

# **Green Creek**

**Mono County, California**

## **2006 Stream Habitat Survey Report**



**Prepared By:**

**Humboldt- Toiyabe National Forest, Bridgeport Ranger District**

## **Introduction**

Green Creek is located in Mono County, California. The mainstem of Green Creek flows for approximately 13 miles in a northeasterly direction starting from a series of lakes in the Hoover Wilderness and then flowing to its confluence with the East Walker River and eventually into Bridgeport Reservoir. Approximately the upper 1/3 of the Green Creek watershed occurs on National Forest Lands. The bottom 2/3 of the watershed occurs on California State lands, lands managed by the Bureau of Land Management, and private property. Approximately 4.9 miles of Green Creek were surveyed between the California State-National Forest boundary located approximately 1.5 miles downstream of Green Creek Campground (Site 1, 2388m) and East Lake located on the West Fork of Green Creek in the Hoover Wilderness (Site 13, 2896m).

## **Purpose and Need**

The 1995 Lahontan Cutthroat Trout Recovery Plan recommended that an ecosystem management plan be developed for the Walker River Basin in order to both determine objectives for the future desired conditions of the watershed, and to create strategies for achieving these objectives. In 1998 a Walker River Basin Recovery Implementation Team was organized to develop strategies for Lahontan cutthroat trout (LCT) restoration and recovery efforts in the Walker River Basin. In August 2003 the recovery team completed a Short-Term Action Plan for Lahontan Cutthroat Trout Recovery in the Walker River Basin. The short-term action plan outlines specific tasks to be completed within five years. Some of the tasks that were identified include: (1) identifying and evaluating fish passage and existing barriers within the Walker River Basin, (2) developing a watershed analysis of the physical components of the Walker River Basin, and (3) initiating habitat surveys to evaluate potential LCT introduction streams and validating against existing LCT inhabited streams.

The Walker River Basin historically provided an estimated 595 miles of stream habitat (Kling and Mellison 2008) and 49,400 acres of lake habitat 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.

Within the Walker River basin, LCT currently occupy one stream that is within their historic range; By-Day Creek. Lahontan cutthroat trout have also been introduced into the formerly fishless headwaters of five other Walker River basin streams; Wolf Creek, Silver Creek, Mill Creek, Slinkard Creek, and Murphy Creek. Together, LCT within these 6 streams occupy approximately 17 miles of stream habitat, approximately 2.9% 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, (4) reduction of lake levels and concentrated chemical components in natural lakes, and (5) introductions of non-native fish species. The Walker River Basin is primarily inhabited by non-native salmonid species that include but are not limited to: Rainbow Trout (*Oncorhynchus mykiss*), Brook Trout (*Salvelinus fontinalis*), and Brown Trout (*Salmo trutta*). These competitive and aggressive introduced fish have displaced the endemic LCT. A small native population of LCT can be found in By-Day Creek part of the East Walker River system.

Long term survival and recovery of LCT with the Walker River Basin 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 Walker 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 reintroduce LCT, these surveys can provide baseline information for future management of the fishery. Green Creek was surveyed on July 5, 2006 by Joel Ingram and Harrison Davis of the Bridgeport Ranger District: Humboldt-Toiyabe National Forest.

## **Methodology**

Forest Service personnel surveyed Green Creek by hiking the stream 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 4.9 miles of Green Creek were surveyed between the California State-National Forest boundary (Site 1) located approximately 1.5 miles downstream of Green Creek Campground and East Lake located on the West Fork of Green Creek

