

SILVER CREEK

Alpine County, California

2006 Stream Habitat Survey Report



Prepared By:

Carson Ranger District: Humboldt-Toiyabe National Forest

Introduction

Silver Creek is located in Alpine County, California. The mainstem of Silver Creek is approximately 9.2 miles long, and flows in a northeasterly direction from Lower Kinney Reservoir to the confluence with the East Fork Carson River. The stream originates at an elevation of 8499 feet and descends to an elevation of approximately 5853 feet where it feeds into the East Fork Carson River. Silver Creek is located primarily within the boundaries of the Humboldt-Toiyabe National Forest, though the channel passes through several parcels of private property in the middle segment of stream (See Attached Map).

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. Silver Creek was surveyed on August 28th, 29th, and September 27, 2006 by HTNF employee Robert Omann.

Materials and Methods

Forest Service personnel surveyed Silver 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

Two sections of Silver Creek were surveyed: a 4.49 mile segment between the East Fork Carson River and the confluence with Noble Creek, and another 1.76 mile segment between the upper Highway 4 bridge and a point 0.78 miles downstream of Lower Kinney Reservoir (Sites 1-27 & Sites 28-41, respectively). The overall gradient of the stream is 5.0 percent. A steep section of 2.18 miles was circumnavigated between Sites 27 and 28. The section between Site 27 and the nearest upstream road crossing near Silver Creek campground, although not surveyed, based on reviewing a topographic map this short section may provide potential LCT habitat. The section between the road crossing near Silver Creek campground and Site 28 was impassible to fish and hikers (SEE MAP). Eleven fish passage barriers were identified throughout the stream: eight seasonal barriers (Sites 14, 18, 19, 30, 31, 32, 34, 37), and three permanent barriers (Sites 28, 33, & 39). Several additional permanent barriers are likely to occur between Sites 27-28. Three campsites were documented (Sites 3, 20, & 24). Seven tributaries were identified throughout the stream, including Pennsylvania Creek and Noble Creek (Sites 11, 15, 17, 21, 26, 27, & 35). Three specific fish sightings were documented (Sites, 5, 23, 38), and in addition, fish were also present in the meadow at Site 40. Photos were taken to document stream characteristics throughout the survey (Sites 2, 7, 8, 9, 13, 25, 29, & 40). Three erosion concerns were noted (Sites 6, 10, & 16). Five road-stream crossings were documented where Wolf Creek Road or Highway 4 intersect the stream (Sites 4, 12, 22, 28, & 36).

Discussion

Silver Creek provides approximately 5.4 miles of potential LCT habitat. The entire 4.49 mile length of Silver Creek between Site 1 and Site 27 provides potential LCT habitat; and in addition, the section of stream between Site 39 and Site 41 provides 0.86 miles of potential LCT habitat. Although not surveyed, the Silver Creek section between Site 27 and the road crossing near Silver Creek campground may also provide potential LCT habitat.

Silver Creek is a relatively large stream with an abundant population of non-native trout. The lower reach (Sites 1-27) is a relatively low-gradient reach which provides ample cover and habitat complexity. The section of stream between Site 28 and Site 39 is steeper than the lower reach and contains eight fish passage barriers. The permanent barriers are formed by obstacles including culverts and naturally occurring falls. The barrier at Site 33 for example is formed by a 50 foot long cascades sequence, with a vertical height of 10.0 feet. Brook trout are abundant between Site 39 and Site 41, as this segment of stream offers favorable fish habitat with an absence of barriers. Above Site 41 permanent barriers prohibit upstream migration towards Lower Kinney Reservoir.

