

WOLF CREEK

Alpine County, California

2006 Stream Habitat Survey Report



Prepared by:

Carson Ranger District: Humboldt-Toiyabe National Forest

Introduction

Wolf Creek is located in Alpine County, California and flows in a northerly direction from Arnot Peak to the East Fork Carson River over a course of approximately twelve miles. The headwaters originate at an elevation above 9200 feet and the stream descends to an elevation of 6038 feet where it feeds into the East Fork Carson River. Wolf Creek is located almost entirely within the boundaries of the Carson-Iceberg Wilderness and the Humboldt-Toiyabe National Forest. The stream flows through one small parcel of private land in Wolf Creek Meadows (SEE 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. Wolf Creek was surveyed on July 10, 11, & 17, and on September 1 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 Wolf 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 10.4 miles of Wolf Creek were surveyed (Sites 1-61), and an additional 1.50 mile section of stream was circumnavigated because it lies on private property (Sites 11-12). The overall gradient of the surveyed reach is 4.4 percent. Nine seasonal barriers were documented (Sites 6, 35, 41, 48, 51, 53, 54, 57, & 58). Four permanent fish passage barriers were documented, including Wolf Creek Falls (Sites 26, 40, 42, & 60). Seven campsites were noted, though others undoubtedly exist (Sites 5, 13, 15, 17, 20, 36, & 37). A total of seventeen tributaries were documented, including the three main tributaries: Dixon Creek, Bull Canyon Creek, and Elder Creek (Sites 9, 19, 22, 23, 24, 25, 28, 31, 34, 38, 39, 43, 45, 50, 55, 56, & 59). Fish sightings were specifically recorded at three locations (Sites 47, 49, & 52). In addition, fish were sighted below the barriers at Sites 26 and 35, and in a tributary at Site 38. Erosion concerns were noted at Sites 4 and 30. Other documented features included property boundaries (Site 12), diversions (Site 16), and barbed-wire fences (Site 46). Several trail concerns, including a trailhead and landslide, were recorded (Sites 18, 32, & 33). A trail crossing was documented at Site 44 and a road crossing at Site 11. In addition, eight photos were used to document stream characteristics throughout the survey (Sites 2, 3, 8, 10, 14, 21, 27, & 29). One adjacent road impact was documented at Site 7.

Discussion

Wolf Creek provides approximately 11.5 miles of potential LCT habitat (Sites 1-56). In addition, the tributary Elder Creek may provide an additional 1.5 miles of potential LCT habitat in the upper watershed.

Three of the four recorded permanent fish passage barriers (Sites 26, 40 & Site 42) on Wolf Creek separate the stream into three substantial and continuous sections: Sites 1-26, Sites 26-40, and Sites 42-57. The reach between Site 1 and Site 26 is approximately 6.0 miles long, including the 1.5 river miles flowing through private property. Between Site 26 and Site 40 the stream has a relatively low gradient and total of approximately 2.86 river miles. Wolf Creek Falls (Site 40) is comprised of two parts and has a total vertical height of 50-75 feet. The permanent barrier at Site 42 is a 10-foot waterfall with a maximum pool depth of approximately 5.0 feet. The distance between the waterfalls at Sites 40 and 42 is approximately 0.50 miles. The river mileage between Sites 42-57 is approximately 2.65 miles. Seasonal barriers are found throughout the drainage; however, most of these barriers are concentrated in the upper half of the watershed. Between Sites 1 and 40 two seasonal barriers exist: a 2.4 foot barrier (Site 6) and 3.3 foot barrier (Site 35). The barrier at Site 26, although referenced as a permanent barrier above, this site may actually only prohibit fish passage seasonally. This section of stream offers vegetative cover, habitat complexity, and has a verified capability of inhabiting fish.

