



State of Utah
DEPARTMENT OF NATURAL RESOURCES
Division of Wildlife Resources

Bonneville cutthroat trout (*Oncorhynchus
clarki utah*) surveys in the Northern Region,
2000



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Utah Division of Wildlife Resources
1594 W. North Temple
Salt Lake City, Utah
John F. Kimball, Director

**Bonneville cutthroat trout (*Oncorhynchus
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2000**

by

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INTRODUCTION

Bonneville cutthroat trout surveys in Northern Utah during 2000 focused primarily with the assessment of two drainages, Woodruff Creek and the North Fork of the Ogden River. A Bonneville cutthroat trout metapopulation was known to exist in the Woodruff Creek Drainage upstream from Woodruff Creek Dam, however, the extent of this metapopulation had not been documented. Surveys in the North Fork of the Ogden River were completed to determine if Bonneville cutthroat trout populations remained in this drainage.

The surveys completed in these two drainages included mainstem and all tributary streams. These surveys were extensive and provided a complete picture on the entire metapopulation of Bonneville cutthroat trout in the Woodruff Creek Drainage and the remaining cutthroat trout populations in the North Fork of the Ogden River. Bonneville cutthroat trout surveys in addition to these two drainages included the following streams: Weber River sections 02-05, Hardscrabble Creek, Rees Creek, and Saddle Creek. The 2000 surveys provided needed data that will help towards the objectives of long term conservation of Bonneville cutthroat trout in Utah (Lentsch et al. 1997). This information will be included in the revision of the Bonneville cutthroat trout Conservation Strategy in Utah (Lentsch et al. 1997).

The **Goal** of the 2000 surveys was to document the extent of the Bonneville cutthroat trout metapopulation in the Woodruff Creek Drainage and the remaining populations in the North Fork of the Ogden River Drainage.

More specifically, the **Objectives** for these surveys were:

- 1) to quantify the extent (number of stream kilometers) that Bonneville cutthroat trout occupy during base flow conditions in these drainages, and
- 2) to quantify the genetic integrity of the Bonneville cutthroat trout in these drainages.

Results related to Objective 1 will be discussed within this document. Objective 2 will be addressed during the next several

years as the genetic tissue samples of Bonneville cutthroat trout collected in 2000 are processed with nuclear DNA, mitochondrial DNA, and meristic analyses.

METHODS

All stream surveys in the Woodruff Creek Drainage and the North Fork of the Ogden River Drainage were completed during base flow conditions in July and August to determine the extent of the resident Bonneville cutthroat trout populations in each stream/stream section. When possible, stream survey locations were chosen as closely to previous Utah Division of Wildlife Resources (UDWR) survey locations and some tributary stations were chosen to maximize information on the cutthroat trout distribution within the target tributary streams. Eighteen days were required to complete the surveys in these two drainages. The surveys completed in addition to these two drainages required seven days.

Universal Transverse Mercator (UTM) coordinates were recorded for each stream survey location with a hand-held Global Positioning System (GPS). Habitat Quality Index (HQI) attributes were collected for Model II according to Binns (1982). HQI attributes were collected in most streams that contained cutthroat trout. All captured fish were transferred to live cages placed in the stream. Fish collected from the first electrofishing pass were kept separate from the fish collected from the second electrofishing pass. Fish processing and data collection commenced immediately following electrofishing completion and fish not collected for genetic analyses were returned to the stream downstream of the station. All fish captured were measured to the nearest millimeter (mm) TL and weighed to the nearest gram (g).

A modified Zippin multiple pass depletion electrofishing formula was used to calculate the population estimates and ninety-five percent confidence limits for each site surveyed (Zippin 1958). The formulas used to calculate the estimates were:

$$N = C_1^2 / C_1 - C_2$$

where,

N = estimated fish population,

C₁ = the number of fish captured from the first pass, and

C₂ = the number of fish captured on the second pass.

$$SE = [C_1 * C_2 / (C_1 - C_2)^2] * (C_1 + C_2)^{1/2}$$

$$95\% \text{ C.I.} = 2 * \text{SE}$$

Population estimates were calculated separately for age-1 and older fish and age-0 fish because smaller fish are not immobilized as effectively as larger fish while electrofishing (Reynolds 1989) and consequently, population estimates for age-0 fish are usually not as meaningful. All cutthroat trout < 45 mm TL were considered to be age-0.

Condition factor (Ktl) was calculated using the formula:

$$K = W * 100,000/L^3$$

where,

W = weight in g, and

L = TL in mm.

All cutthroat trout tissue samples were collected for genetic analysis according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999). These samples will be submitted to the Salt Lake Office of the UDWR during the winter/spring of 2001. Samples will be processed with nuclear DNA and mitochondrial DNA. Anticipated completion of these samples is 2003. Meristic analyses will be completed by 2002 at the UDWR office located in Salt Lake City.

Surveys on the Weber River sections 02-05

When possible, each sample site was 200 m in length. Sites were measured using a laser range finder or a tape measure. A electric block was used at the upstream end of the electrofishing stations. No block net was used at the lower end of the stations.

Sampling was conducted using a two-pass depletion technique. For both electrofishing passes, a canoe with a generator and Coffelt C-Phase VVP set to 300-400 V was pulled slowly upstream with four hand held anodes. The cathode was attached to the canoe. Each person with an anode used a dip net to collect stunned fish. Additional netting personnel in the electrified area also collected stunned fish and transferred them from the other personnel to a holding container in the canoe. Ten personnel were used on these surveys.

Remaining surveys

A 100 m reach, representing habitat conditions throughout the entire stream, was identified for each survey. Stations were measured using a 100 m tape. Because hiking was required for most surveys, block nets were not used. A natural habitat break (e.g., small waterfall/cascade) was chosen for the upper end of each reach and when possible, the lower end. Two battery-powered backpack electrofishing units, manufactured by Smith Root, were utilized side-by-side for surveys on Hardscrabble Creek, Woodruff Creek section 02, and Woodruff Creek section 03 (low). On all remaining surveys, a single battery-powered backpack electrofishing unit was used. Between three and six personnel were utilized on these surveys. Electrofishing settings varied depending on the stream conductivity. In general, the pulse was set at J (70 Hz), the frequency was set at 4 (4 ms), and the voltage was set at 400 V.

RESULTS

Fish populations in the Woodruff Creek and North Fork of the Ogden River drainages were sampled to: 1) determine the distribution of Bonneville cutthroat trout in the drainages and 2) collect Bonneville cutthroat trout tissue for genetic analyses. At least one complete two-pass depletion electrofishing survey was completed on the following streams: Woodruff Creek section 02, Woodruff Creek section 03 (low), Woodruff Creek section 03 (high), Woodruff Creek section 03 (headwaters), Sugar Pine Creek, Wheeler Creek, Silvia Hollow, Big Spring Fork, Birch Creek section 01, Birch Creek section 02 (low), Birch Creek section 02 (high) (Table 1; Figure 1), North Fork of the Ogden River section 02, North Fork of the Ogden River section 03, Liberty Spring Creek, Wolf Creek section 02 (low), Wolf Creek section 02 (high), South Fork of Wolf Creek, Broadmouth Canyon, Cold Canyon, Sheep Creek, Durfee Creek, Cutler Creek (Table 1; Figure 2), Hardscrabble Creek, Saddle Creek, Weber River section 02 (UDWR Riverdale land), Weber River section 02 (Uinta Bridge), Weber River section 03 (Utah Power and Light), Weber River section 03 (train trestle), Weber River section 04 (UDWR Red Barn land), Weber River section 04 (UDWR Ranch Land), Weber River section 05 (Morgan County Fairgrounds), and Weber River section 05 (Taggart) (Table 1).

Thirty-three two-pass electrofishing stream surveys were completed on 25 streams/stream sections in 2000 (Table 1; Figure 1; Figure 2). An additional 15 streams/stream sections were spot electrofished or visually examined and found dry. Of these 15 streams/stream sections, Bonneville cutthroat trout occupied the lower portion of 5 streams.

Based on the stream surveys in 2000, Bonneville cutthroat trout occupy approximately 59 stream km (36.8 stream miles) in the Woodruff Creek Drainage, 25.5 stream km (15.9 stream miles) in the North Fork of the Ogden River Drainage, and 55.8 stream km (34.7 stream miles) in the additional streams surveyed (Table 1).

Fish species caught during 2000 stream surveys included: Bonneville cutthroat trout (BCT), brown trout (BNT; *Salmo trutta*), rainbow trout (RBT; *Oncorhynchus mykiss*), mountain whitefish (MWF; *Prosopium williamsoni*), mountain sucker (MTS; *Catostomus platyrhincus*), mottled sculpin (MSC, *Cottus bairdi*), Utah Sucker (UTS; *Catostomus ardens*), redbside shiner (RSS; *Richardsonius balteatus hydrophlox*), speckled dace (SPD; *Rhinichthys osculus*), longnose dace (LND; *Rhinichthys cataractae*), black crappie (BLC; *Pomoxis nigromaculatus*), yellow perch (YEP; *Perca flavescens*), common carp (CRP; *Cyprinus carpio*), black bullhead (*Ictalurus melas*), and green sunfish (*Lepomis cyanellus*).

Table 1. Streams/stream sections containing Bonneville cutthroat trout during 2000 surveys.

Stream/Section	Approximate # of stream km occupied (# stream miles occupied)	# of ≥ age-1 cutthroat/km (#/mile)
Woodruff Creek Drainage		
Woodruff Creek section 02	12.0 (7.5)	111 (179)
Woodruff Creek section 03 (low)	14.0 (8.7)	1108 (1782)
Woodruff Creek section 03 (high)		947 (1524)
Woodruff Creek section 03 (headwaters)		1288 (2073)
Birch Creek section 01	5.1 (3.2)	57 (91)
Birch Creek section 02 (low)	6.9 (4.3)	140 (225)
Birch Creek section 02 (high)		856 (1377)
Big Mahogany Creek	0.8 (0.5)	spot electrofished
Sugar Pine Creek	6.0 (3.7)	730 (1174)
Zeke Hollow	0.5 (0.3)	spot electrofished
Wheeler Creek	4.7 (3.0)	1023 (1646)
Silvia Hollow	1.6 (1.0)	120 (193)
Big Spring Fork	5.0 (3.1)	671 (1080)
Fence Creek	1.6 (1.0)	spot electrofished
Girl Hollow	0.8 (0.5)	spot electrofished
Total	59.0 (36.8)	
North Fork of the Ogden River		
North Fork of the Ogden River section 02	3.2 (2.0)	522 (840)
North Fork of the Ogden River section 03	5.0 (3.1)	999 (1608)
Wolf Creek section 02 (low)	3.2 (2.0)	437 (703)
Wolf Creek section 02 (high)		695 (1118)
South Fork of Wolf Creek	2.6 (1.6)	812 (1306)
Sheep Creek	2.4 (1.5)	865 (1391)
Broadmouth Canyon	1.6 (1.0)	30 (48)
Cold Canyon	1.6 (1.0)	366 (589)
Durfee Creek	2.4 (1.5)	693 (1115)
Cutler Creek	3.5 (2.2)	301 (485)
Total	25.5 (15.9)	

Table 1. Continued.

Stream/Section	Approximate # of stream km occupied (# stream miles occupied)	# of \geq age-1 cutthroat/km (#/mile)
Saddle Creek	1.6 (1.0)	262 (421)
Weber River section 03 (Utah Power and Light)	2.7 (1.7)	160 (258)
Weber River section 03 (Train Trestle)		108 (173)
Weber River section 04 (Red Barn)	16.1 (10.0)	42 (67)
Weber River section 04 (Ranch Land)		30 (48)
Weber River section 05 (Morgan County Fairgrounds)	19.3 (12.0)	25 (40)
Weber River section 05 (Taggart)		107 (172)
Hardscrabble Creek	16.1 (10.0)	1050 (1690)
Total	55.8 (34.7)	

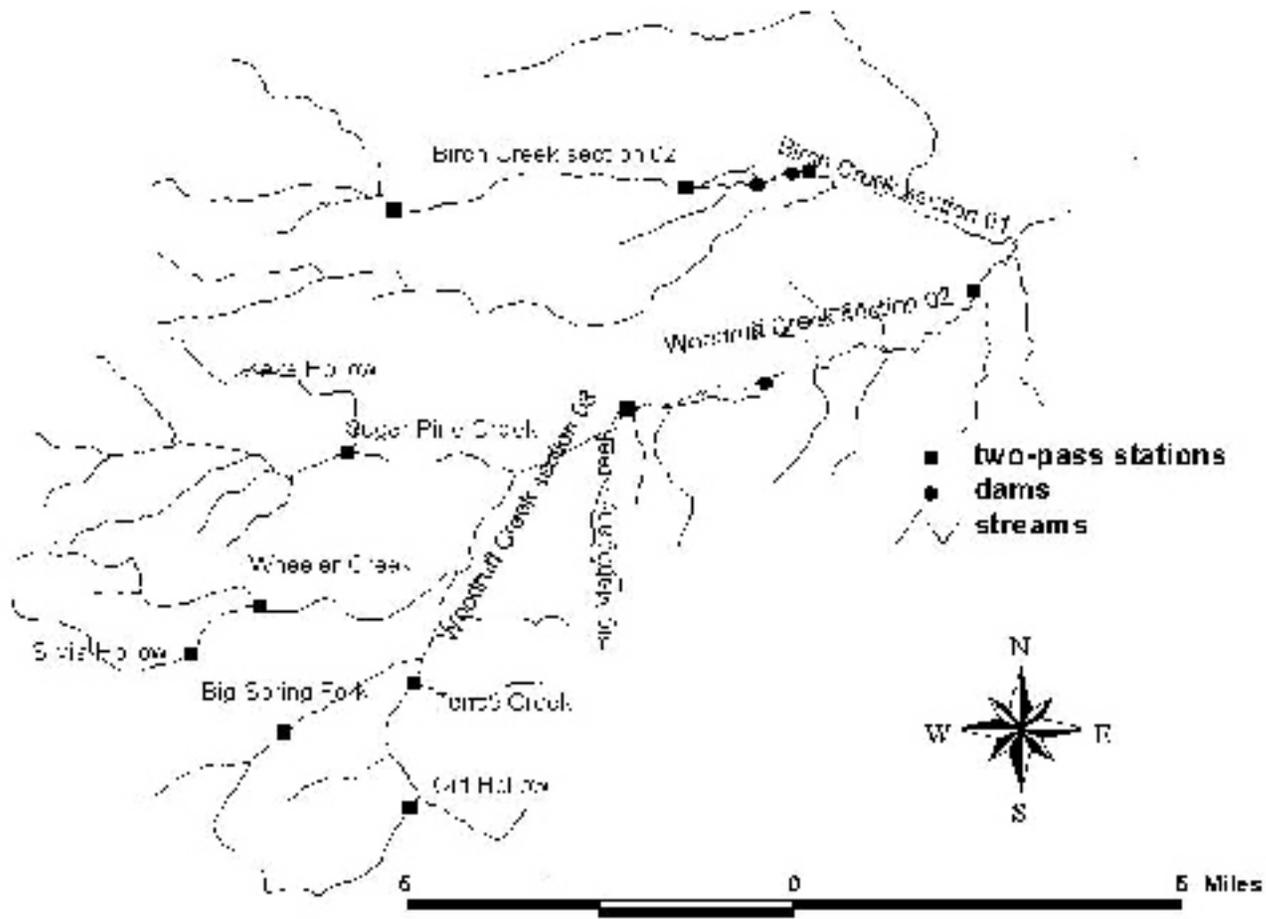


Figure 1. Stream surveys that contained Bonneville cutthroat trout in the Woodruff Creek Drainage, 2000.

