

**Mill Creek**  
Mono County, California

**2004 Fish & Habitat Survey Report**



Looking south at the Mill Creek watershed. Photograph provided by Chad Mellison

Prepared by:

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

# Mill Creek Lahontan Cutthroat Trout Survey - 2004

-  LCT Present
-  LCT\_Potential Habitat
-  Cannon Fire - 2002
-  BLM
-  BRIDGEPORT RD
-  MIXOWN; NON-FS
-  PRIVATE
-  STATE LAND; CA

Natural Barrier  
 Reach 1 Unit 1  
 Reach 1 Unit 2  
 Reach 1 Unit 3  
 Reach 1 Unit 4  
 Reach 1 Unit 5  
 Reach 2 Unit 1  
 Reach 2 Unit 2  
 Reach 2 Unit 3  
 Reach 2 Unit 4  
 Artificial Barrier  
 Reach 2 Unit 5  
 Reach 3 Unit 1  
 Reach 3 Unit 2  
 Artificial Barrier  
 Reach 3 Unit 3  
 Reach 3 Unit 4  
 Reach 3 Unit 5  
 Reach 4 Unit 1  
 Reach 4 Unit 2  
 HOBO Temp  
 Reach 4 Unit 3  
 Reach 4 Unit 4  
 Reach 4 Unit 5



Contour Interval = 80 ft.



This GIS product was compiled from various sources and may be corrected, modified, or replaced at any time. For more information, contact the GIS coordinator at the Bridgeport Ranger District, Bridgeport, CA (760) 932-7070.

Sherry Sorensen  
GIS Specialist  
Bridgeport R.D.  
12/9/04

## **Introduction**

Mill Creek, Mono County, California, Bridgeport Ranger District, supports an introduced population of Lahontan cutthroat trout (LCT), a federally endangered species. Mill Creek is located in northern Mono County, California on the east slope of the Sierra Nevada mountain range. Mill Creek flows for approximately 9 miles in a northerly direction to its confluence with the West Walker River near the town of Walker, California located on Highway 395. The Mill Creek watershed ranges from approximately 6000 feet elevation to 8500 feet elevation. The Mill Creek watershed is located on lands managed by the Humboldt-Toiyabe National Forest (HTNF), California Department of Fish and Game (CDFG), and Bureau of Land Management. Due to the close proximity of the Mountain Warfare Training Center to the south of the watershed, the Marines use the Mill Creek watershed as a training area. The Mill Creek watershed has been established as a Critical Aquatic Refuge in the Sierra Nevada Forest Plan Amendment.

Mill Creek was chemically treated with rotenone in 1988 and 1989 to remove non native fishes. In 1991 a 153 LCT, and in 2001 an additional 54 LCT, were captured from Slinkard Creek and released into the lower meadow section of Mill Creek, on CDFG land, within reach 2.

In an effort to document LCT distribution, density, and genetic composition, the HTNF, CDFG, and the U.S. Fish and Wildlife Service (USFWS) decided to conduct fish distribution and density surveys in Mill Creek. Surveys were conducted in September 2004.

## **Methodology**

Mill Creek was broken into four reaches. Reaches 1 and 2 were located within the area that was burned by the 2002 Cannon Fire. Reach 1 started at the natural barrier (Figure 15) located just upstream of the Lost Cannon Creek-Mill Creek confluence. Reaches 1 and 2 had similar habitats, so each reach was divided into similar lengths. Reaches 1 and 2 were each approximately 1.25 miles in length. Reach 3 was above the area burned by the 2002 Cannon Fire. Reach 3 was approximately 1.3 miles in length and ends at a tributary that enters Mill Creek from the west side that contributes more than 10% to the overall Mill Creek flow. Reach 4 was approximately 2.75 miles in length and also ends at a tributary that enters Mill Creek from the west side that contributes approximately 75% to the overall Mill Creek flow. Upstream of Reach 4/Unit 5 Mill Creek became dry.

All reaches were separated into 5 evenly spaced units. Units 1, 2, 3, and 5 were 40 meters in length. Unit 4 was 100 meters in length. A backpack electroshocker was used to sample these units. Units 1, 2, 3, and 5 were sampled with one pass. Unit 4 was sampled with three passes. Block nets were used at the upstream and downstream ends of each unit sampled.

Appendix 1 contains a copy of raw data for each unit sampled. A new data form was prepared for each unit sampled. A Trimble GPS unit was used to document unit locations. GPS locations were taken at the downstream (bottom) end of each unit. Unit length (measured), average width (to the closest 1/10 meter), and average depth (to the closest 1/10 meter) were recorded for each unit.

Notes regarding habitat quality/quantity, observations, morphological characteristics, management concerns, restoration opportunities, etc were recorded in the comments section.

A small piece of caudal fin was clipped from 30 different LCT and placed in separate envelopes to dry. Genetic samples were collected from each unit sampled to obtain spatial variation with the samples. Fin clips were also collected from different length LCT to obtain age class variation. These samples were given to Dr. Mary Peacock at University of Nevada Reno for genetic analysis.

Photographs were taken at the upstream and downstream ends of each unit (looking upstream and downstream) and of important/interesting features.

Assessment of the road-stream crossings, dispersed campsites, and trail condition occurred on the 28 & 30, April 2004.

## **Results**

The distribution of LCT within the Mill Creek watershed is limited to approximately 5.4 miles of Mill Creek. Lahontan cutthroat trout are distributed between Reach 2/Unit 1 and Reach 4/Unit 5 (Figures 4 & 5). The total length of LCT ranges from 38 to 325 mm total length with the average total length of LCT being 102 mm (Figure 1). The length frequency histogram (Figure 1) suggests that multiple age classes of LCT are found within the Mill Creek watershed.

The mean number of LCT between Reach 1/Unit 5 and the end of Reach 2 is 849 (Figure 6). The upper 90% confidence interval is 1564 and the lower 90% confidence interval is 133 (Figure 6). The distance between Reach 1/Unit 5 and the end of Reach 2 is approximately 1.3 miles. The mean number of LCT within Reach 3 is 333 (Figure 6). The upper 90% confidence interval is 562 and the lower 90% confidence interval is 103 (Figure 6). The length of Reach 3 is approximately 1.34 miles. The mean number of LCT within Reach 4 is 315 (Figure 6). The upper 90% confidence interval is 514 and the lower 90% confidence interval is 114 (Figure 6). The length of Reach 4 is approximately 2.75 miles. The mean number of LCT within the entire watershed of Mill Creek is 1496 (Figure 7). The upper 90% confidence interval is 2642 and the lower 90% confidence interval is 351 (Figure 7). The mean number of LCT/mile within the entire Mill Creek watershed is 277 (Figure 8). The upper 90% confidence interval is 489 and the lower 90% confidence interval is 65 (Figure 8).

An Optic StowAway – Temp (C) Onset -4C to 38C was used to collect temperature data on California State lands near Reach 2 Unit 2 between 1999 and 2004. In 1999-2000 temperature was collected from 8 Sept. 1999 to 4 Aug. 2000. During that time period the overall maximum temperature was 19.11 degrees Celsius, the overall average temperature was 5.13 degrees Celsius, and the overall minimum temperature was -0.02 degrees Celsius. The average temperature between 1 Nov. 1999 and 31 March 2000 was 1.13 degrees Celsius. The average temperature between 8 Sept. 1999 and 31 Oct. 1999, and between 1 April 2000 and 4 Aug. 2000 was 8.04 degrees Celsius (Figure 9).

In 2000-2001 temperature was collected from 6 Sept. 2000 to 4 Aug. 2001. During that time period the overall maximum temperature was 19.6 degrees Celsius, the overall average temperature was 5.06 degrees Celsius, and the overall minimum temperature was -0.02 degrees

Celsius. The average temperature between 1 Nov. 2000 and 31 March 2001 was 0.55 degrees Celsius. The average temperature between 6 Sept. 2000 and 31 Oct.2000, and between 1 April 2001 and 4 Aug. 2001 was 8.31 degrees Celsius (Figure 10).

In 2001-2002 temperature was collected from 22 Aug. 2001 to 24 Oct. 2002. During that time period the overall maximum temperature before the Cannon Fire was 19.27 degrees Celsius, the overall average temperature before the Cannon Fire was 4.80 degrees Celsius, and the overall minimum temperature before the Cannon Fire was 0.13 degrees Celsius. The average temperature between 1 Nov. 2001 and 31 March 2002 was 1.27 degrees Celsius. The average temperature between 22 Aug. 2001 and 31 Oct. 2001, and between 1 April 2002 and 14 June 2002 was 8.50 degrees Celsius. The Cannon Fire started on 15 June 2002. The maximum temperature after the Cannon Fire was 23.91 degrees Celsius. The average temperature after the Cannon Fire between 15 June 2002 and 24 Oct. 2002 was 13.17 degrees Celsius (Figure 11).

In 2003-2004 temperature was collected from 3 Oct. 2003 to 30 Aug. 2004. During that time period the overall maximum temperature was 23.2 degrees Celsius, the overall average temperature was 6.52 degrees Celsius, and the overall minimum temperature was -0.02 degrees Celsius. The average temperature between 1 Nov. 2003 and 31 March 2004 was 1.70 degrees Celsius. The average temperature between 3 Oct. 2003 and 31 Oct. 2003, and between 1 April 2004 and 30 Aug. 2004 was 9.42 degrees Celsius (Figure 12).

