

# **Upper Truckee River 2009 Summary Report**

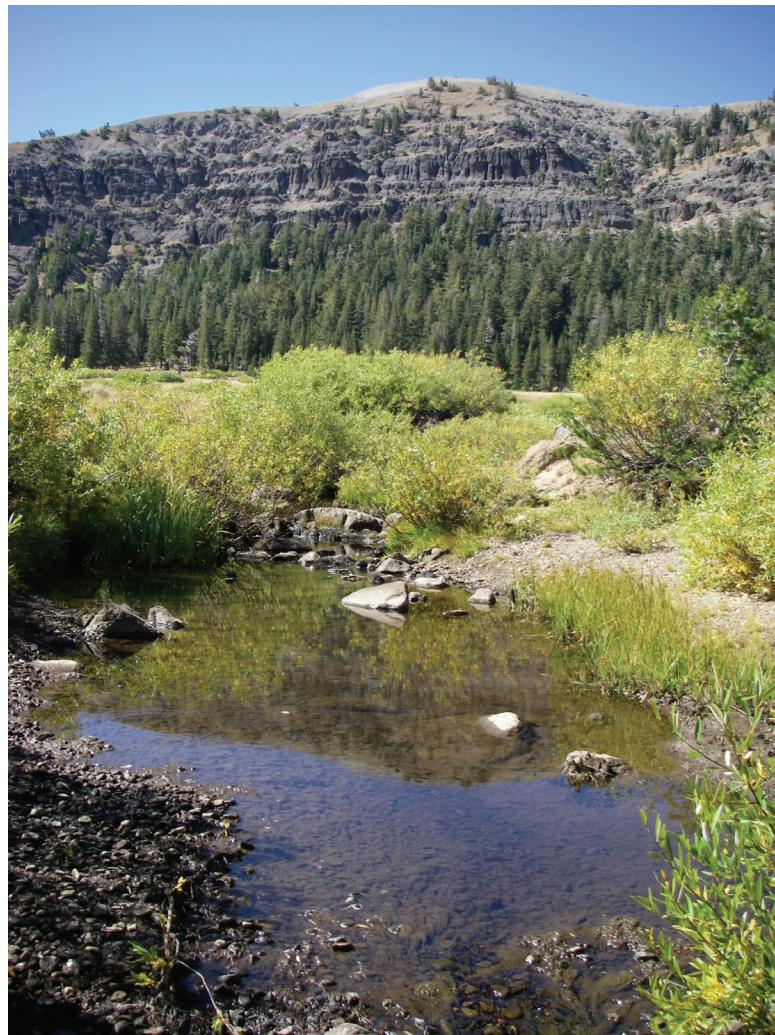
**September 21-24, 2009**

**State of California**

**Natural Resources Agency**

**Department of Fish and Game**

**Heritage and Wild Trout Program**



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## **Introduction:**

Lahontan cutthroat trout (LCT; *Oncorhynchus clarkii henshawi*) are native to the Lahontan Basin in northern Nevada, eastern California, and southern Oregon. Habitat degradation and the introduction of non-native species have caused significant LCT declines throughout their range. In 1970, this species was first listed as endangered under the Federal Endangered Species Act. In 1975, LCT were reclassified to threatened status to facilitate management and restoration efforts.

In California, LCT are native to the Truckee, Carson, Susan, and Walker River systems, including the Upper Truckee River (UTR). The UTR is located in both Alpine and El Dorado counties and is a snow-fed headwater tributary to Lake Tahoe in the Truckee River drainage and provided historic spawning grounds for LCT. The introduction of non-native brook trout (*Salvelinus fontinalis*) contributed to the extirpation of LCT in the Upper Truckee River.

In cooperation with the United States Fish and Wildlife Service (USFWS) and the United States Forest Service (USFS), the California Department of Fish and Game (DFG) has conducted an ongoing LCT restoration effort on the UTR since 1988, when the system was first chemically treated to remove non-native fishes. In 1990 and 1991, LCT from Macklin Creek (Sierra and Nevada counties) were translocated to reestablish LCT in this portion of their native range. However, during routine snorkel surveys in 1996, the USFS again observed brook trout in the UTR. Since then, the DFG has been using backpack electroshockers on an annual basis to assess the LCT population and capture and physically remove all brook trout encountered. Zero brook trout were captured during the electrofishing surveys in 2007, 2008, and 2009 (Weaver and Mehalick 2007 and 2008).

