

HORSETHIEF CREEK

Alpine County, California

2006 Stream Habitat Survey Reports



Prepared by:

Carson Ranger District: Humboldt-Toiyabe National Forest

Introduction

Horsethief Creek is located in Alpine County, California and flows for approximately 2.7 miles in a southerly direction before its confluence with the West Fork Carson River. The headwaters of Horsethief Creek originate at an elevation above 8131 feet and the mainstem descends to 6501 feet where it feeds into the West Fork Carson River. The entire watershed is found within the boundaries of the Humboldt-Toiyabe National Forest.

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. Horsethief Creek was surveyed on August 2, 2006 by Brian Hodge of the Carson Ranger District: Humboldt-Toiyabe National Forest.

Materials and Methods

Forest Service personnel surveyed Horsethief 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

The lowermost section (Sites 2-7) of Horsethief Creek is a continuum of fish passage barriers. In this section the stream descends 1132 feet in approximately 0.87 longitudinal miles: a 25% gradient. Several specific barriers were documented, though they represent only a few of the existing barriers. Two naturally occurring permanent barriers were noted (Sites 2 & 5). One artificial seasonal barrier was documented at Highway 88 (Also Site 2) where two culverts beneath the road create a 2.4 foot and 3.0 foot barrier, with maximum pool depths of 0.4 and 1.0 feet, respectively. The naturally occurring barrier was so close to the culverts that Site 2 was used to mark both features. Two road-stream crossings were noted: the aforementioned crossing of Highway 88, and another unmarked dirt road (Sites 3 & 12). Nine separate tributaries were noted from the survey start to survey end (Sites 7, 11, 13 left, 13 right, 17 left, 17 right, 18, 19, & 20). At Site 13 and Site 17 two tributaries entered Horsethief Creek at the same point, but from opposite directions. These points are documented by a single site number with a sub-heading to denote from which side of the stream they enter. One campsite was located (Site 10), and a culvert was found in the channel (Site 16). Fish sightings were specifically documented at Site 9 and at Site 14, however fish were seen from Site 7 up through the survey end (Site 21). In addition, several photo points were noted where pictures helped to capture characteristic sections of the stream (Sites 4, 6, 8, & 15).

Discussion

Approximately 1.4 miles of Horsethief Creek provide potential LCT habitat (Sites 7-17). The upper section of stream is made up of many horseshoe bends and in some instances the stream provides nearly twice as many river miles of habitat as a map portrays in longitudinal miles. Subsequently, 1.4 miles may be a conservative number.

The lowermost 0.87 miles of stream (Sites 2-7) is far too steep to provide LCT habitat, and therefore any anthropogenic changes (i.e. road-stream crossings, culverts, etc.) seem less consequential when considering fish habitat. The steep lower section acts as a significant passage barrier. The road stream-crossing at Site 12 consisted of an upside down half-pipe culvert, and passage is not hindered by this intersection. The trash culvert located at Site 16 does slightly alter the stream's natural flow, and serves no visible purpose.

Brook trout were sighted consistently between Site 7 and Site 21. Despite the small channel, Horsethief Creek has a visibly high carrying capacity for fish. Undercut banks and aspen forests provide adequate cover for abundant fish. In the upper section of Horsethief Creek the stream gains a large amount of water between Sites 17-20. Therefore, the reach between Site 7 and Site 17 offers sustainable LCT habitat, whereas the 0.45 mile section of stream between Site 17 and Site 21 provides seasonal LCT habitat.

Recommendations

1. Consider the 1.4 mile section of Horsethief Creek between Site 7 and Site 17 as potential LCT habitat and the 0.45 mile section of stream between Site 17 and Site 21 as seasonal LCT habitat. Consider Horsethief Creek a medium candidate for restoration.
2. Remove the trash culvert located in the stream at Site 16.

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Site 1 & 2: Horsethief Creek, Carson Ranger District. Downstream view of river right braid, just above the confluence with the West Fork. This section creates a 10-foot permanent fish barrier. This site is located at UTM: N: 4295625 & E: 249831, Elev. 6501 feet (1982m).



Site 1 & 2: Horsethief Creek, Carson Ranger District. Downstream view of river left braid just above the confluence with the West Fork. This section creates a 10-foot permanent fish barrier. This site is located at UTM: N: 4295625 & E: 249831, Elev. 6501 feet (1982m).