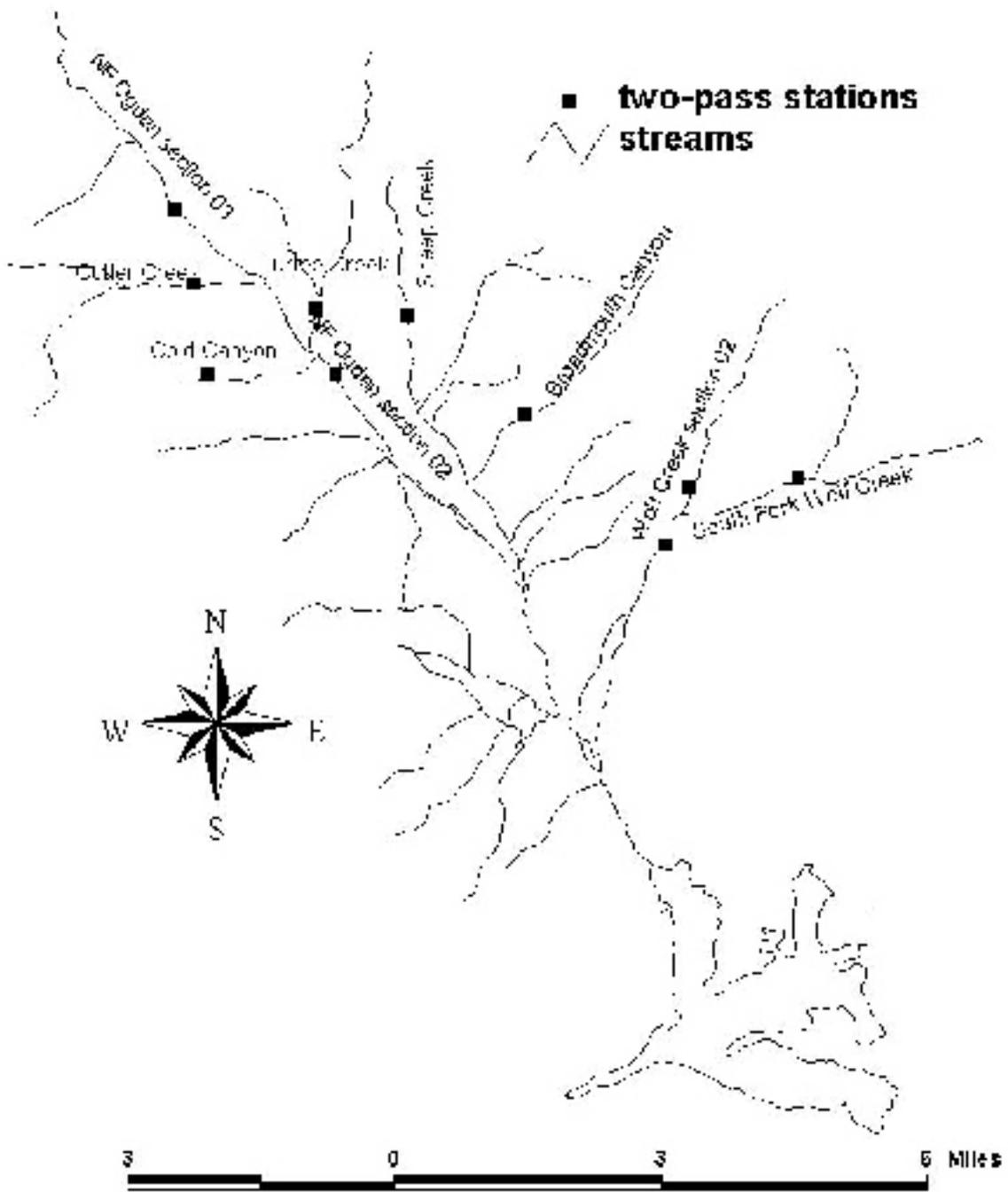


Figure 2. Stream surveys that contained Bonneville cutthroat trout in the North Fork of the Ogden River Drainage, 2000.

BEAR LAKE GMU

Bonneville cutthroat trout work in the Bear Lake GMU was coordinated and completed by the Bear Lake Field Station. Results from 2000 activities can be found in the reports produced by this field station.

BEAR RIVER GMU Cache Valley subunit

Saddle Creek

IVAQ040A03A1

Saddle Creek section 01 (confluence with the Left Hand Fork of the Blacksmith Fork to the headwaters) is a tributary to the Left Hand Fork of the Blacksmith Fork, a tributary to the Blacksmith Fork. Saddle Creek is in Cache County (Boulder Mountain, Red Spur Mountain, and Meadowville USGS Quads) with over 95% being USFS land and the remainder being privately owned. Fish species present in Saddle Creek are Bonneville cutthroat trout and brook trout. All cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Saddle Creek should be considered for conservation status. Saddle Creek is classified as a class IVB fishery for Bonneville cutthroat trout.

The majority of Saddle Creek is intermittent, however two sections of the stream contain perennial water and a trout population. Approximately 0.5 km of the stream directly upstream from the confluence with the Left Hand Fork of the Blacksmith Fork has perennial water. The portion of the stream sampled in 2000 was the headwaters of Saddle Creek. Two surveys on the headwaters of Saddle Creek were completed on June 28, 2000 with USFS personnel. A visual survey (UTMs 0460879E and 4622536N) was completed at the lower portion of the headwaters where the stream was becoming intermittent. Approximately 200-300 m of the stream was walked and 15 and two dead brook trout and Bonneville cutthroat trout, respectively, were observed. A few live trout also were observed. The second survey was a 100 m station with the bottom end at the USFS enclosure. UTM's for this station were: 0460609E and 4623463N.

Two-pass electrofishing in the 100 m station resulted in the capture of 26 age-1 and older Bonneville cutthroat trout ($262 \pm 10/\text{stream km}$ [$421 \pm 16/\text{stream mile}$]; 69 kg/ha [61 lb/acre]) (Table 2). Most of the Bonneville cutthroat trout appeared to be age-1 or age-2 fish (Figure 3). HQI was not completed. An additional 5 m of stream was electrofished to obtain 30 cutthroat trout (10 whole fish, 20 fin clips) for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Saddle Creek had been sampled once previously by UDWR. In 1981, one-pass electrofishing in a 81 m reach located in the 0.5 km of stream directly upstream from the confluence with the Left Hand Fork of the Blacksmith Fork yielded 40 brook trout ($497/\text{stream km}$; $800/\text{stream mile}$) and four Bonneville cutthroat trout ($50/\text{stream km}$; $80/\text{stream mile}$) (Table 2). Bonneville cutthroat trout appear to be the dominant trout species in the headwaters, while brook trout dominate the lower portion of this stream. The several miles of dry channel between the lower 0.5 km of stream and the headwaters have likely protected the headwater cutthroat trout population from being replaced by brook trout.

Table 2. Population statistics for species sampled in Saddle Creek, 1981 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1981 low	BKT <u>≥</u> age-1 BCT	497 ¹ (800 ¹) 50 ¹ (80 ¹)				
2000 high	<u>≥</u> age-1 BCT	262 ² (421 ²)	69 (61)	132 (100-293)	26 (10-232)	0.84

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

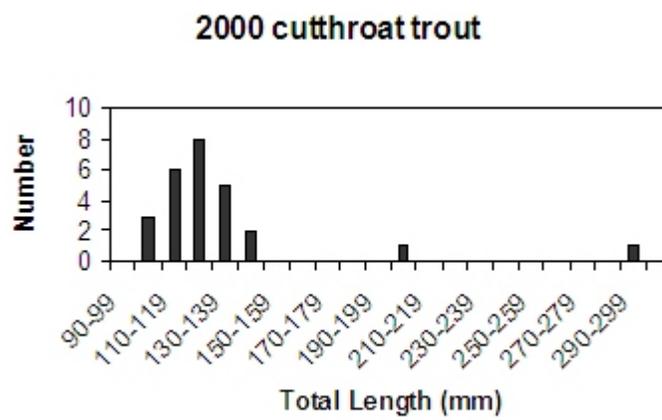


Figure 3. Size distribution of Bonneville cutthroat trout sampled in Saddle Creek, 2000.

Rich County subunit

Woodruff Creek

IVAQ200

Section 01

Woodruff Creek section 01 (Bear River confluence to Woodruff Ditch) is a tributary to the Bear River. Woodruff Creek section 01 is in Rich County (Woodruff Narrows, Neponset Reservoir NE, Neponset Reservoir NW, and Woodruff USGS Quads) with the entire stream corridor being privately owned. Section 01 is routinely de-watered, consequently, no surveys were completed. Presently, Woodruff Creek section 01 will not support a resident fish population.

Section 02

Woodruff Creek section 02 (Woodruff Ditch to Woodruff Creek Reservoir) is a tributary to the Bear River. Woodruff Creek Reservoir was built in the late 1960s as a multiple purpose water storage reservoir. Woodruff Creek section 02 is in Rich County (Woodruff and Meachum Ridge USGS Quads) with approximately 15% of the stream corridor being state land and the remaining 85% being privately owned. Fish species present in Woodruff Creek section 02 are Bonneville cutthroat trout, rainbow trout, brown trout, mountain whitefish, and mottled sculpin. Woodruff Creek section 02 has been stocked historically with catchable rainbow trout and fingerling brown trout, however, cutthroat trout which phenotypically resembled Bonneville cutthroat trout still remain in the stream section. Bonneville cutthroat trout in section 02 should be included as a sport fishing population. Woodruff Creek section 02 is classified as a class III fishery for brown trout, rainbow trout, Bonneville cutthroat trout, and mountain whitefish.

The stream survey on Woodruff Creek section 02 was completed on July 12, 2000. Section 02 was surveyed with one 100 m station located approximately 1.2 km downstream from Woodruff Creek Dam at a road crossing. UTM's for the station were: 0477810E and 4592334N.

Two-pass electrofishing resulted in the capture of 11 age-1 or older Bonneville cutthroat trout (111 ± 10 /stream km [179 ± 16 /stream mile]; 23 kg/ha [20 lb/acre]), three rainbow trout (30 ± 0 /stream km [48 ± 0 /stream mile]; 6 kg/ha [5 lb/acre]), 44 brown

trout (482 ± 80 /stream km [775 ± 129 /stream mile]; 125 kg/ha [111 lb/acre]) (Table 3), and one mountain whitefish. Several year classes of adult cutthroat trout were present (Figure 4). The one mountain whitefish was caught on the second electrofishing pass, consequently, a population estimate was not available. Mottled sculpin were abundant. Genetic samples and HQI were not collected.

Woodruff Creek section 02 had been sampled twice previously by UDWR. In 1965, a 161 m reach was electrofished upstream of the confluence with Birch Creek. One-pass electrofishing in this station produced 14 Bonneville cutthroat trout (87/stream km; 140/stream mile) and 31 mountain whitefish (193/stream km; 310/stream mile) (Table 3). Mottled sculpin were abundant. In 1968, a 161 m reach located 0.5 km downstream from the newly completed Woodruff Creek Reservoir was electrofished to determine the influence of Woodruff Creek Dam. One-pass electrofishing produced 19 age-1 and older Bonneville cutthroat trout (118/stream km; 190/stream mile), two mountain whitefish (12/stream km; 20/stream mile), and five age-1 and older rainbow trout (31/stream km; 50/stream mile) (Table 3). The rainbow trout were all hatchery catchables that had been recently stocked. Mottled sculpin were abundant.

Section 03

Woodruff Creek section 03 (Woodruff Creek Reservoir to the headwaters) is a tributary to the Bear River. Woodruff Creek section 03 is in Rich County (Meachum Ridge, Dairy Ridge, and Horse Ridge USGS Quads) with the entire stream corridor upstream from Woodruff Creek Reservoir in private ownership. A majority of the land ownership surrounding Woodruff Creek Reservoir is BLM. Fish species present in Woodruff Creek section 03 are Bonneville cutthroat trout, mountain whitefish, mountain sucker, and mottled sculpin. Woodruff Creek section 02 has historically been stocked with catchable rainbow trout and these fish could have moved upstream into section 03 before Woodruff Creek Reservoir was built in the late 1960s. Genetic data collected from Woodruff Creek Reservoir in 1998, however, indicated that Bonneville cutthroat trout in the reservoir were pure (Toline et al. 1999). In addition, genetic work completed on Sugar Pine Creek indicated that rainbow trout influence was not evident within the Bonneville

cutthroat trout in this stream (Martin and Shiozawa 1982). Woodruff Creek section 03 and its tributaries likely contain pure Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Woodruff Creek section 03 should be considered for conservation status. Woodruff Creek section 03 is classified as a class IIIB fishery for Bonneville cutthroat trout.