The UTR and tributaries upstream of the confluence with Showers Creek are designated by the California Fish and Game Commission as a Heritage and Wild Trout Water for the self-sustaining population of LCT within their historic (native) distribution. Angling is open from July 1<sup>st</sup> through September 30<sup>th</sup> and special regulations stipulate that only artificial lures with barbless hooks may be used. There is a zero trout bag limit. In 2009, the DFG Heritage and Wild Trout Program (HWTP) worked in collaboration with the USFS and conducted a single-pass electrofishing survey of the UTR and tributaries to assess the LCT population and locate and remove any non-native trout in the drainage.

## **Methods:**

Survey protocols were established by DFG North Central Region staff (Somer, personal communication, 2009). The survey area included the main-stem UTR from USFS Falls upstream to the Pacific Crest Trail (PCT) Crossing 1 and nine associated tributaries within this part of the system (Figure 1). The 2009 survey was conducted from September 21<sup>st</sup> through 24<sup>th</sup> and consisted of single pass electrofishing throughout the upper portions of the basin.

Figure 1. Overview map of Upper Truckee River survey area (map courtesy of William Somer, DFG North Central Region).

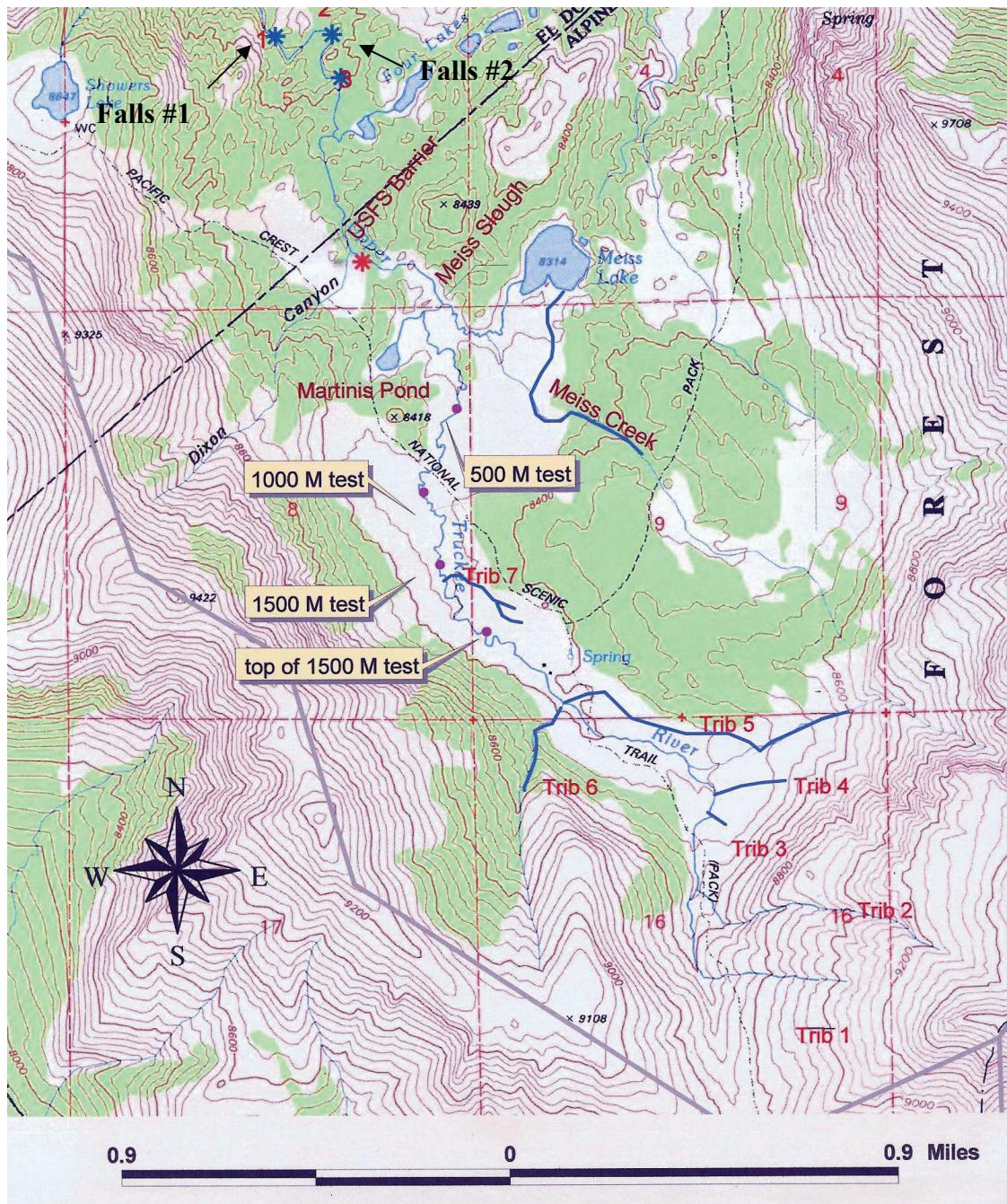


Figure 2. Map of main-stem Upper Truckee River survey sections (Falls 1 and Falls 2 were not surveyed in 2009).

