West Fork Carson River

Alpine County, California

2007 Stream Habitat Survey Report

Prepared By:

Carson Ranger District: Humboldt-Toiyabe National Forest

Introduction

The West Fork Carson River watershed is also located in Alpine County, California. The headwaters of the West Fork Carson River originate close to 8,200 feet near Lost Lakes, approximately 4 miles south of Carson Pass off Highway 88. The West Fork Carson River flows in a northeasterly direction for approximately 40 miles to the confluence with the East Fork Carson River near Minden, NV. The majority of the upper watershed is located within the boundaries of the Humboldt-Toiyabe National Forest. Approximately 18.3 miles of the West Carson River were surveyed between the Woodfords, California area and the Lost Lakes area (See Included Maps).

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 2007 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. The West Fork Carson River was surveyed on May 1-8th, 2007 by Joel Ingram and Kevin Rybacki of the Carson and Bridgeport Ranger Districts: Humboldt-Toiyabe National Forest.

Methods and Materials

Forest Service personnel surveyed the West Fork Carson River 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. Some permanent barriers may actually act as seasonal barriers and some seasonal barriers may actually act as a permanent barrier.

Results

Approximately 18.3 miles of the West Fork Carson River were surveyed between the Woodfords, California area and the Lost Lakes area (See Included Maps). During the survey 13 fish barriers were identified, nine of these were classified as seasonal barriers and are located at Sites 6, 11, 13, 16, 24, 26, 56, 64, and 81. The other four barriers were considered permanent barriers and can be viewed at Sites 27, 57, 61, and 83. We marked 21 different campsites along the stream and noted them at Sites 4, 7, 8, 9, 10, 14, 15, 17, 23, 28, 30, 42, 53, 54, 58, 59, 60, 62, 63, 65, 67, 68, and 72. There were 13 different stream crossings throughout the survey, most of them were bridges and had little impact on the stream. These bridges are located at Sites 2, 5, 19, 20, 25, 29, 31, 36, 38, 41, and 66. Site 69 is a ford crossing and Site 79 is a trail crossing. Site 52 was listed as an adjacent road impact and there were two beaver dams found along the river located at Sites 32 and 73. There were also several tributaries found along the stream. These 19 tributaries can be found at Sites 3, 12, 18, 21, 22, 33, 35, 44, 46, 49, 50, 55, 70, 75, 76, 77, 78, 82, and 84. Erosion concerns were documented at Sites 40, 45, 47, 48, 51, 71, and 74. Three photo points were taken at Sites 34, 43, and 80. At Site 37 a fish was seen swimming in the stream. A concrete platform that provides handicapped fishing access was documented as “other” at Site 39.

Discussion

The West Fork Carson River provides approximately 18.3 miles of potential LCT habitat between Sites 1 and 85. The West Fork Carson River has 4 permanent fish passage barriers at Sites 27, 57, 61, and 83. Site 27 is the most imposing waterfall barrier on the river and was recorded at 35ft tall. It also marks the top of the canyon and where the river opens up into Hope Valley, a wide expanse where the river is allowed to meander. The next barriers are at Sites 57 and 61 and are located in a rocky section between Hope Valley and Faith Valley. Both barriers measure around 5 ½ -6 ½ feet tall and will prohibit the migration of fish upstream. Never-the-less potential habitat does exist upstream of Site 61 through Faith Valley. Upstream of Faith Valley the last permanent barrier is found at Site 83. The distance between Sites 1 and 27 is approximately 4 miles, the distance between Sites 27 and 57 is approximately 8 miles, and the distance between Sites 61 and 83 is approximately 5 miles.

The 4 miles of habitat on the West Fork Carson River between Sites 1 and 27, although considered potential, the habitat is marginal, gradients are higher, and several seasonal barriers were identified. For these reasons, restoring the West Fork Carson River between Sites 1 and 27 to LCT should be considered a low priority. Restoring the West Fork Carson River upstream of Site 27 through Hope and Faith Valleys should be considered a high candidate for restoration.

With Willow, Red Lake, Crater Lake, Hawkins, and Forestdale Creeks all being tributaries to the West Fork Carson River, the West Fork Carson River watershed does provide some opportunity for restoring a metapopulation of LCT. One metapopulation could occur in the West Fork Carson River upstream of Site 61 and in the lower sections of Forestdale Creek. The other metapopulation could occupy the West Fork Carson River between Sites 27 and 57, and sections of Red Lake, Crater Lake, Hawkins, and Willow Creeks. Fish in the West Fork Carson River would be able to move downstream from Faith Valley to Hope Valley over the barriers at Sites 57 and 61, but they would not be able to move back upstream from Hope to Faith Valley. The West Fork Carson River through Hope and Faith Valleys is a high public use area and is a popular location for fishing. Restoring a put-and-take recreational LCT fishery should seriously be considered.

