

**Wolf Creek**  
Mono County, California

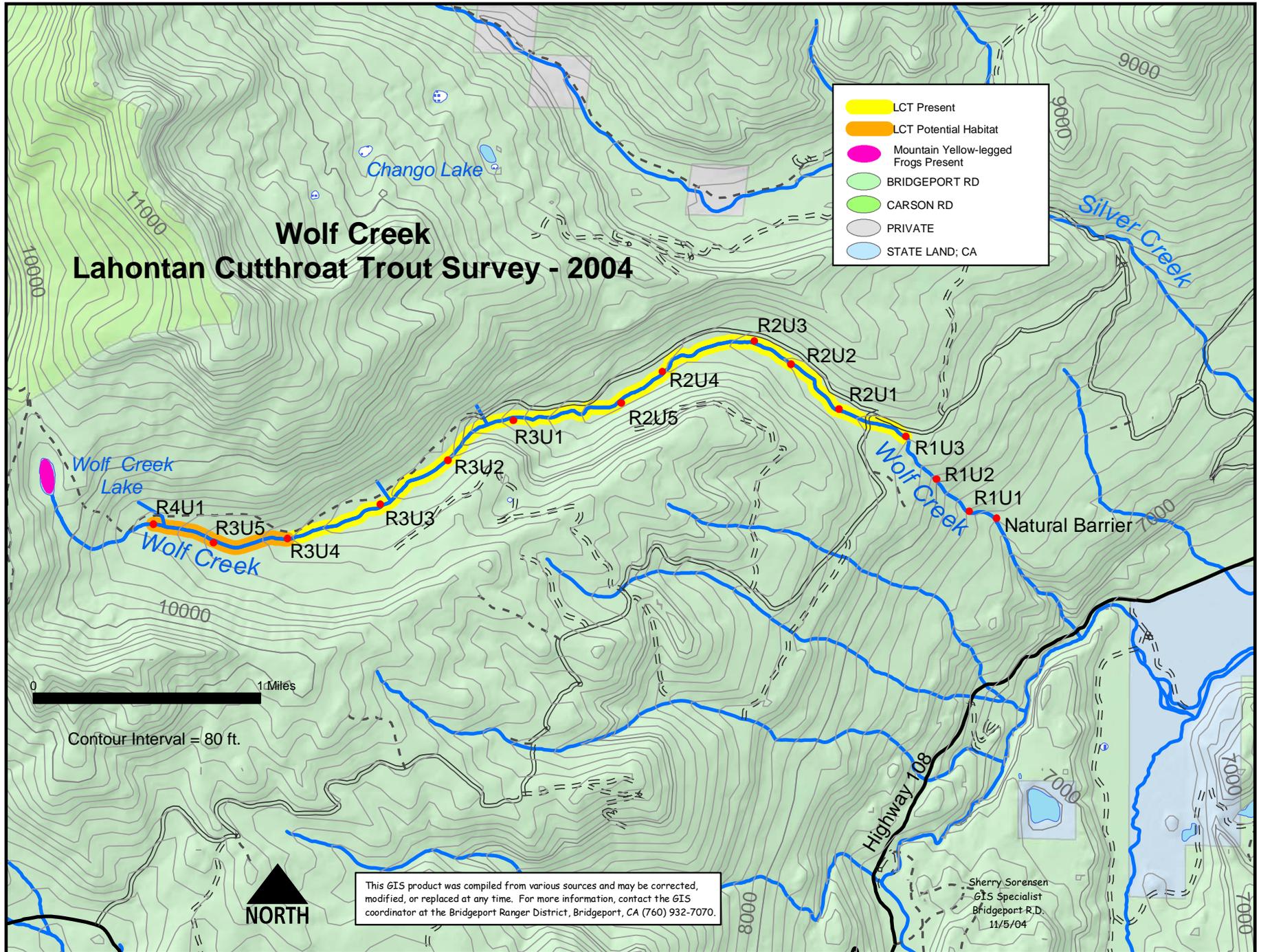
**2004 Fish & Habitat Survey Report**



Overlooking the Wolf Creek watershed to the east

Prepared by:

Bridgeport Ranger District  
Humboldt-Toiyabe National Forest



## **Introduction**

Wolf Creek, Mono County, California, Bridgeport Ranger District, supports an introduced population of Lahontan cutthroat trout (LCT), a federally endangered species. Wolf Creek is located in northern Mono County, California on the east slope of the Sierra Nevada mountain range. Wolf Creek flows for approximately 6 miles in an easterly direction to its confluence with the West Walker River near the Mountain Warfare Training Center located on Highway 108. The Wolf Creek watershed ranges from 7000 feet elevation to 10,100 feet elevation. The entire Wolf Creek watershed is managed by the Humboldt-Toiyabe National Forest (HTNF). Due to the close proximity of the Mountain Warfare Training Center, the Marines use the Wolf Creek watershed as a training area. The Wolf Creek watershed has been established as a Critical Aquatic Refuge in the Sierra Nevada Forest Plan Amendment.

Wolf Creek was chemically treated with rotenone in 1991 and 1992 to remove non native fishes. In 1993, 289 LCT were captured from Slinkard Creek and released into Wolf Creek in the meadow near Reach 2 units 4 & 5. In 1998, an additional 53 LCT were released into Wolf Creek. In 1999, 56 LCT were moved into the upper meadow section near Reach 3 unit 3. In 2003, 65 LCT were captured from Slinkard Creek and released into Wolf Creek near Reach 1 unit 2.

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

## **Methodology**

Wolf Creek was broken into four reaches. Reach 1 was very high gradient, and because of the short distance between the natural barrier (Figure 9) and where the gradient decreased, only three units were sampled in Reach 1. Reaches 2 and 3 had similar habitats, so each reach was divided into similar lengths. Reach 2 and 3 were each approximately 1.5 miles in length. Only one unit was sampled in Reach 4 because upstream of Reach 4 Unit 1 Wolf Creek became completely dry. At Wolf Creek Lake the crew walked around the lake looking for presence of fish and amphibians.