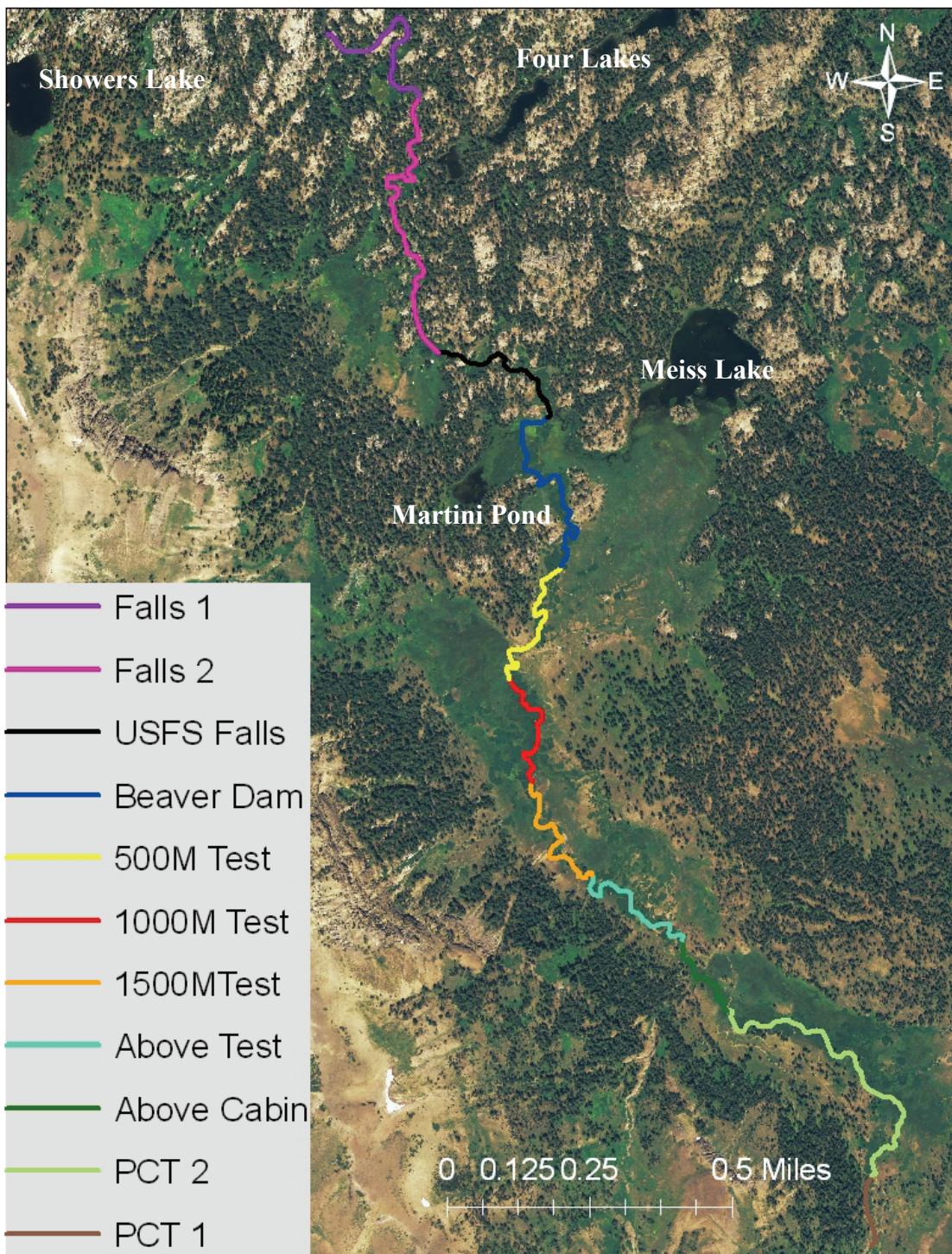