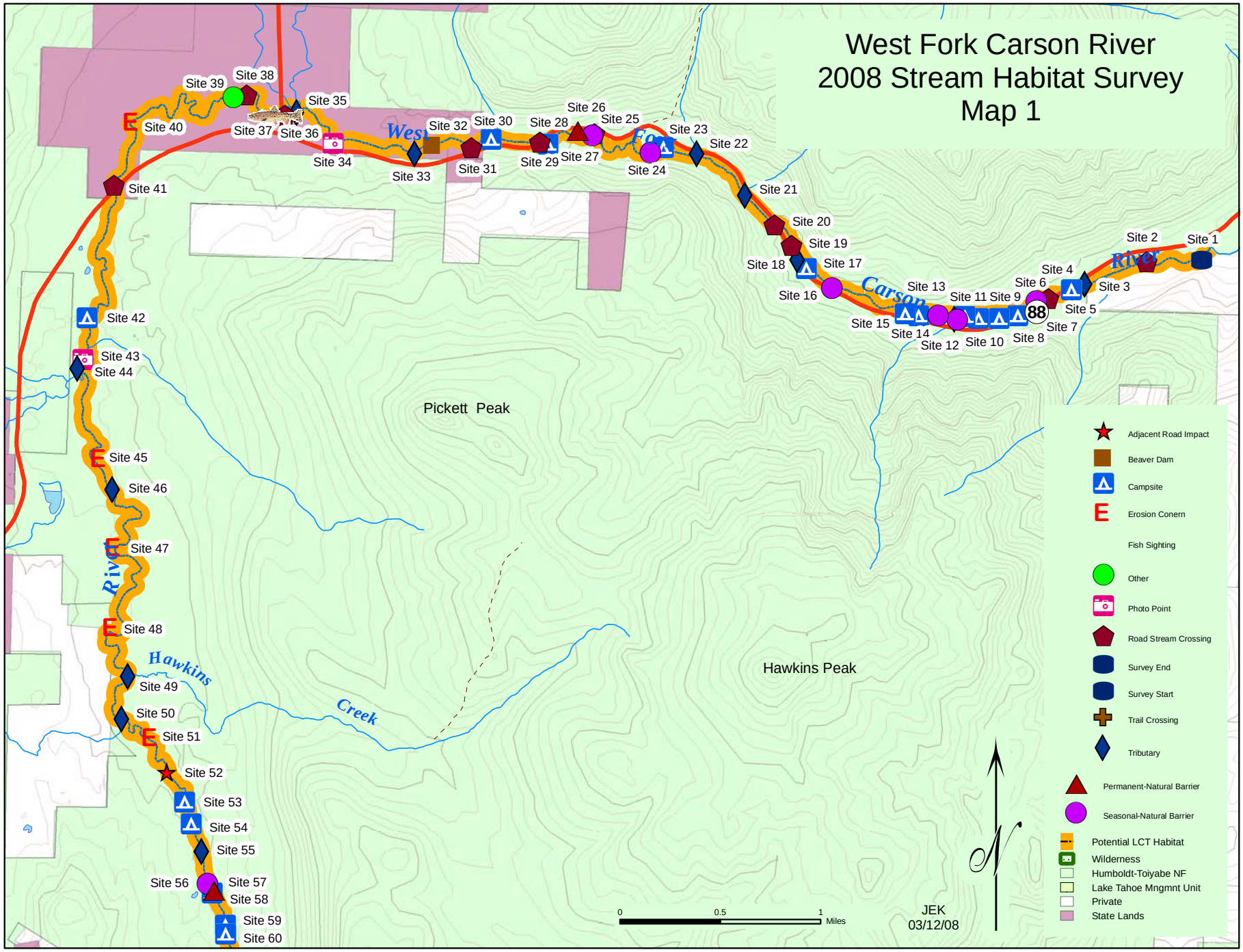
Overall, the West Fork Carson River is a great river for fish and it offers a variety of different types of habitat for fish. It is also already a very popular river for anglers as well as the recreational camper. There is a lot of evidence of use by these two groups ranging from hiking trails through the open meadows and along the river, to the construction of illegal campsites on the waters edge and trash discarded in the woods. We found 21 sites that had dispersed camping with many of the sites consisting of several fire rings and camping areas. The most heavily impacted areas were through the canyon from Woodfords to Hope Valley and from the south end of Hope Valley into and through Faith Valley. This area is lined with 8 different National Forest operated campgrounds. Many of these campsites were within 100 feet from the water's edge, and are having a negative impact on the stream.

Another impact that was noted several times was the large amount of erosion that was happening to the stream. Through Faith and Hope Valleys on nearly every outside turn the river banks were eroding and sloughing off into the river. This was occurring not only in the open grassy meadows but also in willow stands where the soil should have been held in place by roots. The amount of sediment being released into the river is extraordinary.

Recommendations

1. Consider the 18.25 mile section between Site 1 and Site 83 as potential LCT habitat and consider the West Fork Carson River as a high candidate for restoration. The West Fork Carson River has several tributaries that provide potential LCT habitat, therefore making the West Fork Carson River watershed a high candidate for restoring a metapopulation of LCT.
2. Close and decommission all campsites within 100 feet of the West Fork Carson River. Only allow camping to occur more than 100 feet away from the river edge.
3. Investigate the missing bridge for ATV use at Site 69 and utilize physical barriers and signage to encourage users to stay on designated routes.
4. Investigate the artificial stream bank at Site 77. Determine who constructed the bank and the purpose of the bank. Consider restoring the stream bank to a natural condition.