Upstream of Site 42 the seasonal barriers range from 2.0 to 3.7 feet in height, inhibiting but not excluding fish passage. At Site 50 the survey progressed up the drainage that contributed the greatest amount of water at that confluence. The main stem of Wolf Creek provided 40% of the total flow; therefore, the survey progressed up an unnamed

headwater branch (SEE MAP). Above Site 57 the stream gradient is moderate and stream flows are minimal. This uppermost section of stream (Sites 57-61) does not provide favorable LCT habitat, and is further divided by a permanent barrier at Site 60.

Because Wolf Creek lies primarily within the Carson-Iceberg Wilderness, the stream has seen little anthropogenic change. Of the seven campsites noted, most were located within 100 feet of Wolf Creek, though they showed little evidence of use other than an abandoned fire ring. The single largest campsite along Wolf Creek is near the Wolf Creek trailhead (Site 17). During the survey more than ten trailers, riders, and sets of pack animals were present. Individual campsites are located 5-50 meters from Wolf Creek.

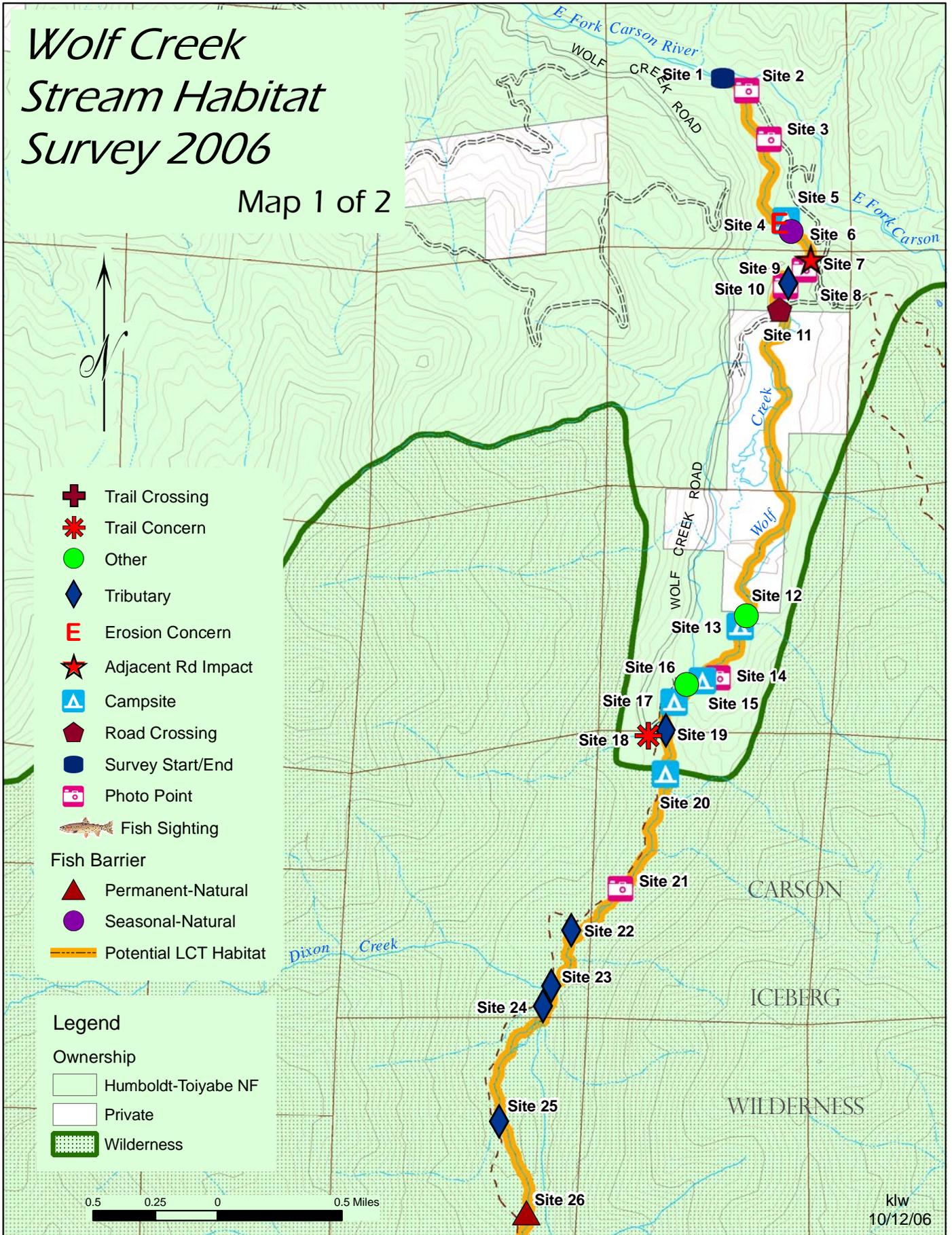
One major landslide event was documented and photographed as Site 30. A naturally occurring mudflow reached the floodplain and left a large debris pile, cutting through the main trail in the process. The photos associated with Sites 30-32 show the evidence of the event. At Site 33 the trail is located directly on an elevated stream bank. Any sort of slumping or further erosion will result in a piece of the trail falling into the channel below.