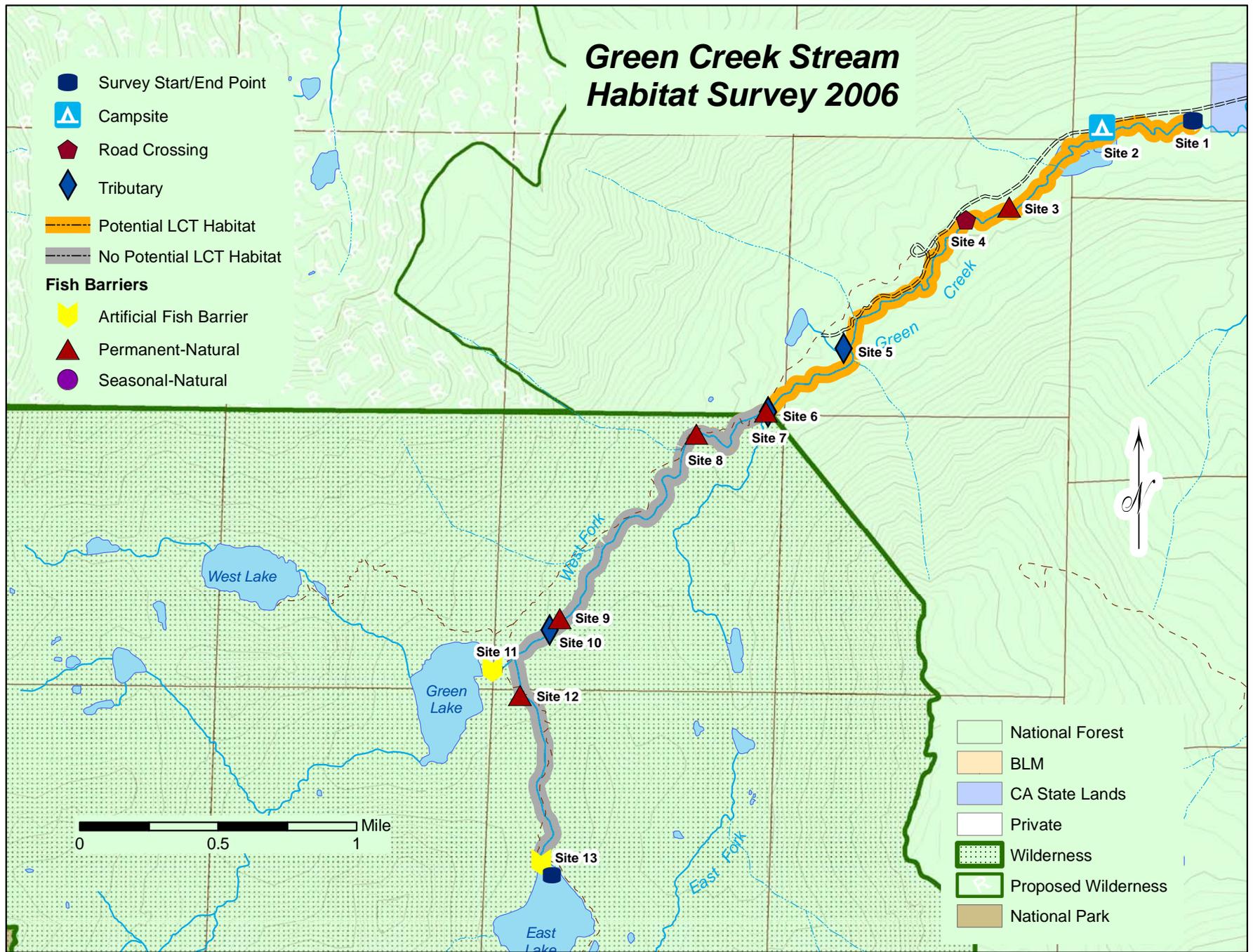
in the Hoover Wilderness (Site 13). Five permanent natural fish passage barriers were documented at Sites 3, 7, 8, 9, and 12. At Sites 11 and 13 artificial barriers were documented. Each artificial barrier seemed to be some sort of dike and dam system to raise the water level in Green Lake and East Lake. As the water level was raised in Green Lake, a new outlet was formed (Site 11). Three tributaries were documented at Sites 5, 6, and 10. A bridge was documented at Site 4. The bridge is used to gain access to Green Creek Campground. Additional campsites were identified in the lower sections of the stream; however, while conducting the survey these campsites were occupied so no campsite specific information for those sites was recorded. The campsite at Site 2 was empty; and therefore, is documented in this report. The overall average stream gradient between Site 1 and Site 13 is 6.4%.