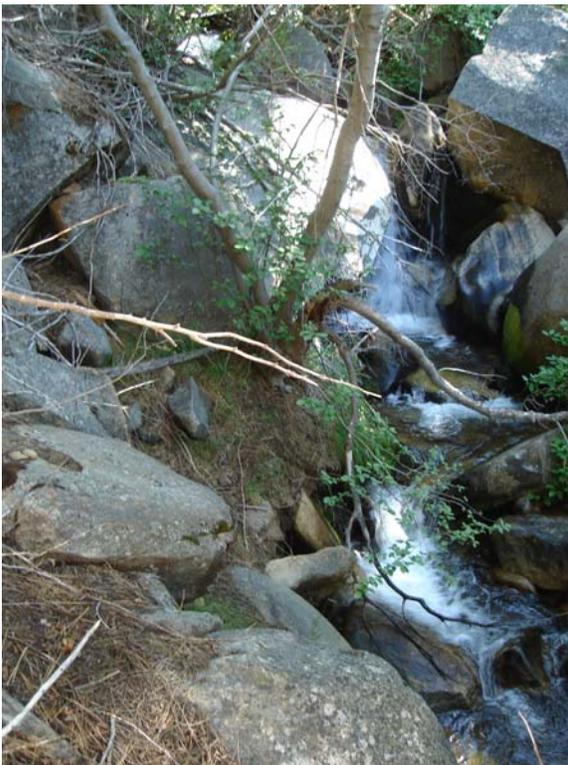
Site 2: Horsethief Creek, Carson Ranger District. For this culvert on the right, the braid drops 2.4 feet into a pool with maximum depth 0.4 feet. This site is located at UTM: N: 4295646 & E: 249839, Elev.6504 feet (1983m).



Site 2: Horsethief Creek, Carson Ranger District. Photo shows the river left braid that drops 3.0 feet out of the mouth of a culvert (max. pool depth 1.0 feet). This site is located at UTM: N: 4295646 & E: 249839, Elev.6504 feet (1983m).



Site 4: Horsethief Creek, Carson Ranger District. Upstream photo of creek and multiple cascades averaging 2.5 vertical feet.



Site 5: Horsethief Creek, Carson Ranger District. Upstream photo of a 9-foot waterfall that creates a permanent fish barrier. Note: the section between Site 4 and Site 5 is impassible.



Site 5 continued: Horsethief Creek, Carson Ranger District. Upstream photo of a waterfall located upstream of the barrier featured at Site 5.



Site 6: Horsethief Creek, Carson Ranger District. Photo shows a bird's eye view of the stream inside Horsethief canyon. This site is located at UTM: N: 4295679 & E: 249855.



Site 6: Horsethief Creek, Carson Ranger District. Upstream view of Horsethief Canyon where it opens into aspen forest. This site is located at UTM: N: 4295679 & E: 249855.



Site 7: Horsethief Creek, Carson Ranger District. Photo looking up at the confluence of Horsethief Creek and a tributary that enters on river right, adding 10% to the flow in the stream. This site is located at UTM: N: 4295679 & E: 249979, Elev. 7633 feet (2327m).



Site 7: Horsethief Creek, Carson Ranger District. Photo of a pool near the confluence where fish were sighted. This point marks the downstream end of potential LCT habitat. This site is located at UTM: N: 4295679 & E: 249979, Elev. 7633 feet (2327m).



Site 8: Horsethief Creek, Carson Ranger District. Upstream view of low gradient section of stream, with grassy banks. This site is located at UTM: N: 4297381 & E: 250076, Elev. 7633 feet (2327m).



Site 9: Horsethief Creek, Carson Ranger District. Photo of a pool where a fish was sighted. This site is located at UTM: N: 4297571 & E: 250051, Elev. 7820 feet (2384m).



Site 10: Horsethief Creek, Carson Ranger District. Photo of a campsite located 3m from the stream on river right. This site is located at UTM: N: 4286135 & E: 255155.



Site 11: Horsethief Creek, Carson ranger District. Photo of a small tributary entering on river left (3% contributing flow). This site is located at UTM: N: 4297827 & E: 250204, Elev. 7800 feet (2378m).



Site 12: Horsethief Creek, Carson Ranger District. Upstream photo of a road-stream crossing. This site is located at UTM: N: 4297863 & E: 250252, Elev. 7810 feet (2381m).



Site 13: Horsethief Creek, Carson Ranger District. Photo of one of two tributaries entering at this point. This tributary contributes approximately 20% of flow on river left. This site is located at UTM: N: 4298264 & E: 250206, Elev. 7800 feet (2378m).