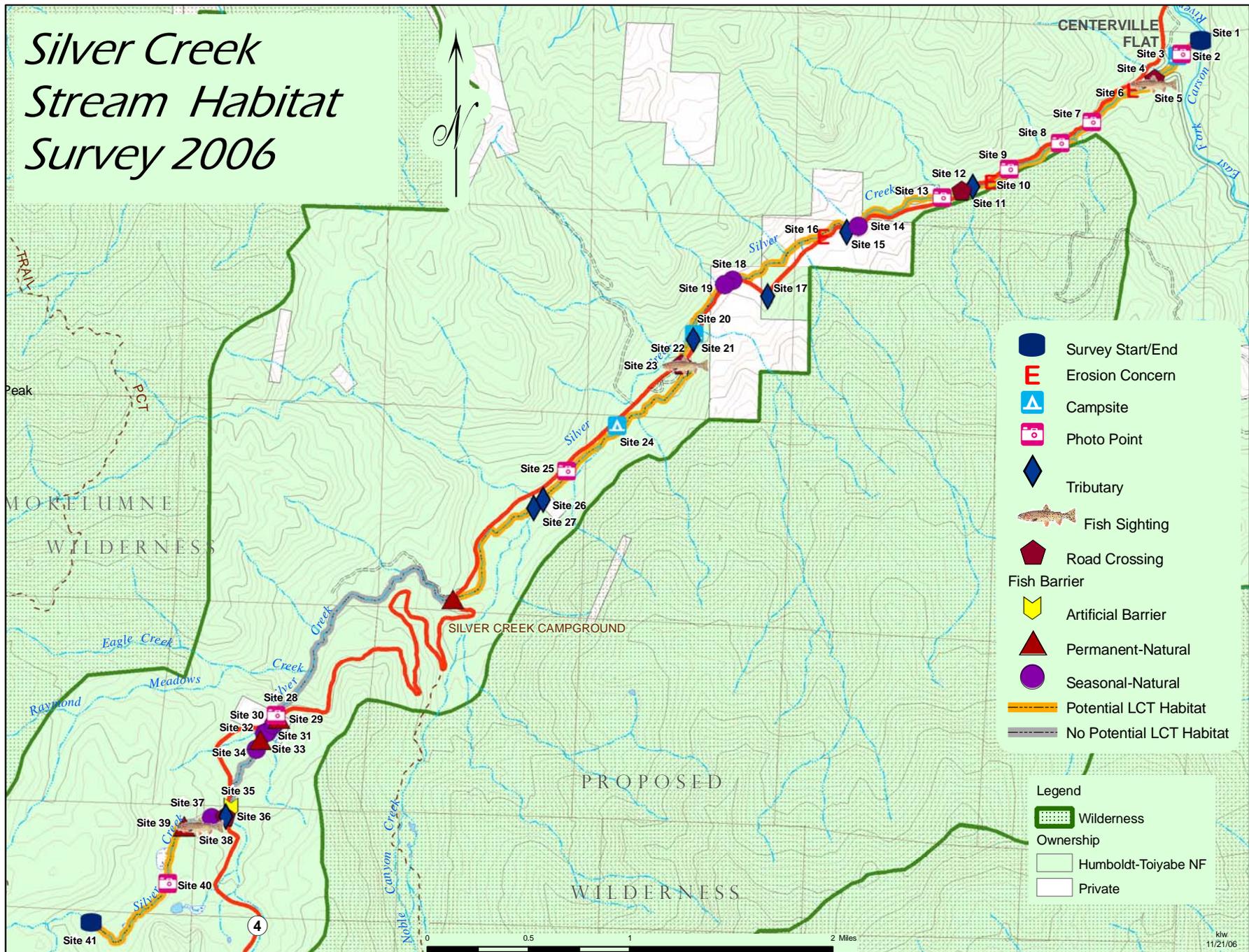
The location of Silver Creek adjacent to Highway 4 makes it a popular destination among anglers as well as recreational campers. Human impacts may be exacerbating erosion along the stream banks in several locations due to the proximity of the stream to the highway. The popularity of fishing in Silver Creek as well as easy public access makes

the stream less conducive to the idea of restoration, and more conducive to the idea of stocking.