5. Work with the California Department of Fish and Game and Alpine County to develop and implement a stream bank restoration plan to restore and fix the stream bank erosion that is occurring in the Hope and Faith Valley areas.


West Fork Carson River
2008 Stream Habitat Survey
Map 1
Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Site 9
Site 10
Site 11
Site 12
Site 13
Site 14
Site 15
Site 16
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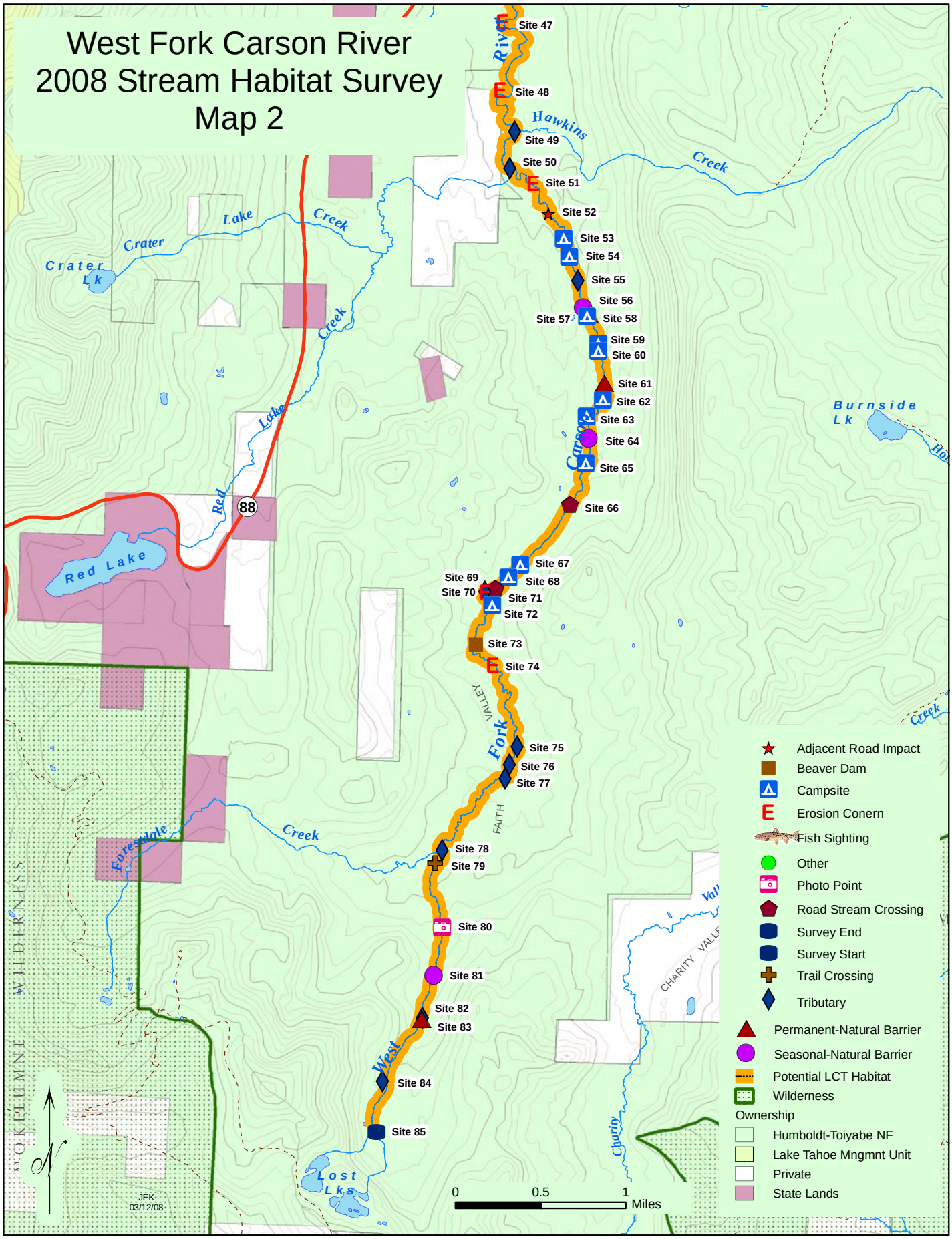
Site 51
Site 52
Site 53
Site 54
Site 55
Site 56
Site 57
Site 58
Site 59
Site 60
West Fork Carson River
Hawkins Creek
Pickett Peak
Hawkins Peak
88
0
0.5
1
Miles
JEK
03/12/08
Adjacent Road Impact
Beaver Dam
Campsite
Erosion Conern
Fish Sighting
Other
Photo Point
Road Stream Crossing
Survey End
Survey Start
Trail Crossing
Tributary
Permanent-Natural Barrier
Seasonal-Natural Barrier
Potential LCT Habitat
Wilderness
Humboldt-Toiyabe NF
Lake Tahoe Mngmnt Unit
Private
State Lands