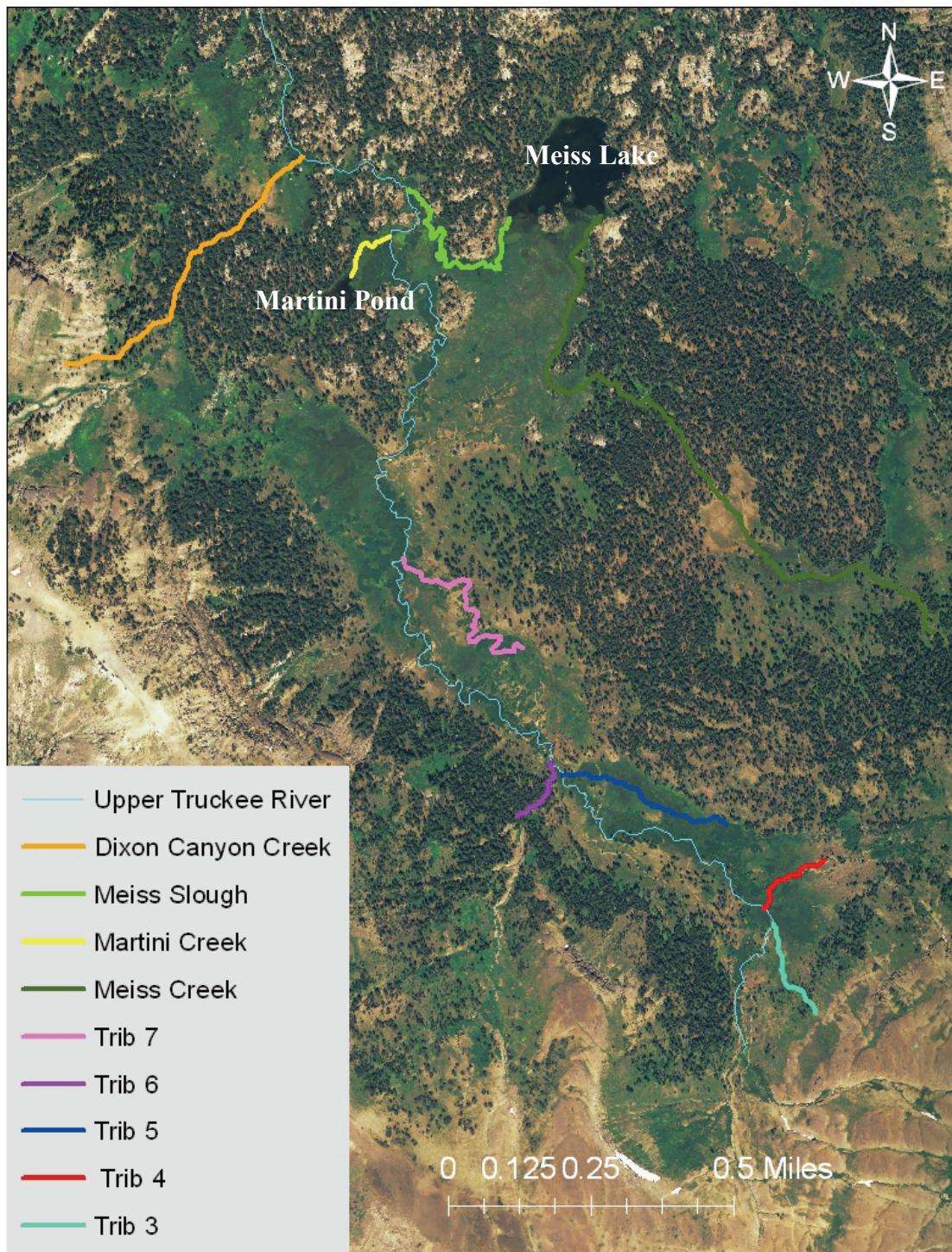