Recommendations

1. Consider the 4.5 mile section of Silver Creek between Site 1 and the Silver Creek Campground and the 0.86 mile section of Silver Creek between Site 39 and Site 41 as potential LCT habitat. Consider Silver Creek a medium candidate for restoration.
2. Post signs along the highway/stream interface reminding anglers and campers of personal responsibilities regarding trash, campsites, Leave-No-Trace, etc.
3. Consider managing Silver Creek as a put-and-take LCT fishery.

Silver Creek Stream Habitat Survey 2006





Site 1: Silver Creek, Carson Ranger District. Upstream photo of Silver Creek at the confluence with the East Fork Carson River. Silver Creek enters the East Fork on river left and contributes 33% of flow. This site is located at UTM: N: 4279216 & E: 263316 Elev. 5853 ft (1784 m).



Site 2: Silver Creek, Carson Ranger District. Upstream photo of habitat characteristic of Silver Creek. This site is located at UTM: N: 4279116 & E: 263168, Elev. 5872 ft (1790 m).



Site 3: Silver Creek, Carson Ranger District. Photo of a campsite on the left bank. This site is located at UTM: N: 4279101 & E: 263136, Elev. 5850 ft (1783 m).



Site 4: Silver Creek, Carson Ranger District. Photo of a road-stream crossing where Wolf Creek Road crosses Silver Creek. Note the minor erosion concerns on the left and right banks. This site is located at UTM: N: 4278918 & E: 262959 Elev. 5882 ft (1793 m).



Site 5: Silver Creek, Carson Ranger District. Cross-sectional photo shows a pool where a small salmonid was sighted. This site is located at UTM: N: 4278875 & E: 262945, Elev. 5906 ft (1800 m).



Site 6: Silver Creek, Carson Ranger District. A downstream photo showing the eroded left bank, this erosion is partially caused by the adjacent Highway 89. This site is located at UTM: N: 4278824 & E: 262779, Elev. 5922 ft (1805 m).



Site 7: Silver Creek, Carson Ranger District. Upstream photo. This site is located at UTM: N: 4278576 & E: 262456, Elev. 5984 ft (1824 m).



Site 8: Silver Creek, Carson Ranger District. Photo shows a deep pool within a narrow ravine. This site is located at UTM: N: 4278404 & E: 266207, Elev. 5971 ft (1820 m).



Site 9: Silver Creek, Carson Ranger District. Photo of a jar of salmon eggs found near a popular fishing hole. This site is located at UTM: N: 4278199 & E: 261801, Elev. 6046 ft (1843 m)



Site 10: Silver Creek, Carson Ranger District. A downstream photo showing an eroded right bank with dimensions 75m x 4 m. Appears to be naturally occurring. This site is located at UTM: N: 4278098 & E: 261650, Elev. 6066 ft (1849 m).



Site 11: Silver Creek, Carson Ranger District. Photo shows a small tributary entering on the right bank, contributing 5% of flow. This site is located at UTM: N: 4278063 & E: 261512, Elev. 6066 ft (1849 m).



Site 12: Silver Creek, Carson Ranger District. Upstream photo of Highway 4 crossing Silver Creek. This site is located at UTM: N: 4278032 & E: 261425, Elev. 6093 ft (1857 m).



Site 13: Silver Creek, Carson Ranger District Downstream photo of rip-rap placed on the steep banks along highway 89. This site is located at UTM: N: 4277963 & E: 261271, Elev. 6106 ft (1861 m).



Site 14: Silver Creek, Carson Ranger District. Upstream photo of a seasonal fish barrier formed by a 4.5 ft waterfall with a max pool depth of 3.1 feet. This site is located at UTM: N: 4277746 & E: 260605, Elev. 6211 ft (1893 m).



Site 15: Silver Creek, Carson Ranger District. Upstream photo of a tributary that enters on river right, and contributes 3% of flow. This site is located at UTM: N: 42777705 & E: 260515, Elev. 6224 ft (1897 m).



Site 16: Silver Creek, Carson Ranger District. Downstream photo of an erosion concern on left bank. This site is located at UTM: N: 4277664 & E: 260326, Elev. 6234 ft (1900 m).