West Fork Carson River
2008 Stream Habitat Survey
Map 2
Site 47
Site 48
Site 49
Site 50
Site 51
Site 52
Site 53
Site 54
Site 55
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Site 57
Site 58
Site 59
Site 60
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Site 84
Site 85
Hawkins
Creek
Lake
Crater
Crater Lk
Red
Lake
Red Lake
88
Carson
Burnside Lk
Fork
West
Forestdale
Creek
Lost Lks
Charity
CHARITY VALLEY
FAITH VALLEY
OKEETUMNE WILDERNESS
JEK
03/12/08
0
0.5
1
Miles
Adjacent Road Impact
Beaver Dam
Campsite
Erosion Conern
Fish Sighting
Other
Photo Point
Road Stream Crossing
Survey End
Survey Start
Trail Crossing
Tributary
Permanent-Natural Barrier
Seasonal-Natural Barrier
Potential LCT Habitat
Wilderness
Ownership
Humboldt-Toiyabe NF
Lake Tahoe Mngmnt Unit
Private
State Lands

Site 1: West Carson River, Carson Ranger District. Photo of survey start point shows a wide stream moving swiftly over large rocks and boulders. This site is located at UTM: N: 4294781 & E: 253882, Elev. 1759m.

Site 2: West Carson River, Carson Ranger District. Crystal Springs Road as it crosses over river to access private property and Crystal Springs Campground. This site located at UTM: N: 4294768 & E: 253440, Elev. 1772m.

Site 3: West Carson River, Carson Ranger District. At this location a small tributary enters river left and adds less than 1% to the overall flow. This site is located at UTM: N: 4294588 & E: 252943, Elev. 1804m.

Site 4: West Carson River, Carson Ranger District. Crystal Springs Campground located on river right. The campground is established and has facilities. This site is located at UTM: N: 4294547 & E: 252834, Elev. 1810m.

Site 5: West Carson River, Carson Ranger District. Hwy 88 crosses over the river via a bridge near Crystal Springs Campground. This site is located at UTM: N: 4294477 & E: 252652, Elev. 1816m.

Site 5 continued: West Carson River, Carson Ranger District. Riprap along the river right bank protects the bridge. This site is located at UTM: N: 4294477 & E: 252652, Elev. 1816m.

Site 6: West Carson River, Carson Ranger District. Looking at a seasonal fish passage barrier that is 2ft. 9in. high. This site is located at UTM: N: 4294458 & E: 252556, Elev. 1823m.

Site 7: West Carson River, Carson Ranger District. Campsite with 1 fire ring and vehicle access is located on river right between Hwy 88 and river. Fire ring is approx. 25m from the water's edge. This site is located at UTM: N: 4294337 & E: 252407.

Site 8: West Carson River, Carson Ranger District. Campsite on river right contains 1 fire ring and lies approx. 5m from the river. There is road access to this campsite. This site is located at UTM: N: 4294312 & E: 252258.

Site 9: West Carson River, Carson Ranger District. This campsite is found 50m from the water's edge, has 1 fire ring, and has road access. This site is located at UTM: N: 4294313 & E: 252092.

Site 10: West Carson River, Carson Ranger District. This large campsite is located approx. 20m from the water's edge, has 1 fire ring, and is accessible by road. This site is located at UTM: N: 4294328 & E: 251983.

Site 11: West Carson River, Carson Ranger District. Looking upstream at a seasonal barrier that stretches across the entire width of river and is approx. 4-4½ft high. This site is located at UTM: N: 4294301 & E: 251917, Elev. 1866m.

Site 12: West Carson River, Carson Ranger District. This small tributary enters river right. The small tributary contributes 2% of the river's overall flow. This site is located at UTM: N: 4294305 & E: 251895, Elev. 1879m.

Site 13: West Carson River, Carson Ranger District. A series of cascading seasonal barriers ranging from 2 to 4ft in height define this section of the river. This site is located at UTM: N: 4294339 & E: 251766, Elev. 1883m.

Site 14: West Carson River, Carson Ranger District. RV pullover section located 35m from river right. Pullover is off Hwy 88. This site is located at UTM: N: 4294338 & E: 251612, Elev. 1907.