Reaches 2 and 3 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. All units within Reach 1 and Reach 4 were 40 meters in length and sampled with one pass. Units within Reach 1 were also evenly spaced.

Appendix 1 contains raw data filled out for each unit sampled. A new data form was prepared for each unit sampled. A Trimble GPS unit was used to document unit locations. The 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 in 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.

## **Results**

The distribution of LCT within the Wolf Creek watershed is limited to approximately 3.2 miles of Wolf Creek. Lahontan cutthroat trout are distributed between Reach 1 Unit 3 and Reach 3 Unit 4 (Figures 3 & 4). The total length of LCT ranges from 38 to 268 mm total length with the average total length of LCT being 136 mm (Figure 1). The length frequency histogram (Figure 1) suggests that multiple age classes of LCT are found within the Wolf Creek watershed.

The mean number of LCT between Reach 1 Unit 3 and the end of Reach 2 is 504 (Figure 5). The upper 90% confidence interval is 897 and the lower 90% confidence interval is 111 (Figure 5). The distance between Reach 1 Unit 3 and the end of Reach 2 is approximately 1.8 miles. The mean number of LCT between Reach 3 Unit 1 and Reach 3 Unit 4 is 252 (Figure 5). The upper 90% confidence interval is 534 and the lower 90% confidence interval is 0 (Figure 5). The distance between Reach 3 Unit 1 and Reach 3 Unit 4 is approximately 1.3 miles. The mean number of LCT within the entire watershed of Wolf Creek is 757 (Figure 6). The upper 90% confidence interval is 1431 and the lower 90% confidence interval is 111 (Figure 6). The mean number of LCT/mile within the entire Wolf Creek watershed is 236 (Figure 7). The upper 90% confidence interval is 447 and the lower 90% confidence interval is 35 (Figure 7).

The dominant overstory consists of conifers, aspen, pine, and alder, and the dominant understory consists of willows and grasses. The dominant Rosgen channel type is characterized as B. The average width of Wolf Creek is 2.8 meters and the average depth of Wolf Creek is 0.17 meters.

Wolf Creek Lake was surveyed for presence of amphibians. Six to 8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of the lake. No fish were seen in the lake. The outlet was dry for approximately 300 meters downstream of the lake.

## **Discussion**

Lahontan cutthroat trout are unlikely to extend their distribution downstream of Reach 1 Unit 3 due to increased gradient. However, LCT could likely extend their distribution upstream of Reach 3 Unit 4 to Reach 4 Unit 1 if flows increased. Lahontan cutthroat trout are unlikely to extend their distribution upstream of Reach 4 Unit 1 due to increased gradient.

Habitat conditions in Wolf Creek between the natural barrier and Reach 4 Unit 1 are fairly good. Typical habitat consisted of riffles, pools, several pieces of large woody debris in the stream, well vegetated stream banks, some good undercut cover, and not many bare or eroding banks. Only one area was noted for having unstable banks (Figures 31 & 32); however, a large amount of sedimentation in the stream was still noted several times while conducting the survey. Just upstream of Reach 3 Unit 1 a 12 foot high waterfall (Figure 33) was documented. Lahontan cutthroat trout may be able to get around this waterfall at certain times of the year. One beaver dam (Figures 21 & 22) was also documented just upstream of Reach 2 Unit 2. The beaver dam may be a temporary fish barrier. Lahontan cutthroat trout were visually sighted upstream of the beaver dam within the beaver pond.

Forest System Road 042 parallels Wolf Creek for approximately 2 miles. The road has been maintained fairly well. A few dispersed campsites are located between Wolf Creek and Forest System Road 042 within 100 feet of the creek. The dispersed campsites are likely causing erosion impacts on Wolf Creek. Forest System Road 062 crosses Wolf Creek just downstream of Reach 1 Unit 3. A large bridge was constructed at the Wolf Creek/Forest System Road 062 intersection (Figures 15 & 16). No significant impacts were documented at this bridge crossing.

A lot of Marine activity appears to be occurring within the Wolf Creek watershed. At the end of Forest System Road 042 a trail continues to parallel Wolf Creek up to Wolf Creek Lake. The trail appears to be heavily used by the Marines. Littering was very evident near the trail. Several user created trails were noted as spurring of the main trail. Several areas between Reach 3 Unit 1 and Reach 4 Unit 1 were noted for having ground disturbance.

