanent fish barrier was located: a 25-foot naturally occurring waterfall located at Site 14. Three tributaries were documented (Sites 6, 9, & 13). Two campsites were documented (Sites 2 & 7). Two sites of erosion concern were identified (Sites 4 and 5). In addition, photos were taken at several points to document characteristics of the stream (Sites 1, 3, & 11). No fish were observed in Leviathan Creek, which can be partially attributed to the current turbidity in the watershed, likely a product of runoff from Leviathan Mine.

Discussion

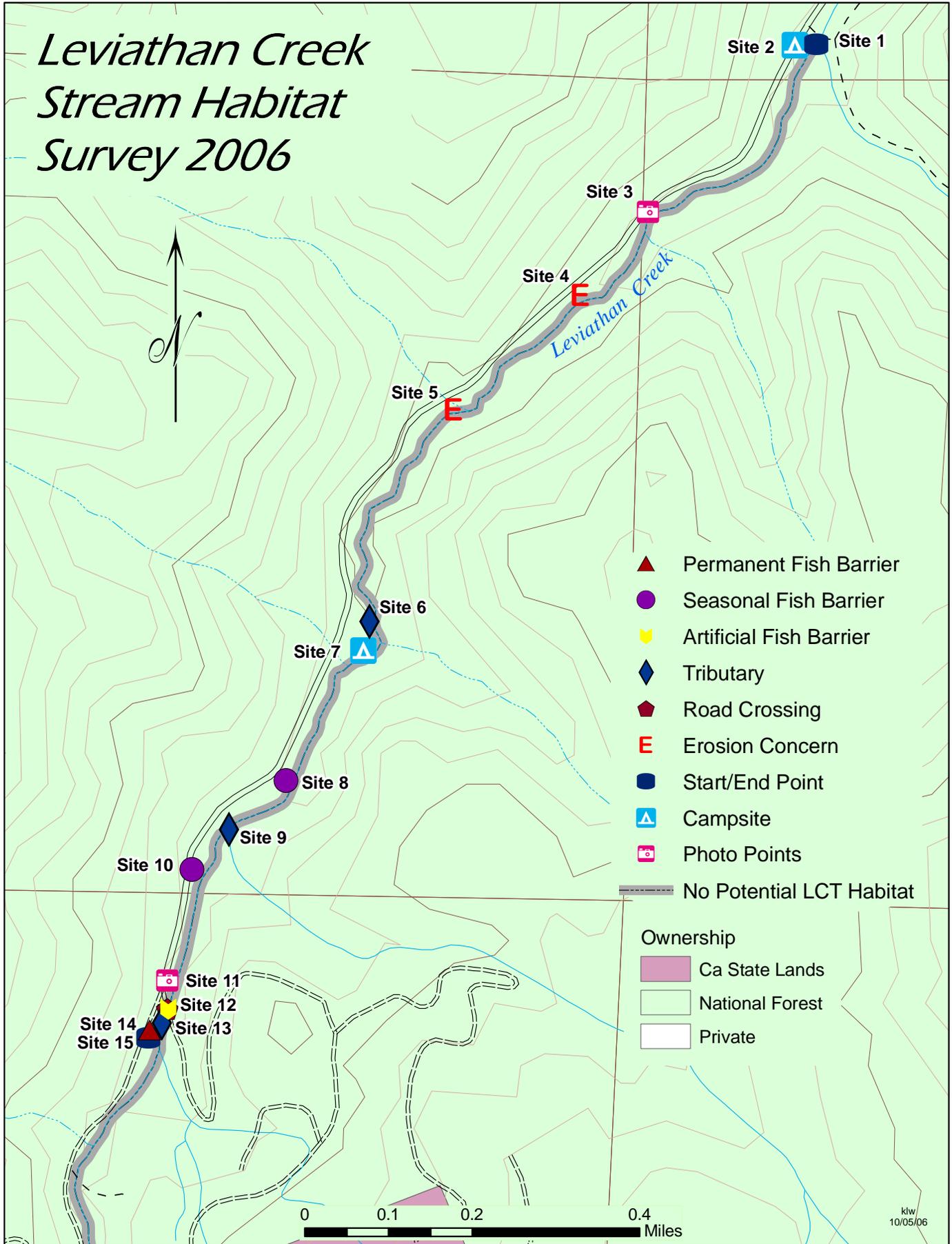
The presence of the Superfund site (Leviathan Mine) in the Leviathan Creek watershed makes the current biological condition of the stream appear marginal or unfavorable for aquatic life. Excluding concerns with water quality, the physical parameters of Leviathan Creek (gradient, width, depth, etc) fall within acceptable levels for LCT survival. Large numbers of pools, riffles, and woody debris could provide trout habitat. The erosion concerns noted at Sites 4 and 5 appear to have a negligible impact on the stream. Approximately 1.25 miles or more of Leviathan Creek are continuous (Sites 1-12), though two small seasonal barriers are located between the confluence of Mountaineer and Leviathan Creeks and the road-stream crossing at Site 12 (This forms a seasonal barrier). The manmade seasonal fish barrier formed by the culvert at Site 12 is of little consequence when considering the presence of a permanent barrier less than 30 meters upstream (Site 14).