Figure 3. Map of Upper Truckee River tributaries.



Beaver dams are numerous within the survey area and, due to the creation of deep pools by the dams, it was necessary to remove beaver dams prior to electroshocking (Figure 4). USFS personnel visited the UTR during the week of September 14<sup>th</sup>, 2009 to assess the extent of beaver dam distribution and begin the process of dam removal. Dams were removed using a Pulaski and pick axe. During the electrofishing surveys, it was again necessary to break down portions of each dam to lower water levels and increase water visibility (the beavers had rebuilt these dams in the short period between initial dam removal and electrofishing). As electrofishing progressed upstream and individual dams were encountered, sampling was stopped until the dams could again be removed and water levels lowered. The removal of dams released large loads of fine sediment and increased turbidity downstream of the dam; therefore, once a dam was torn apart, electrofishing was not feasible downstream of the dam. In an effort to minimize this complication, dams were either removed on days prior to the electrofishing effort, or in the process of electrofishing upstream (thereby avoiding the sediment plume and associated turbidity by continuing upstream of the newly removed dam).

Figure 4. 2008 site photographs depicting beaver dams before (left) and after (right) removal.



Sections were located based on GPS coordinates, historic knowledge, and written survey plans. At the start of each survey, physical measurements of the stream and environmental conditions were taken, including air and water temperature (in the shade) and conductivity (both specific and ambient). These factors were used to determine appropriate electroshocker settings. Surveys were initiated at the downstream extent of each section and proceeded in an upstream direction, with netters capturing stunned fish and placing them in five-gallon buckets to be held until processed. All captured LCT were measured with a calibrated landing net to the nearest ½ inch (total length), and were tallied by section and size class (Tables 1 and 2). Fish measured from 1.5 inches to 1.99 inches were tallied in the 1.5 inch size class; fish measured as 2.0 inches to 2.49 inches were tallied as two-inch fish and so forth. All fish less than 1.49 inches were recorded as fry. Processed fish were released downstream of the

electrofishing effort. One of the primary objectives of this survey was to find and remove non-native brook trout; thus, brook trout were processed differently from LCT. All brook trout captured were sexed, measured to the nearest millimeter (total length), and then dispatched (buried or dispersed in dense vegetation). All non-game species were tallied by section.

An assessment of electrofishing injury from current and past survey efforts was conducted by keeping a tally (separate from the population count) of visible injury by size class for LCT (Table 3). Injury types were classified as: deformed spine (a curvature as viewed from above); short body (perch-like body form); tail or body fungus; mortality; or other (Figure 5). The tally of injury type by size class was totaled for the entire survey and was not differentiated by section.

Figure 5. Photographs depicting perch-like body form (left); spinal injury (right); and LCT without deformities (bottom).



## Results:

As noted, the main objective of this survey was to find and remove brook trout in an ongoing effort to restore native LCT. Zero brook trout were captured in 2009.