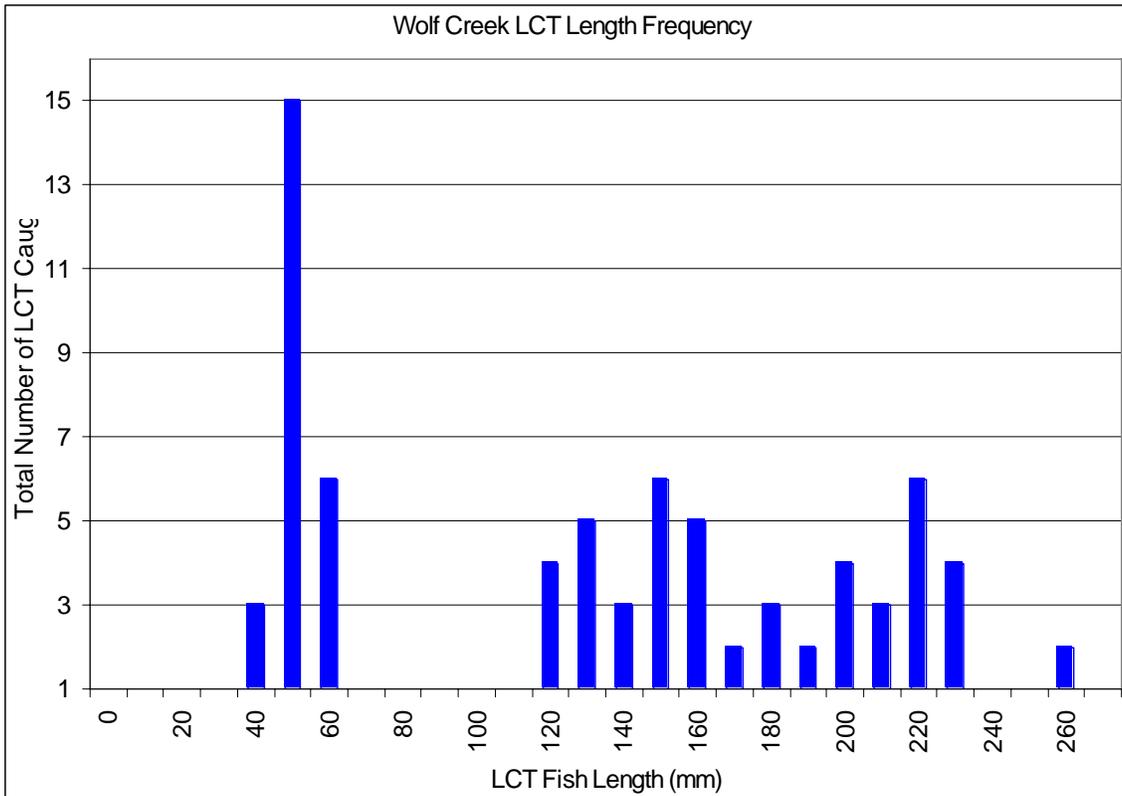
Impacts from electroshocking are a concern, and care was taken to limit LCT exposure to both handling and electrical currents. Lahontan cutthroat trout were closely monitored immediately after being netted. Only one obvious injury was observed. Most of the LCT appeared to respond well to the method of survey.

The 2004 Lahontan cutthroat trout population estimate is higher than the 1995 and 1996 population estimates (Figure 8). In 1995 and 1996 only a one pass depletion survey was conducted; therefore, the 1995 and 1996 population estimates may be conservative. In 2004 a 2-3 pass depletion survey was conducted. Visual surveys were conducted in 1999 and 2000.

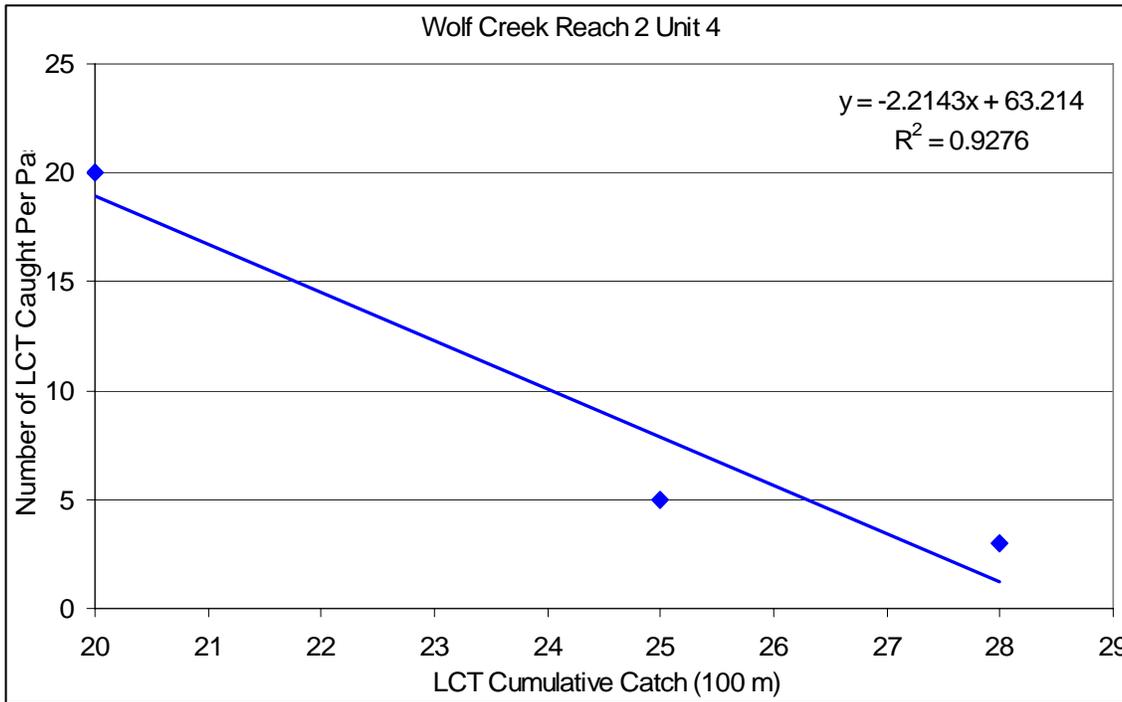
In 1999 Wolf Creek Lake was visually surveyed for presence of fish and amphibians. No fish were seen in the lake; however, Mountain yellow-legged frogs and Yosemite toads were present at the lake. In 2004, 6-8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of Wolf Creek Lake (Figures 46-47).