Recommendations

1. Consider the 11.5 mile section of Wolf Creek between Site 1 and Site 56 as potential LCT habitat and consider Wolf Creek a medium candidate for restoration.
2. Work with trail crews and Forest Service personnel to relocate the trail at Site 33 to a path further away from the high bank. A wash-out appears to be eminent.
3. Discuss with private landowners the possibility of fencing a riparian corridor along Wolf Creek (Sites 11-12). Explore the possibility of funding/cost-share on fencing in exchange for retiring acreage.
4. Investigate and enhance the effectiveness of the diversion at Site 16 to ensure that the adjudicated quantity of water is diverted, and to ensure that fish are not being terminally recruited into an irrigation canal.
5. Work with Forest Service personnel to maintain the integrity of both Wolf Creek and the campsite at Site 17. Consider opening more camping space away from the stream in order to close the areas adjacent to the watercourse. Decommission infrequently used campsites in the Wolf Creek watershed and encourage campers to utilize well established sites located at least 100 feet from the stream.
6. Enhance the visibility of Leave-No-Trace principles at trailheads leading into the Carson-Iceberg Wilderness.

Wolf Creek Stream Habitat Survey 2006

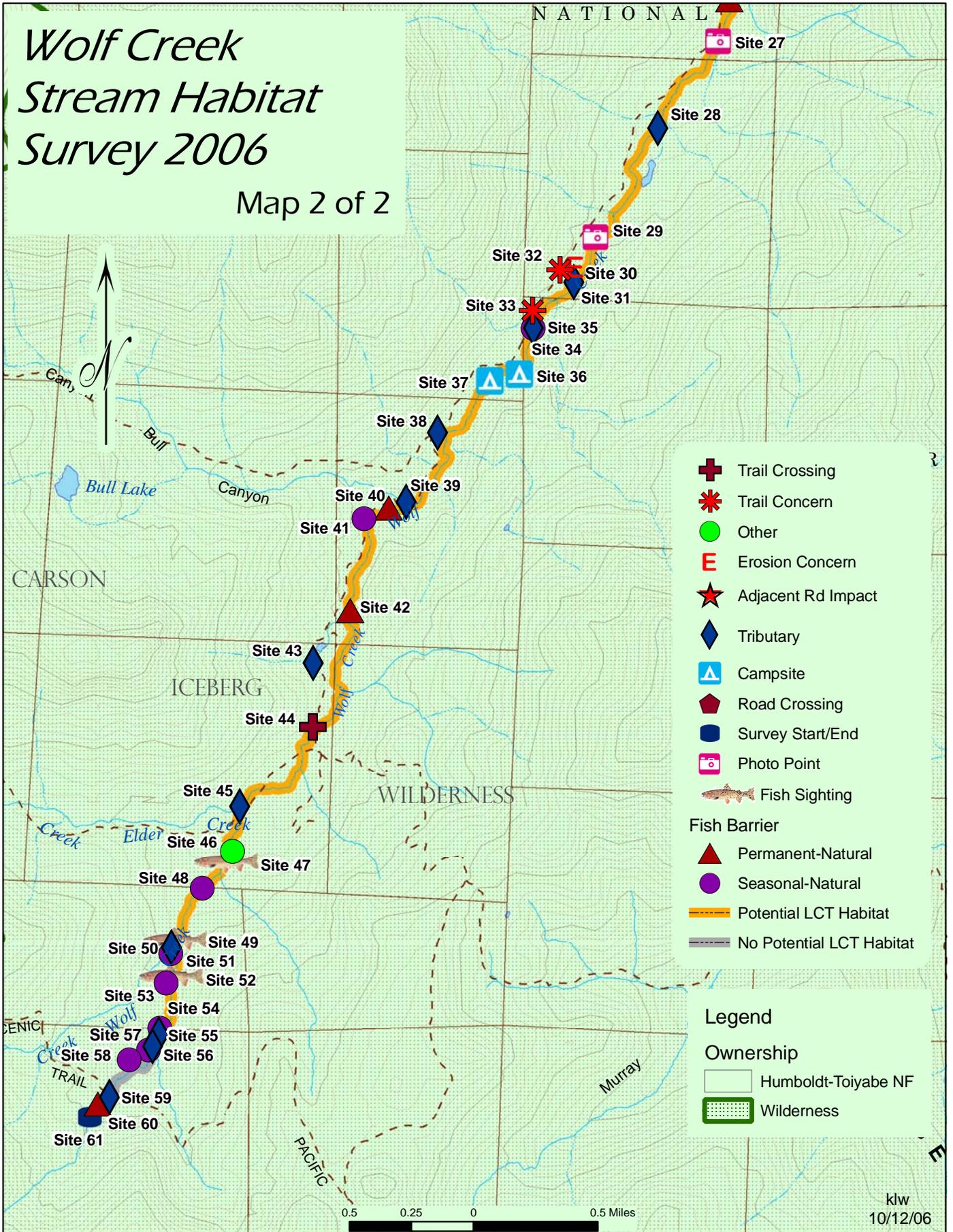
Map 1 of 2



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Wolf Creek Stream Habitat Survey 2006