As part of this process, basic data on LCT size class distribution and injury rates (caused by annual electrofishing) were also collected. In 2009, a total of 2080 LCT and 16 speckled dace (*Rhinichthys osculus*) were captured in the main-stem UTR, from USFS Falls upstream to PCT 1 (Table 1). The speckled dace were relegated to the USFS Falls Section only. A total of 348 LCT were captured in the nine tributary sections (Table 2). LCT sizes ranged from less than 1.5 inches (fry) to 11.5 inches. For both the main-stem and tributary sections, fry had the highest abundance of any size class, followed by three inch fish (Figures 6 and 7). Flow was intermittent throughout most of the main-stem from the Beaver Dam Section upstream to the headwaters.

Table 1. 2009 summary of LCT captured by size class and section on main-stem UTR.

Size Class	USFS Falls	Beaver Dams	500M Test	1000M Test	1500M Test	Above Test	Above Cabin	PCT 2	PCT 1	Total	% Total
<1.5	0	142	61	0	44	9	24	5	0	285	14
1.5	26	15	26	0	6	0	11	0	0	84	4
2	87	7	3	1	11	6	7	1	0	123	6
2.5	19	1	1	6	19	24	18	5	0	93	4
3	10	7	18	11	38	45	46	24	0	199	10
3.5	22	22	13	16	24	18	27	15	0	157	8
4	29	38	49	4	18	16	17	21	0	192	9
4.5	13	16	22	4	19	10	26	14	0	124	6
5	8	7	15	9	16	9	15	25	0	104	5
5.5	9	7	4	7	10	4	14	6	0	61	3
6	14	20	14	10	8	4	6	7	1	84	4
6.5	8	15	16	11	3	3	3	2	0	61	3
7	20	25	18	14	11	9	4	3	0	104	5
7.5	14	18	14	6	6	3	5	10	0	76	4
8	13	27	23	17	8	11	8	11	1	119	6
8.5	9	18	6	11	4	2	5	3	1	59	3
9	6	25	6	25	8	4	4	2	1	81	4
9.5	3	7	3	6	0	1	1	0	1	22	1
10	10	14	3	8	1	3	0	1	0	40	2
10.5	1	2	1	2	0	0	0	0	0	6	0
11	1	0	2	1	0	0	0	0	0	4	0
11.5	1	0	0	1	0	0	0	0	0	2	0
12	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>323</b>	<b>433</b>	<b>318</b>	<b>170</b>	<b>254</b>	<b>181</b>	<b>241</b>	<b>155</b>	<b>5</b>	<b>2080</b>	<b>100</b>

Table 2. 2009 summary of total number of LCT captured by size class and section on UTR tributaries.

Size Class	Dixon Canyon Creek	Martini Creek	Meiss Slough	Meiss Creek	Trib 7	Trib 6	Trib 5	Trib 4	Trib 3	Total	% Total
<1.5	0	0	0	72	0	0	8	0	0	80	23
1.5	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	2	0	0	4	0	0	6	2
2.5	0	0	0	22	1	0	12	0	0	35	10
3	0	0	0	28	6	0	22	0	0	56	16
3.5	0	0	0	11	1	0	5	0	0	17	5
4	0	0	0	14	3	0	3	0	0	20	6
4.5	0	0	0	16	4	0	2	0	0	22	6
5	0	0	0	22	3	0	4	0	0	29	8
5.5	0	0	0	3	0	0	5	0	0	8	2
6	0	0	0	3	3	0	2	0	0	8	2
6.5	0	0	0	9	3	0	2	0	0	14	4
7	0	0	0	7	2	0	2	0	0	11	3
7.5	0	0	0	7	0	0	1	0	0	8	2
8	0	0	0	6	3	0	3	0	0	12	3
8.5	0	0	0	5	1	0	2	0	0	8	2
9	0	0	0	3	0	0	5	0	0	8	2
9.5	0	0	0	1	1	0	0	0	0	2	1
10	0	0	0	2	0	0	1	0	0	3	1
10.5	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	1	0	0	0	0	0	1	0
11.5	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>234</b>	<b>31</b>	<b>0</b>	<b>83</b>	<b>0</b>	<b>0</b>	<b>348</b>	<b>100</b>

Figure 6. Histogram of 2009 electrofishing data on main-stem UTR: total number of Lahontan cutthroat trout captured by size class.