Also in 2003-2004 a HOBO Temperature (C) 1996 Onset data logger was used to collect temperature data in Mill Creek on National Forest Lands just upstream of Reach 4 Unit 2 at 7240 feet elevation. Temperature was collected from 3 Oct. 2003 to 19 Aug. 2004. During that time period the overall maximum temperature was 14.47 degrees Celsius, the overall average temperature was 4.17 degrees Celsius, and the overall minimum temperature was -0.16 degrees Celsius. The average temperature between 1 Nov. 2003 and 31 March 2004 was 0.69 degrees Celsius. The average temperature between 3 Oct. 2003 and 31 Oct. 2003, and between 1 April 2004 and 19 Aug. 2004 was 6.30 degrees Celsius (Figure 13).

The dominant overstory consists of willows, aspen, pine, and alder, and the dominant understory consists of grasses, shrubs, willows, rose, sedges, and aspen. The dominant Rosgen channel type is characterized as B. The average width of Mill Creek is 1.5 meters and the average depth of Mill Creek is 0.11 meters.

## **Discussion**

Lahontan cutthroat trout are unlikely to extend their distribution upstream of Reach 4 Unit 5 due to low flows. Just upstream of Reach 4 Unit 5 a tributary enters Mill Creek from the west side that contributes approximately 75% to the overall Mill Creek flow. Upstream of the Mill Creek-tributary confluence Mill Creek became dry. However, LCT could likely extend their distribution downstream of Reach 2 Unit 1 to the natural barrier if flows increased. The gradient within Reach 1 is slightly steeper than Reach 2, but the overall habitat is still good and could support a population of LCT. If LCT migrated down into Reach 1, an additional 1.25 miles (approximate) of stream habitat could be occupied by LCT.

Habitat conditions throughout the Mill Creek watershed between the natural barrier and Reach 4 Unit 5 are fairly good. Typical habitat consists of riffles, pools, several pieces of large woody

debris in the stream, and well vegetated stream banks. Vegetation within the area burned by the 2002 Cannon Fire appeared to be responding well. Within the burn area, willow height near the stream averaged 8-10 feet.

Several (40-50) active beaver dams were documented within Reach 2 (Figure 33 and 34). Some of the beaver dams may be acting as temporary fish barriers. Lahontan cutthroat trout were found up and downstream of the beaver dams. A large amount of sedimentation was noted several times while surveying Reaches 1 and 2. This large amount of sedimentation may be a result of several beaver dams and the 2002 Cannon Fire.

Two artificial concrete fish barriers are located on Mill Creek. The lower fish barrier is located near Reach 2 Unit 4 (Figure 32) and the upper fish barrier (Figures 37 & 38) is located just downstream of the Terry Canyon-Mill Creek intersection near Reach 3 Unit 3. The Bridgeport Ranger District and CDFG are planning to alter the two barriers in Fall 2005 to provide LCT the ability to migrate up and downstream within the watershed without unobstructed movement. Lahontan cutthroat trout were found up and downstream of each artificial barrier.

National Forest System Road 32028 parallels Mill Creek for approximately 5.5 miles from the natural barrier to just upstream of Reach 4 Unit 2. In a few locations the road comes within approximately 25 feet of the stream. Forest System Road 32028 crosses Mill Creek in two locations: 1) at the Terry Canyon-Mill Creek intersection (Figure 39), and 2) approximately ¼ mile upstream of Reach 4 Unit 2 (Figure 50). Both road-stream crossing are causing increased erosion, sedimentation, and turbidity within Mill Creek. The Bridgeport Ranger District is planning to construct a 3 sided concrete box bridge at the Terry Canyon-Mill Creek intersection in Fall 2005. A decision on how to manage the road-stream crossing upstream of Reach 4 Unit 2 needs to be decided. Mono County maintains part of Forest System Road 32028. No maintenance appears to be occurring upstream of Reach 3 Unit 2. Some general road maintenance needs to occur upstream of Reach 3 Unit 2 to reduce erosion impacts on Mill Creek. As part of an upcoming fuels project, the Bridgeport Ranger District is planning to do some general road maintenance on all of Forest System Road 32028.

A few dispersed campsites (Figures 51 & 52) are located between Mill Creek and Forest System Road 32028; within 100 feet of Mill Creek. Most of the dispersed campsites are located between Reach 4 Unit 2 and the end of Forest System Road 32028. The dispersed campsites are causing erosion impacts on Mill Creek. The Bridgeport Ranger District is planning to do some dispersed campsite rehabilitation work in Fall 2005 to reduce erosion impacts on Mill Creek.

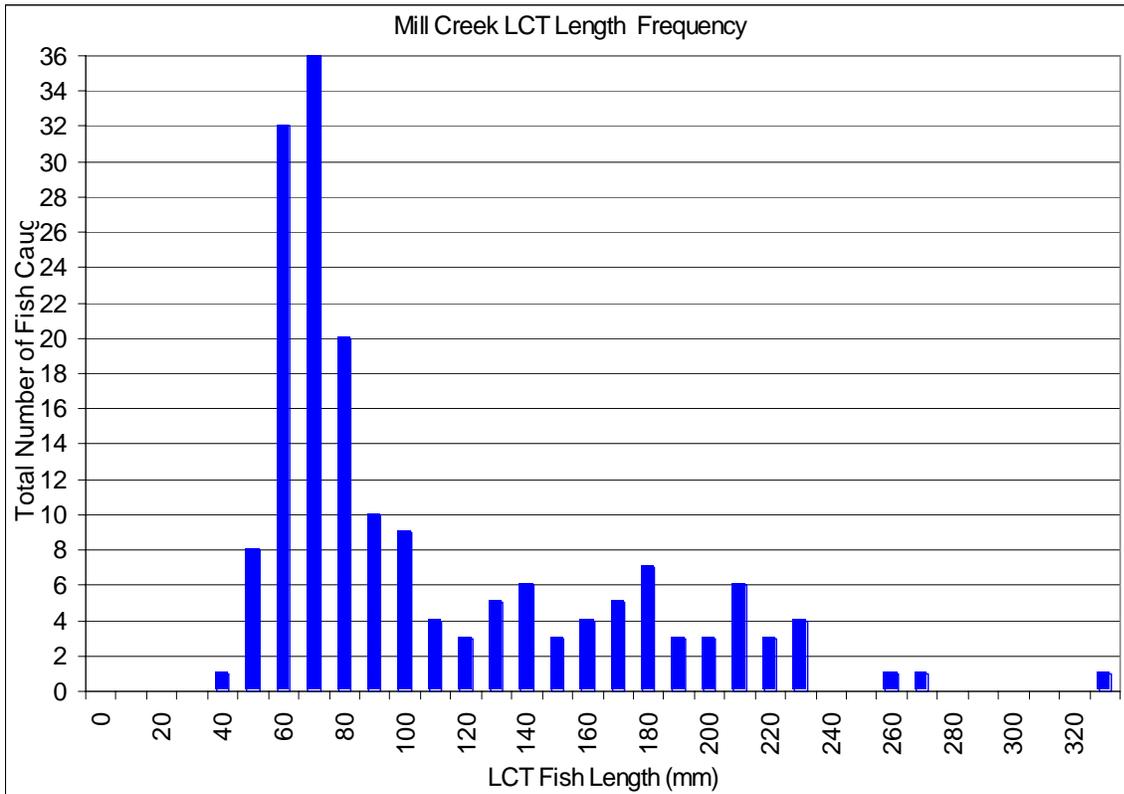
Starting at the end of Forest System Road 32028 a trail parallels Mill Creek up to the top of the watershed above Reach 4 Unit 5. The trail crosses Mill Creek in two locations: 1) just downstream of Reach 4 Unit 5 (Figure 58), and 2) just upstream of Reach 4 Unit 5 (Figure 61). No significant impacts were documented at these two trail crossing locations. Between Reach 4 Unit 3 and Reach 4 Unit 4, where the trail pinches the stream, a few unstable and eroding stream banks (Figure 55) were documented. In the headwaters of Mill Canyon above Reach 4 Unit 5 the trail also passes through a wet meadow (Figure 62) causing resource damage. The Bridgeport Ranger District is planning to do some streambank restoration (possibly installing willow waddles) and trail realignment work in Fall 2005 to reduce erosion impacts on Mill Creek.

Impacts from electroshocking are a concern, and care was taken to limit LCT exposure to both handling and electrical currents. Lahontan cutthroat trout were closely monitored immediately after being netted. No obvious injuries to LCT were observed. The LCT appeared to respond well to the method of survey. No LCT mortality was documented.