Map 2 of 2





Site 1: Wolf Creek, Carson Ranger District. Downstream photo of the confluence of Wolf Creek (left) and the East Fork Carson River (right). Wolf Creek contributes an average of 30% to the downstream flow in the East Fork. This site is located at UTM: N: 4277190 & E: 265544, Elev. 6038 feet (1841m).



Site 1: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek just above the confluence with the East Fork. This site is located at UTM: N: 4277190 & E: 265544, Elev. 6038 feet (1841m).



Site 2: Wolf Creek, Carson Ranger District. Upstream photo shows typical cross-section: the outside of the bend is steep bedrock and the inside is a bar composed of cobble/boulder substrate. This site is located at UTM: N: 4277114 & E: 265699, Elev. 6055 feet (1846m).



Site 3: Wolf Creek, Carson Ranger District. Bird's eye view of stream from high right bank. Photo shows a deep pool and tail-water where one would expect to find fish. This site is located at UTM: N: 4276797 & E: 265838, Elev. 6140 feet (1872m).



Site 4: Wolf Creek, Carson Ranger District. Photo shows an exposed left bank (80m long & 5-20m tall), subject to erosion. This site is located at UTM: N: 4276252 & E: 265916, Elev. 6183 feet(1885m).



Site 5: Wolf Creek, Carson Ranger District. Photo shows a campsite inside the canyon. The camp is located roughly 15m from right bank. This site is located at UTM: N: 4276266 & E: 265964, Elev. 6219 feet (1896m).