Three stream surveys were completed on Woodruff Creek section 03 in 2000. The lower station (100 m in length) was surveyed on July 5, 2000. The station was located approximately 200 m upstream from the confluence with Woodruff Creek Reservoir. UTM coordinates for this station were: 0470653E and 4589855N. The high station (100 m in length) was surveyed on July 6, 2000. The station was located at the confluence of Fence Creek, which was approximately 0.5 km upstream from the confluence of Big Spring Fork. UTM coordinates for this station were: 0470653E and 4589855N. The headwater station (107 m in length) was completed approximately 400 m upstream from Girl Hollow. UTM coordinates for this station were: 0466121E and 4581422N.

Low

Two-pass electrofishing resulted in the capture of 78 age-1 and older Bonneville cutthroat trout (1108 ± 239 /stream km [1782 ± 385 /stream mile]; 54 kg/ha [48 lb/acre]), three mountain whitefish, and 35 mountain sucker (800 ± 1391 /stream km; 1288 ± 2238 /stream mile) (Table 3). Several age classes of Bonneville cutthroat trout were present (Figure 4) and mottled sculpin were abundant. More mountain whitefish were caught on the second electrofishing pass, consequently, a population estimate was not available. The HQI predicted a higher salmonid biomass (124 kg/ha) with macro-invertebrates being the most limiting factor. All cutthroat trout from this station phenotypically resembled Bonneville cutthroat trout. Thirty whole cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

High

Two-pass electrofishing resulted in the capture of 91 age-1 or older Bonneville cutthroat trout (947 ± 60 /stream km [1524 ± 96 /stream mile]; 135 kg/ha [121 lb/acre]) (Table 3). Many year classes of cutthroat trout were present, but age-1 fish were the

most abundant size group (Figure 4). Mottled sculpin were abundant. The HQI predicted a similar trout biomass (94 kg/ha) with cover and macro-invertebrates being the limiting factors. All cutthroat trout from this station phenotypically resembled Bonneville cutthroat trout. Thirty cutthroat trout (20 whole fish, 10 fin clips) were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Headwaters

Two-pass electrofishing resulted in the capture of 115 age-1 or older Bonneville cutthroat trout ($1288 \pm 47/\text{stream km}$ [$2073 \pm 75/\text{stream mile}$]; 454 kg/ha [404 lb/acre]) (Table 3). This station was dominated by age-1 and age-2 Bonneville cutthroat trout (Figure 4). The headwaters of Woodruff Creek section 03 appears to be an important spawning and rearing area for the cutthroat trout population in this drainage. Mottled sculpin were abundant. A HQI was not completed in this station. All cutthroat trout from this station phenotypically resembled Bonneville cutthroat trout, but because sufficient genetic samples had been collected from the drainage, genetic samples were not collected from this station.

Section 03 of Woodruff Creek had been sampled once previously by the UDWR. In 1974, one-pass electrofishing in a 161 m reach located at the confluence of Woodruff Creek and Sugar Pine Creek, yielded 39 Bonneville cutthroat trout (242/stream km; 390/stream mile) and 27 mountain whitefish (168/stream km; 270/stream mile) (Table 3). The population of Bonneville cutthroat trout in Woodruff Creek section 03 has maintained at moderate/high densities through time.

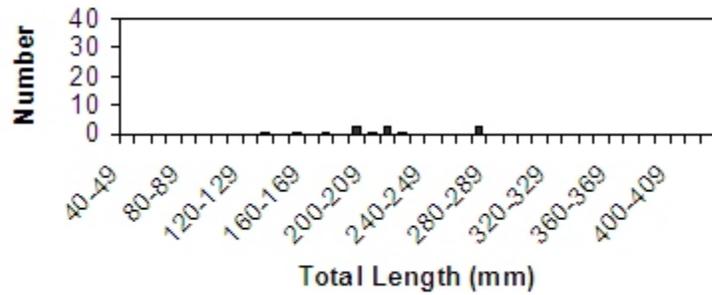
Table 3. Population statistics for species sampled in Woodruff Creek, 1965, 1968, 1974, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1965 sec.02	≥age-1 BCT MWF	87 ¹ (140 ¹) 193 ¹ (310 ¹)				
1968 sec.02	≥age-1 BCT ≥age-1 RBT MWF MSC	118 ¹ (190 ¹) 31 ¹ (50 ¹) 12 ¹ (20 ¹) abundant				
2000 sec.02	≥age-1 BCT ≥age-1 RBT BNT MWF MSC	111 ² (179) ² 30 ² (48) ² 482 ² (775) ² sparse abundant	23 (20) 6 (5) 125 (111)	205 (132-276) 233 (202-270) 215 (63-400) 67	105 (36-202) 123 (78-170) 155 (1-537) 2	1.35 0.95 1.19 0.66
1974 sec.03	≥age-1 BCT MWF	242 ¹ (390 ¹) 168 ¹ (270 ¹)				
2000 sec.03 low	≥age-1 BCT MWF MTS MSC	1108 ² (1782 ²) sparse 800 ² (1288 ²) abundant	54 (48)	112 (66-412) 61 (48-72)	28 (3-595) 2 (1-3)	1.03 0.99
2000 sec.03 high	≥age-1 BCT MSC	947 ² (1524 ²) abundant	135 (121)	129 (69-302)	40 (2-363)	0.93
2000 sec.03 hdwtrs	≥age-1 BCT MSC	1288 ² (2073 ²) abundant	454 (404)	88 (50-171)	1-51)	1.11

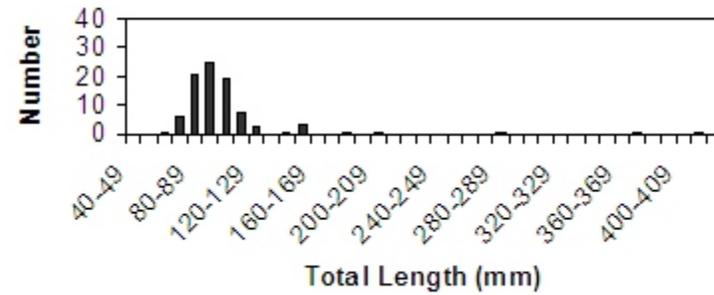
¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

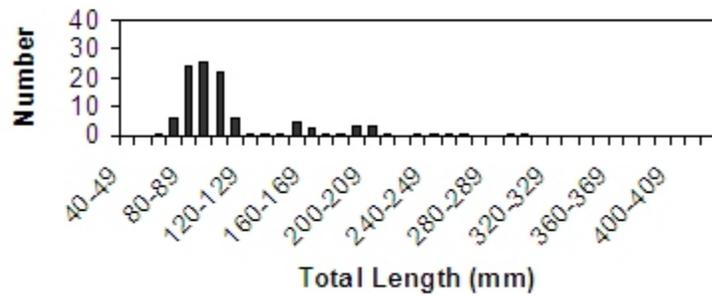
Woodruff section 02 cutthroat trout



**Woodruff section 03 cutthroat trout
low**



**Woodruff section 03 cutthroat trout
high**



**Woodruff section 03 cutthroat trout
headwaters**

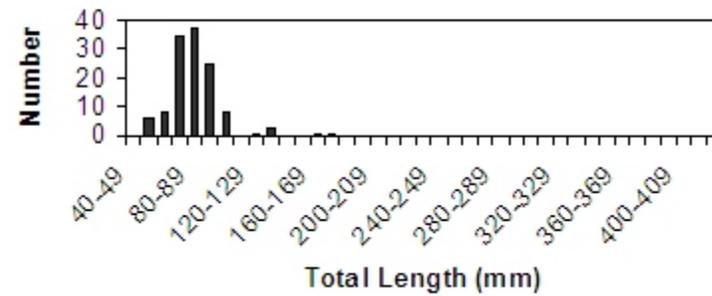


Figure 4. Size distribution of Bonneville cutthroat trout sampled in Woodruff Creek section 02 and section 03, 2000.

Woodruff Creek Reservoir

IV407B

Woodruff Creek Reservoir is in Rich County (Meachum Ridge USGS Quad). Woodruff Creek Reservoir was built in the late 1960s as a multiple purpose water storage reservoir. Woodruff Creek Reservoir was stocked with cutthroat trout (likely Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*) in 1969 (n=12,000), 1970 (n=30,000), and 1971 (n=100,000). The stocking was completed with an airplane, consequently, the cutthroat trout likely were stocked as fingerling trout. Rainbow trout have not been stocked into Woodruff Creek Reservoir, however, before the completion of the reservoir, rainbow trout stocked into Woodruff Creek section 02 could have moved upstream. Based on genetic results from Toline et al. (1999), Woodruff Creek Reservoir is considered a Bonneville cutthroat trout conservation population.

Woodruff Creek Reservoir was gill netted on July 2, 1997. Four standard sinking experimental gill nets were set for 24 hours. Net #1 was near the inlet, net #2 was parallel to the south shore, net #3 was across the mouth of a bay, and net #4 was parallel to the dam. The resulting catch was 42 Bonneville cutthroat trout (10.5/net day), 62 mountain whitefish (15.5/net day), and 8 mountain sucker (2.0/net day) (Table 4). All Bonneville cutthroat trout were adult fish (Figure 5).

Woodruff Creek Reservoir had been sampled nine times previously by UDWR. In 1971, two gill nets were set at a depth of 1.5 m and 4.5 m. The resulting catch was 17 Bonneville cutthroat trout (9.7/net hour), nine mountain whitefish (5.1/net hour), and three mountain sucker (1.7/net hour). In 1973, two gill nets were set (one sinking and one floating). The floating gill net was set across the inflow and the sinking net was set perpendicular to the south shore. The resulting catch was 30 Bonneville cutthroat trout (18.5/net day) and two mountain whitefish (1.2/net day). In 1974, two experimental gill nets were set (one sinking and one floating). Both nets were set perpendicular to the south shore. The resulting catch was 24 Bonneville cutthroat trout (19.2/net day), six mountain whitefish (4.8/net day), and one mottled sculpin (0.8/net day). In 1975, two experimental gill nets (one sinking and one floating) were set and the resulting catch was 86 Bonneville cutthroat trout (60.7/net day), three mountain whitefish (2.1/net day), and one mountain sucker (0.7/net day).

In 1978, one floating experimental gill net resulted in three Bonneville cutthroat trout (5.5/net day), two mountain whitefish (3.7/net day), and one mountain sucker (1.8/net day). In 1979, two experimental gill nets (one sinking and one floating) were set. One net was set from the north shore and one from the south shore. The resulting catch was six Bonneville cutthroat trout (5.5/net day), seven mountain whitefish (6.5/net day), and four mountain sucker (3.7/net day). In 1980, two experimental gill nets (one sinking and one floating) were set resulting in two Bonneville cutthroat trout (1.5/net day), two mountain whitefish (1.5/net day), and two mountain sucker (1.5/net day). In 1981, two experimental gill nets (one sinking and one floating) were set perpendicular to the south shore. The resulting catch was 58 Bonneville cutthroat trout (55.7/net day), 13 mountain whitefish (12.5/net day), and eight mountain sucker (7.7/net day). In 1986, six experimental gill nets (four floating and two sinking) were set throughout the reservoir. The resulting catch was 78 Bonneville cutthroat trout (24.0/net day), 18 mountain whitefish (5.5/net day), and three mountain sucker (0.9/net day) (Table 4). The catch in Woodruff Creek Reservoir has varied through time, however, the time of year the reservoir was gill netted would affect the catch. In many years, the reservoir was sampled in late spring/early summer and Bonneville cutthroat trout may have been in Woodruff Creek section 03 spawning. Regardless of the variability within catch per year, the fish species composition in Woodruff Creek Reservoir has remained the same.

Table 4. Population statistics for species sampled in Woodruff Creek Reservoir, 1971, 1973, 1974, 1975, 1978, 1979, 1980, 1981, 1986, and 1997.

Year	Species	#/net day	Avg TL (mm)	Avg WT (g)	Avg K
1971	≥age-1 BCT	9.7	273 (135-385)	241 (28-565)	1.00
	MWF	5.1	323 (230-360)	419 (140-610)	1.19
	MTS	1.7			
1973	≥age-1 BCT	18.5	281 (222-370)	215 (98-668)	0.87
	MWF	1.2	342 (321-362)	375 (318-432)	0.94
1974	≥age-1 BCT	19.2	285 (190-390)	211 (60-606)	0.89
	MWF	4.8	328 (189-418)	365 (60-660)	0.91
	MSC	0.8			
1975	≥age-1 BCT	60.7	257 (176-401)	143 (40-600)	0.79
	MWF	2.1	296 (194-387)	287 (64-550)	0.90
	MTS	0.7			
1978	≥age-1 BCT	5.5	339 (303-405)	355 (204-610)	0.83
	MWF	3.7	356 (350-362)	396 (393-396)	0.88
	MTS	1.8			
1979	≥age-1 BCT	5.5	344 (288-378)	372 (210-454)	0.89
	MWF	6.5	259 (226-297)	181 (130-245)	1.03
	MTS	3.7			
1980	≥age-1 BCT	1.5	271 (186-355)	226 (52-400)	0.85
	MWF	1.5	262 (226-298)	147 (90-203)	0.77
	MTS	1.5			
1981	≥age-1 BCT	55.7	245 (173-416)	125 (10-620)	0.74
	MWF	12.5	208 (120-380)	141 (5-141)	0.63
	MTS	7.7			
1986	≥age-1 BCT	24.0	272 (176-401)	208 (50-650)	0.93
	MWF	5.5	326 (200-406)	400 (75-745)	1.00
	MTS	0.9			
1997	≥age-1 BCT	10.5	269 (120-446)	176 (10-900)	0.73
	MWF	15.5	347 (130-476)	409 (10-1150)	0.91
	MTS	2.0			

Woodruff Creek Res. cutthroat trout

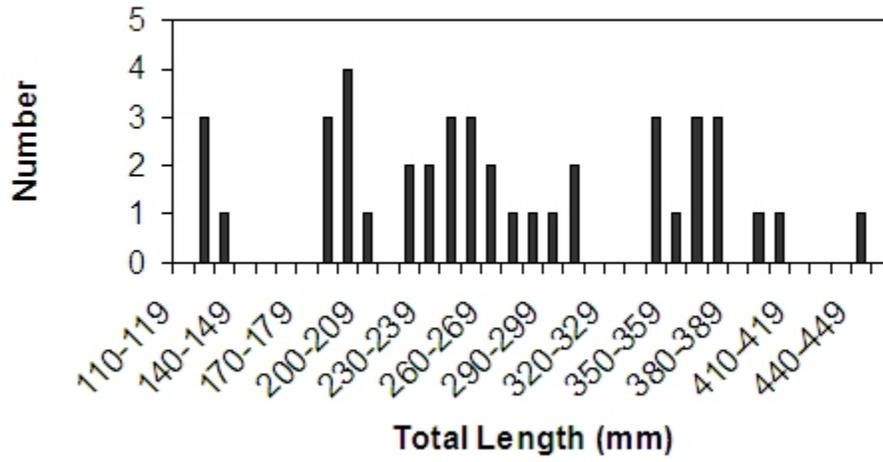


Figure 5. Size distribution of Bonneville cutthroat trout sampled in Woodruff Creek Reservoir, 1997.