## **Recommendations**

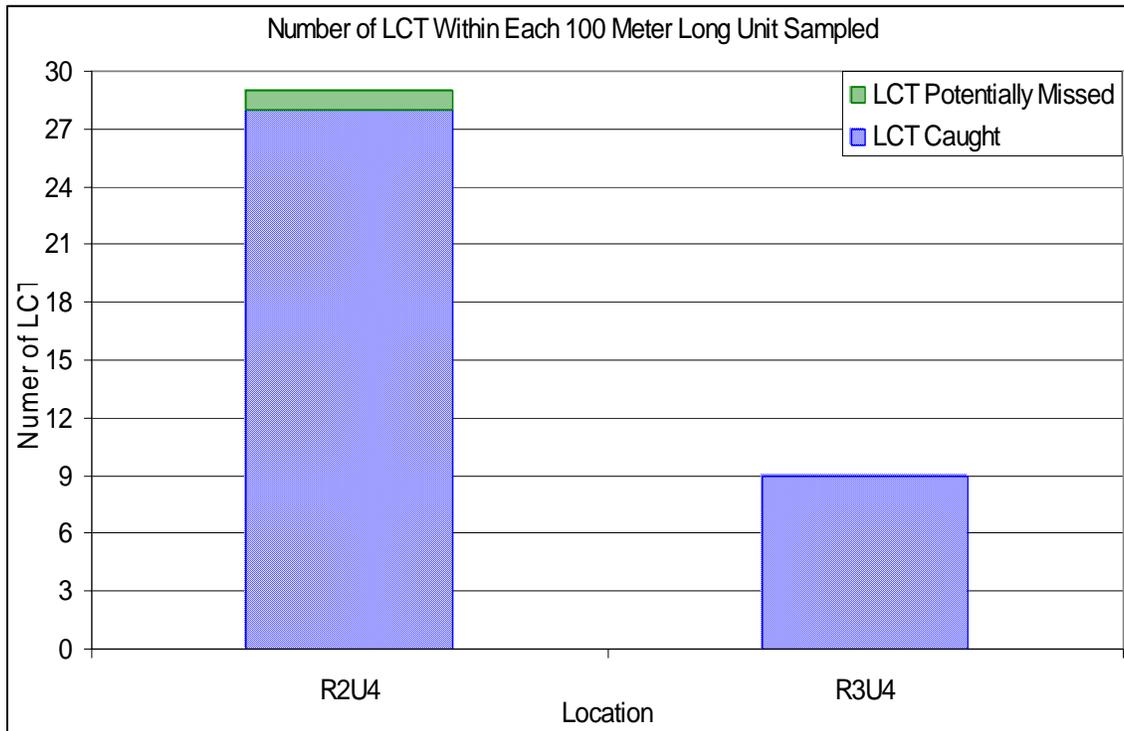
1. At the latest, in 2009 conduct another similar electrofishing LCT distribution and density survey.
2. Maintain Forest System Road 042 to minimize erosion impacts on Wolf Creek.
3. Decommission all campsites within 100 feet of Wolf Creek to reduce erosion impacts.
4. Monitor water temperature within the Wolf Creek watershed.
5. Monitor beaver activity within the Wolf Creek watershed.
6. Once the genetic analysis is completed, implement actions consistent with the conclusions made from the analysis.
7. If LCT in the future are stocked into Wolf Creek, consider restocking the LCT near Reach 2 Unit 4 or near Reach 3 Unit 3. Both units occur within meadow habitats.
8. Monitor amphibian populations at Wolf Creek Lake.
9. Work with the Mountain Warfare Training Center to minimize impacts and disturbance within all riparian areas (300 feet on each side of Wolf Creek and all tributaries).
10. Coordinate with the Mountain Warfare Training Center a “trash pickup day” within the Wolf Creek watershed.



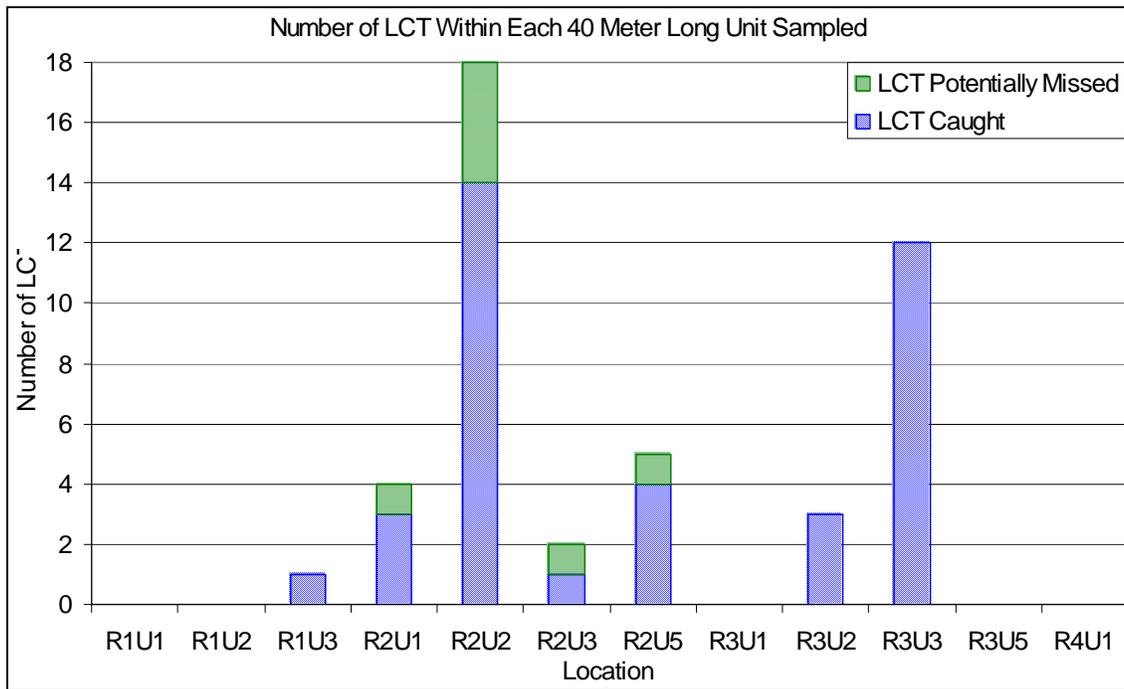
**Figure 1:** Length frequency of Lahontan cutthroat trout caught from Wolf Creek, Bridgeport Ranger District. Wolf Creek was surveyed from 30 September 2004 through 4 October 2004. The average length of LCT is 136 mm (5 inches).