Site 6: Wolf Creek, Carson Ranger District. Upstream photo of the river right braid and a 2.9 foot seasonal fish barrier. The stream divides into two braids, both of which have seasonal barriers. This site is located at UTM: N: 4276203 & E: 265995.



Site 6: Wolf Creek, Carson Ranger District. Upstream photo of the river left braid and a 2.9 foot seasonal fish barrier. The stream divides into two braids, both of which have seasonal barriers. This site is located at UTM: N: 4276203 & E: 265995.



Site 7: Wolf Creek, Carson Ranger District. A Forest Service road runs along the horizon in the photo, potentially exacerbating erosion along the open faced canyon. This site is located at UTM: N: 4276021 & E: 266114, Elev. 6357 feet (1938m).



Site 8: Wolf Creek, Carson Ranger District. Upstream photo of a cascading section of stream. This site is located at UTM: N: 4275955 & E: 266068.



Site 9: Wolf Creek, Carson Ranger District. Viewpoint looking down a small, brushy tributary towards river right (<1% contribution). This site is located at UTM: N: 4275846 & E: 265976, Elev. 6248 feet (1905m).



Site 10: Wolf Creek, Carson Ranger District. Upstream photo of an entrenched and moderate gradient Wolf Creek. This site is located at UTM: N: 4275849 & E: 265951, Elev. 6409 feet (1954m) at point of photo.



Site 11: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek Meadows, taken from a bridge where Forest Service Road 090 crosses the stream. This bridge is located at the downstream boundary line of a private parcel of property. This site is located at UTM: N: 4275694 & E: 265916.



Site 12: Wolf Creek, Carson Ranger District. Upstream view from the upper private property boundary. Sites 11 and 12 are separated by approximately 1.5 miles. This site is located at UTM: N: 4273714 & E: 265705, Elev. 6435 feet (1962m).



Site 13: Wolf Creek, Carson Ranger District. Photo shows a campsite on the left bank, located about 1m from water. This site is located at UTM: N: 4273641 & E: 265657.



Site 13: Wolf Creek, Carson Ranger District. Downstream photo of a slumping bank near the campsite. Grazing and hooves may expedite the erosion process at this location. This site is located at UTM: N: 4273641 & E: 265657.



Site 14: Wolf Creek, Carson Ranger District. Cross-sectional photo of Wolf Creek where it braids through a forested area. This site is located at UTM: N: 4273307 & E: 265511, Elev. 6462 feet (1970m).



Site 15: Wolf Creek, Carson Ranger District. Photo shows a campsite located 8m from the left bank. This site is located at UTM: N: 4273283 & E: 265412, Elev. 6458 feet (1969m).



Site 16: Wolf Creek, Carson Ranger District. Bird's eye view of a diversion that takes 4-5% of the flow in the stream out to irrigated pasture. This site is located at UTM: N: 4273267 & E: 265322, Elev. 6514 feet (1986m).



Site 16: Wolf Creek, Carson Ranger District. Upstream view from the diversion. Note the enhanced bar in the center of the photo. This site is located at UTM: N: 4273267 & E: 265322, Elev. 6514 feet (1986m).



Site 17: Wolf Creek, Carson Ranger District. Photo of a horse trailer parked near the Wolf Creek trailhead. This trailer is one of ten or more parked in the large camp. This site is located at UTM: N: 4273150 & E: 265244, Elev. 6560 feet (2000m).



Site 17: Wolf Creek, Carson Ranger District. Vehicles and pack animals are parked 5-50m from Wolf Creek. This site is located at UTM: N: 4273150 & E: 265244, Elev. 6560 feet (2000m).



Site 18: Wolf Creek, Carson Ranger District. Photo of the Wolf Creek trailhead and wilderness boundary sign. This site is located at UTM: N: 4272938 & E: 265071.



Site 18: Wolf Creek, Carson Ranger District. Photo of an information board near the trailhead. This site is located at UTM: N: 4272938 & E: 265071.