Birch Creek

IVAQ200A

Section 01

Birch Creek section 01 (Woodruff Creek confluence to Birch Creek Reservoir) is a tributary to Woodruff Creek. Birch Creek Reservoir was built in the late 1960s as a multiple purpose water storage reservoir. Birch Creek section 01 is in Rich County (Meachum Ridge and Birch Creek Reservoirs USGS Quads) with approximately 30% being BLM land and the remaining 70% being privately owned. Fish species present in Birch Creek section 01 are Bonneville cutthroat trout, rainbow trout, mountain sucker, and mottled sculpin. Birch Creek section 01 has been historically stocked with rainbow trout, however, cutthroat trout which phenotypically resembled Bonneville cutthroat trout still remain in the stream section. Bonneville cutthroat trout in section 01 should be included as a sport fishing population. Birch Creek section 01 is classified as a class III fishery for rainbow trout and Bonneville cutthroat trout.

The stream survey on Birch Creek section 01 was completed on July 17, 2000. Section 01 was surveyed with one 106 m station located approximately 0.5 km downstream from Birch Creek Dam at a camp site. UTM's for the station were: 0474434E and 4594915N.

Two-pass electrofishing resulted in the capture of six age-1 or older Bonneville cutthroat trout (57 ± 0 /stream km [91 ± 0 /stream mile]; 14 kg/ha [13 lb/acre]), one rainbow trout (9 ± 0 /stream km [15 ± 0 /stream mile]; 13 kg/ha [12 lb/acre]) (Table 5), and eight mountain sucker. All Bonneville cutthroat trout were adult fish (Figure 6) and likely moved upstream into Birch Creek section 01 from Woodruff Creek section 02. Equal numbers of mountain sucker were caught on each electrofishing pass, consequently, a population estimate was not available. Mottled sculpin were sparse. Genetic samples and HQI were not collected. All cutthroat trout phenotypically resembled Bonneville cutthroat trout.

Birch Creek section 01 had been sampled once previously by UDWR. In 1971, one-pass electrofishing in a 161 m station produced 17 Bonneville cutthroat trout (106/stream km; 170/stream mile) (Table 5). Bonneville cutthroat trout densities in Birch Creek section 01 likely remain suppressed because of minimal flow releases from Birch Creek Reservoir during the irrigation season.

Section 02

Birch Creek section 02 (Birch Creek Reservoir to the headwaters) is a tributary to Woodruff Creek. Birch Creek section 02 is in Rich County (Birch Creek Reservoirs, Curtis Ridge, and Dairy Ridge USGS Quads) with 100% of the drainage being privately owned. Fish species present in Birch Creek section 02 are Bonneville cutthroat trout, rainbow trout, tiger trout (*Salvelinus fontinalis* x *Salmo trutta*), and mottled sculpin. Birch Creek Reservoir has been historically stocked with rainbow trout through 1999, when tiger trout were stocked in the place of rainbow trout. Tiger trout will now be stocked yearly, at least until a sterile rainbow trout source is secured by UDWR. In spite of the historical stocking of rainbow trout in Birch Creek Reservoir, all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Birch Creek section 02 should be considered for conservation status. Birch Creek section 02 is classified as a class IIIB fishery for Bonneville cutthroat trout.

Two stream surveys on Birch Creek section 02 were completed in 2000. The lower survey (108 m in length) was completed on July 19, 2000. This station was located directly upstream from the high water mark of Birch Creek Reservoir. UTM coordinates for this station were: 0471865E and 4594738N. The higher survey (100 m in length) was completed on July 12, 2000. This station was located 300 m downstream from the three headwater forks. UTM coordinates for this station were: 0469659E and 4594218N.

Low

Two-pass electrofishing resulted in the capture of 15 age-1 or older Bonneville cutthroat trout (140 ± 37/stream km [225 ± 60/stream mile]; 2 kg/ha [2 lb/acre]), two age-0 Bonneville cutthroat trout (19 ± 0/stream km; 30 ± 0/stream mile), and 18 mountain sucker (167 ± 0/stream km; 268 ± 0/stream mile) (Table 5). All but one Bonneville cutthroat trout were age-0 or age-1 fish (Figure 6). The lower reaches of Birch Creek section 02 are an important nursery area for Bonneville cutthroat trout produced upstream. Mottled sculpin were abundant. A HQI was not completed on this station. An additional 300 m of stream was spot electrofished to obtain 30 whole Bonneville cutthroat trout for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch

1999). Two rainbow trout and one tiger trout were caught while spot electrofishing.

High

Two-pass electrofishing resulted in the capture of 84 age-1 or older Bonneville cutthroat trout ($856 \pm 30/\text{stream km}$ [$1377 \pm 48/\text{stream mile}$]; 62 kg/ha [56 lb/acre]) (Table 5). Several age groups of Bonneville cutthroat trout were present with age-1 fish being the most prevalent (Figure 6). The HQI predicted a similar trout biomass (45 kg/ha) with stream width and macro-invertebrates being the limiting factors. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Birch Creek section 02 had been sampled twice previously by UDWR. In 1954, one-pass electrofishing in a 64 m station located approximately 0.8 km upstream from Birch Creek Reservoir produced 10 Bonneville cutthroat trout ($155/\text{stream km}$; $250/\text{stream mile}$) (Table 5). Mountain sucker and mottled sculpin were abundant. In 1971, one-pass electrofishing in a 161 m station (no location recorded) produced 29 Bonneville cutthroat trout ($180/\text{stream km}$; $290/\text{stream mile}$) (Table 5). Bonneville cutthroat trout densities in Birch Creek section 02 have remained at moderate levels directly upstream from the reservoir. The 2000 survey in the headwaters was the first survey completed in this portion of section 02. The density of Bonneville cutthroat trout in the headwaters was higher than the portion of stream directly upstream from the reservoir.

Table 5. Population statistics for species sampled in Birch Creek, 1954, 1971, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1971 sec.01	≥age-1 BCT	106 ¹ (170 ¹)				
2000 sec.01	≥age-1 BCT ≥age-1 RBT MSC MTS	57 ² (91) ² 9 ² (15) ² sparse sparse	14 (13) 13 (12)	203 (156-259) 375	100 (40-186) 565	1.11 1.07
1954 sec.02	≥age-1 BCT	155 ¹ (250 ¹)				
1971 sec.02	≥age-1 BCT	180 ¹ (290 ¹)				
2000 sec.02 low	≥age-1 BCT age-0 BCT MTS MSC	140 ² (225) ² 19 ² (30) ² 167 ² (268) ² abundant	2 (2)	58 (45-156) 38 (33-43)	4 (1-45) <1	0.82
2000 sec.02 high	≥age-1 BCT	856 ² (1377) ²	62 (56)	100 (55-232)	16 (1-120)	0.98

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

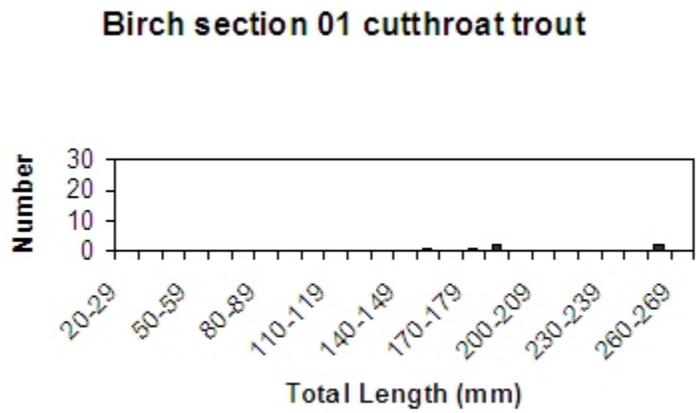
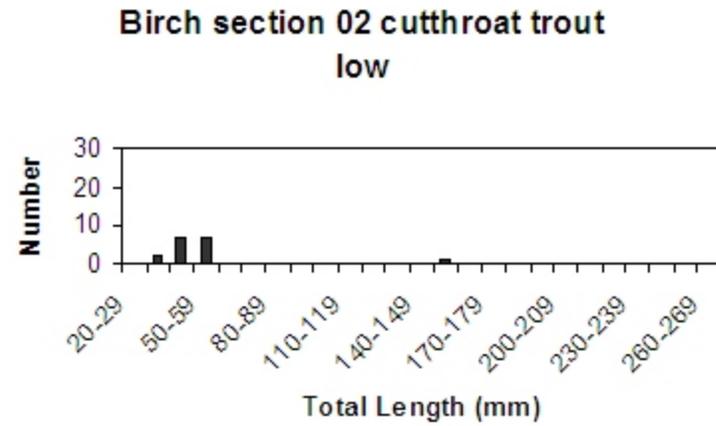
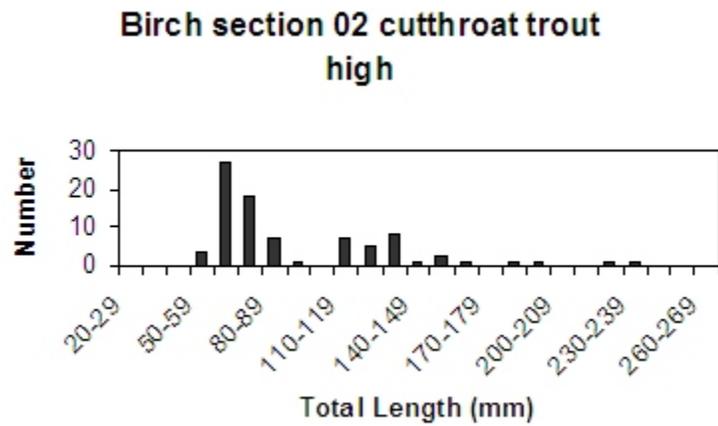


Figure 6. Size distribution of Bonneville cutthroat trout sampled in Birch Creek section 01 and section 02, 2000.

Birch Creek Reservoir**IV406A**

Birch Creek Reservoir is in Rich County (Birch Creek Reservoirs USGS Quad). Birch Creek Reservoir was built in the late 1960s as a multiple purpose water storage reservoir. Birch Creek Reservoir has been historically stocked with rainbow trout until 2000, when tiger trout were stocked in the place of rainbow trout. Tiger trout will now be stocked yearly, at least until a sterile rainbow trout source is secured by UDWR. In spite of the historical stocking of rainbow trout in Birch Creek Reservoir, all cutthroat trout caught in 1998 phenotypically resembled Bonneville cutthroat trout.

Birch Creek Reservoir was gill netted on June 30, 1998 and July 1, 1998. Four experimental gill nets (two floating and two sinking) were set each night for two nights. The nets were set randomly throughout the reservoir. The resulting catch was 44 Bonneville cutthroat trout (3.2/net day), 26 rainbow trout (1.9/net day), and 56 mountain sucker (4.1/net day) (Table 6). All Bonneville cutthroat trout were adult fish (Figure 7). Although Birch Creek Reservoir likely has been gill netted previously by UDWR, records were not available. A genetic sample needs to be collected from Birch Creek Reservoir, and pending genetic analyses, Bonneville cutthroat trout in Birch Creek Reservoir should be considered for conservation status.

Table 6. Population statistics for species sampled in Birch Creek Reservoir, 1998.

Year	Species	#/net day	Avg TL (mm)	Avg WT (g)	Avg K
1998	≥age-1 BCT	3.2	237 (103-454)	195 (8-998)	0.95
	≥age-1 RBT	1.9	225 (98-379)	238 (10-616)	1.10
	MTS	4.1			

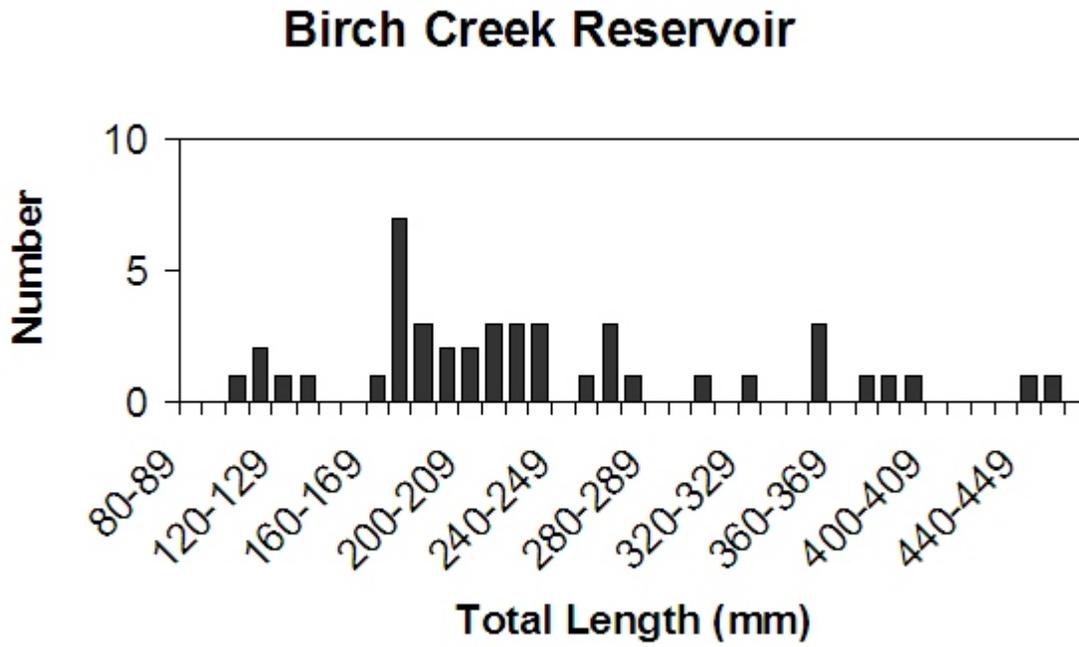


Figure 7. Size distribution of Bonneville cutthroat trout sampled in Birch Creek Reservoir, 1998. Fig

Walton Canyon**IVAQ200A01**

Walton Canyon section 01 (Birch Creek section 02 confluence to Millie Springs) is a tributary to Birch Creek. Walton Canyon is in Rich County (Dairy Ridge, Meachum Ridge, and Birch Creek Reservoirs USGS Quads) with approximately 12% of the drainage being administered by BLM and the remaining 88% being privately owned. No fish were found in Walton Canyon in 1954 and 2000, however, Bonneville cutthroat trout were found in a 1965 survey. In 1965, one-pass electrofishing in a 161 m reach located 2.5 km upstream from the confluence with Birch Creek section 01 produced nine Bonneville cutthroat trout (56/stream km; 90/stream mile). Mottled sculpin were sparse. Walton Canyon has been historically stocked with catchable rainbow trout. Walton Canyon is considered a class IV fishery.