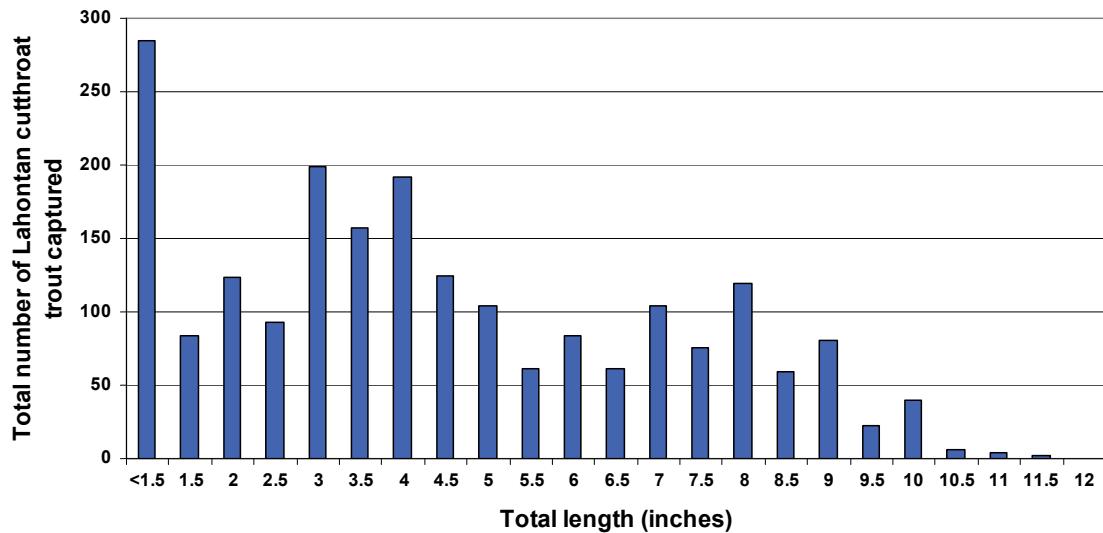
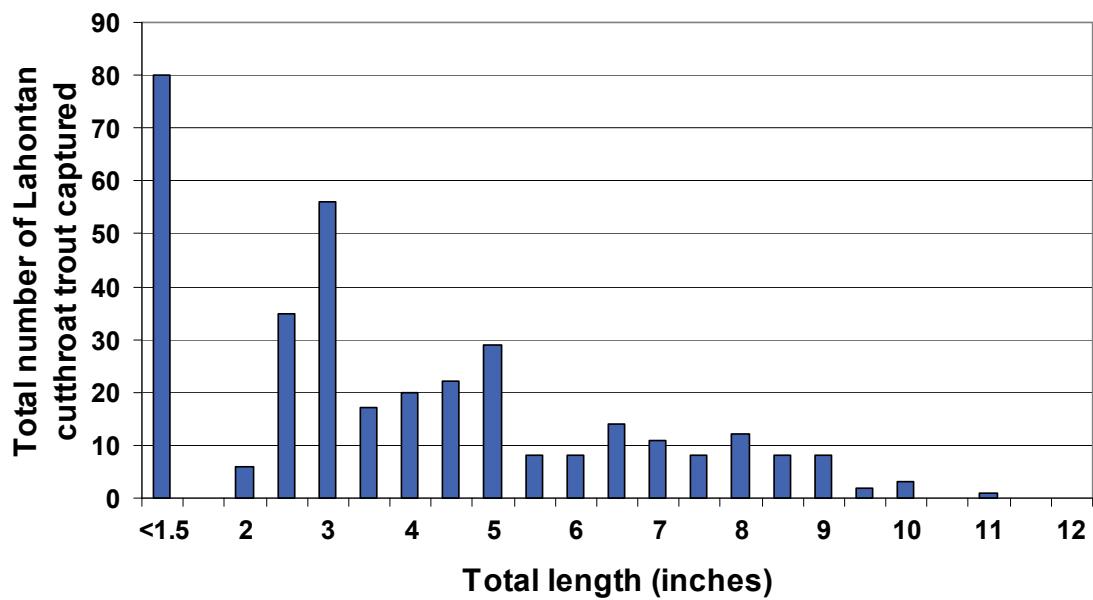


Figure 7. Histogram of 2009 electrofishing data on UTR tributaries: total number of Lahontan cutthroat trout captured by size class.