Site 19: Wolf Creek, Carson Ranger District. Upstream photo of confluence of Wolf Creek and a small tributary that enters at the Wilderness boundary line. This site is located at UTM: N: 4272981 & E: 265173.



Site 20: Wolf Creek, Carson ranger District. Upstream view of a campsite situated less than 1m from the water. The campsite dimensions are 10m x 20m. Note the cracked bank. This site is located at UTM: N: 4272683 & E: 265175, Elev. 6540 feet (1994m).



Site 21: Wolf Creek, Carson Ranger District. Downstream photo of a pool typical of this reach. This site is located at UTM: N: 4271947 & E: 264879, Elev. 6888 feet (2100m).



Site 22: Wolf Creek, Carson Ranger District. Photo of a small tributary that enters river left (1% contribution). This site is located at UTM: N: 4271677 & E: 264569, Elev. 6603 feet (2013m).



Site 23: Wolf Creek, Carson Ranger District. Looking up Wolf Creek where Dixon Creek enters (photo right), contributing 40% of the total flow. This site is located at UTM: N: 4271319 & E: 264439, Elev. 6652 feet (2028m).



Site 24: Wolf Creek, Carson Ranger District. Looking up an unnamed tributary that enters Wolf Creek on river left (2% contribution). This site is located at UTM: N: 4271202 & E: 264387, Elev. 6649 feet (2027m).



Site 25: Wolf Creek, Carson Ranger District. Photo of a small tributary (1% contribution) that enters river left. This site is located at UTM: N: 4270444 & E: 264089.



Site 26: Wolf Creek, Carson Ranger District. Upstream photo of a permanent fish barrier with height 5.3 feet. This site is located at UTM: N: 4269850 & E: 264273, Elev. 6803 feet (2074m).



Site 26: Wolf Creek, Carson Ranger District. A fish was sighted battling the current and eddies below the barrier. This site is located at UTM: N: 4269850 & E: 264273, Elev. 6803 feet (2074m).



Site 27: Wolf Creek, Carson Ranger District. Upstream photo of creek as it flows through an alluvial valley. This site is located at UTM: N: 4269582 & E: 264200, Elev. 2095m).



Site 28: Wolf Creek, Carson Ranger District. Photo of a tributary entering on river left (4% contribution). This site is located at UTM: N: 4269024 & E: 263813, Elev. 6891 feet (2101m).



Site 28: Wolf Creek, Carson Ranger District. Photo of a tributary entering on river right (1-2% contribution). This site is located at UTM: N: 4269024 & E: 263813, Elev. 6891 feet (2101m).



Site 29: Wolf Creek, Carson Ranger District. Upstream view of a moderately steep section of stream. This site is located at UTM: N: 4268306 & E: 263413, Elev. 7088 feet (2161m).



Site 30: Wolf Creek, Carson Ranger District. Upstream view of a debris bar deposited during a mudslide. The debris area is approximately 50m x 25m, with a depth of up to 3m. This site is located at UTM: N: 4268121 & E: 263276, Elev. 7131 feet (2174m).



Site 31: Wolf Creek, Carson Ranger District. Photo shows the tributary that was the likely conduit for the mudflow. This site is located at UTM: N: 4268121 & E: 263276, Elev. 7131 feet (2174m).



Site 31: Wolf Creek, Carson Ranger District. Upstream photo of the braided tributary where it flows through the alluvium. This site is located at UTM: N: 4268121 & E: 263276, Elev. 7131 feet (2174m).



Site 32: Wolf Creek, Carson Ranger District. Looking up the tributary from Site 32 where the Wolf Creek trail intersects the drainage. This site is located at UTM: N: 4268103 & E: 263187.



Site 32: Wolf Creek, Carson Ranger District. Viewpoint looking up the trail, where dirt levees have been formed by the debris. This site is located at UTM: N: 4268103 & E: 263187.



Site 33: Wolf Creek, Carson Ranger District. Photo shows a location where the trail runs along a steep eroding bank. This site is located at UTM: N: 4267838 & E: 263007.