Site 17: Silver Creek, Carson Ranger District. An upstream photo of a tributary entering river right (contributes 3% of flow to the stream). This site is located at UTM: N: 4277192 & E: 259885, Elev. 6316 ft (1925 m).



Site 18: Silver Creek, Carson Ranger District Upstream photo of a seasonal fish barrier formed by a fast moving chute, 3 ft in height. This site is located at UTM: N: 4277319 & E: 259609, Elev. 6312 ft (1924 m).



Site 19: Silver Creek, Carson Ranger District. Seasonal fish barrier formed by a long cascade, with overall height of 6.0 feet. (2.5 max pool depth). This site is located at UTM: N: 4277281 & E: 259545, Elev. 6329 ft (1929 m)



Site 20: Silver Creek, Carson Ranger District. Photo of a campsite located 4m from the stream on the right bank. This site is located at UTM: N: 4276893 N & E: 259303, Elev. 6394 ft (1949 m).



Site 21: Silver Creek, Carson Ranger District. A small tributary enters on river right contributing 2% of flow. This site is located at UTM: N: 4276848 & E: 259297, Elev. 6368 ft (1941 m).



Site 22: Silver Creek, Carson Ranger District Upstream photo of a road-stream crossing (Highway 4). This site is located at UTM: N: 4276652 & E: 259204, Elev. 6414 ft (1955 m).



Site 23: Silver Creek, Carson Ranger District. A cross-sectional photo shows the right bank where a salmonid was sighted. This site is located at UTM: N: 4276647 & E: 259229, Elev. 6378 ft (1944 m).



Site 24: Silver Creek, Carson Ranger District. Photo of a campsite with dimensions 20m x 20m, located 25m from the stream channel. This site is located at UTM: N: 4276167 & E: 258693, Elev. 6467 ft (1971 m).



Site 25: Silver Creek, Carson Ranger District. Upstream photo showing general habitat characteristics. This site is located at UTM: N: 4275807 & E: 258292, Elev. 6539 ft (1993 m).



Site 26: Silver Creek, Carson Ranger District. Upstream photo shows the confluence of Pennsylvania Creek and Silver Creek. Pennsylvania enters river left and contributes 33% of flow. This site is located at UTM: N: 4275578 & E: 258106, Elev. 6542 ft (1994 m).



Site 27: Silver Creek, Carson Ranger District Upstream photo at the survey end showing Noble Creek (left) enter Silver Creek (right). Noble Creek and Silver Creek contribute nearly equal amounts of water. This site is located at UTM: N: 4275513 & E: 258030, Elev. 6555 ft (1998 m).



Site 28: Silver Creek, Carson Ranger District. Downstream view of a permanent fish barrier underneath a Highway 4 bridge. This site is located at UTM: N: 4273844 & E: 256015, Elev. 7675 feet (2340m).



Site 29: Silver Creek, Carson Ranger District. Upstream photo shows habitat typical of this reach. This site is located at UTM: N: 4273831 & E: 255991, Elev. 7678 feet (2341m).



Site 30: Silver Creek, Carson Ranger District. Upstream photo of a seasonal fish barrier with a height of 4.0 feet, and a max. pool depth of 2.2 feet. This site is located at UTM: N: 4273795 & E: 255973.



Site 31: Silver Creek, Carson Ranger District. Upstream photo of a waterfall with height 3.9 feet and a longitudinal distance of 10.0 feet. This site is located at UTM: N: 4273725 & E: 255935, Elev. 7774 feet (2370 m).



Site 32: Silver Creek, Carson Ranger District. Upstream photo of a seasonal barrier with a height of 3.0 feet, and a max. pool depth of 1.5 feet. This site is located at UTM: N: 4273728 & E: 255903, Elev. 7715 feet (2352m).



Site 33: Silver Creek, Carson Ranger District. Cross-sectional photo of a 50 foot long cascade sequence with a vertical height of 10.0 feet. This obstacle forms a permanent fish passage barrier. This site is located at UTM: N: 4273649 & E: 255869, Elev. 7734 feet (2358m).