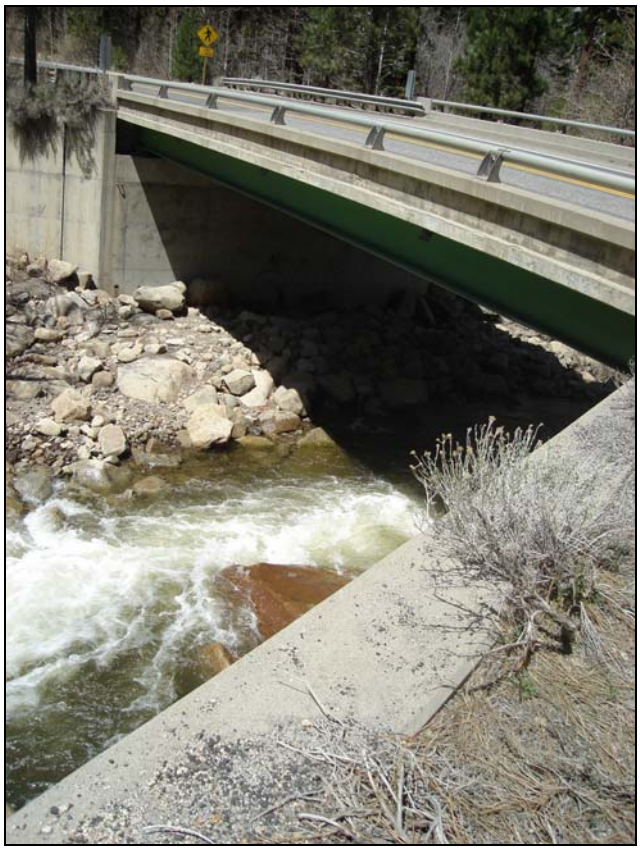
Site 15: West Carson River, Carson Ranger District. This campsite is found approx. 25m from the water's edge, has 1 fire ring, and it has road access near Hwy 88. This site is located at UTM: N: 4294350 & E: 251501, Elev. 1903m.

Site 16: West Carson River, Carson Ranger District. This 4ft seasonal barrier stretches across width of the river making fish passage difficult. This site is located at UTM: N: 4294516 & E: 250915, Elev. 1794m.

Site 17: West Carson River, Carson Ranger District. Five fire rings are found on river right between the river and Hwy 88 along with full garbage bags left near a tree. These campsites can be accessed by road. This site is located at UTM: N: 4294713 & E: 250711.

Site 18: West Carson River, Carson Ranger District. A moderate size tributary drains into river right contributing approx. 5% of the overall river flow. This tributary is over 2m wide and 2 foot deep at the deepest point and could possibly support fish. This site is located at UTM: N: 4294785 & E: 250642, Elev. 1899m.

Site 19: West Carson River, Carson Ranger District. A small bridge crosses over the river north of Hwy 88. This bridge is perpendicular to Hwy 88 and appears to provide access into private land. This site is located at UTM: N: 4294898 & E: 250592.



Site 20: West Carson River, Carson Ranger District. Hwy 88 crosses over the river and is now on the north side. This site is located at UTM: N: 4295066 & E: 250451, Elev. 1959m.

Site 21: West Carson River, Carson Ranger District. This small tributary is approx. 2m wide and 1 foot deep, it enters river left, and contributes approx. 1% to overall stream flow. This site is located at UTM: N: 4295303 & E: 250212, Elev. 1969m.

Site 22: West Carson River, Carson Ranger District. Tributary flows into river left from two culverts under Hwy 88. Together they contribute approx. 2% to the total overall flow. This site is located at UTM: N: 4295635 & E: 249827, Elev. 2003m.

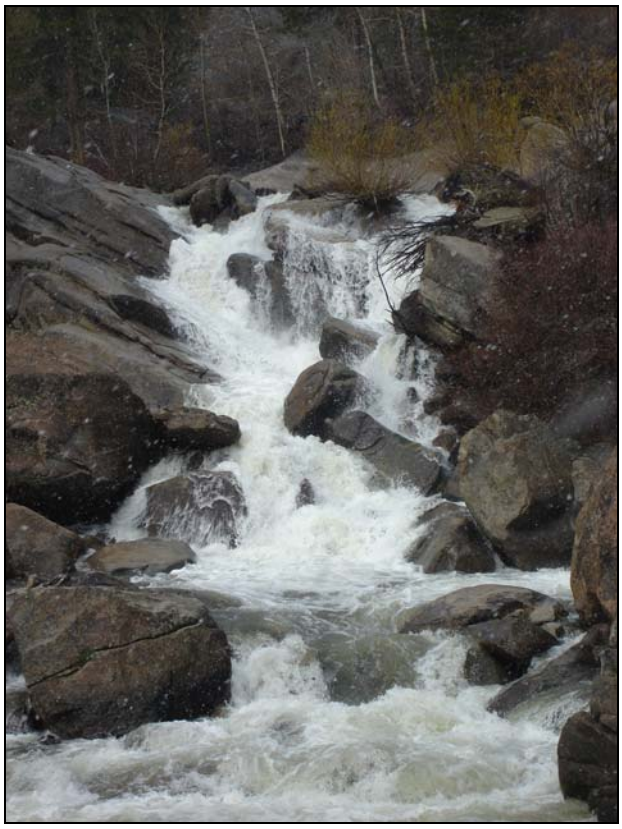
Site 23: West Carson River, Carson Ranger District. Snowshoe Springs Campground is well established with numerous sites, picnic tables, fire pits, and facilities. Campgrounds are located right off Hwy 88 with signs directing visitors. This site is located at UTM: N: 4295684 & E: 249563.

Site 23 continued: West Carson River, Carson Ranger District. Photo depicts the river at Snowshoe Springs with a series of small cascading falls and high velocity water flow. This site is located at UTM: N: 4295684 & E: 249563.