## **Discussion**

Green Creek provides 2.4 miles of potential LCT habitat between Site 1 and Site 7. Between Sites 1 and 6 the stream provides slow deep water with lots of underwater structure like fallen trees, old beaver dams in disrepair, and cut banks. Even though a permanent fish barrier exist at Site 3, the areas above and below this fish barrier provide potential LCT habitat. The stream gradient between Site 1 and Site 7 is 3.5%. Upstream of Site 7 the stream has a higher gradient and three different permanent natural fish barriers were identified. These barriers would leave fish genetically and physically isolated. Two artificial barriers were also documented upstream of Site 7. Non-native fish were sighted throughout the watershed; however, many of these fish were probably airily stocked in several of the headwater lakes within the watershed and subsequently those fish have been able to migrate downstream but not back upstream.

## **Recommendations**

1. Consider Green Creek to provide 2.4 miles of potential LCT habitat between Site 1 and Site 7 and consider Green Creek a low candidate for restoration.
2. If permission can be obtained, conduct a stream habitat survey on Green Creek directly downstream of Site 1 on the California State land and on the lands managed by the Bureau of Land Management to determine if additional LCT habitat exists within the watershed.
3. Conduct a stream habitat survey on the East Fork of Green Creek to determine if additional LCT habitat exists within the watershed.
4. Work with the California Department of Fish and Game to obtain stocking records and information related to previous density and distribution surveys of fish in Green Creek.
5. Increase public awareness of Leave-No-Trace principles along Green Creek, (i.e.) more signs at Green Creek Campground and at the main trailhead.
6. Close and decommission all dispersed campsites within 100 feet of Green Creek. Only allow camping to occur more than 100 feet away from the streams edge.
7. Further investigate the impact Green Creek Campground is having on fish habitat and the water quality in Green Creek.





**Site 1:** Green Creek, Bridgeport Ranger District, looking upstream from the survey start point. The survey starts at the California State Wildlife Area-National Forest boundary. The stream at this location is approximately 15 ft wide and has an average depth of 1.5 ft. This site is located at UTM: N: 4220930 & E: 301892, Elevation 2388m.



**Site 1 continued:** Green Creek, Bridgeport Ranger District, looking downstream from the survey start point. This site is located at UTM: N: 4220930 & E: 301892, Elevation 2388m.



**Site 2:** Green Creek, Bridgeport Ranger District, looking at a small campsite approximately 5m (16ft) from the stream. This campsite has a campfire ring and a flat area for parking and tents. Two more campsites are located just downstream from this site. This site is located at UTM: N: 4220889 & E: 301365, Elevation 2399m.



**Site 3:** Green Creek, Bridgeport Ranger District, looking upstream at a permanent fish passage barrier. This waterfall is 2.25m (7.4ft) high. This site is located at UTM: N: 4220433 & E: 300827, Elevation 2442m.



**Site 4:** Green Creek, Bridgeport Ranger District, looking upstream at a road-stream crossing. A large bridge crosses the creek to gain access to the Green Creek Campground. The bridge has two cement anchors that channel the water under the bridge. This site is located at UTM: N: 4220358 & E: 300571, Elevation 2440m.



**Site 4 continued:** Green Creek, Bridgeport Ranger District, looking downstream from the road-stream crossing. This site is located at UTM: N: 4220358 & E: 300571, Elevation 2440m.



**Site 4 continued:** Green Creek, Bridgeport Ranger District, looking upstream from the road-stream crossing. This site is located at UTM: N: 4220358 & E: 300571, Elevation 2440m.



**Site 5:** Green Creek, Bridgeport Ranger District, looking upstream at a tributary. This tributary contributes approximately 10% of the overall flow in Green Creek. This site is located at UTM: N: 4219616 & E: 299863, Elevation 2465m.



**Site 5 continued:** Green Creek, Bridgeport Ranger District, looking at the confluence of the tributary and Green Creek. This site is located at UTM: N: 4219616 & E: 299863, Elevation 2465m.