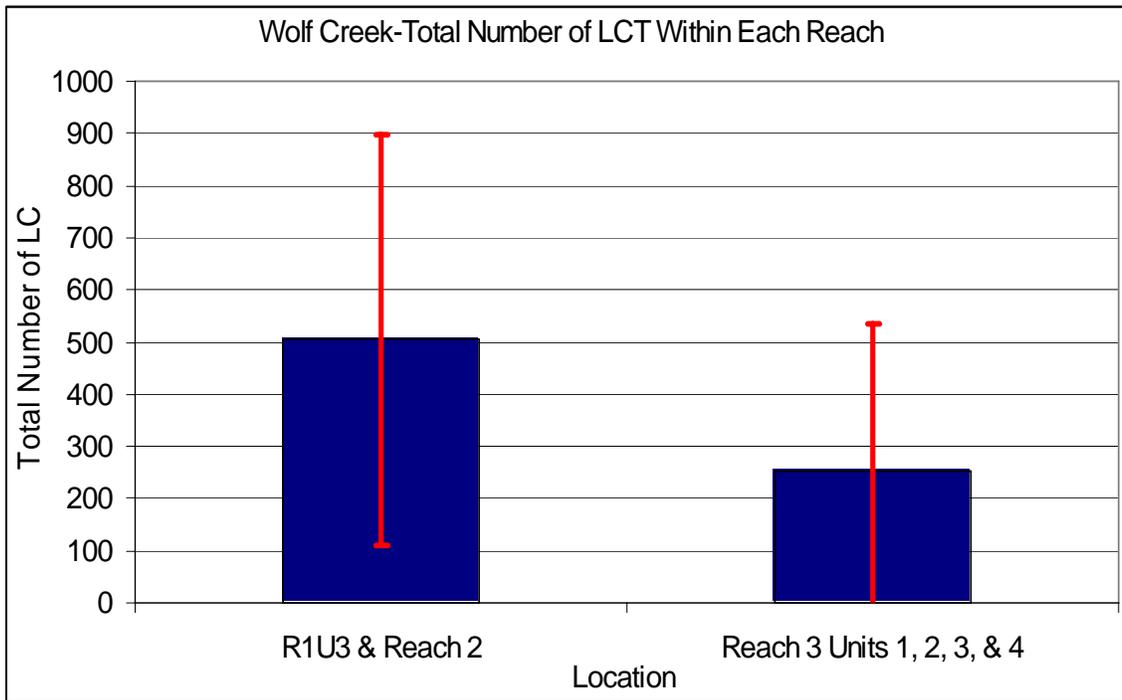
**Figure 2:** Linear regression equation for cumulative number of Lahontan cutthroat trout caught from Wolf Creek, Bridgeport Ranger District, Reach 2 Unit 4. Using the linear regression equation, the estimated total number of LCT within Reach 2 Unit 4 is 29. Reach 2 Unit 4 was 100 meters long and was 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: 4249191 & E: 275358. Survey was conducted on 1 Oct. 2004. Twenty fish caught on the first pass is 69% of the estimated total number of LCT within Reach 2 Unit 4; therefore, the estimated miss rate of LCT from Reach 2 Unit 4 is 31%.



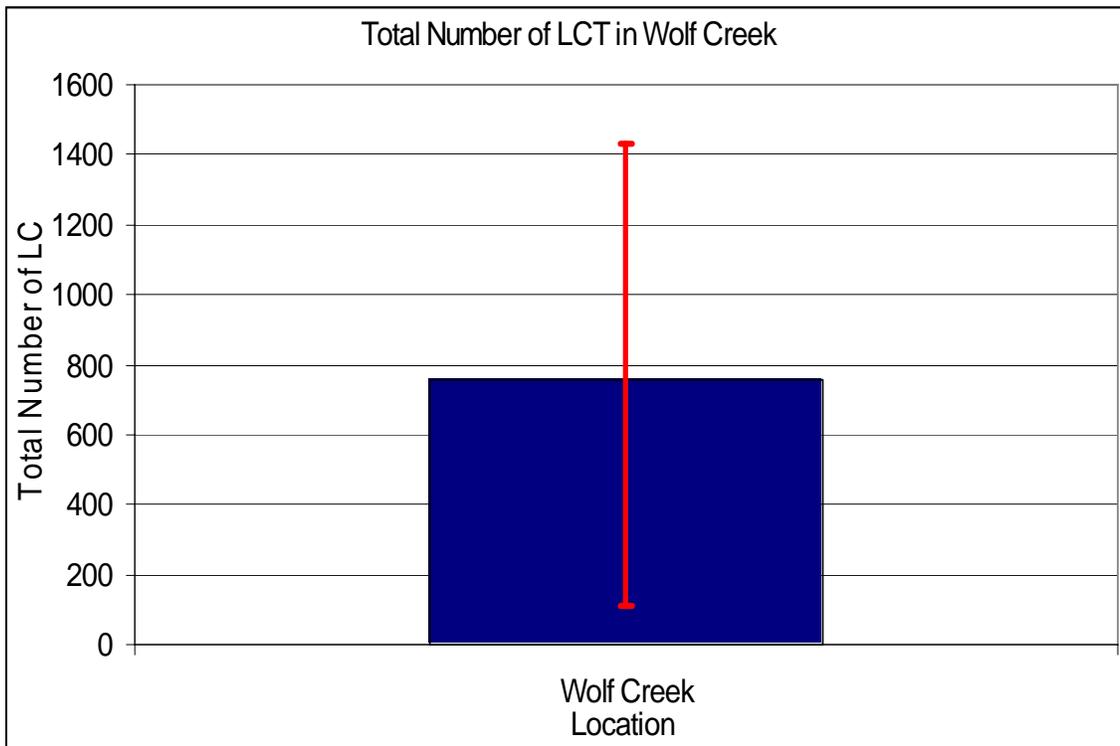
**Figure 3:** Number of LCT captured and potentially missed from each 100 meter long unit sampled on Wolf Creek, Bridgeport Ranger District. Surveys were conducted from 30 September 2004 through 4 October 2004. Reach 2 Unit 4 was electrofished three times. Reach 3 Unit 4 was electrofished two times. On Reach 3 Unit 4 zero fish were caught on the second pass; therefore, a third pass was not conducted. 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. A linear regression equation was used to estimate the total number of LCT within Reach 2 Unit 4 (Figure 2). Reach 1 and Reach 4 did not have 100 meter long unit.