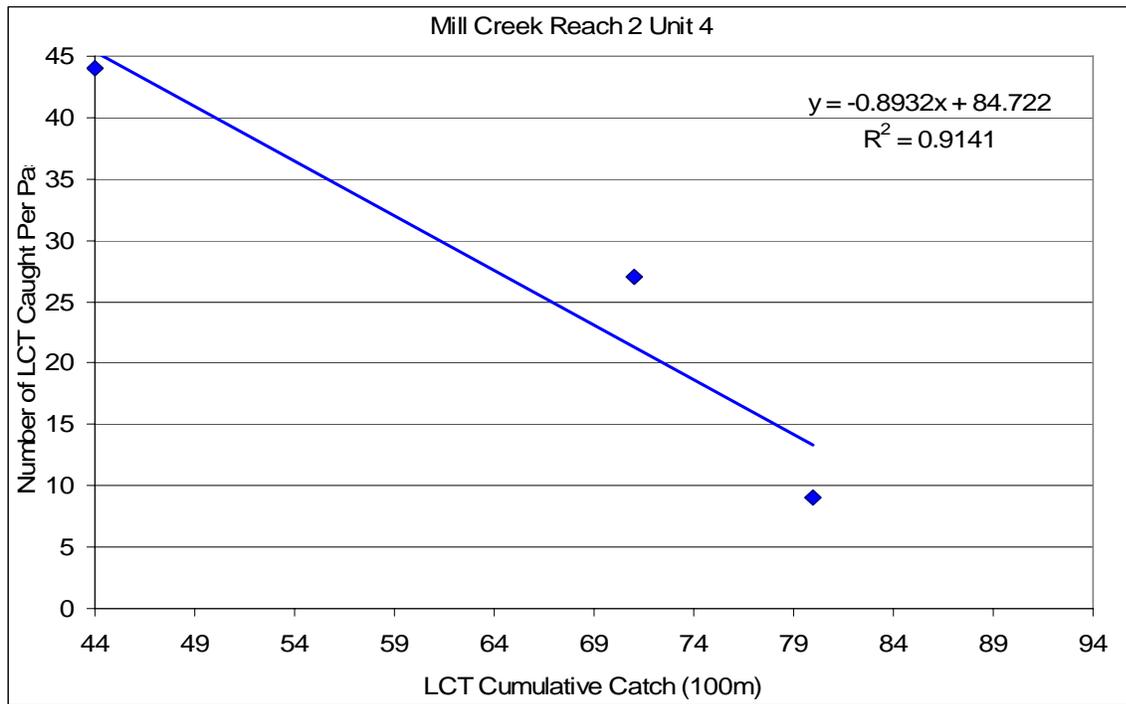
The 2004 Lahontan cutthroat trout population estimate is higher than the 1995 and 1996 population estimates (Figure 14). In 1995 and 1996 only a one pass depletion survey was conducted; therefore, the 1995 and 1996 population estimates may be conservative. In 1995, LCT were occupying approximately 2 miles of stream habitat only on CDFG land within reaches 1 and 2. In 1996, LCT extended their distribution upstream onto National Forest Lands. This may be the reason why the LCT population estimate in 1996 was lower than the 1995 population estimate. In 2004 a 2-3 pass depletion survey was conducted. Visual surveys were conducted in 1999 and 2000.

### **Recommendations**

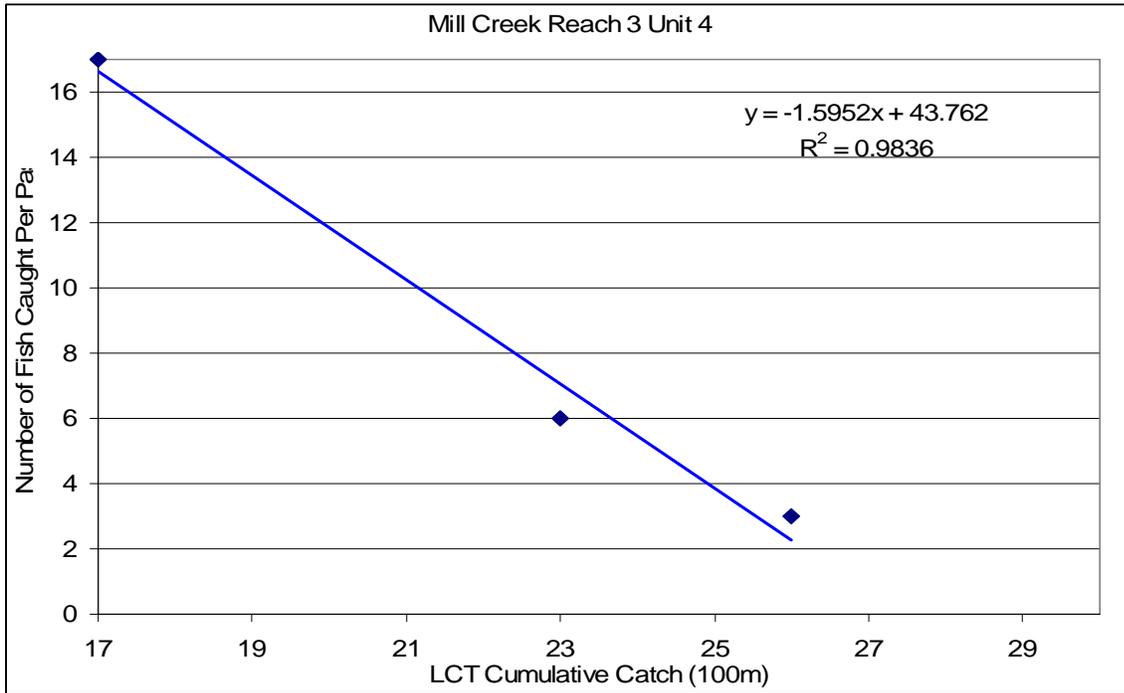
1. At the latest, in 2009 conduct another electrofishing LCT distribution and density survey.
2. Maintain Forest System Road 32028 to minimize erosion impacts on Mill Creek.
3. Decommission all campsites within 100 feet of Mill Creek to reduce erosion impacts.
4. Monitor water temperature within the Mill Creek watershed.
5. Monitor beaver activity within the Mill Creek watershed.
6. Once the genetic analysis is completed, implement actions consistent with the conclusions made from the analysis.
7. Make sure that all work planned for Fall 2005 related to bridge construction, road maintenance, altering artificial barriers, dispersed campsite rehabilitation, streambank restoration, and trail relocation is implemented.



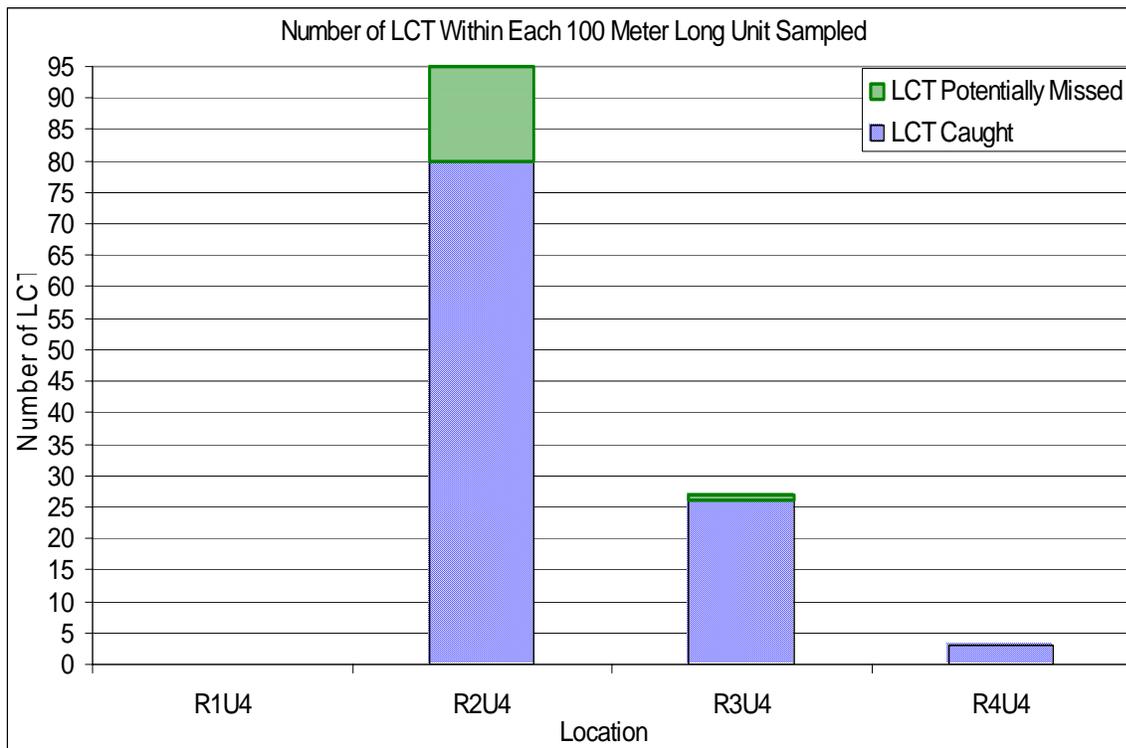
**Figure 1:** Length frequency of Lahontan cutthroat trout caught from Mill Creek, Bridgeport Ranger District. Mill Creek was surveyed from 21 September 2004 through 29 September 2004. The average length of LCT is 102 mm (4 inches).