**Site 6:** Green Creek, Bridgeport Ranger District, looking upstream at the East Fork of Green Creek. At this site the East and West Forks of Green Creek converge. The amount of flow in each stream is hard to determine due to the obstructed view by plants and boulders. The East Fork is definitely contributing more water than the West Fork at this point. This site is located at UTM: N: 4219244 & E: 299422, Elevation 2525m.



**Site 7:** Green Creek, Bridgeport Ranger District, looking upstream at a permanent fish barrier. This is a picture of the West Fork of Green Creek upstream from the confluence of the East and West Forks. Although no water is visible there is a large amount of water flowing under and through this large boulder field. At the top of this boulder field is a large waterfall. This site is located at UTM: N: 4219224 & E: 299414, Elevation 2511m.



**Site 7 continued:** Green Creek, Bridgeport Ranger District, looking downstream at the West Fork. This site is located at UTM: N: 4219224 & E: 299414, Elevation 2511m.



**Site 8:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at a permanent fish barrier. The height of this waterfall is 1.6m (5.2ft). This site is located at UTM: N: 4219112 & E: 299005, Elevation 2577m.



**Site 8 continued:** West Fork Green Creek, Bridgeport Ranger District, view looking downstream from the fish barrier. This site is located at UTM: N: 4219112 & E: 299005, Elevation 2577m.



**Site 9:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at a permanent fish barrier. This fish barrier is 4m (13.1ft) high. This site is located at UTM: N: 4218045 & E: 298216, Elevation 2671m.



**Site 9 continued:** West Fork Green Creek, Bridgeport Ranger District, view looking downstream from the fish barrier. This site is located at UTM: N: 4218045 & E: 298216, Elevation 2671m.



**Site 10:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at a tributary. At this site the creek from Green Lake and the creek from East Lake converge. The stream coming from East Lake is extremely braided and enters Green Creek at several locations. This site is located at UTM: N: 4217981 & E: 298155, Elevation 2682m.



**Site 10 continued:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at one of the braids on the creek that comes from East Lake. This site is located at UTM: N: 4217981 & E: 298155, Elevation 2682m.



**Site 11:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at an artificial permanent fish barrier. This barrier appears to be a type of dam system constructed to raise the water level of Green Lake. This structure appears to be impassable for fish; however, due to the raised lake level an additional outlet has been created thus allowing fish an alternate route to exit or enter the lake. This site is located at UTM: N: 4217754 & E: 297823, Elevation 2738m.



**Site 11 continued:** West Fork Green Creek, Bridgeport Ranger District, view of dam device. This site is located at UTM: N: 4217754 & E: 297823, Elevation 2738m.



**Site 11 continued:** West Fork Green Creek, Bridgeport Ranger District, view of Green Lake. This site is located at UTM: N: 4217754 & E: 297823, Elevation 2738m.



**Site 11 continued:** West Fork Green Creek, Bridgeport Ranger District, view of the main outlet from Green Lake. This site is located at UTM: N: 4217754 & E: 297823, Elevation 2738m.



**Site 12:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at a permanent fish barrier. This section of stream that comes out of East Lake is extremely steep and forms a continuous cascade. Here two distinct waterfalls can be seen that make this stream impassable for fish. The first section of waterfall is just less than 4m (13.1ft) high and the second section is 4m high. This site is located at UTM: N: 4217601 & E: 297985, Elevation 2758m.



**Site 12 continued:** West Fork Green Creek, Bridgeport Ranger District, looking upstream at the second section of waterfall. This section is 4m (13.1ft) high. This site is located at UTM: N: 4217601 & E: 297985, Elevation 2758m.



**Site 13:** West Fork Green Creek, Bridgeport Ranger District, view of a dike and dam system on East Lake. This dike and dam system is similar to the one at Green Lake represented at Site 11. This site is located at UTM: N: 4216633 & E: 298109.



**Site 13 continued:** West Fork Green Creek, Bridgeport Ranger District, view of East Lake. This site is located at UTM: N: 4216633 & E: 298109.