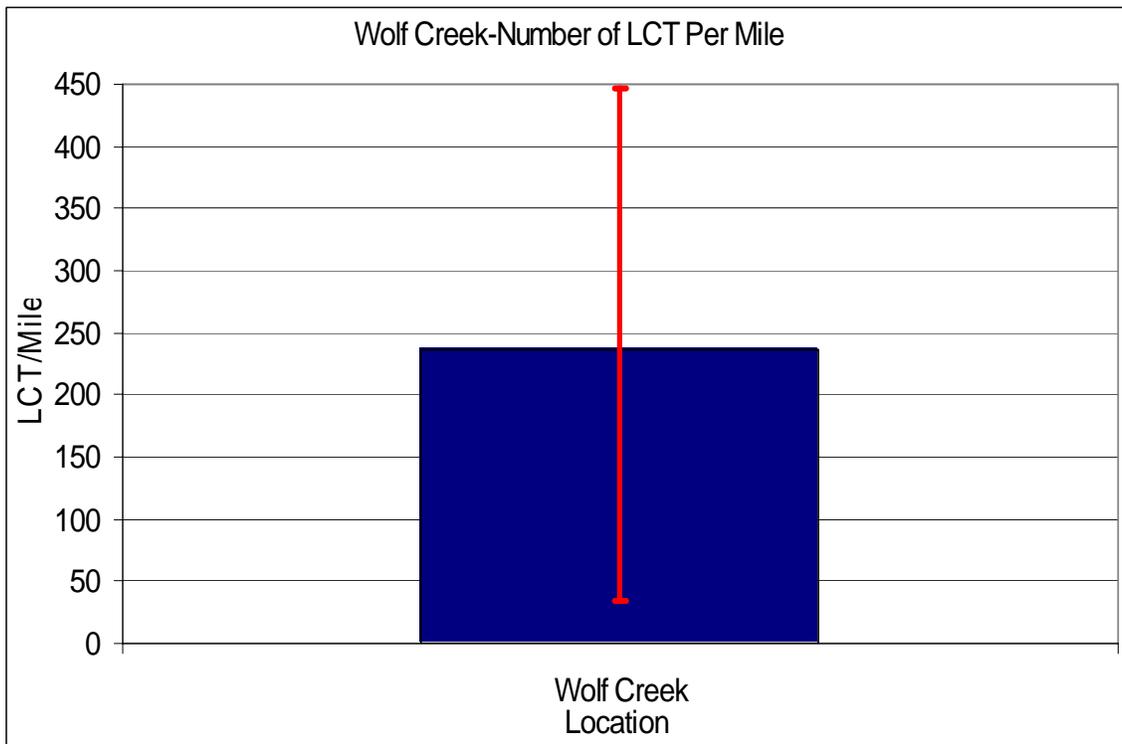
**Figure 4:** Number of LCT captured and potentially missed from each 40 meter long unit sampled on Wolf Creek, Bridgeport Ranger District. Surveys were conducted from 30 September 2004 through 4 October 2004. Each unit was electrofished one time. Reach 2 Units 1, 2, 3, and 5 all had habitat similar to the habitat within Reach 2 Unit 4. Reach 2 Unit 4 had a miss rate of 31% (Figure 2); therefore, an additional 31% of the captured LCT from each unit was added to Reach 2 Units 1, 2, 3, and 5 to account for potentially missed LCT from each unit. Reach 3 Units 2 and 3 had habitat similar to the habitat on Reach 3 Unit 4. Reach 3 Unit 4 had an estimated miss rate of 0%; therefore, no additional percentage could be added to Reach 3 Units 2 and 3 to account for potentially missed LCT. Reach 1 and Reach 4 did not have a 100 meter long unit. Reach 1 was a short reach and Reach 4 Unit 1 is where the survey ended.