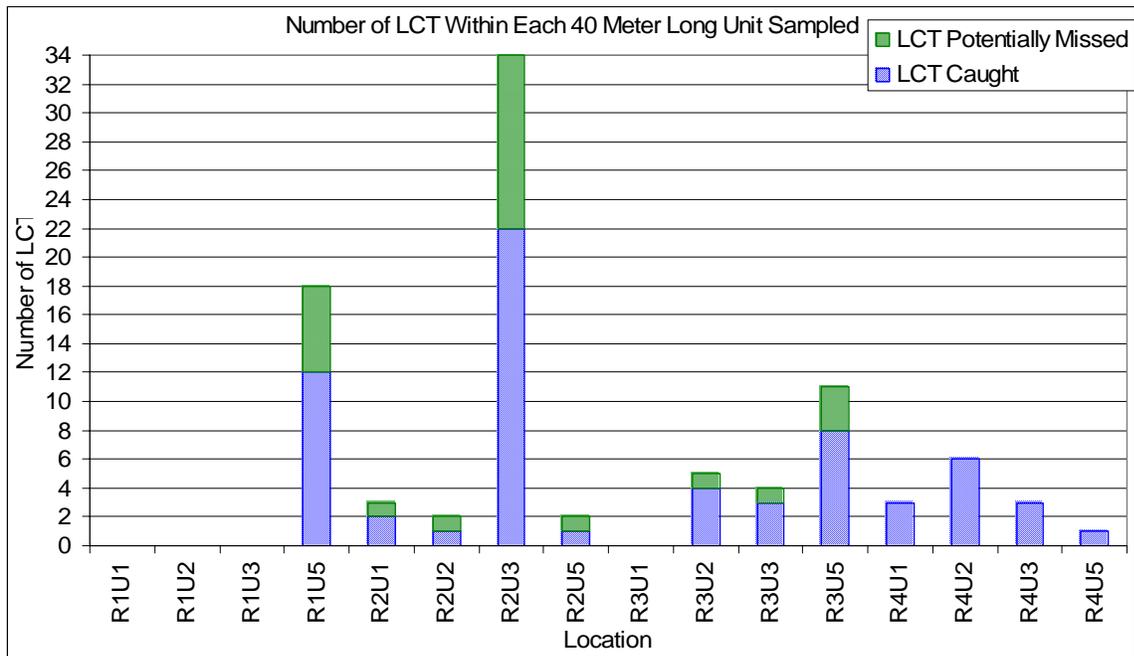
**Figure 2:** Linear regression equation for cumulative number of Lahontan cutthroat trout caught from Mill Creek, Bridgeport Ranger District, Reach 2/Unit 4. Using the linear regression equation, the estimated total number of LCT within Reach 2 Unit 4 is 95. Reach 2/Unit 4 was 100 meters long and was electroshocked three times. Block nets were set at the top and bottom of the unit to keep fish from entering and leaving the unit. Reach 2/Unit 4 is located at UTM N: 4260436 & E: 282884. Survey was conducted on 22 Sept. 2004. Forty-four fish caught on the first pass is 46% of the estimated total number of LCT within the 100 meter long unit; therefore, the estimated miss rate of LCT from Reach2/Unit 4 is 54%. Zero fish were caught at Reach 1 unit 4.



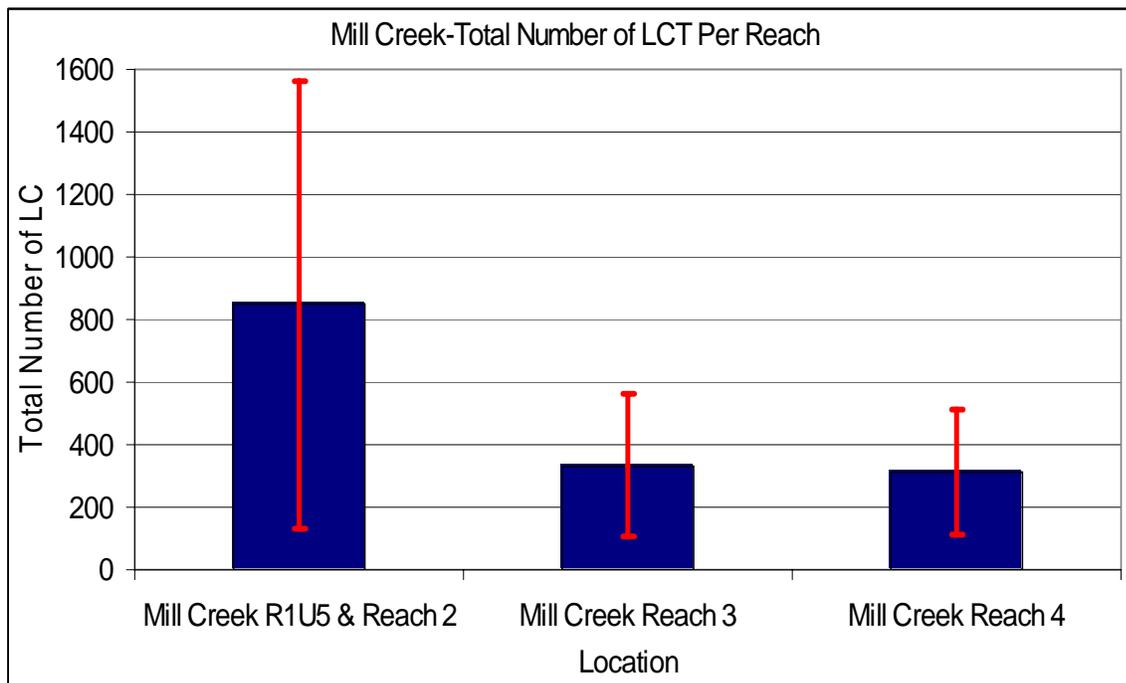
**Figure 3:** Linear regression equation for cumulative number of Lahontan cutthroat trout caught from Mill Creek, Bridgeport Ranger District, Reach 3/Unit 4. Using the linear regression equation, the estimated total number of LCT within Reach 3 Unit 4 is 27. Reach 3/Unit 4 was 100 meters long and was electroshocked three times. Block nets were set at the top and bottom of the unit to keep fish from entering and leaving the unit. Reach 3/Unit 4 is located at UTM N: 4258335 & E: 282871. Survey was conducted on 28 Sept. 2004. Seventeen fish caught on the first pass is 63% of the estimated total number of LCT within Reach 3/Unit4; therefore, the estimated miss rate of LCT from Reach 3/Unit 4 is 37%.



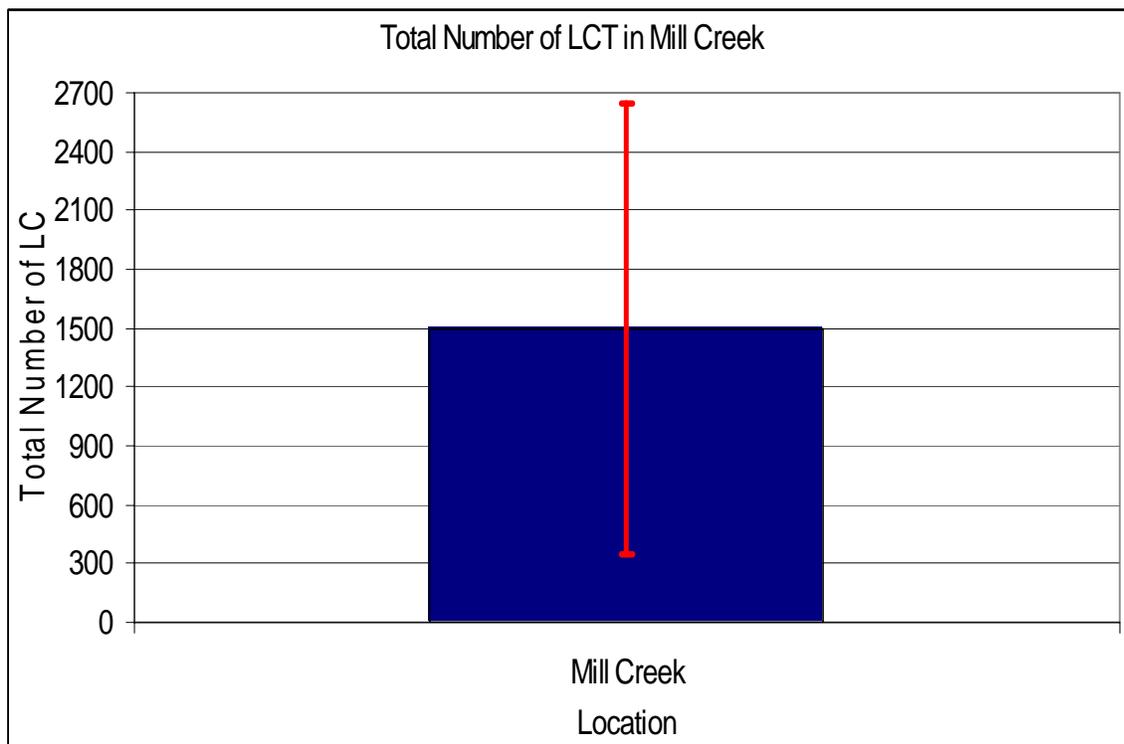
**Figure 4:** Number of LCT captured and potentially missed from each 100 meter long unit sampled on Mill Creek, Bridgeport Ranger District. Surveys were conducted from 21 September 2004 through 29 September 2004. Each unit was electrofished three times. Block nets were set up at the top and bottom of each 100 meter long unit to keep fish from entering and leaving the sample area. Linear regression equations were used to estimate the total number of LCT within each 100 meter long unit sampled (Figures 2 & 3).