Walton Canyon was sampled on July 12, 2000. A 100 m reach was electrofished and resulted in no fish. This station was located at UTM's: 0466622E and 4592389N. Stream flow was adequate in Walton Canyon and fish may be present in the lower reaches of this stream. Extensive beaver activity below the 2000 electrofishing station may have prevented fish from being in this portion of the stream.

Big Mahogany Creek**IVAQ200AA03**

Big Mahogany Creek section 01 (Woodruff Creek section 03 confluence to the headwaters) is a tributary to Woodruff Creek section 03. The confluence of Big Mahogany Creek is approximately 0.8 km upstream from Woodruff Creek Reservoir. Big Mahogany Creek is in Rich County (Meachum Ridge USGS Quad) with the entire drainage being privately owned. Stream flow in Big Mahogany Creek was limited in 2000, however, Bonneville cutthroat trout were present, at least in the lower one km of stream. The lower one km of Big Mahogany Creek was spot electrofished on July 5, 2000. Habitat was extremely limited with approximately one pool every 100 m. Bonneville cutthroat trout (likely age-1 fish) were observed in almost every pool. A total of five Bonneville cutthroat trout were observed. Big Mahogany Creek appears to be used by Bonneville cutthroat trout in Woodruff Creek section 03 for spawning, based on the presence of age-1 fish one km upstream. The water year likely influences the spawning significance of this tributary to Woodruff Creek section 03.

Sugar Pine Creek

IVAQ200B

Sugar Pine Creek section 01 (Woodruff Creek confluence to the headwaters) is a tributary to Woodruff Creek section 03. Sugar Pine Creek is in Rich County (Dairy Ridge USGS Quad) with approximately 50% of the drainage being USFS land and the remaining 50% being privately owned. Fish species present in Sugar Pine Creek are Bonneville cutthroat trout and mottled sculpin. No stocking records exist for Sugar Pine Creek and all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. In addition, genetic work completed on Sugar Pine Creek indicated that rainbow trout influence was not evident within the Bonneville cutthroat trout in this stream (Martin and Shiozawa 1982). The Bonneville cutthroat trout in Sugar Pine Creek should be considered a conservation population. Sugar Pine Creek is classified as a class IIIIB fishery for Bonneville cutthroat trout.

The stream survey on Sugar Pine Creek was completed on July 17, 2000. Sugar Pine Creek was surveyed with one 108 m station located at the USFS boundary. UTM's for the station were: 0464829E and 4588927N.

Two-pass electrofishing resulted in the capture of 76 age-1 or older Bonneville cutthroat trout ($730 \pm 46/\text{stream km}$ [$1174 \pm 74/\text{stream mile}$]; 112 kg/ha [100 lb/acre]) (Table 7). Several age groups of Bonneville cutthroat trout were present (Figure 8). Mottled sculpin were abundant. The HQI predicted a lower trout biomass (59 kg/ha) with cover and macro-invertebrates being the limiting factors. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Sugar Pine Creek had been sampled twice previously by UDWR. In 1974, one-pass electrofishing in a 161 m station located 400 m upstream from Woodruff Creek produced 57 Bonneville cutthroat trout ($354/\text{stream km}$; $570/\text{stream mile}$). In 1993, two-pass electrofishing in a 161 m station at the USFS boundary produced 36 Bonneville cutthroat trout ($227 \pm 25/\text{stream km}$ [$336 \pm 40/\text{stream mile}$]; 61 kg/ha [54 lb/acre]) (Table 7). Bonneville cutthroat trout densities in Sugar Pine Creek have remained at moderate to high levels through all surveys.

Table 7. Population statistics for species sampled in Sugar Pine Creek, 1974, 1993, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1974	≥age-1 BCT	354 ¹ (570 ¹)				
1993	≥age-1 BCT	227 ² (366 ²)	61 (54)	217 (143-336)	106 (18-410)	0.89
2000	≥age-1 BCT MSC	730 ² (1174) ² abundant	112 (100)	140 (68-271)	41 (4-235)	1.20

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

Sugar Pine Creek cutthroat trout

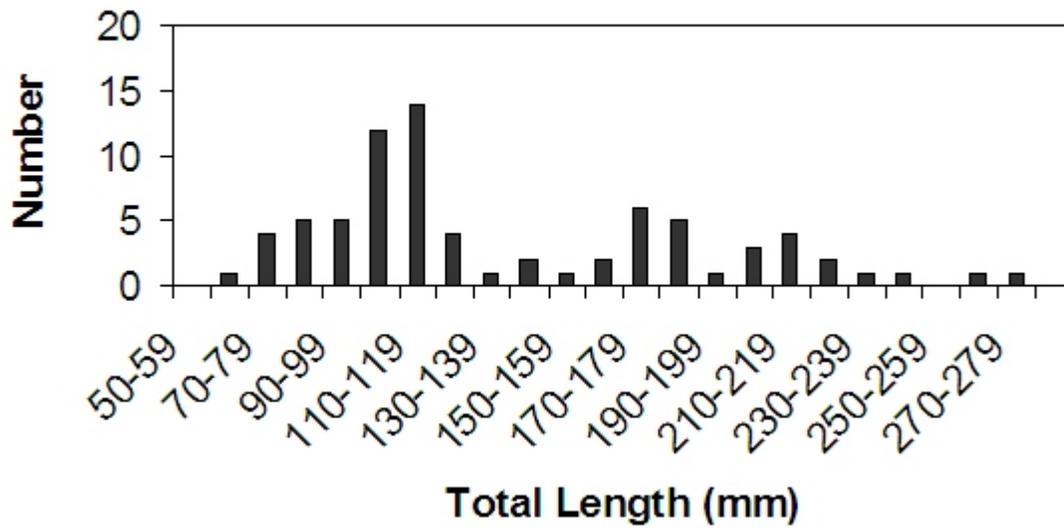


Figure 8. Size distribution of Bonneville cutthroat trout sampled in Sugar Pine Creek, 2000.

Zeke Hollow**IVAQ200B01**

Zeke Hollow section 01 (Sugar Pine Creek confluence to the headwaters) is a tributary to Sugar Pine Creek. Zeke Hollow is in Rich County (Dairy Ridge USGS Quad) with the entire drainage being privately owned. Stream flow in Zeke Hollow was limited in 2000, however, Bonneville cutthroat trout were present, at least in the lower 0.5 km of stream. The lower 0.5 km of Zeke Hollow contains extensive beaver activity and several adult Bonneville cutthroat trout (approximately 250 mm TL) were observed in several beaver ponds on July 17, 2000. No electrofishing was attempted. Zeke Hollow was essentially dry approximately 0.5 km upstream from Sugar Pine Creek.

Dip Hollow**IVAQ200B04**

Dip Hollow is a tributary to Sugar Pine Creek. Dip Hollow is in Rich County (Dairy Ridge USGS Quad) with the entire drainage being administered by the USFS. A survey was attempted on Dip Hollow on July 19, 2000. The lower 0.5 km was walked and the stream was dry. On good water years, the lower reaches of Dip Hollow may be seasonally used by Bonneville cutthroat trout, however, Dip Hollow appears to be of small importance to the Woodruff Creek Bonneville cutthroat trout metapopulation.

Wheeler Creek**IVAQ200C**

Wheeler Creek section 01 (Woodruff Creek confluence to the headwaters) is a tributary to Woodruff Creek section 03. Wheeler Creek is in Rich County (Dairy Ridge and Monte Cristo Peak USGS Quads) with approximately 50% of the drainage being USFS land and the remaining 50% being privately owned. Fish species present in Wheeler Creek are Bonneville cutthroat trout and mottled sculpin. No stocking records exist for Wheeler Creek and all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. In addition, mitochondrial genetic work completed on Wheeler Creek indicated that rainbow trout influence was not evident within the Bonneville cutthroat trout in this stream (Shiozawa and Evans 1994). The Bonneville cutthroat trout in Wheeler Creek should be considered a conservation population. Wheeler Creek is classified as a class IIIB fishery for Bonneville cutthroat trout.

The stream survey on Wheeler Creek was completed on July 11, 2000. Wheeler Creek was surveyed with one 100 m station located 400 m

downstream from the 4WD road crossing near the spring head. UTM coordinates for the station were: 0463018E and 4585667N.

Two-pass electrofishing resulted in the capture of 101 age-1 or older Bonneville cutthroat trout (1023 ± 30 /stream km [1646 ± 48 /stream mile]; 60 kg/ha [54 lb/acre]) (Table 8). Several age groups of Bonneville cutthroat trout were present, but age-1 fish dominated the sample (Figure 9). Mottled sculpin were abundant. The HQI predicted a lower trout biomass (12 kg/ha) with macro-invertebrates, water velocity, and stream width being the limiting factors. Thirty Bonneville cutthroat trout (20 whole fish, 10 fin clips) were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Wheeler Creek had been sampled twice previously by UDWR. In 1954, one-pass electrofishing in a 161 m station (no location recorded) produced 76 Bonneville cutthroat trout (472 /stream km; 760 /stream mile). Mottled sculpin were abundant. In 1974, one-pass electrofishing in a 161 m station located at the 4WD road crossing near the spring head produced 21 Bonneville cutthroat trout (131 /stream km; 210 /stream mile) (Table 8). Mottled sculpin were abundant. Bonneville cutthroat trout densities in Wheeler Creek have remained at moderate to high levels through all surveys.

Table 8. Population statistics for species sampled in Wheeler Creek, 1954, 1974, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1954	≥age-1 BCT MSC	472 ¹ (760 ¹) abundant				
1974	≥age-1 BCT MSC	131 ¹ (210 ¹) abundant				
2000	≥age-1 BCT MSC	1023 ² (1646) ² abundant	60 (54)	94 (59-199)	12 (2-75)	0.98

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

Wheeler Creek cutthroat trout

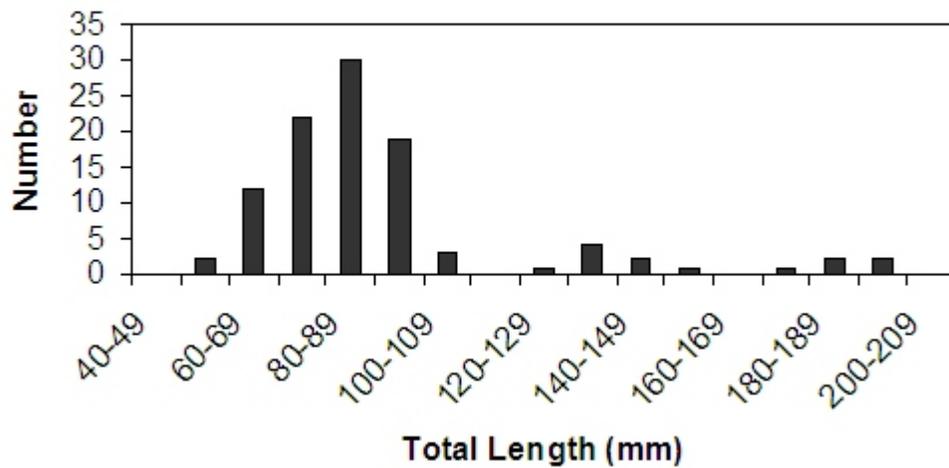


Figure 9. Size distribution of Bonneville cutthroat trout sampled in Wheeler Creek, 2000.

Silvia Hollow

IVAQ200C01

Silvia Hollow section 01 (Wheeler Creek confluence to the headwaters) is a tributary to Wheeler Creek. Silvia Hollow is in Rich County (Dairy Ridge and Monte Cristo Peak USGS Quads) with approximately 100% of the drainage being administered by the USFS. Fish species present in Silvia Hollow are Bonneville cutthroat trout. No stocking records exist for Silvia Hollow and all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. In addition, mitochondrial genetic work completed on Wheeler Creek indicated that rainbow trout influence was not evident within the Bonneville cutthroat trout in this stream (Shiozawa and Evans 1994). The Bonneville cutthroat trout in Silvia Hollow should be considered a conservation population. Silvia Hollow is classified as a class IVB fishery for Bonneville cutthroat trout.

The stream survey on Silvia Hollow was completed on July 11, 2000. Approximately six km of Silvia Hollow was walked. Silvia Hollow was dry from the confluence with Wheeler Creek upstream to 400 m downstream of William Spring. Silvia Hollow then contained water upstream for approximately one km where the stream again was dry. Bonneville cutthroat trout were present in this portion of Silvia Hollow. The upper one km, downstream from the main spring source again contained water, however, no Bonneville cutthroat trout were visually seen in this reach. One 100 m station was electrofished adjacent to William Spring. UTM's for this station were: 0461590E and 4584675N. Silvia Hollow was spot electrofished from this point upstream to UTM's 0461336E and 4584555N. Additional age-1 Bonneville cutthroat trout were seen in this reach.