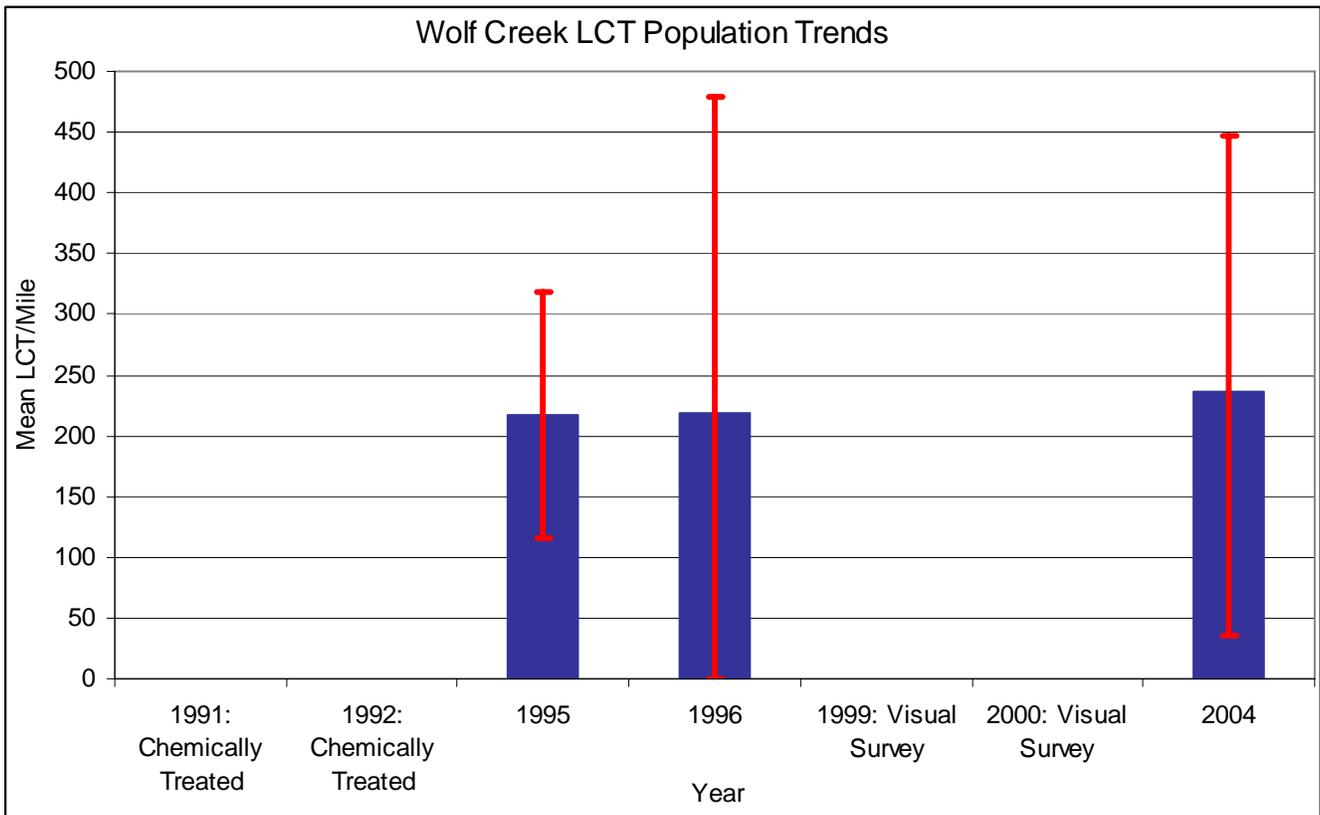
**Figure 5:** Means and 90% confidence intervals for the estimated total number of LCT within Reach 1 Unit 3 and Reach 2, and Reach 3 Units 1, 2, 3, & 4 on Wolf Creek, Bridgeport Ranger District. Surveys were conducted from 30 September 2004 through 4 October 2004. For R1U3 and Reach 2 the mean number of LCT is 504, the upper 90% confidence interval is 897, and the lower 90% confidence interval is 111. For Reach 3 Units 1, 2, 3, & 4 the mean number of LCT is 252, the upper 90% confidence interval is 534, and the lower 90% confidence interval is 0. The distance between R1U3 and the end of Reach 2 (R2U5) is approximately 1.8 miles, and the distance between R3U1 and R3U4 is approximately 1.3 miles.



**Figure 6:** Mean and 90% confidence interval for the estimated total number of LCT within Wolf Creek, Bridgeport Ranger District. Surveys were conducted from 30 September 2004 through 4 October 2004. The mean number of LCT is 757, the upper 90% confidence interval is 1431, and the lower 90% confidence interval is 111. Lahontan cutthroat trout in Wolf Creek are occupying approximately 3.2 miles of stream habitat.



**Figure 7:** Mean number of LCT/mile and 90% confidence interval for LCT in Wolf Creek, Bridgeport Ranger District. Surveys were conducted from 30 September 2004 through 4 October 2004. The mean number of LCT/mile is 236, the upper 90% confidence interval is 447, and the lower 90% confidence interval is 35. Lahontan cutthroat trout in Wolf Creek are occupying approximately 3.2 miles of stream habitat.



**Figure 8:** Mean number of LCT/mile and 90% confidence intervals for Lahontan cutthroat trout in Wolf Creek, Bridgeport Ranger District, between 1995 and 2004. In 2004 a 2-3 pass depletion survey was conducted. In 1995 and 1996 only a one pass depletion survey was conducted; therefore, the 217 LCT/mile in 1995 and 219 LCT/mile in 1996 are probably conservative. In 2004, LCT were occupying approximately 3.2 miles of stream habitat.



**Figure 9:** Wolf Creek natural barrier, Bridgeport Ranger District, downstream of Reach 1/Unit 1. This barrier is located at UTM N: 4248130 & E: 277746. Picture was taken on 30 Sept. 2004. Barrier is approximately 15 feet high.



**Figure 10:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 1. This Unit is located at UTM N: 4248255 & E: 277680. Picture was taken on 30 Sept. 2004.



**Figure 11:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit 1. This Unit is located at UTM N: 4248255 & E: 277680. Picture was taken on 30 Sept. 2004.



**Figure 12:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 2. This Unit is located at UTM N: 4248467 & E: 277383. Picture was taken on 30 Sept. 2004.



**Figure 13:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 1/Unit2. This Unit is located at UTM N: 4248467 & E: 277383. Picture was taken on 30 Sept. 2004.



**Figure 14:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 1/Unit 3. This Unit is located at UTM N: 4248710 & E: 277102. Picture was taken on 30 Sept. 2004.