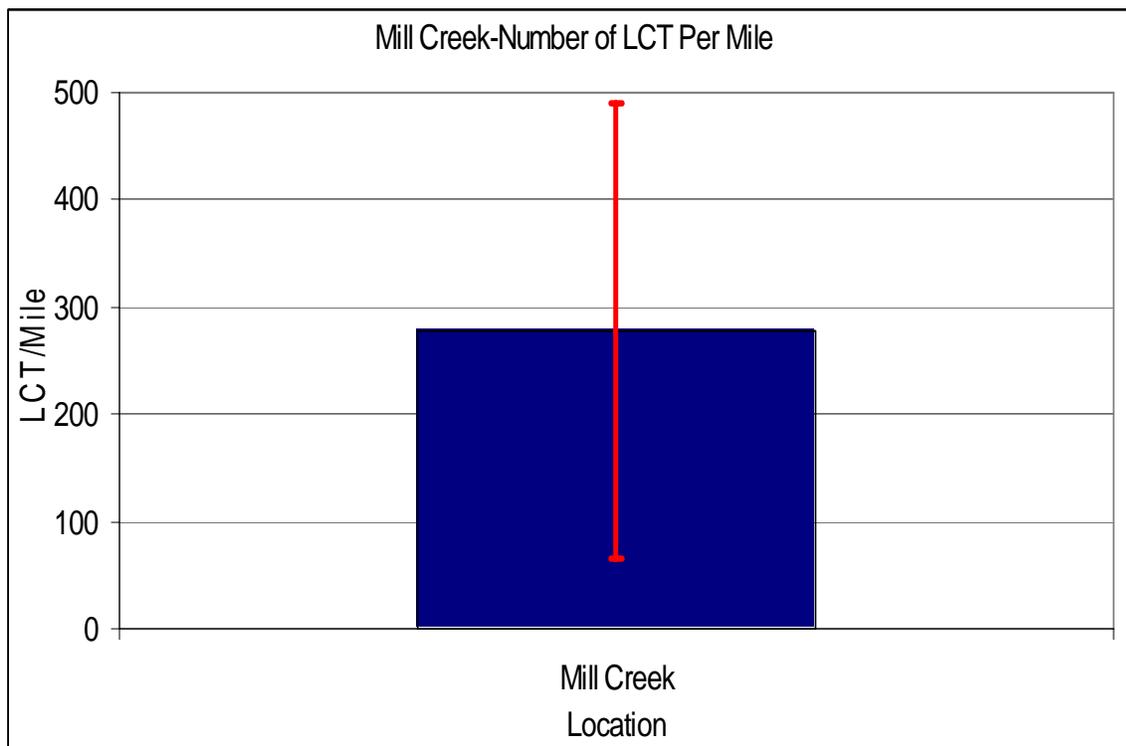
**Figure 5:** Number of LCT captured and potentially missed from each 40 meter long unit sampled on Mill Creek, Bridgeport Ranger District. Surveys were conducted from 21 September 2004 through 29 September 2004. Each unit was electrofished one time. Reach 1/Unit 5, and Reach 2/Units 1, 2, 3, and 5 all had habitat similar to the habitat within Reach 2/Unit 4. Reach 2/Unit 4 had a miss rate of 54% (Figure 1); therefore, an additional 54% of the captured LCT from each unit was added to Reach 1/Unit 5 and Reach 2/Units 1, 2, 3, and 5 to account for potentially missed LCT from each unit. Reach 3/Units 2, 3, and 5 all had habitat similar to the habitat within Reach 3/Unit 4. Reach 3/Unit 4 had an estimated miss rate of 37% (Figure 2); therefore, an additional 37% of the captured LCT from each unit was added to Reach 3/Units 2, 3, and 5 to account for potentially missed LCT. Habitat within Reach 4/Units 1, 2, 3, and 5 was not similar to the habitat within Reach 4/Unit 4 so no additional percentage of LCT was added to Reach 4 Units.



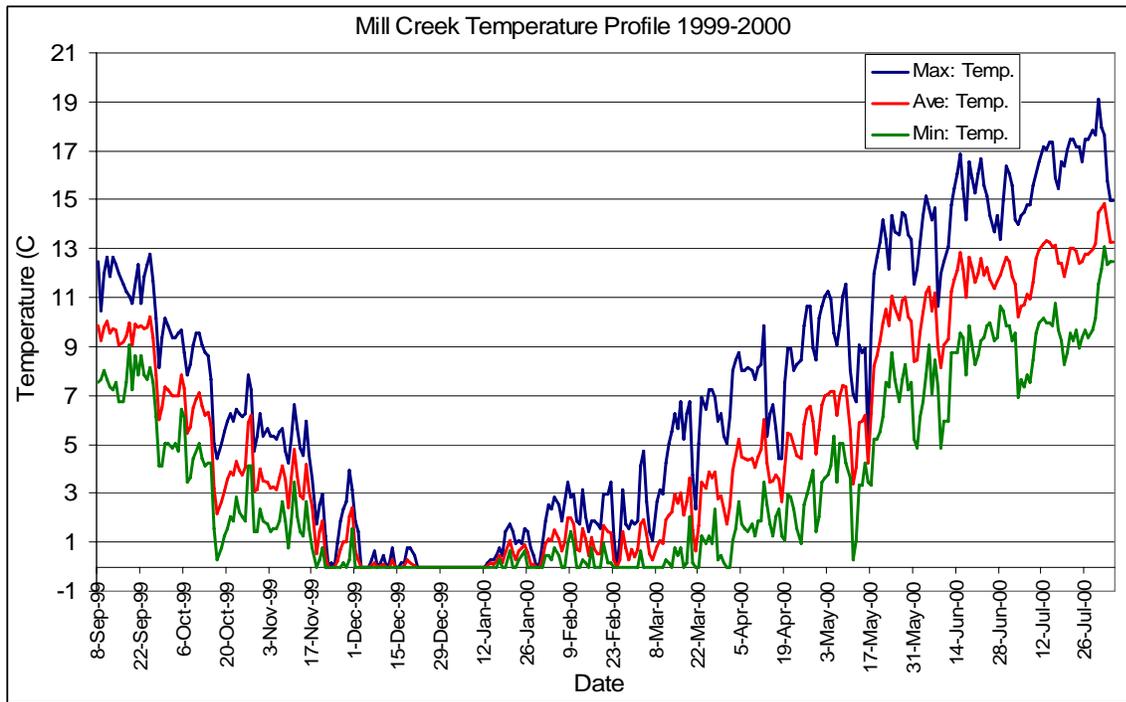
**Figure 6:** Means and 90% confidence intervals for the estimated total number of LCT within Reach 1/Unit 5 and Reach 2, Reach 3, and Reach 4 on Mill Creek, Bridgeport Ranger District. Surveys were conducted from 21 September 2004 through 29 September 2004. For R1U5 and Reach 2 the mean number of LCT is 849, the upper 90% confidence interval is 1564, and the lower 90% confidence interval is 133. For Reach 3 the mean number of LCT is 333, the upper 90% confidence interval is 562, and the lower 90% confidence interval is 103. For Reach 4 the mean number of LCT is 315, the upper 90% confidence interval is 514, and the lower 90% confidence interval is 114. The distance between R1U5 and the end of Reach 2 is approximately 1.3 miles long, the length of Reach 3 is approximately 1.34 miles long, and the length of Reach 4 is approximately 2.75 miles long.



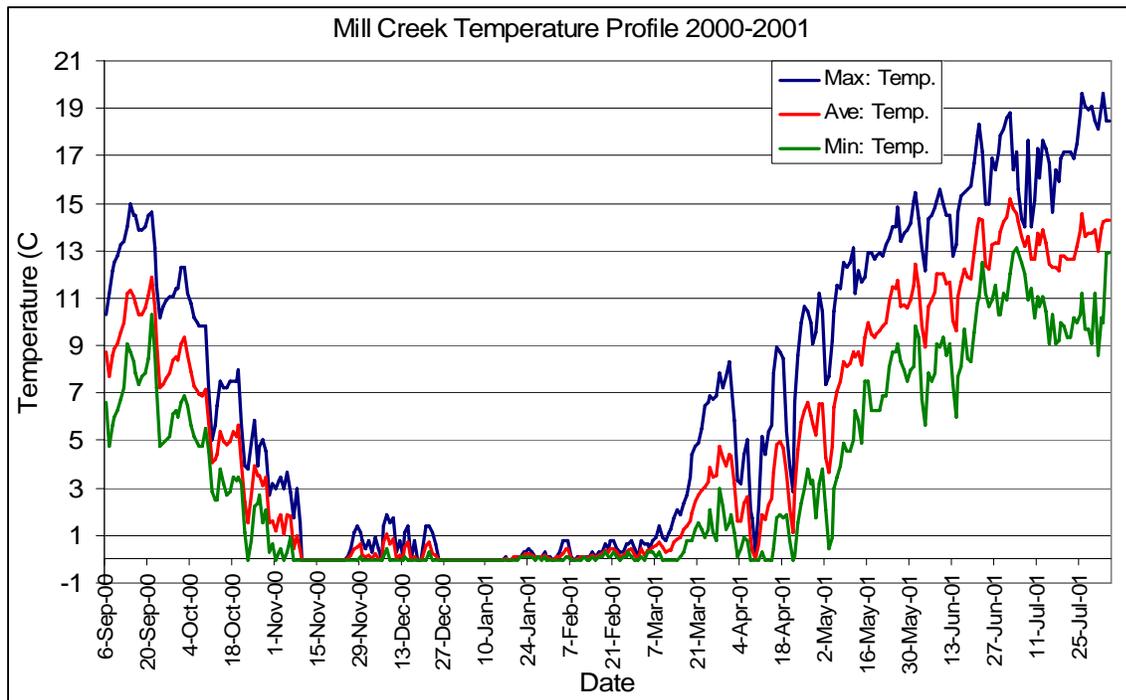
**Figure 7:** Mean and 90% confidence interval for the estimated total number of LCT within Mill Creek, Bridgeport Ranger District. Surveys were conducted from 21 September 2004 through 29 September 2004. The mean number of LCT is 1496, the upper 90% confidence interval is 2642, and the lower 90% confidence interval is 351. Lahontan cutthroat trout in Mill Creek are occupying approximately 5.4 miles of stream habitat.