Two-pass electrofishing in the 100 m station resulted in the capture of 12 age-1 and older Bonneville cutthroat trout (120 ± 0 /stream km [193 ± 0 /stream mile]; 7 kg/ha [6 lb/acre]) (Table 9). All Bonneville cutthroat trout were age-1 fish (Figure 10). Silvia Hollow appears to be utilized as a spawning and rearing tributary of Wheeler Creek. On good water years, the lower portion of Silvia Hollow may remain connected for a longer duration of time to Wheeler Creek. Although stream flow appeared to be limiting in Silvia Hollow, this stream overwintered fish during the winter of 1999/2000 because of the presence of age-1 Bonneville cutthroat trout in 2000. No HQI or genetic samples were collected. Silvia Hollow had not been previously sampled by UDWR.

Table 9. Population statistics for species sampled in Silvia Hollow, 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
2000	≥age-1 BCT	120 ^a (193) ^a	7 (6)	76 (69-86)	6 (3-8)	1.26

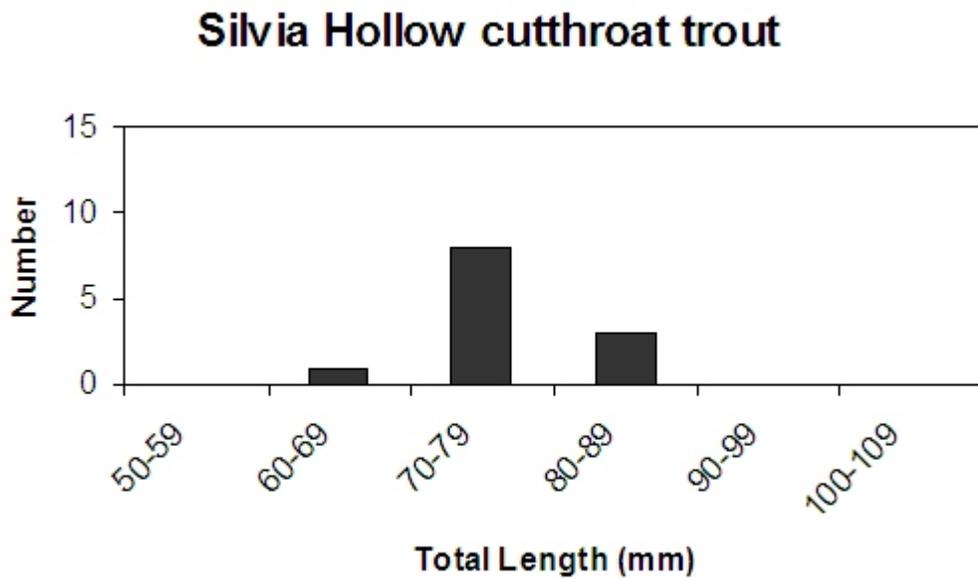


Figure 10. Size distribution of Bonneville cutthroat trout sampled in Silvia Hollow, 2000.

Road Hollow**No Water ID**

Road Hollow is a tributary to Woodruff Creek section 03. Road Hollow is in Rich County (Dairy Ridge and Meachum Ridge USGS Quads) with the entire drainage being privately owned. A survey was attempted on Road Hollow on July 6, 2000. Road Hollow was examined approximately one km upstream from Woodruff Creek (UTMs 0464785E and 4585648N). Water was present in the stream, however, stream flows were not adequate for a resident fish population. No Bonneville cutthroat trout were visually seen. On good water years, the lower reaches of Road Hollow may be seasonally used by Bonneville cutthroat trout, however, Road Hollow appears to be of small importance to the Woodruff Creek Bonneville cutthroat trout metapopulation.

Big Spring Fork**IVAQ200D**

Big Spring Fork section 01 (Woodruff Creek confluence to the headwaters) is a tributary to Woodruff Creek section 03. Big Spring Fork is in Rich County (Dairy Ridge USGS Quad) with approximately 50% of the drainage being USFS land and the remaining 50% being privately owned. Fish species present in Big Spring Fork are Bonneville cutthroat trout. No stocking records exist for Big Spring Fork and all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Big Spring Fork should be considered for conservation status. Big Spring Fork is classified as a class IIIB fishery for Bonneville cutthroat trout.

The stream survey on Big Spring Fork was completed on July 10, 2000. Big Spring Fork was surveyed with one 103 m station located at the USFS boundary. UTM coordinates for the station were: 0463506E and 4583531N. Big Spring Fork was spot electrofished upstream from the 100 m station and Bonneville cutthroat trout were present upstream to the UTM coordinates: 0461985E and 4582371N.

Two-pass electrofishing in the 103 m station resulted in the capture of 67 age-1 or older Bonneville cutthroat trout (671 ± 39/stream km [1080 ± 63/stream mile]; 22 kg/ha [19 lb/acre]) (Table 10). The majority of the Bonneville cutthroat trout were age-1 fish (Figure 11). The HQI predicted a higher trout biomass (68 kg/ha) with cover being the most limiting factor. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat

trout collection procedural manual (Toline and Lentsch 1999).

Big Spring Fork had been sampled once previously by UDWR. In 1981, one-pass electrofishing in a 81 m station located 0.8 km downstream from the spring head produced three Bonneville cutthroat trout (37/stream km; 60/stream mile) (Table 10). Bonneville cutthroat trout densities were not as high near the spring head. With the majority of the Bonneville cutthroat trout caught in Big Spring Fork being age-1 fish, this stream appears to be an important spawning tributary to the Bonneville cutthroat trout metapopulation in Woodruff Creek section 03.

Table 10. Population statistics for species sampled in Big Spring Fork, 1981 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1981	≥age-1 BCT	37 ¹ (60 ¹)				
2000	≥age-1 BCT	671 ² (1080) ²	17 (15)	85 (55-178)	8 (1-56)	0.84

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

Big Spring Fork cutthroat trout

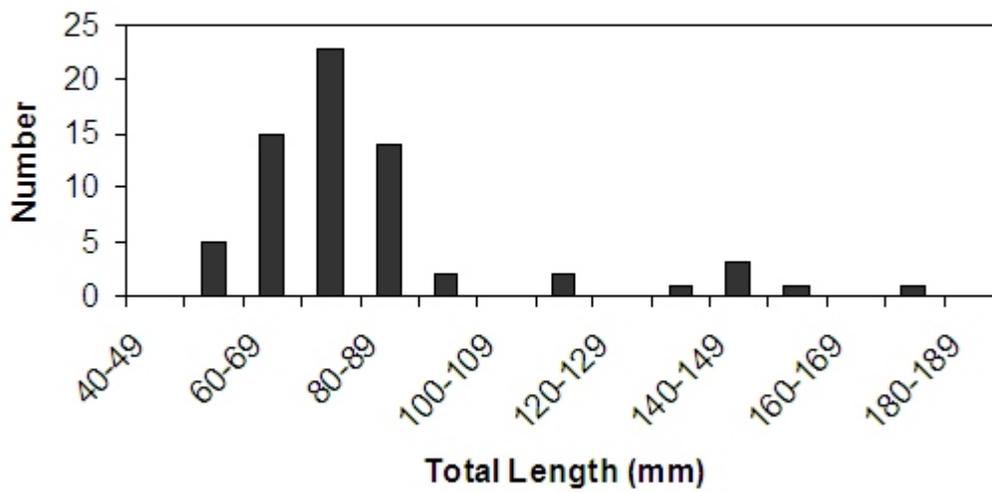


Figure 11. Size distribution of Bonneville cutthroat trout sampled in Big Spring Fork, 2000.

Fence Creek**IVAQ200E**

Fence Creek section 01 (Woodruff Creek section 03 confluence to the headwaters) is a tributary to Woodruff Creek section 03. Fence Creek is in Rich County (Dairy Ridge and Meachum Ridge USGS Quads) with the entire drainage being privately owned. Stream flow in Fence Creek was adequate to support a resident trout population. Fence Creek was spot electrofished on July 6, 2000 upstream from Woodruff Creek to the UTMs: 0466753E and 4583825N. Bonneville cutthroat trout (age-1 and older fish) were observed in the entire portion of the stream spot electrofished. Two potential barriers for the upstream movement of fish exist at 0466382E and 4584009N (drop of 0.75 m) and 0466464E and 4583990 (drop of 1.4 m). Pools were present below each of these drops. Although good numbers of Bonneville cutthroat trout were present, a genetic sample was not collected because a sample was collected on Woodruff Creek section 03 at the confluence of Fence Creek. Fence Creek may be used by the Bonneville cutthroat trout metapopulation in Woodruff Creek for spawning and rearing, however, resident fish may be present in this stream if either of the two drops do act as barriers to the upstream movement of fish.

Girl Hollow**IVAQ200G**

Girl Hollow section 01 (Woodruff Creek confluence to the headwaters) is a tributary to Woodruff Creek section 03. Girl Hollow is in Rich County (Dairy Ridge USGS Quad) with the entire drainage being privately owned. Stream flow in Girl Hollow was adequate to support a resident trout population. Girl Hollow was spot electrofished from 300 m to 700 m upstream from Woodruff Creek. The most upstream distribution of Bonneville cutthroat trout was UTMs: 0466410E and 4581744N. Although Girl Hollow contained Bonneville cutthroat trout, this stream does not appear to contribute significantly to the Bonneville cutthroat trout metapopulation in Woodruff Creek section 03.

NORTHERN BONNEVILLE GMU
Ogden River subunit

North Fork of the Ogden River

IVAP030D

Section 01

The North Fork of the Ogden River section 01 (Pineview Reservoir to the Liberty-Eden Diversion) is a tributary to the Ogden River. The North Fork of the Ogden River section 01 is in Weber County (Huntsville and North Ogden USGS Quads) with the entire river corridor being privately owned. Section 01 is routinely dewatered and the stream was dry in early July 2000, consequently, no surveys were completed. The North Fork of the Ogden River section 01 did historically support a trout fishery. In 1954, brown trout, rainbow trout, cutthroat trout, mountain sucker, and mottled sculpin were caught at the Eden Bridge.

Section 02

The North Fork of the Ogden River section 02 (Liberty-Eden Diversion to Utaba Reservoir #1, water ID - IV843) is a tributary to the Ogden River. Utaba Reservoir was built in the early 1960s for silt retention. The North Fork of the Ogden River section 02 is in Weber County (North Ogden and Mantua USGS Quads) with the entire river corridor being privately owned. Fish species present in the North Fork of the Ogden River section 02 are Bonneville cutthroat trout, rainbow trout, Bonneville cutthroat trout x rainbow trout hybrids, and mottled sculpin. The North Fork of the Ogden River section 02 has been historically stocked with rainbow trout and Yellowstone cutthroat trout, however, good numbers of cutthroat trout phenotypically resembling Bonneville cutthroat trout still remain in the stream. The North Fork of the Ogden River should be considered a sport fish population of Bonneville cutthroat trout. The North Fork of the Ogden River section 02 is classified as a class III fishery for rainbow trout and Bonneville cutthroat trout.

The stream survey on the North Fork of the Ogden River section 02 was completed on August 1, 2000. Section 02 was surveyed with one 105 m station located approximately 0.8 km upstream from the Liberty-Eden Diversion. UTM's for the station were: 0425305E and 4580200N.

Two-pass electrofishing resulted in capture of 49 age-1 or older

Bonneville cutthroat trout and Bonneville cutthroat trout x rainbow trout hybrids (522 ± 95 /stream km [840 ± 153 /stream mile]; 42 kg/ha [36 lb/acre]), seven age-0 Bonneville cutthroat trout (68 ± 10 /stream km; 110 ± 16 /stream mile), and 13 rainbow trout (136 ± 39 /stream km [219 ± 63 /stream mile]; 27 kg/ha [24 lb/acre]) (Table 11). Many year classes of Bonneville cutthroat trout were present (Figure 12) and all the rainbow trout appeared to be adults. Mottled sculpin were abundant. The HQI predicted a similar trout biomass (74 kg/ha) with cover being the limiting factor. A genetic sample was not collected from the North Fork of the Ogden River section 02.

The North Fork of the Ogden River section 02 had been sampled three times previously by UDWR. In 1965, one-pass electrofishing in a 161 m reach located downstream from Utaba Reservoir Dam, yielded 30 Bonneville cutthroat trout (300 /stream km; 483 /stream mile). Mottled sculpin were sparse. In 1966, one-pass electrofishing in a 161 m reach located approximately 1.6 km upstream from the Liberty-Eden Diversion yielded 120 Bonneville cutthroat trout (1201 /stream km; 1932 /stream mile). Mottled sculpin were common. In 1988, two-pass electrofishing in a 161 m reach located directly downstream from Utaba Reservoir Dam, yielded 12 rainbow trout (75 ± 0 /stream km [120 ± 0 /stream mile]; 9 kg/ha [8 lb/acre]) and four cutthroat trout (25 ± 0 /stream km [40 ± 0 /stream mile]; 4 kg/ha [3 lb/acre]) (Table 11). Mottled sculpin were abundant. Trout densities in section 02 appear to be similar between surveys. Surveys completed downstream from Utaba Reservoir Dam have lower trout densities than those completed lower in section 02. The trout assemblage has changed through time, however. Only Bonneville cutthroat trout were caught in the mid 1960s where rainbow trout have made up part of the trout assemblage since the late 1980s.

Section 03

The North Fork of the Ogden River section 03 (Utaba Reservoir #1 to the headwaters) is a tributary to the Ogden River. The North Fork of the Ogden River section 03 is in Weber County (Mantua USGS Quad) with approximately 80% of river corridor being privately owned and 20% being USFS land. Fish species present in the North Fork of the Ogden River section 03 are Bonneville cutthroat trout and mottled sculpin. The North Fork of the Ogden River section 03 has not been historically stocked. No evidence of hybridization

was seen in Bonneville cutthroat trout in the North Fork of the Ogden River section 03. The absence of rainbow trout or rainbow trout influence in this section can likely be attributed to Utaba reservoir, which has acted as a migration barrier for nearly 40 years between sections 02 and 03. Pending genetic analyses, the Bonneville cutthroat trout in the North Fork of the Ogden River section 03 should be considered for conservation status. The North Fork of the Ogden River section 03 is classified as a class IIIB fishery for Bonneville cutthroat trout.