Site 34: Silver Creek, Carson Ranger District. A long longitudinal cascade forms a seasonal barrier. This site is located at UTM: N: 4273603 & E: 255844, Elev. 7718 feet (2353m).



Site 35: Silver Creek, Carson Ranger District. A tributary enters on river right and contributes 60% of flow. This site is located at UTM: N: 4273071 & E: 255591, Elev. 7928 feet (2417m).



Site 36: Silver Creek, Carson Ranger District. Bird's eye view taken from above a culvert at a road-stream crossing. The culvert forms a permanent fish passage barrier. This site is located at UTM: N: 4273074 & E: 255592, Elev. 7885 feet (2404m).



Site 37: Silver Creek, Carson Ranger District. A seasonal barrier is formed by a complex cascade sequence. This site is located at UTM: N: 4273042 & E: 255487, Elev. 7911 feet (2412m).



Site 38: Silver Creek, Carson Ranger District. A small brook trout was sighted in this pool within a low gradient reach. This site is located at UTM: N: 4272978 & E: 255385, Elev. 7938 feet (2420m).



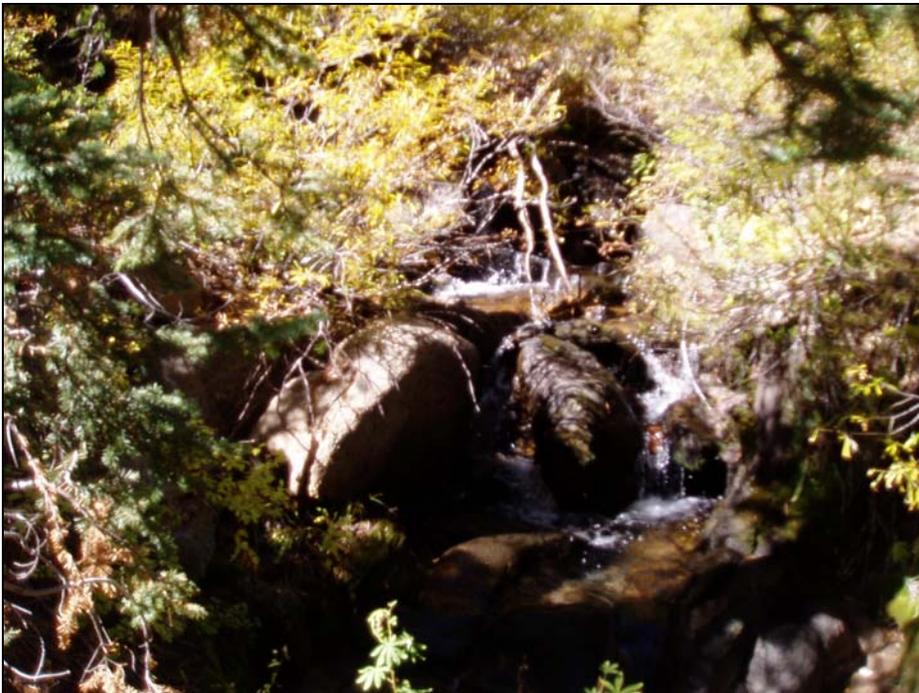
Site 39: Silver Creek, Carson Ranger District. A steep section of continuous cascades form a permanent barrier. This site is located at UTM: N: 4272985 & E: 2555263, Elev. 8036 feet (2450m).



Site 39: Silver Creek, Carson Ranger District. A steep section of continuous cascades form a permanent barrier. This site is located at UTM: N: 4272985 & E: 255263, Elev. 8036 feet (2450m).



Site 40: Silver Creek, Carson Ranger District. Photo shows a small meadow where small brook trout are abundant. This site is located at UTM: N: 4272527 & E: 255103, Elev. 8141 feet (2482m).



Site 41: Silver Creek, Carson Ranger District. Photo taken from the survey end point. Upstream of this site Silver Creek has a high gradient and therefore was not surveyed. This site is located at UTM: N: 4272225 & E: 254525, Elev. 8252 feet (2516m).