**Figure 15:** Wolf Creek, Bridgeport Ranger District, bridge downstream of Reach 2/Unit 1. Picture was taken on 30 Sept. 2004. Picture was taken looking upstream at bridge.



**Figure 16:** Wolf Creek, Bridgeport Ranger District, bridge downstream of Reach 2/Unit 1. Picture was taken on 30 Sept. 2004. Picture was taken looking downstream at bridge.



**Figure 17:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 1. This Unit is located at UTM N: 42489033 & E: 276708. Picture was taken on 30 Sept. 2004.



**Figure 18:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 1. This Unit is located at UTM N: 42489033 & E: 276708. Picture was taken 30 Sept. 2004.



**Figure 19:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 2. This Unit is located at UTM N: 4249296 & E: 276374. Picture was taken on 30 Sept. 2004.



**Figure 20:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 2. This Unit is located at UTM N: 4249296 & E: 276374. Picture was taken on 30 Sept. 2004.



**Figure 21:** Wolf Creek, Bridgeport Ranger District, beaver pond located just upstream of Reach 2/Unit 2. Picture was taken on 30 Sept. 2004.



**Figure 22:** Wolf Creek, Bridgeport Ranger District, streamside view of a beaver pond located just upstream of Reach 2/Unit 2. Picture was taken on 30 Sept. 2004.



**Figure 23:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 3. This Unit is located at UTM N: 4249385 & E: 276026. Picture was taken on 30 Sept. 2004.



**Figure 24:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 3. This Unit is located at UTM N: 4249385 & E: 276026. Picture was taken on 30 Sept. 2004.



**Figure 25:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 4. This Unit is located at UTM N: 4249191 & E: 275358. Picture was taken on 1 Oct. 2004.



**Figure 26:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 4. This Unit is located at UTM N: 4249191 & E: 275358. Picture was taken on 1 Oct. 2004.



**Figure 27:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 2/Unit 5. This Unit is located at UTM N: 4248947 & E: 275083. Picture was taken on 30 Sept. 2004.



**Figure 28:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 2/Unit 5. This Unit is located at UTM N: 4248947 & E: 275083. Picture was taken on 30 Sept. 2004.



**Figure 29:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 1. This Unit is located at UTM N: 4248822 & E: 274316. Picture was taken on 1 Oct. 2004.



**Figure 30:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 1. This Unit is located at UTM N: 4248822 & E: 274316. Picture was taken on 1 Oct. 2004.



**Figure 31:** Wolf Creek, Bridgeport Ranger District, unstable south bank at Reach 3/Unit 1. This Unit is located at UTM N: 4248822 & E: 274316. Picture was taken on 1 Oct. 2004.



**Figure 32:** Wolf Creek, Bridgeport Ranger District, unstable bank at Reach 3/Unit 1. This Unit is located at UTM N: 4248822 & E: 274316. Picture was taken on 1 Oct. 2004.



**Figure 33:** Wolf Creek, Bridgeport Ranger District, waterfall at the top of Reach 3/Unit 1. This Unit is located at UTM N: 4248822 & E: 274316. Picture was taken on 1 Oct. 2004. LCT may be able to swim around the waterfall at certain times of the year. Waterfall is approximately 12 feet high.



**Figure 34:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 2. This Unit is located at UTM N: 4248542 & E: 273853. Picture was taken on 1 Oct. 2004.



**Figure 35:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 2. This Unit is located at UTM N: 4248542 & E: 273853. Picture was taken on 1 Oct. 2004.



**Figure 36:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 3. This Unit is located at UTM N: 4248229 & E: 273376. Picture was taken on 1 Oct. 2004.



**Figure 37:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 3. This Unit is located at UTM N: 4248229 & E: 273376. Picture was taken on 1 Oct. 2004.



**Figure 38:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 4. This Unit is located at UTM N: 4247988 & E: 272715. Picture was taken on 4 Oct. 2004.



**Figure 39:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 4. This Unit is located at UTM N: 4247988 & E: 272715. Picture was taken on 4 Oct. 2004.



**Figure 40:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 3/Unit 5. This Unit is located at UTM N: 4247956.93 & E: 272190.49. Picture was taken on 4 Oct. 2004.



**Figure 41:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 3/Unit 5. This Unit is located at UTM N: 4247956.93 & E: 272190.49. Picture was taken on 4 Oct. 2004.



**Figure 42:** Wolf Creek, Bridgeport Ranger District, looking upstream at Reach 4/Unit 1. This Unit is located at UTM N: 4248088 & E: 271766. Picture was taken on 4 Oct. 2004.



**Figure 43:** Wolf Creek, Bridgeport Ranger District, looking downstream at Reach 4/Unit 1. This Unit is located at UTM N: 4248088 & E: 271766. Picture was taken on 4 Oct. 2004.



**Figure 44:** Wolf Creek Lake, Bridgeport Ranger District, looking north. Picture was taken on 1 Oct. 2004. No fish were seen in the lake. Approximately 6-8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of the lake. The outlet of the lake was dry.



**Figure 45:** Wolf Creek Lake, Bridgeport Ranger District, looking south at the outlet. Picture was taken on 1 Oct. 2004. No fish were seen in the lake. Approximately 6-8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of the lake. The outlet of the lake was dry.



**Figure 46:** Mountain yellow-legged frog first year tadpole caught from Wolf Creek Lake, Bridgeport Ranger District. Picture was taken on 1 Oct. 2004. No fish were seen in the lake. Approximately 6-8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of the lake.



**Figure 47:** Mountain yellow-legged frog first year tadpole caught from Wolf Creek Lake, Bridgeport Ranger District. Picture was taken on 1 Oct. 2004. No fish were seen in the lake. Approximately 6-8 first year Mountain yellow-legged frog tadpoles were sighted on the west side of the lake.



