The stream survey on the North Fork of the Ogden River section 03 was completed on August 9, 2000. Section 03 was surveyed with one 67 m station located near the first locked gate upstream from the locked gate on Cutler Creek. UTMs for the station were: 0422405E and 4583201N.

Two-pass electrofishing of a 67 m station resulted in capture of 61 age-1 or older Bonneville cutthroat trout (999 ± 134 /stream km [1608 ± 216 /stream mile]; 84 kg/ha [75 lb/acre) and 2 age-0 Bonneville cutthroat trout (Table 11). One age-0 cutthroat trout was caught on each electrofishing pass, consequently, a population estimate for this age group was not available. Several age classes of Bonneville cutthroat trout were present (Figure 12) and mottled sculpin were abundant. The HQI predicted a lower trout biomass (51 kg/ha) with macro-invertebrates and cover being limiting. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999). The North Fork of the Ogden River section 03 had not been sampled previously by the UDWR.

Table 11. Population statistics for species sampled in the North Fork of the Ogden River, 1954, 1965, 1966, 1988, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1954 sec.01	RBT BNT BCT MTS MSC					
1965 sec.02	≥age-1 BCT MSC	300 ¹ (483 ¹) sparse				
1966 sec.02	≥age-1 BCT MSC	1201 ¹ (1932 ¹) common				
1988 sec.02	≥age-1 RBT ≥age-1 BCT MSC	75 ² (120 ²) 25 ² (40 ²) abundant	9 (8) 4 (3)	162 (55-251) 191 (155-220)	61 (1-146) 78 (42-108)	1.01 1.07
2000 sec.02	≥age-1 BCT age-0 BCT ≥age-1 RBT MSC	522 ² (840 ²) 68 ² (110 ²) 136 ² (219 ²) abundant	42 (36) 27 (24)	139 (41-274) 31 (25-37) 205 (152-279)	43 (1-215) 105 (44-241)	1.16 1.14
2000 sec.03	≥age-1 BCT ³ age-0 BCT MSC	999 ² (1608 ²) sparse abundant	84 (75)	120 (40-275) 36 (36-36)	34 (1-222) <1	1.06

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

³ includes hybrid trout

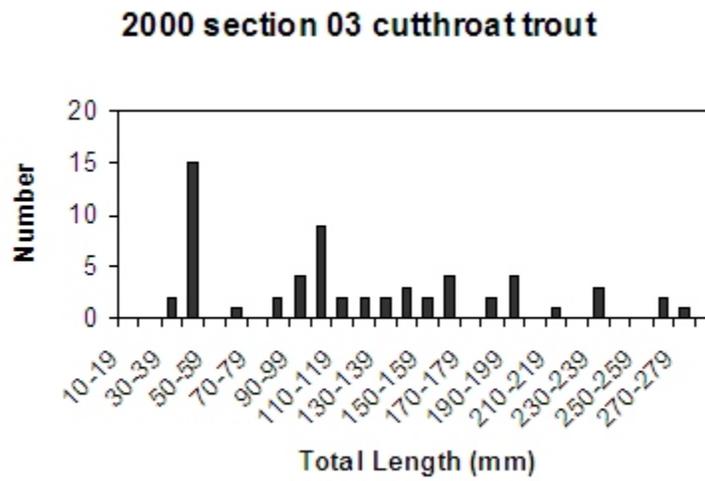
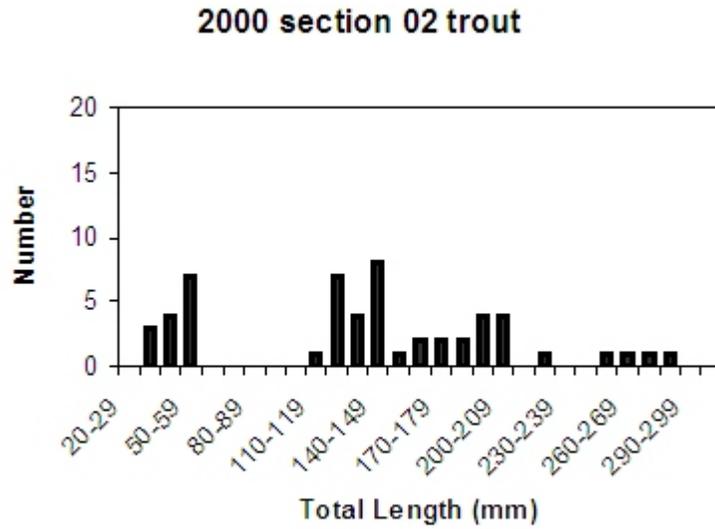


Figure 12. Size distribution of Bonneville cutthroat trout and Bonneville cutthroat trout x rainbow trout hybrids sampled in the North Fork of the Ogden River section 02 and Bonneville cutthroat trout sampled in section 03, 2000.

Wolf Creek

IVAP030D01

Section 01

Wolf Creek section 01 (confluence with the North Fork of the Ogden River to a diversion) is the lower 3.2 km section of Wolf Creek. Wolf Creek section 01 is in Weber County (Huntsville USGS Quad) with the entire stream section being privately owned. Water from Wolf Creek section 01 is diverted through Wolf Creek Golf Course and into Eccles Canal, consequently, Wolf Creek section 01 only has water during the runoff season. Eccles Canal, however, does contain water year round and supports a resident fish population. Fish species present in Eccles Canal are Bonneville cutthroat trout and green sunfish. Two of the 16 Bonneville cutthroat caught in 1997 appeared to be slightly hybridized with rainbow trout. The remaining 14 Bonneville cutthroat trout did not appear hybridized. Eccles Canal is classified as a class IVB fishery for Bonneville cutthroat trout.

The stream survey on Eccles Canal was completed on July 28, 1997 with a 100 m station located directly behind a private landowners residence. UTM's for the station were: 0430900E and 4575500N.

Two-pass electrofishing resulted in the capture of 16 Bonneville cutthroat trout (163 ± 21 /stream km [263 ± 33 /stream mile]; 229 kg/ha [204 lb/acre]) and two green sunfish (20 ± 0 /stream km; 32 ± 0 /stream mile) (Table 12). All cutthroat trout appeared to be adult fish (Figure 13). No HQI was completed and genetic samples were not collected. Eccles Canal had not be sampled previously by the UDWR.

Section 02

Wolf Creek section 02 (diversion to the headwaters) is a tributary to the North Fork of the Ogden River. Wolf Creek section 02 is in Weber County (Huntsville and James Peak USGS Quads) with the entire drainage in private ownership. Fish species present in Wolf Creek section 02 are Bonneville cutthroat trout and mottled sculpin. No stocking records exist for Wolf Creek section 02, however, rainbow trout may have been stocked. Only 2 of the 120 fish captured in the two stations on Wolf Creek section 02 in 2000 were identified as potential hybrid cutthroat trout. The remaining fish collected in 2000 all phenotypically appeared to be Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Wolf Creek section 02 should be considered for

conservation status. Wolf Creek section 02 is classified as a class IIIIB fishery for Bonneville cutthroat trout.

Two stream surveys were completed on Wolf Creek section 02 in 2000. The lower station (106 m in length) was surveyed on July 20, 2000. The station was located approximately 1.6 km downstream from the confluence with the South Fork of Wolf Creek. This station was located directly upstream from the diversion that defines the lower boundary of this stream section. The diversion takes the entire flow of Wolf Creek underground. UTM's for this station were: 0431724E and 4578147N. The higher station (100 m in length) was surveyed on August 3, 2000. The station was located approximately 1.2 km upstream from the confluence of Wolf Creek and the South Fork of Wolf Creek. UTM's for this station were: 0431282E 4577104N.

Low

Two-pass electrofishing resulted in capture of 44 age-1 or older Bonneville cutthroat trout (437 ± 47 /stream km [703 ± 76 /stream mile]; 61 kg/ha [54 lb/acre]) and six age-0 Bonneville cutthroat trout (59 ± 20 /stream km; 95 ± 32 /stream mile) (Table 12). Several age classes of Bonneville cutthroat trout were present (Figure 13) and mottled sculpin were abundant. The HQI predicted a higher trout biomass (133 kg/ha) with macro-invertebrates and cover being the limiting factors. All but two cutthroat trout from this station phenotypically resembled Bonneville cutthroat trout. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

High

Two-pass electrofishing resulted in capture of 64 age-1 or older Bonneville cutthroat trout (695 ± 81 /stream km [1118 ± 130 /stream mile]; 37 kg/ha [33 lb/acre]) and seven age-0 Bonneville cutthroat trout (Table 12). More age-0 cutthroat trout were caught on the second electrofishing pass, consequently, a population estimate was not available for this age group. Many year classes of cutthroat trout were present, but age-0 and age-1 fish dominated the sample (Figure 13). The headwater portions of Wolf Creek appear to an important spawning and rearing area for this population of cutthroat trout. No HQI was completed and genetic

samples were not collected from this station. All cutthroat trout caught in this station phenotypically resembled Bonneville cutthroat trout.

Section 02 of Wolf Creek had been sampled once previously by the UDWR. In 1971, one-pass electrofishing in a 161 m reach located directly upstream from the diversion, yielded 26 cutthroat trout (260/stream km; 419/stream mile) (Table 12). The population of cutthroat trout in Wolf Creek section 02 has maintained at moderate/high densities through time.

Table 12. Population statistics for species sampled in Wolf Creek, 1971, 1997, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL(mm)	Avg WT(g)	Avg K
1997 sec.01 Eccles	≥age-1 BCT GSF	163 ² (263 ²) 20 ² (32 ²)	229 (204)	216 (142-301) 94 (80-107)	140 (29-360) 15 (9-20)	1.15
1971 sec.02 low	≥age-1 BCT	260 ² (419 ²)		165 (60-242)	59 (1-162)	1.31
2000 sec.02 low	≥age-1 BCT age-0 BCT MSC	437 ² (703 ²) 59 ² (95 ²) abundant	61 (54)	156 (76-280) 30 (25-36)	61 (5-215) <1	1.19
2000 sec.02 high	≥age-1 BCT age-0 BCT	695 ² (1118 ²) present	37 (33)	77 (40-175) 38 (36-39)	11 (1-62) <1	1.29

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

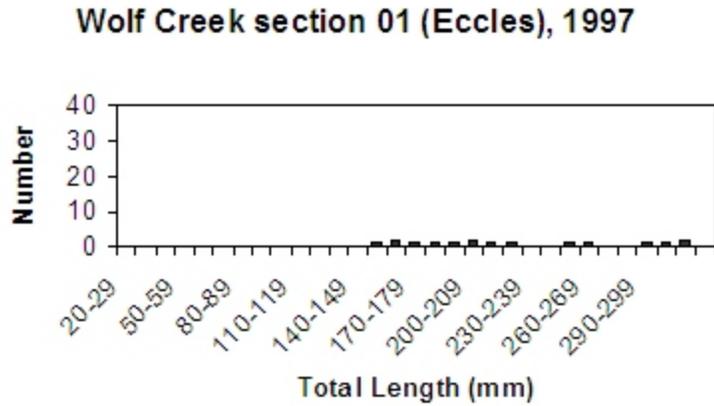
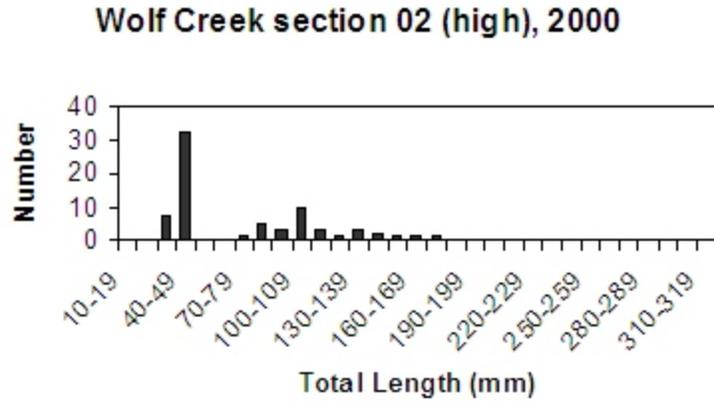
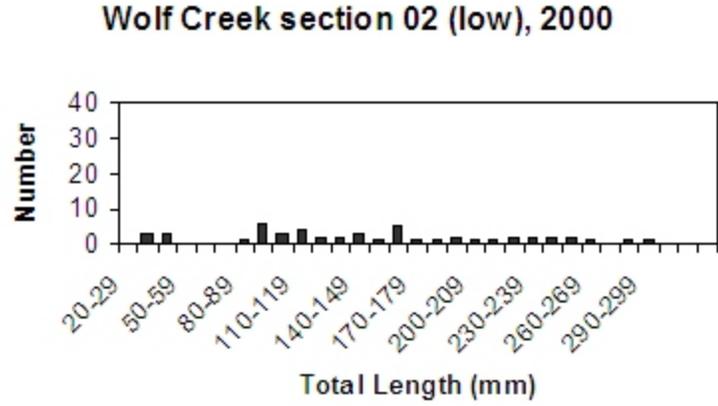


Figure 13. Size distribution of Bonneville cutthroat trout sampled in Wolf Creek, 1997 and 2000.

South Fork of Wolf Creek

IVAP030D01A

The South Fork of Wolf Creek section 01 (confluence with Wolf Creek to the headwaters) is a tributary to Wolf Creek. The South Fork of Wolf Creek is in Weber County (Huntsville and James Peak USGS Quads) with approximately 80% of the drainage in private ownership with the remaining 20% being USFS land. Fish species present in the South Fork of Wolf Creek are Bonneville cutthroat trout. The Bonneville cutthroat trout in the South Fork of Wolf Creek have a good potential of being pure for the following reasons: 1) no stocking records exist for this stream, 2) a potential barrier exists at the first highway crossing (UTMs 0432148E and 4577753N) upstream from Wolf Creek, and 3) all but two cutthroat trout present in Wolf Creek section 02 phenotypically resembled Bonneville cutthroat trout. The potential barrier is a significant cascade created from the construction of the bridge. In addition, all fish captured in the 2000 survey, phenotypically appeared to be Bonneville cutthroat trout. Pending genetic analyses, the Bonneville cutthroat trout in the South Fork of Wolf Creek should be considered for conservation status. The South Fork of Wolf Creek is classified as a class IIIB fishery for Bonneville cutthroat trout.