Site 24: West Carson River, Carson Ranger District. This seasonal barrier stretches across the width of the river. Large boulders force water through narrow paths causing high velocity white water rapids. This site is located at UTM: N: 4295648 & E: 249460, Elev. 2022m.

Site 25: West Carson River, Carson Ranger District. This small bridge crosses the river and it appears to have been used by vehicles in past; however, the river has washed away the road on river right and now the bridge probably only sees pedestrian traffic. This site is located at UTM: N: 4295797 & E: 249007, Elev. 2044m.

Site 26: West Carson River, Carson Ranger District. This small seasonal barrier stretches across width of the river. This site is located at UTM: N: 4295782 & E: 248992.



Site 27: West Carson River, Carson Ranger District. This large waterfall approx. 35ft high creates a permanent fish passage barrier. Water flows over bedrock and large boulders as topography changes drastically. This site is located at UTM: N: 4295815 & E: 248875, Elev. 2064m.

Site 28: West Carson River, Carson Ranger District. This campsite located on river right is approx. 5m from the stream. Two RVs along with a pickup truck can be seen across the river. This site is located at UTM: N: 4295712 & E: 248635, Elev. 2041m.

Site 29: West Carson River, Carson Ranger District. Hwy 88 crosses over the river. There is a shoreline located on river right where humans can access the river for swimming and fishing. This site is located at UTM: N: 4295732 & E: 248574, Elev. 2078m.

Site 30: West Carson River, Carson Ranger District. Heavy human activity can be seen with OHV tire tracks, old burnt charcoal, and logs set up in a gathering fashion. This site is located at UTM: N: 4295754 & E: 248180, Elev. 2094m.

Site 31: West Carson River, Carson Ranger District. This small bridge crosses the river and it appears to provide access into a small residential area. This site is located at UTM: N: 4295685 & E: 248020, Elev. 1871m.

Site 32: West Carson River, Carson Ranger District. An old abandon beaver dam lies across part of the river. The dam is not holding any water but does slow it down. This site is located at UTM: N: 4295704 & E: 247698, Elev. 2107m.

Site 33: West Carson River, Carson Ranger District. This small tributary flows into river right. The tributary flows underneath some boulders just before entering the main stream. This site is located at UTM: N: 4295634 & E: 247559, Elev. 2105m.

Site 34: West Carson River, Carson Ranger District. A photo point is taken to show the characteristics typical for this section of stream. Water is flowing rapidly with some open pools. This site is located at UTM: N: 4295729 & E: 246712.

Site 35: West Carson River, Carson Ranger District. This moderately sized, slow flowing tributary enters river left and it appears to contribute 8-10% of the overall stream flow. This tributary appears to provide some fish habitat. This site is located at UTM: N: 4295967 & E: 246615, Elev. 2149m.

Site 36: West Carson River, Carson Ranger District. Hwy 89 crosses the river in a slow flowing section of stream. This site is located at UTM: N: 4295948 & E: 246525, Elev. 2151m.

Site 37: West Carson River, Carson Ranger District. Under a thin layer of ice lies a rainbow trout (approx. 11 to 13 inches) found in a small cove on river right. The fish is not very mobile. This site is located at UTM: N: 4295941 & E: 246443, Elev. 2154m.

Site 38: West Carson River, Carson Ranger District. A small backcountry bridge crosses the river. The bridge appears to be for pedestrians only. This site is located at UTM: N: 4296109 & E: 246217, Elev. 2154m.

Site 39: West Carson River, Carson Ranger District. Looking upstream at a concrete platform that provides handicapped fishing access. This site is located at UTRM: N: 4296109 & E: 246110, Elev. 2157m.

Site 40: West Carson River, Carson Ranger District. The erosion here is over 2m in height and about 25m in length. This site is located at UTM: N: 4295894 & E: 245281, Elev. 2156m.

Site 41: West Carson River, Carson Ranger District. Hwy 88 crosses the river and a small trail leading to the river on both sides of the bridge is present. This site is located at UTM: N: 4295382 & E: 245151, Elev. 2163m.

Site 42: West Carson River, Carson Ranger District. This campsite with two fire rings is found on river right approx. 10m from the water's edge. The river here is calm and slow moving. This site is located at UTM: N: 4294321 & E: 244936, Elev. 2166m.

Site 43: West Carson River, Carson Ranger District. This photo point is taken to show the characteristics typical for this section of stream. The river flows in a meandering pattern in this relatively flat area with water flowing at a moderate velocity. The stream banks are heavily eroded and the river is outlined by willows. Good fish habitat is present. This site is located at UTM: N: 4293985 & E: 244902, Elev. 2162m.

Site 44: West Carson River, Carson Ranger District. This tributary enters river left and it contributes 15% of the overall flow. The tributary itself is made up of two smaller streams that appear to provide fish habitat. This site is located at UTM: N: 4293914 & E: 244857, Elev. 2161m.

Site 45: West Carson River, Carson Ranger District. Photo shows the erosion that is occurring through this section of stream. Large chunks of the stream bank can be seen in the water as the height of the eroded stream bank is over 3m. This site is located at UTM: N: 4293191 & E: 245022, Elev. 2166m.