LCT injury was quantified for the entire system, including the main-stem and all tributaries. Of the 2428 LCT captured in 2009, 127 showed signs of injury (5.2%; Table 3). The majority of these injured fish had some type of spinal abnormality (71% perch-like short body form, 7% deformed spine).

Table 3. 2009 occurrence of LCT injury by type and size class.

Size Class	LCT Injury Type			
	Deformed Spine	Short Body	Tail/Body Fungus	Mortality
Fry	0	0	0	5
1.5	0	0	0	1
2	0	0	0	0
2.5	0	0	0	1
3	0	3	0	3
3.5	0	8	0	3
4	2	10	0	2
4.5	1	11	0	2
5	0	5	0	2
5.5	0	1	0	0
6	1	4	0	1
6.5	0	1	0	0
7	1	12	0	0
7.5	1	4	0	0
8	0	15	1	1
8.5	2	7	1	2
9	0	8	2	0
9.5	0	0	1	0
10	1	1	0	0
10.5	0	0	0	0
11	0	0	0	0
11.5	0	0	0	0
12	0	0	0	0
<b>Total</b>	<b>9</b>	<b>90</b>	<b>5</b>	<b>23</b>

These surveys did not include measurement of stream habitat attributes such as widths or survey section lengths; thus, density and biomass estimates for LCT were not generated. However, the total number of fish captured may be compared across time as a possible indicator of changes in population size or structure. Data on the UTR main-stem from the USFS Falls upstream to PCT 1 (including all tributaries) were examined for the years 2007 through 2009. Additional sections were surveyed in previous years; however, these were not

included in the comparison in order to ensure that the survey area remained consistent from year to year. Since 2007, the number of fish captured has increased each year (Table 4).

Table 4. Comparison of total numbers of LCT captured in the Upper Truckee River from USFS Falls upstream to PCT1, including nine tributaries, from 2007 through 2009.

Year	Number of LCT captured		
	Main-stem	Tributaries	Total
2007	1381	128	1509
2008	1614	264	1878
2009	2080	348	2428

In 2008, the HWTP did not capture any speckled dace in the USFS Falls section; however, they were captured downstream of the confluence with the outflow of Four Lakes (this results from the fact that, in 2008, an additional two sections were surveyed farther downstream). The downstream boundary or start of the USFS Falls Section marks the endpoint of the chemical treatment to restore LCT that occurred in the late 1980s. At this location, there is a split in the channel and, in the past, the majority of flow went to the downstream-left branch. The USFS created a rock barrier to prevent upstream fish migration at this location. Although there are natural barriers farther downstream, this barrier was fabricated as added protection against upstream movement of non-native fishes into the restoration area. Over time, the channel morphology in this location has changed and, currently, the majority of water flows to the downstream-right branch. The presence of speckled dace upstream of this barrier in 2009 may be an indication that this barrier is no longer functioning as intended.

#### **Discussion:**

This was the third consecutive year since 1996 that zero brook trout were captured in the entire survey area of the UTR. In 2006, only two yearling brook trout were captured in the UTR. The DFG HWTP is dedicated to protecting this important heritage trout resource and will continue monitoring the UTR to ensure that non-native brook trout are eliminated and the restored LCT population continues to thrive. The HWTP recommends reducing monitoring of the trout population to a semi-annual basis to limit the effects of repeated electroshocking, assessing potential impacts of beavers on the LCT population, and re-evaluating the structural integrity of the USFS barrier and its role in limiting upstream movement of fish.

## **References**

Weaver, J. and S. Mehalick. 2007. Upper Truckee River 2007 Summary Report. State of California. Natural Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.

Weaver, J. and S. Mehalick. 2008. Upper Truckee River 2008 Summary Report. State of California. Natural Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.