Site 34: Wolf Creek, Carson Ranger District. Photo looking up a tributary that enters river left and contributes 4% to the flow in Wolf Creek. This site is located at UTM: N: 4267723 & E: 263011, Elev. 7196 feet (2194m).



Site 35: Wolf Creek, Carson Ranger District. Upstream photo of a seasonal fish barrier with height 3.3 feet and a maximum pool depth of 5.5-6.0 feet. A salmonid was sighted in the plunge pool. This site is located at UTM: N: 4267723 & E: 263013, Elev. 7206 feet (2197m).



Site 36: Wolf Creek, Carson Ranger District. Photo of a campsite located roughly 20m from the stream. Campsite dimensions are 30m x 30m. This site is located at UTM: 4267420 & E: 262911, Elev. 7285 feet (2221m).



Site 37: Wolf Creek, Carson Ranger District. A campsite is located on river left, approximately 20m from the water. This site is located at UTM: N: 4267377 & E: 262713, Elev. 7272 feet (2217m).



Site 38: Wolf Creek, Carson Ranger District. A small tributary enters Wolf Creek on river left. Photo shows 5 brook trout in the tributary. This site is located at UTM: N: 4267049 & E: 262384, Elev. 7318 feet (2231m).



Site 38: Wolf Creek, Carson Ranger District. Upstream photo of a small tributary that enters Wolf Creek on river left. Photo shows 5 brook trout in the tributary. This site is located at UTM: N: 4267049 & E: 262384, Elev. 7318 feet (2231m).



Site 39: Wolf Creek, Carson Ranger District. Viewpoint looking down Bull Canyon Creek at the confluence with Wolf Creek. Bull Canyon adds 30-40 % to the total flow in Wolf Creek. This site is located at UTM: N: 4266579 & E: 262199, Elev. 7429 feet (2265m).



Site 40: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek Falls. This permanent fish passage barrier has two parts totaling 50-75 vertical feet. This site is located at UTM: N: 4266555 & E: 262075, Elev. 7432 feet (2266m).



Site 40: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek Falls. Zoomed in view of lower Wolf Creek Falls. This site is located at UTM: N: 4266555 & E: 262075, Elev. 7432 feet (2266m).



Site 40: Wolf Creek, Carson Ranger District. Zoomed in view of upper Wolf Creek Falls. This site is located at UTM: N: 4266555 & E: 262075, Elev. 7432 feet (2266m).



Site 41: Wolf Creek, Carson Ranger District. Upstream photo of a 3.5 foot seasonal barrier with maximum pool depth 1.5 feet. This site is located at UTM: N: 4266487 & E: 261922, Elev. 7426 feet (2264m).



Site 42: Wolf Creek, Carson Ranger District. Side view of a 10-foot permanent fish passage barrier (max. pool depth 5.0 feet). This site is located at UTM: N: 4266898 & E: 261828, Elev. 7432 (2308m).



Site 43: Wolf Creek, Carson Ranger District. Photo looking up a small tributary that enters on river left (contributes 2% to flow). This site is located at UTM: N: 4265559 & E: 261581.



Site 44: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek taken from a ford trail crossing. This site is located at UTM: N: 4265141 & E: 261585, Elev. 7810 feet (2381m).



Site 45: Wolf Creek, Carson Ranger District. Upstream view of confluence of Elder Creek (photo right) and Wolf Creek (photo center). Elder Creek and upper Wolf Creek contribute equal portions to the total discharge in Wolf Creek. This site is located at UTM: N: 4264622 & E: 261108, Elev. 7757 feet (2365m).



Site 45: Wolf Creek, Carson Ranger District. Upstream photo of Wolf Creek taken above the confluence with Elder. This site is located at UTM: N: 4264622 & E: 261108, Elev. 7757 feet (2365m).