Site 46: West Carson River, Carson Ranger District. This large tributary enters river left and contributes 3% of the river's overall flow. Notice the heavy erosion on the opposite stream bank which is a characteristic for this particular stretch of the river. This site is located at UTM: N: 4292940 & E: 245137, Elev. 2162m.

Site 47: West Carson River, Carson Ranger District. Photo shows more erosion of the stream banks during this stretch of the river. At this particular site, erosion levels are approx. 5m in height and 100m in length. This site is located at UTM: N: 4292478 & E: 245140, Elev. 2167m.

Site 48: West Carson River, Carson Ranger District. Photo shows more erosion of the stream banks during this stretch of the river. This site is located at UTM: N: 4291839 & E: 245118, Elev. 2166m.

Site 48 continued: West Carson River, Carson Ranger District. This photo shows the stream characteristics typical for this section of river. The river is meandering and it has braided paths with small islands. There is a small wetlands area located on the north side of the river. This site is located at UTM: N: 4291839 & E: 245118, Elev. 2166m.

Site 49: West Carson River, Carson Ranger District. Hawkins Creek enters river right adding 8% of the overall flow. The water is calm and slow moving without rocks or boulders. This site is located at UTM: N: 4291443 & E: 245260, Elev. 2170m.

Site 50: West Carson River, Carson Ranger District. Red Lake Creek enters river left adding 40% of the overall flow. The creek is approx. 3m wide and over a foot deep at the deepest spot. This site is located at UTM: N: 4291098 & E: 245212, Elev. 2172m.

Site 51: West Carson River, Carson Ranger District. Photo is taken to show more examples of the erosion that is occurring. This is the last stretch of erosion that has been seen consistently since Site 45. This site is located at UTM: N: 4290952 & E: 245430, Elev. 2169m.

Site 52: West Carson River, Carson Ranger District. Blue Lakes Road runs right next to the river left bank. Riprap can be seen along the bank to assure the river runs the same course and does not wash away the road. This site is located at UTM: N: 4290673 & E: 245574, Elev. 2175m.

Site 53: West Carson River, Carson Ranger District. This campsite contains 4 fire rings, is located on river left, and the closest fire ring is 10m from the water's edge. A social trail leads campers to the water through the willows. This site is located at UTM: N: 4290434 & E: 245719, Elev. 2180m.

Site 54: West Carson River, Carson Ranger District. This campsite with 1 fire ring is located 10m from the river. This campsite appears to get little use as vegetation has grown over the fire ring. This site is located at UTM: N: 4290263 & E: 245772, Elev. 2179m.

Site 55: West Carson River, Carson Ranger District. This tributary enters river left from the west side of Blue Lakes Road. This tributary travels under the road through a culvert adding approx. 5% of the overall river flow. This site is located at UTM: N: 4290037 & E: 245852.

Site 56: West Carson River, Carson Ranger District. This seasonal barrier is depicted by cascading falls with one fall at 4 ½ ft followed immediately by a 2 ½ ft fall making fish passage difficult. This site is located at UTM: N: 4289782 & E: 245903, Elev. 2182m.

Site 57: West Carson River, Carson Ranger District. This 5 ½ ft waterfall creates a permanent fish barrier. Water runs down the bedrock with no depth therefore making passage impossible. This site is located at UTM: N: 4289724 & E: 245954, Elev. 2191m.

Site 58: West Carson River, Carson Ranger District. This campsite has one fire ring, is located on river left between the river and Blue Lakes Road, and is approx. 50m from river. This site is located at UTM: N: 4289704 & E: 245939, Elev. 2207m.

Site 59: West Carson River, Carson Ranger District. Two fire rings mark this campsite which is located on a sandy shoreline with the closer ring being 3m from water's edge. This site is located at UTM: N: 4289447 & E: 246045, Elev. 2215m.

Site 60: West Carson River, Carson Ranger District. This large fire ring is located 1m from the river on a gravel shore. This site is located at UTM: N: 4289377 & E: 246048.

Site 61: West Carson River, Carson Ranger District. This 6 ½ ft waterfall acts as a permanent fish barrier. This waterfall is surrounded by boulders and bedrock and stretches across the entire width of the river. This site is located at UTM: N: 4289071 & E: 246101.

Site 62: West Carson River, Carson Ranger District. This campsite has 4 fire rings, is accessible by road, and is located on river left with the closest ring being 5m from the water. This site is located at UTM: N: 4288913 & E: 246089, Elev. 2236m.

Site 63: West Carson River, Carson Ranger District. Two fire rings are seen 50+ meters from the river. This site is located at UTM: N: 4288760 & E: 245936, Elev. 2235m.

Site 64: West Carson River, Carson Ranger District. High velocity water traveling through this thin rocky corridor creates 3 separate waterfalls all approx. 4ft in height. The waterfalls create a seasonal fish passage barrier. This site is located at UTM: N: 4288553 & E: 245952, Elev. 2249m.

Site 65: West Carson River, Carson Ranger District. This campsite is found on river left approx. 50m from the river. This campsite contains 1 large fire ring along with several stumps for sitting and some leftover firewood. This site is located at UTM: N: 4288317 & E: 245930.