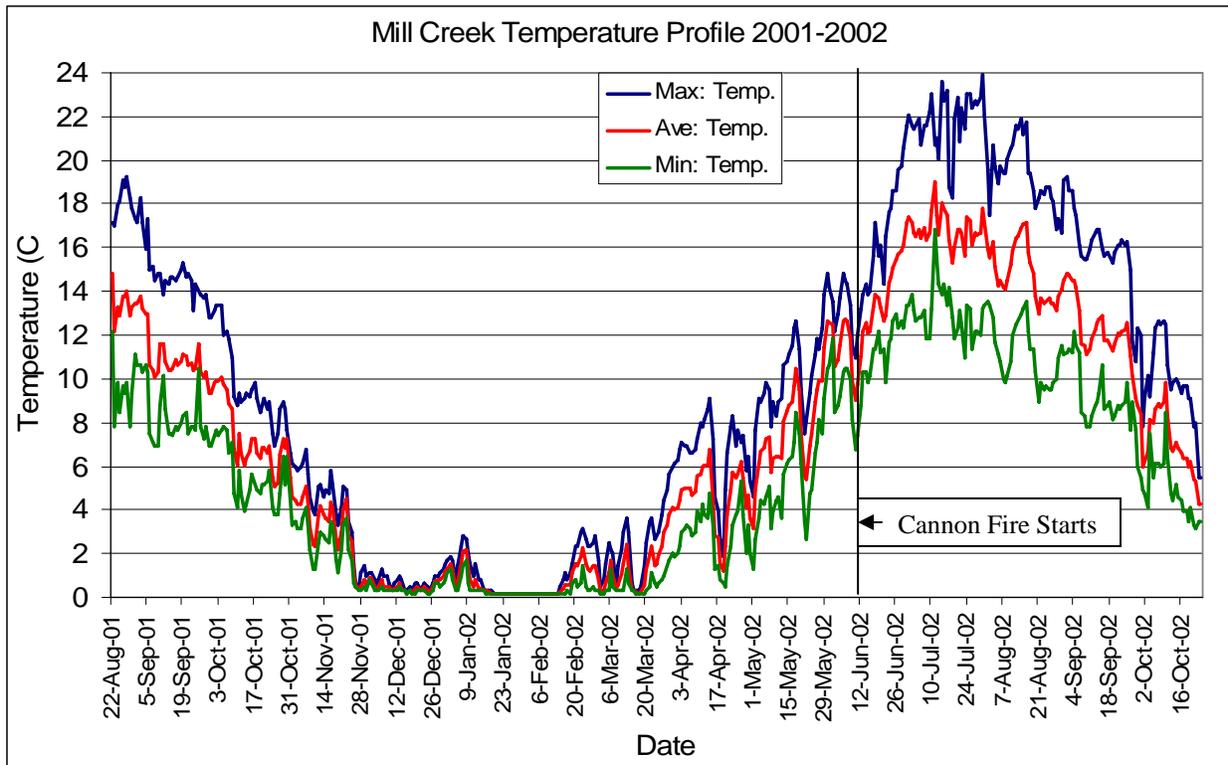
**Figure 8:** Mean number of LCT/mile and 90% confidence interval for LCT in Mill Creek, Bridgeport Ranger District. Surveys were conducted from 21 September 2004 through 29 September 2004. The mean number of LCT/Mile is 277, the upper 90% confidence interval is 489, and the lower 90% confidence interval is 65. Lahontan cutthroat trout in Mill Creek are occupying approximately 5.4 miles of stream habitat.



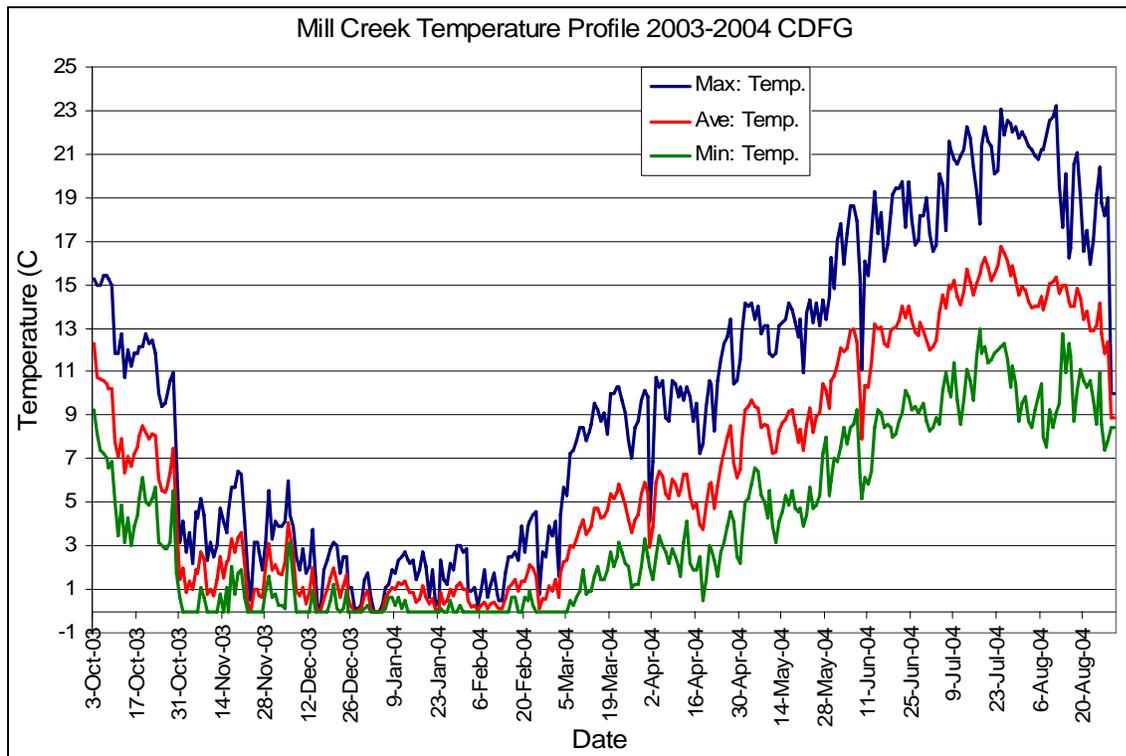
**Figure 9:** 1999-2000 temperature profile for Mill Creek, Bridgeport Ranger District. The overall maximum temperature was 19.11 degrees Celsius, the overall average temperature was 5.13 degrees Celsius, and the overall minimum temperature was -0.02 degrees Celsius. The average temperature between 1 Nov. 1999 and 31 March 2000 was 1.13 degrees Celsius. The average temperature between 8 Sept. 1999 and 31 Oct.1999, and between 1 April 2000 and 4 Aug. 2000 was 8.04 degrees Celsius. An Optic StowAway – Temp (C) Onset -4C to 38C was used to collect the temperature data. Temperature was collected from 8 Sept. 1999 to 4 Aug. 2000. Temperature was collected on California state land near Reach 2 Unit 2.