Site 13: Horsethief Creek, Carson Ranger District. Photo of one of two tributaries entering at this point. This tributary contributes approximately 15- 20% of flow on river right. This site is located at UTM: N: 4298264 & E: 250206, Elev. 7800 feet (2378m).



Site 14: Horsethief Creek, Carson Ranger District. Upstream photo of a relatively narrow channel where brook trout was sighted. This site is located at UTM: N: 4298349 & E: 250248, Elev. 7862 feet (2397m).



Site 15: Horsethief Creek, Carson Ranger District. Upstream photo of an undercut bank providing cover for brook trout. This site is located at UTM: N: 4298693 & E: 250235, Elev. 7924 feet (2416 m).



Site 15: Horsethief Creek, Carson Ranger District. Upstream photo of a horseshoe bend typical of this reach. This site is located at UTM: N: 4298693 & E: 250235, Elev. 7924 feet (2416 m)



Site 16: Horsethief Creek, Carson Ranger District. Upstream view of a trash culvert in the channel. The culvert causes a slight restriction in flow, and therefore some water goes up and around. This site is located at UTM: N: 4298928 & E: 250336, Elev. 7938 feet, 2420m).



Site 17: Horsethief Creek, Carson Ranger District. Photo of a small tributary that enters on river left (2% contribution to flow). This site is located at UTM: N: 4299090 & E: 250401, Elev. 7957 feet (2426m).



Site 17: Horsethief Creek, Carson Ranger District. Photo of a small tributary that enters on river right (5-10% contribution to flow). This site is located at UTM: N: 4299090 & E: 250401, Elev. 7957 feet (2426m).



Site 18: Horsethief Creek, Carson Ranger District. Hidden in the grass in this photo is a tributary that enters on river right and contributes approximately 35% of the downstream flow in Horsethief Creek. This site is located at UTM: N: 4299441 & E: 250370, Elev. 8013 feet (2443m).



Site 19: Horsethief Creek, Carson Ranger District. Photo of a tributary that adds 10-20% to the total discharge in Horsethief Creek at this point. This confluence is located at UTM: N: 4299512 & E: 250365, Elev. 8020 feet (2445m).



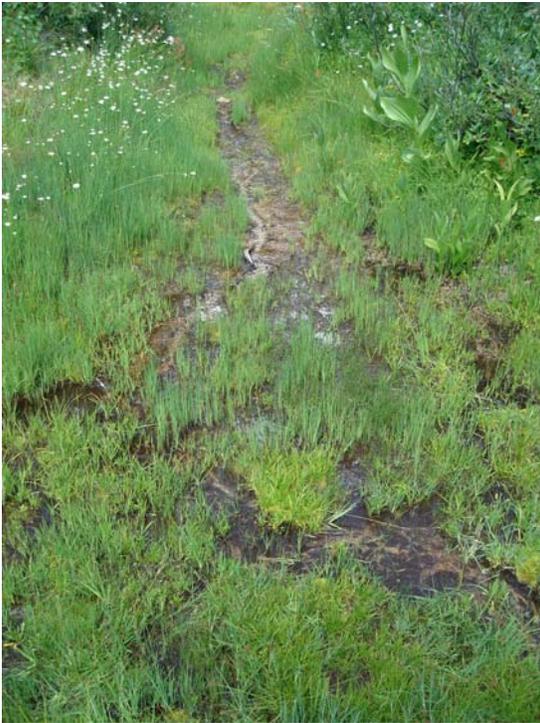
Site 19: Horsethief Creek, Carson Ranger District. Downstream view of Horsethief Creek from the confluence. This confluence is located at UTM: N: 4299512 & E: 250365, Elev. 8020 feet (2445m).



Site 20: Horsethief Creek, Carson Ranger District. Upstream photo of confluence of a tributary entering on river right (35% contribution). This site is located at UTM: N: 4299624 & E: 250375, Elev. 8056 feet (2456m).



Site 21: Horsethief Creek, Carson Ranger District. Upstream photo of the survey end point. Headwaters converge at this point to form the mainstem of Horsethief Creek. This site is located at UTM: N: 4299760 & E: 250430, Elev. 8131 feet (2479m).



Site 21: Horsethief Creek, Carson Ranger District. Upstream photo of the survey end point. Headwaters converge at this point to form the mainstem of Horsethief Creek. This site is located at UTM: N: 4299760 & E: 250430, Elev. 8131 feet (2479m).