Site 66: West Carson River, Carson Ranger District. Blue Lakes Road crosses the river via the bridge pictured above. This site is located at UTM: N: 4287931 & E: 245776, Elev. 2303m.

Site 67: West Carson River, Carson Ranger District. This fire ring is located on river right 2m from the water's edge. On river left there are two trees that have been cut down by a chainsaw. This site is located at UTM: N: 4287358 & E: 245309, Elev.2274m.

Site 68: West Carson River, Carson Ranger District. This large fire ring is found on river left approx. 10m from the river. There are signs of human activity on the other side of the river with lots of wood chips seen on the ground along with another fire ring. This site is located at UTM: N: 4287245 & E: 245198, Elev. 2280m.

Site 69: West Carson River, Carson Ranger District. This shallow area of stream is used as a river crossing for OHV and possibly pedestrian traffic. It appears as though there was some sort of structure downstream that at one point might have been a bridge across the stream. There are boulders on both sides of river as a deterrent for OHV's to cross the river. This site is located at UTM: N: 4287141 & E: 245075, Elev. 2277m.

Site 70: West Carson River, Carson Ranger District. Two tributaries approx. 150m apart from one another enter river left. They are both less than 2m wide and 1 ft in depth. Together they contribute 5% of the overall river flow. This site is located at UTM: N: 4287106 & E: 244976, Elev. 2275m.

Site 70 continued: West Carson River, Carson Ranger District. This photo shows the tributary further upstream. This site is located at UTM: N: 4287106 & E: 244976, Elev. 2275m.

Site 71: West Carson River, Carson Ranger District. This erosion can be seen on the river left bank and the erosion is 1½ meters high and approximately 150m long. This site is located at UTM: N: 4287106 & E: 244976, Elev. 2275m.

Site 72: West Carson River, Carson Ranger District. A dirt road off Blue Lakes Road accesses a campground/recreational site that contains 6 fire rings and different types of OHV tracks. The closest fire ring is 3m from river right. This site is located at UTM: N: 4286979 & E: 245047, Elev. 2273m.

Site 73: West Carson River, Carson Ranger District. Two abandoned beaver dams are located on opposite sides of the river each stretching about 1/3 the width of the river. The dams are not holding any water but slow down the velocity. This site is located at UTM: N: 4286609 & E: 244895.

Site 74: West Carson River, Carson Ranger District. The beginning of another section of river where erosion is occurring on each bend. This site is located at UTM: N: 4286420 & E: 245048, Elev. 2281m.

Site 75: West Carson River, Carson Ranger District. This tributary enters river right and it adds 20% of the overall river flow. There is a smaller tributary 10m upstream that is believed to have forked from the original as it flowed downhill. This site is located at UTM: N: 4285645 & E: 245280, Elev. 2193m.

Site 76: West Carson River, Carson Ranger District. This tributary enters river left and it contributes 10% of the overall river flow. This tributary is approx. 2½m wide but less than a foot deep. This site is located at UTM: N: 4285476 & E: 245210.

Site 77: West Carson River, Carson Ranger District. Two separate tributaries enter river right and combined they add 10% of the overall river flow. Somebody has also built up an artificial bank near the upstream tributary. This site is located at UTM: N: 4285346 & E: 245168, Elev. 2287m.

Site 77 continued: West Carson River, Carson Ranger District. Photo shows the river bank that appears to have been artificially built. This site is located at UTM: N: 4285346 & E: 245168, Elev. 2287m.

Site 78: West Carson River, Carson Ranger District. Looking at Forestdale Creek which contributes 50% of the overall river flow. This site is located at UTM: N: 4284670 & E: 244575, Elev. 2303m.

Site 79: West Carson River, Carson Ranger District. A cross section view of a trail crossing. This site is located at UTM: N: 4284550 & E: 244507, Elev. 2314m.

Site 80: West Carson River, Carson Ranger District. This photo point shows that the river has a steeper gradient until it enters the valley downstream. This site is located at UTM: N: 4283946 & E: 244572, Elev. 2350m.

Site 81: West Carson River, Carson Ranger District. This seasonal barrier is formed by a 4ft waterfall. This waterfall stretches across width of river and fish passage will be difficult. This site is located at UTM: N: 4283492 & E: 244495, Elev. 2373m.

Site 82: West Carson River, Carson Ranger District. A tributary enters river right and it contributes 15% of the overall river flow. This site is located at UTM: N: 4283091 & E: 244387.

Site 83: West Carson River, Carson Ranger District. This 25ft waterfall acts as a permanent fish barrier as it stretches across the entire width of the river making fish passage impossible. This site is located at UTM: N: 4283077 & E: 244383.

Site 84: West Carson River, Carson Ranger District. This tributary contributes 10% of the overall river flow and it enters into river left. This site is located at UTM: N: 4282493 & E: 244013.

Site 85: West Carson River, Carson Ranger District. This photo shows the survey end point. The river here is deep and narrow, and the water is meandering slowly through this snowy meadow. This site is located at UTM: 4282014 & E: 243956.