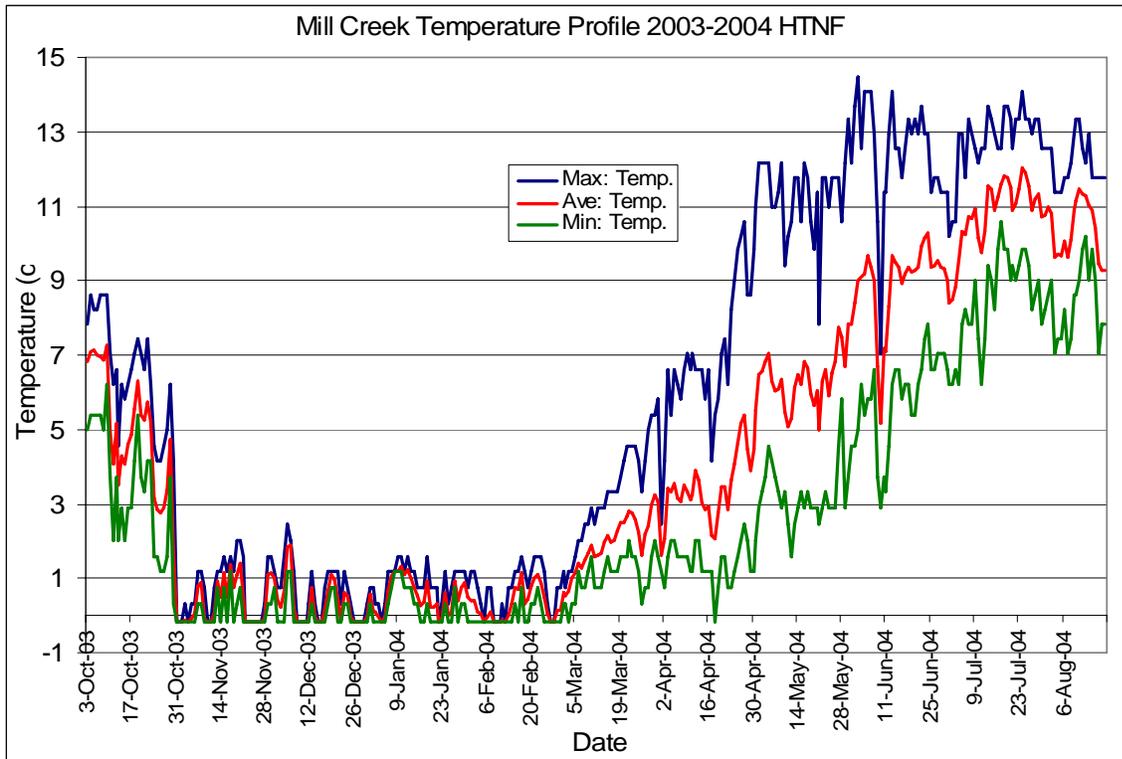
**Figure 10:** 2000-2001 temperature profile for Mill Creek, Bridgeport Ranger District. The overall maximum temperature was 19.6 degrees Celsius, the overall average temperature was 5.06 degrees Celsius, and the overall minimum temperature was -0.02 degrees Celsius. The average temperature between 1 Nov. 2000 and 31 March 2001 was 0.55 degrees Celsius. The average temperature between 6 Sept. 2000 and 31 Oct.2000, and between 1 April 2001 and 4 Aug. 2001 was 8.31 degrees Celsius. An Optic StowAway – Temp (C) Onset -4C to 38C was used to collect the temperature data. Temperature was collected from 6 Sept. 2000 to 4 Aug. 2001. Temperature was collected on California state land near Reach 2 Unit 2.



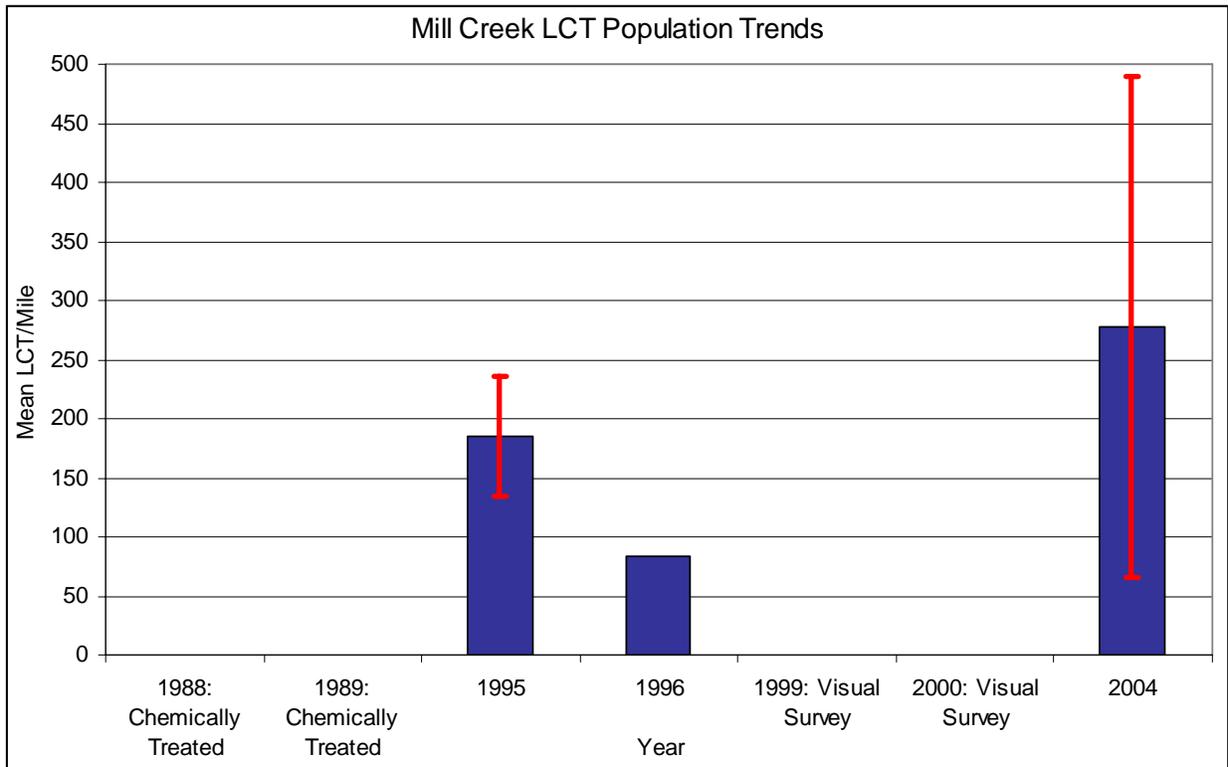
**Figure 11:** 2001-2002 temperature profile for Mill Creek, Bridgeport Ranger District. The overall maximum temperature before the Cannon Fire was 19.27 degrees Celsius, the overall average temperature before the Cannon Fire was 4.80 degrees Celsius, and the overall minimum temperature before the Cannon Fire was 0.13 degrees Celsius. The average temperature between 1 Nov. 2001 and 31 March 2002 was 1.27 degrees Celsius. The average temperature between 22 Aug. 2001 and 31 Oct.2001, and between 1 April 2002 and 14 June 2002 was 8.50 degrees Celsius. The Cannon Fire started on 15 June 2002. The maximum temperature after the Cannon Fire was 23.91 degrees Celsius. The average temperature after the Cannon Fire between 15 June 2002 and 24 Oct. 2002 was 13.17 degrees Celsius. An Optic StowAway – Temp (C) Onset -4C to 38C was used to collect the temperature data. Temperature was collected from 22 Aug. 2001 to 24 Oct. 2002. Temperature was collected on California state land near Reach 2 Unit 2.



**Figure 12:** 2003-2004 temperature profile for Mill Creek, Bridgeport Ranger District. The overall maximum temperature was 23.2 degrees Celsius, the overall average temperature was 6.52 degrees Celsius, and the overall minimum temperature was -0.02 degrees Celsius. The average temperature between 1 Nov. 2003 and 31 March 2004 was 1.70 degrees Celsius. The average temperature between 3 Oct. 2003 and 31 Oct.2003, and between 1 April 2004 and 30 Aug. 2004 was 9.42 degrees Celsius. An Optic StowAway – Temp (C) Onset -4C to 38C was used to collect the temperature data. Temperature was collected from 3 Oct. 2003 to 30 Aug. 2004. Temperature was collected on California state land near Reach 2 Unit 2.



**Figure 13:** 2003-2004 temperature profile for Mill Creek, Bridgeport Ranger District. The overall maximum temperature was 14.47 degrees Celsius, the overall average temperature was 4.17 degrees Celsius, and the overall minimum temperature was -0.16 degrees Celsius. The average temperature between 1 Nov. 2003 and 31 March 2004 was 0.69 degrees Celsius. The average temperature between 3 Oct. 2003 and 31 Oct. 2003, and between 1 April 2004 and 19 Aug. 2004 was 6.30 degrees Celsius. A HOBO Temperature (C) 1996 Onset data logger was used to collect the temperature data. The HOBO Temp was located near Reach 4 Unit 2 at 7240 feet elevation. The HOBO Temp was located at UTM N: 4256941 & E: 283201 on National Forest Lands. Temperature was collected from 3 Oct. 2003 to 19 Aug. 2004.



**Figure 14:** Mean number of LCT/mile and 90% confidence intervals for Lahontan cutthroat trout in Mill Creek, Bridgeport Ranger District, between 1995 and 2004. Not enough information was provided in the 1996 report to compute a confidence interval. In 2004 a 2-3 pass depletion survey was conducted. In 1995 and 1996 only a one pass depletion survey was conducted; therefore, the 185 LCT/mile in 1995 and 83 LCT/mile in 1996 are probably conservative. In 1995, LCT were occupying approximately 2 miles of stream habitat. In 2004 LCT were occupying approximately 5.4 miles of stream habitat.



**Figure 15:** Mill Creek, Bridgeport Ranger District, fish barrier just upstream of the Lost Cannon Creek-Mill Creek confluence. Picture was taken on 21 Sept. 04. Barrier is located at UTM N: 4263238.01 & E: 283594.30 and is at 5971 feet elevation. The barrier is approximately 20 feet high.



**Figure 16:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 1. This unit is located at UTM N: 4263014.00 & E: 283504.25. Picture was taken on 21 Sept. 04.



**Figure 17:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 1. This unit is located at UTM N: 4263014.00 & E: 283504.25. Picture was taken on 21 Sept. 04.



**Figure 18:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 2. This unit is located at UTM N: 4262659.51 & E: 283403.74. Picture was taken on 21 Sept. 04.