Site 46: Wolf Creek, Carson Ranger District. Upstream view of a barbed-wire fence strung across Wolf Creek. This site is located at UTM: N: 4264336 & E: 261063, Elev. 7823 feet (2385m).



Site 47: Wolf Creek, Carson Ranger District. Photo shows a side-channel where 5 young-of-year salmonids were sighted. This site is located at UTM: N: 4264264 & E: 261021, Elev. 7800 feet (2378m).



Site 48: Wolf Creek, Carson Ranger District. Upstream photo of a seasonal barrier measuring 2.3 feet high, with a maximum pool depth of 0.9 feet. This site is located at UTM: N: 4264098 & E: 260864, Elev. 2385.



Site 49: Wolf Creek, Carson Ranger District. Photo of pool where a fish was sighted. This site is located at UTM: 4263754 & E: 260864, Elev. 7823 feet (2385m).



Site 50: Wolf Creek, Carson Ranger District. Upstream photo of the headwater Wolf Creek, which contributes 40% of the flow to the mainstem. The survey proceeded up the headwater branch that contributes 60% of flow to Wolf creek. This site is located at UTM: N: 4263713 & E: 260672, Elev. 7938 feet (2420m).



Site 51: Wolf Creek, Carson Ranger District. Upstream photo of a small seasonal fish barrier created by LWD. The barrier height is 2.35 feet and the max. pool depth is 1.7 feet. This site is located at UTM: N: 4263669 & E: 260666, Elev. 7944 feet (2422m).



Site 52: Wolf Creek, Carson Ranger District. Upstream photo of stream where a 6-inch salmonid was sighted. This site is located at UTM: N: 4263525 & E: 260663, Elev. 7977 feet (2432m).



Site 53: Wolf Creek, Carson Ranger District. Upstream photo of a seasonal fish barrier formed by a two-part waterslide with height 2.75 feet and length 12 feet. This site is located at UTM: N: 4263488 & E: 260633, Elev. 7957 feet (2426m).



Site 54: Wolf Creek, Carson Ranger District. Upstream photo of a 2.8-foot seasonal barrier (max. pool depth .85 feet). This site is located at UTM: N: 4263186 & E: 260595, Elev.8046 feet (2453m).



Site 55: Wolf Creek, Carson Ranger District. Photo of a small tributary that enters on river right (2% contribution). This site is located at UTM: N: 4263146 & E: 260586, Elev. 8029 feet (2448m).



Site 56: Wolf Creek, Carson Ranger District. Upstream photo of confluence of two headwater streams, each of which contributes a nearly equal amount of water. The survey progressed up the branch in (photo right). This point marks the end of LCT habitat. This site is located at UTM: N: 4263070 & E: 260545, Elev. 8098 feet (2469m).



Site 57: Wolf Creek, Carson Ranger District. Upstream view of a seasonal barrier measuring 2.5 feet high with a maximum pool depth of 1.55 feet. This site is located at UTM: N: 4263041 & E: 260525, Elev. 8010 feet (2442m).



Site 58: Wolf Creek, Carson Ranger District. Upstream view of a seasonal barrier measuring 3.7 feet high with a maximum pool depth of 1.5 feet. This site is located at UTM: N: 4262964 & E: 260401, Elev. 8190 feet (2497m).



Site 59: Wolf Creek, Carson Ranger District. Photo of a small tributary that enters on river right (2% contribution). This site is located at UTM: N: 4262736 & E: 260281, Elev. 8312 feet (2534m).



Site 60: Wolf Creek, Carson Ranger District. Upstream photo of a 9.0 foot tall permanent fish barrier (max. pool depth 1.0 foot). This site is located at UTM: N 4262694 & E: 260190, Elev. 8259 feet (2518m).



Site 61: Wolf Creek, Carson Ranger District. Upstream photo taken from the survey end point. The stream has minimal flow, and is located in a steep rocky canyon. This site is located at UTM: N: 4262606 & E: 260141, Elev. 8325 feet (2538m).