Non-native salmonids have been sighted in Mountaineer and Bryant Creeks, providing evidence that these same species would likely occupy Leviathan Creek in the absence of mine drainage. However, water quality issues from the Leviathan Mine create current conditions so that Leviathan Creek cannot be qualified as potential LCT habitat.

Recommendations

1. Consider the 1.58 mile section of Leviathan between Site 1 and Site 15 as having no potential LCT habitat and consider Leviathan Creek a low candidate for restoration.
2. Work with state and federal agencies to closely monitor the water quality in Leviathan Creek. Assess impacts of runoff from Leviathan Mine on Leviathan and Bryant Creeks, and work to minimize negative influences on the aquatic inhabitants.
3. Remove the trash culvert material found in the streambed at Site 11.

Leviathan Creek Stream Habitat Survey 2006



- ▲ Permanent Fish Barrier
- Seasonal Fish Barrier
- ▲ Artificial Fish Barrier
- ◆ Tributary
- ⬠ Road Crossing
- E Erosion Concern
- Start/End Point
- ▲ Campsite
- 📷 Photo Points
- No Potential LCT Habitat

- Ownership
- Ca State Lands
 - National Forest
 - Private

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10/05/06



Site 1: Leviathan Creek, Carson Ranger District, looking downstream at the confluence with Mountaineer Creek. Note that Leviathan exhibits a turbid characteristic, whereas Mountaineer Creek is clear. This site is located at UTM: N: 4290552 & E: 296820, Elev. 6240 ft (1902m).



Site 2: Leviathan Creek, Carson Ranger District. Campsite located 20m from the confluence of Leviathan and Mountaineer Creeks. This site is located at UTM: N: 4290549 & E: 270071.



Site 3: Leviathan Creek, Carson Ranger District. Photo looking upstream. Note the turbidity in the watershed. This site is located at UTM: N: 4290229 & E: 269787, Elev. 6309 ft (1923m).



Site 4: Leviathan Creek, Carson Ranger District. Erosion concern found on the river right bank. This site is located at UTM: N: 4290063 & E: 269669, Elev. 6329 ft (1929m).



Site 5: Leviathan Creek, Carson Ranger District. Erosion concern during peak flow. This site is located at UTM: N: 4289844 & E: 269413, Elev. 6417 (1956m).



Site 6: Leviathan Creek, Carson Ranger District. A small tributary enters river right and contributes less than 1% of flow. Note that the tributary runs clear as it is not affected by runoff from the mine. This site is located at UTM: N: 4289446 & E: 269252, Elev. 6460 ft (1969m).



Site 7: Leviathan Creek, Carson Ranger District. Campsite located 30m from the streambed. The location of this site is UTM: N: 4289386 & E: 268242, Elev. 6447 ft (1965m).



Site 8: Leviathan Creek, Carson Ranger District. Seasonal fish barrier created by a natural waterfall 3ft in height with a pool depth of 1 foot. This site is located at UTM: N: 4289140 & E: 269092, Elev. 6486 ft (1977m).



Site 9: Leviathan Creek, Carson Ranger District. Clear running tributary enters river right and contributes 5% of flow. The tributary was found to be 2 feet wide and 6 inches deep. This site is located at UTM: N: 4289044 & E: 268985



Site 10: Leviathan Creek, Carson Ranger District. Seasonal fish barrier formed by a natural waterfall. Pool depth is 14 inches, with a barrier height of 2-3 feet. This site is located at UTM: N: 4288958 & E: 268915, Elev. 6575 ft (2004m).



Site 11: Leviathan Creek, Carson Ranger District. Photo of a trash culvert located in the streambed. Note that it is not a fish barrier. This site is located at UTM: N: 4288760 & E: 268864, Elev. 6627 ft (2020m).



Site 12: Leviathan Creek, Carson Ranger District. A culvert under the road is forming a seasonal fish barrier. Pool depth is 1.5 feet with a 16 inch waterfall. This site is located at UTM: N: 4288678 & E: 268864, Elev. 6578 ft (2005m).



Site 13: Leviathan Creek, Carson Ranger District. A clear running tributary enters on river right. The tributary contributes approximately 10% of Leviathan's flow and was found to be 2 feet wide and 4 inches deep. The tributary is located near the culvert shown at Site 12. This site is located at UTM: N: 4288675 & E: 268857, Elev. 6631 ft (2021m).



Site 14: Leviathan Creek, Carson Ranger District. A natural permanent fish barrier formed by a 25-foot waterfall. The location of this site is UTM: N: 4288666 & E: 268840, Elev. 6631ft (2021m).



Site 15: Leviathan Creek, Carson Ranger District. Upstream view of Leviathan Creek from the survey end point, located just upstream of the permanent barrier at Site 14. This site is located at UTM: N: 4288645 & E: 268826, Elev. 6583 feet (2007m).