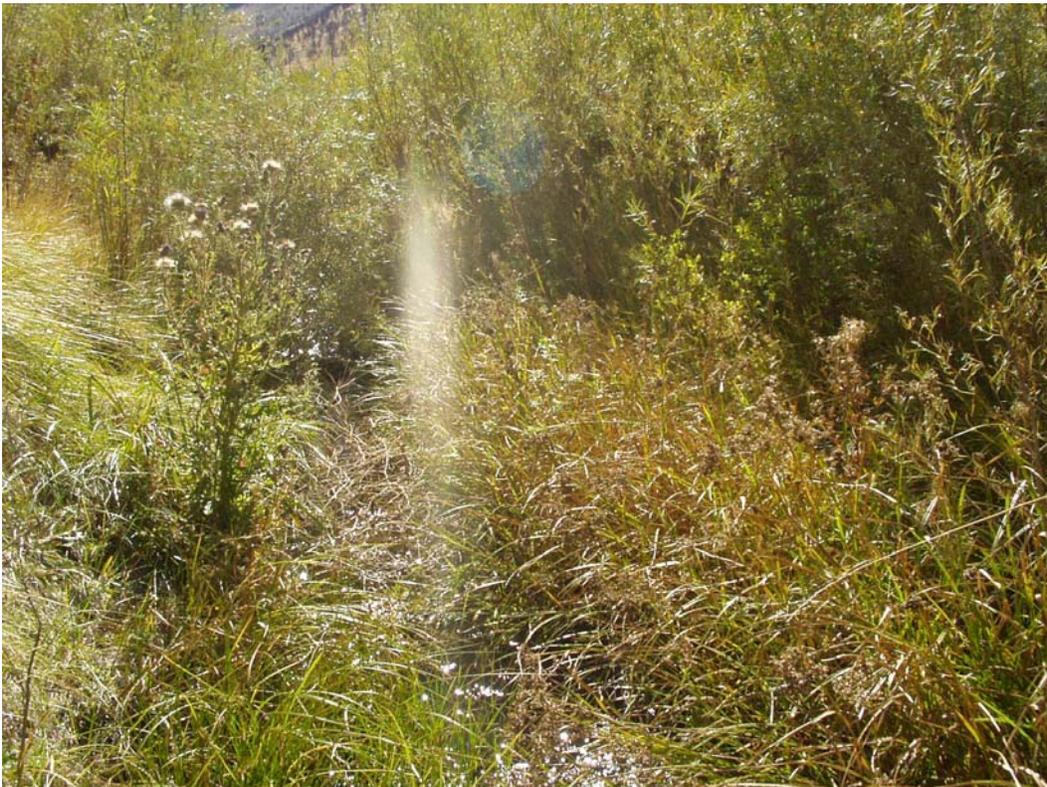
**Figure 19:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 2. This unit is located at UTM N: 4262659.51 & E: 283403.74. Picture was taken on 21 Sept. 04.



**Figure 20:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 3. This unit is located at UTM N: 424262349.20 & E: 283275.15. Picture was taken on 21 Sept. 04.



**Figure 21:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 3. This unit is located at UTM N: 424262349.20 & E: 283275.15. Picture was taken on 21 Sept. 04.



**Figure 22:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 4. This unit is located at UTM N: 4261920.52 & E: 283068.56. Picture was taken on 21 Sept. 04.



**Figure 23:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 4. This unit is located at UTM N: 4261920.52 & E: 283068.56. Picture was taken on 21 Sept. 04.



**Figure 24:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 5. This unit is located at UTM N: 4261687.88 & E: 283039.84. Picture was taken on 21 Sept. 04.



**Figure 25:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 5. This unit is located at UTM N: 4261687.88 & E: 283039.84. Picture was taken on 21 Sept. 04.



**Figure 26:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 1. This unit is located at UTM N: 4261495 & E: 282842. Picture was taken on 22 Sept. 04.



**Figure 27:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 1. This unit is located at UTM N: 4261495 & E: 282842. Picture was taken on 22 Sept. 04.



**Figure 28:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 2. This unit is located at UTM N: 4261140 & E: 282773. Picture was taken on 22 Sept. 04.



**Figure 29:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 2. This unit is located at UTM N: 4261140 & E: 282773. Picture was taken on 22 Sept. 04.



**Figure 30:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 3. This unit is located at UTM N: 4260787 & E: 282799. Picture was taken on 22 Sept. 04.



**Figure 31:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 3. This unit is located at UTM N: 4260787 & E: 282799. Picture was taken on 22 Sept. 04.



**Figure 32:** Mill Creek, Bridgeport Ranger District, artificial concrete fish barrier located just upstream of Reach 2 Unit 4 on California State land. This site is located at UTM N: 4260414 & E: 282913. The height of the wall is approximately 5 feet and has no pool below. Picture was taken in 09 Dec. 2004.



**Figure 33:** Mill Creek, Bridgeport Ranger District, beaver dam within Reach 2. Picture was taken on 6 Oct. 2003.



**Figure 34:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 1. This unit is located at UTM N: 4259552 & E: 282659. Picture was taken on 24 Sept. 04.



**Figure 35:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 1. This unit is located at UTM N: 4259552 & E: 282659. Picture was taken on 24 Sept. 04.



**Figure 36:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 2. This unit is located at UTM N: 4259290 & E: 282770. Picture was taken on 24 Sept. 04.



**Figure 37:** Mill Creek, Bridgeport Ranger District, artificial concrete fish barrier located just downstream of the Mill Creek-Terry Canyon road crossing (just downstream of Reach 3/Unit 3). Picture was taken on 28 April. 04.



**Figure 38:** Mill Creek, Bridgeport Ranger District, artificial concrete fish barrier located just downstream of the Mill Creek-Terry Canyon road crossing (just downstream of Reach 3/Unit 3). Picture was taken on 28 April. 04.



**Figure 39:** Mill Creek, Bridgeport Ranger District, Mill Creek-Terry Canyon road crossing (just downstream of Reach 3/Unit 3). Picture was taken on 28 April. 04.



**Figure 40:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 3. This unit is located at UTM N: 4258814 & E: 282841. Picture was taken on 24 Sept. 04.



**Figure 41:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 3. This unit is located at UTM N: 4258814 & E: 282841. Picture was taken on 24 Sept. 04.



**Figure 42:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 4. This unit is located at UTM N: 4258335 & E: 282871. Picture was taken on 28 Sept. 04.



**Figure 43:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 4. This unit is located at UTM N: 4258335 & E: 282871. Picture was taken on 28 Sept. 04.



**Figure 44:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 5. This unit is located at UTM N: 4257852 & E: 282919. Picture was taken on 28 Sept. 04.



**Figure 45:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 5. This unit is located at UTM N: 4257852 & E: 282919. Picture was taken on 28 Sept. 04.



**Figure 46:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 1. This unit is located at UTM N: 4257781 & E: 282905. Picture was taken on 28 Sept. 04.



**Figure 47:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 1. This unit is located at UTM N: 4257781 & E: 282905. Picture was taken on 28 Sept. 04.



**Figure 48:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 2. This unit is located at UTM N: 4256985 & E: 283125. Picture was taken on 28 Sept. 04.



**Figure 49:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 2. This unit is located at UTM N: 4256985 & E: 283125. Picture was taken on 28 Sept. 04.



**Figure 50:** Mill Creek, Bridgeport Ranger District, road-stream crossing just upstream of Reach 4/Unit 2. Picture was taken on 28 April. 04.



**Figure 51:** Mill Creek, Bridgeport Ranger District, dispersed campsite within 100 feet of Mill Creek. Campsite is located upstream of Reach 4/Unit 2 near the end of Forest System Road 32028. Picture was taken on 28 April. 04.



**Figure 52:** Mill Creek, Bridgeport Ranger District, dispersed campsite within 100 feet of Mill Creek. Campsite is located upstream of Reach 4/Unit 2 near the end of Forest System Road 32028. Picture was taken on 28 April. 04.



**Figure 53:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 3. This unit is located at UTM N: 4256192 & E: 283067. Picture was taken on 29 Sept. 04.



**Figure 54:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 3. This unit is located at UTM N: 4256192 & E: 283067. Picture was taken on 29 Sept. 04.



**Figure 55:** Mill Creek, Bridgeport Ranger District, unstable and eroding bank between Mill Creek and the trail. This site is located between Reach 4/Unit 3 and Reach 4/Unit 4. Picture was taken on 30 April. 04.



**Figure 56:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 4. This unit is located at UTM N: 4255392 & E: 282488. Picture was taken on 29 Sept. 04.



**Figure 57:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 4. This unit is located at UTM N: 4255392 & E: 282488. Picture was taken on 29 Sept. 04.



**Figure 58:** Mill Creek, Bridgeport Ranger District, stream-trail crossing just downstream of Reach 4/Unit 5. Picture was taken on 30 April. 04.



**Figure 59:** Mill Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 5. This unit is located at UTM N: 4254585 & E: 282073. Picture was taken on 29 Sept. 04.



**Figure 60:** Mill Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 5. This unit is located at UTM N: 4254585 & E: 282073. Picture was taken on 29 Sept. 04.



**Figure 61:** Mill Creek, Bridgeport Ranger District, stream-trail crossing just upstream of Reach 4/Unit 5. Picture was taken on 30 April. 04.



**Figure 62:** Mill Creek, Bridgeport Ranger District, trail crossing through a wet meadow. Meadow is located in the headwaters of Mill Creek upstream of the upper stream-trail crossing and Reach 4/Unit 5. Picture was taken on 30 April. 04.







