The stream survey on the South Fork of Wolf Creek was completed on August 3, 2000. Section 01 was surveyed with one 75 m station located approximately 0.5 km downstream from an unnamed tributary entering the South Fork of Wolf Creek from the east. UTM coordinates for the station were: 0433694E and 4578321N.

Two-pass electrofishing resulted in the capture of 55 age-1 or older Bonneville cutthroat trout (812 ± 120 /stream km [1306 ± 193 /stream mile]; 102 kg/ha [90 lb/acre]) (Table 13). Many year classes of Bonneville cutthroat trout were represented (Figure 14). The HQI predicted a lower trout biomass (20 kg/ha) with macro-invertebrates and stream width being limiting. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999). The South Fork of Wolf Creek had not been sampled previously by the UDWR.

Table 13. Population statistics for species sampled in the South Fork of Wolf Creek, 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
2000	≥age-1 BCT	812 (1306)	102 (90)	135 (65-260)	42 (3-190)	1.09

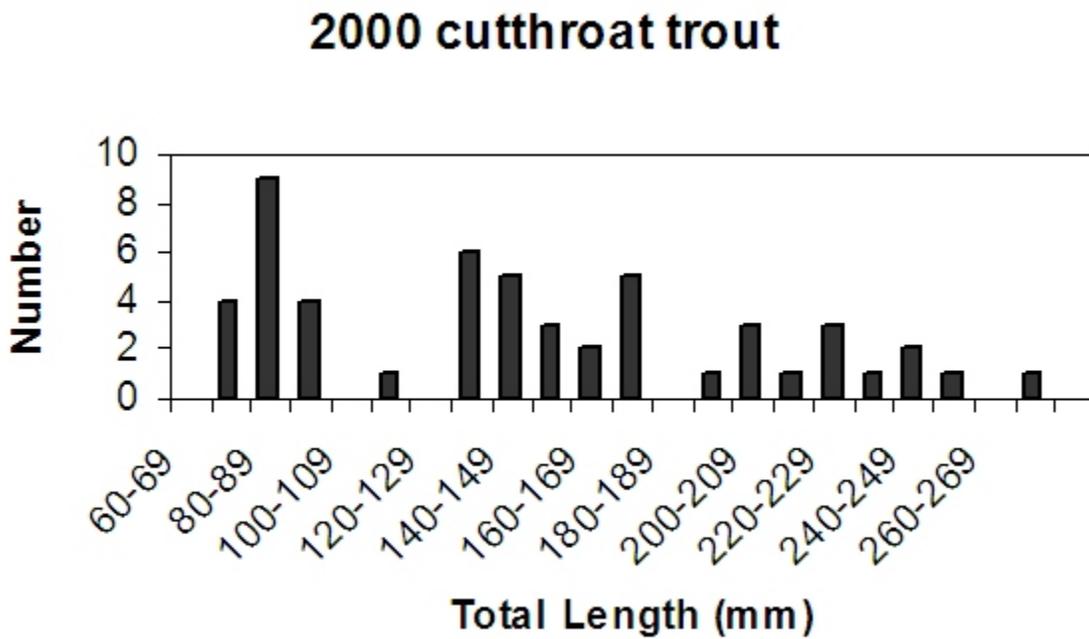


Figure 14. Size distribution of Bonneville cutthroat trout sampled in the South Fork of Wolf Creek, 2000.

Liberty Spring Creek

IVAP030D02

Liberty Spring Creek section 01 (confluence with the North Fork of the Ogden River to the headwaters) is a tributary to the North Fork of the Ogden River. Liberty Spring Creek is in Weber County (North Ogden and Huntsville USGS Quads). Liberty Spring Creek flows through the town of Liberty and the entire drainage is privately owned. The spring once provided water for a private aquaculture facility and now flows through a residential neighborhood. Fish species present in Liberty Spring Creek are rainbow trout and mottled sculpin. Because Liberty Spring Creek is one of the lowest tributaries in the North Fork of the Ogden River Drainage and the entire stream has development along it, the stream has very low future potential for Bonneville cutthroat trout. Liberty Spring Creek is classified as a class IV fishery.

The stream survey on Liberty Spring Creek was completed on August 22, 2000. Section 01 was surveyed with one 100 m station located directly below State Route 162. UTM's for the station were: 0427924E and 4574833N.

Two-pass electrofishing resulted in the capture of one rainbow trout. Because the rainbow trout was caught on the second electrofishing pass, no population estimate was available. Mottled sculpin were abundant. Liberty Spring Creek had been sampled once previously by the UDWR. In 1977, one-pass electrofishing in a 80 m reach at the same location as the 2000 survey resulted in 4 brown trout (50/stream km; 80/stream mile) and one brook trout (13/stream km; 20/stream mile). Mottled sculpin were sparse.

Pole Canyon

IVAP030D02A

Pole Canyon section 01 (ditch to the headwaters) is a tributary to Liberty Spring Creek. Pole Canyon is located in Weber County (Huntsville USGS Quad) with approximately 90% of the drainage being privately owned and the remaining 10% being USFS land. Five sites were visited on Pole Canyon on July 31, 2000. Following are the description of the five surveys starting at the most downstream end and continuing upstream. Just downstream from State Route 162 (UTMs 0429105E and 4574014N), numerous age-0 to age-1 trout were observed. At UTM's 0428501E and 4573545N, the stream was dry. Just downstream from the first road crossing (0428513E and 4573289N) upstream from State Route 162, a culvert

pool was spot electrofished. Approximately 60 trout were present in the pool. The smaller trout (25-100 mm TL) appeared to be Bonneville cutthroat trout x rainbow trout hybrids and six to eight larger trout (200 mm TL) were rainbow trout. At UTM 0428265E and 4572639N, flows were too low for a resident trout population. At UTM 0428116E and 4571597N, the stream was dry between pools. Where water was present at this locality, no invertebrates were found. A small portion of Pole Canyon supports a rainbow trout population. However, if this stream was visited in late August/early September 2000, the entire stream may have been dry due to drought conditions in the summer of 2000. Pole Canyon had not been sampled before by the UDWR.

Pine Creek

No water ID

Pine Creek is a tributary to Liberty Spring Creek. Pine Creek is located in Weber County (Huntsville USGS Quad) with approximately 90% of the drainage being privately owned and 10% being USFS land. Pine Creek has a poorly defined channel and likely only flows during spring runoff. Pine Creek was visited at three localities (UTMs 0428605E and 4574287N; 0427788E and 4572990N; 0428090E and 4573412N) on July 31, 2000. The stream was dry at all three localities. Pine Creek does not contain sufficient flows for a resident fish population. Pine Creek had not been sampled previously by the UDWR.

Union Creek

No water ID

Union Creek is a tributary to Liberty Spring Creek. Union Creek is located in Weber County (Huntsville USGS Quad) with 100% of the drainage being privately owned. A survey was attempted on Union Creek on July 31, 2000, however a defined stream channel could not be located. Union Creek does not contain sufficient flows for a resident fish population. Union Creek had not been previously sampled by the UDWR.

Chicken Creek

No Water ID

Chicken Creek is a tributary to Liberty Spring Creek. Chicken Creek is located in Weber County (North Ogden USGS Quad) with approximately 70% of the drainage being privately owned and the remaining 30% being USFS land. Chicken Creek was surveyed on August 14, 2000. The stream was spot electrofished for 100 m upstream and downstream from the North Ogden Highway (UTMs 0425346E and 4576017N). No fish were encountered during spot

electrofishing, however flows and water temperatures were adequate for a resident fish population. During 2000, the entire flow from Chicken Creek was diverted for irrigation at a diversion located just downstream from the USFS boundary. Chicken Creek had not been previously sampled by the UDWR.

Sheep Creek

IVAP030D03

Section 01

Sheep Creek section 01 (confluence with the North Fork of the Ogden River to the diversion) is a tributary to the North Fork of the Ogden River. Sheep Creek section 01 is in Weber County (Huntsville and North Ogden USGS Quads) with 100% of the stream section being privately owned. Sheep Creek section 01 is routinely de-watered throughout the irrigation season and will not support a resident fish population.

Section 02

Sheep Creek section 02 (diversion to the headwaters) is a tributary to the North Fork of the Ogden River. Sheep Creek section 02 is in Weber County (North Ogden and Mantua USGS Quads) with approximately 40% of the stream section in private ownership and 60% USFS land. Fish species present in Sheep Creek section 02 are Bonneville cutthroat trout, rainbow trout, and rainbow trout x Bonneville cutthroat trout hybrids. Because no stocking records exist for Sheep Creek, the presence of rainbow trout in Sheep Creek section 02 likely originated from its connection with the North Fork of the Ogden River section 02 where rainbow trout have been stocked by the UDWR. Of the 60 fish sampled in Sheep Creek section 02 in 2000, only a couple phenotypically looked like Bonneville cutthroat trout, while the remainder appeared to be hybridized with rainbow trout. Visually determining the degree of hybridization on the small size of fish (32-134 mm TL) that were caught in Sheep Creek section 02, however, is difficult and the genetic sample should be analyzed to quantify the degree of hybridization. Sheep Creek section 02 is classified as a class IVB fishery for Bonneville cutthroat trout.

The stream survey on Sheep Creek section 02 was completed on August 23, 2000. Section 02 was surveyed with one 100 m station, located upstream from a small irrigation reservoir where the water was diverted underground. UTM's for the station were: 0426607E and 4581268N.

Two-pass electrofishing resulted in capture of 56 age-1 or Bonneville cutthroat trout including hybrids (865 ± 113 /stream km [1391 ± 182 /stream mile]; 17 kg/ha [16 lb/acre]) (Table 14) and four age-0 Bonneville cutthroat trout. Two age-0 cutthroat trout were caught on both electrofishing passes, consequently, a

population estimate for this age group was not available. The majority of the Bonneville cutthroat trout including hybrids were age-1 (Figure 15). The HQI predicted a similar trout biomass (10 kg/ha) with macro-invertebrates, water velocity, and stream width being the limiting factors. Thirty whole cutthroat trout were collected for genetic analysis. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999). Although Sheep Creek section 01 is diverted during the irrigation season, a connection to the North Fork of the Ogden River likely occurs in the spring. The abundance of young cutthroat trout and the absence of adult cutthroat trout indicate that Sheep Creek section 02 is an important spawning tributary to the trout in the North Fork of the Ogden River. Sheep Creek section 02 had not been sampled previously by the UDWR.

Table 14. Population statistics for species sampled in Sheep Creek section 02, 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
2000	≥age-1 BCT* age-0 BCT	865 (1391) present	17 (16)	58 (40-134) 36 (32-39)	2 (1-28) <1	0.97

* includes hybrid trout

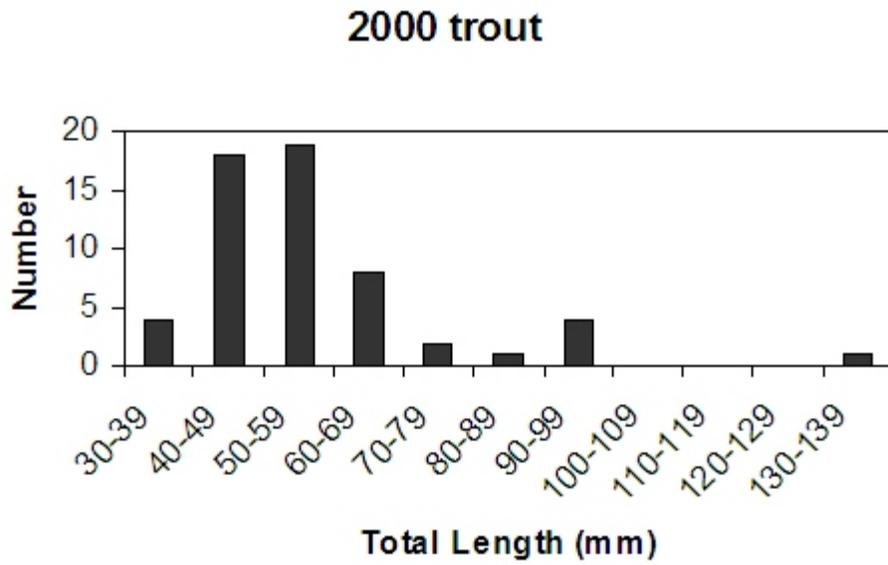


Figure 15. Size distribution of Bonneville cutthroat trout and Bonneville cutthroat trout x rainbow trout hybrids sampled in Sheep Creek section 02, 2000.

Broadmouth Canyon

IVAP030D03B

Section 01

Broadmouth Canyon section 01 (confluence with Sheep Creek to a diversion) is a tributary to Sheep Creek. Broadmouth Canyon section 01 is in Weber County (Huntsville USGS Quad) with 100% of the stream section being privately owned. Broadmouth Canyon section 01 is routinely de-watered throughout the irrigation season and will not support a resident trout population.

Section 02

Broadmouth Canyon section 02 (diversion to the headwaters) is a tributary to Sheep Creek. Broadmouth Canyon section 02 is in Weber County (Huntsville and James Peak USGS Quads). The entire stream section is privately owned. Fish species present in Broadmouth Canyon section 02 are Bonneville cutthroat trout, rainbow trout, and rainbow trout x Bonneville cutthroat trout hybrids. Because no stocking records exist for Broadmouth Canyon, the presence of rainbow trout in Broadmouth Canyon section 02 likely originated from its connection with the North Fork of the Ogden River where rainbow trout have been stocked by the UDWR. Of the 22 fish collected in Broadmouth Canyon in 2000, 10 phenotypically looked like Bonneville cutthroat trout, four appeared to be pure rainbow trout, and eight appeared to be hybridized. Broadmouth Canyon is classified as a class IVB fishery for Bonneville cutthroat trout.

The stream survey on Broadmouth Canyon section 02 was completed on August 23, 2000. Section 02 was surveyed with one 100 m station located adjacent to the property owners cabin. The station was approximately 1.6 km upstream from the confluence with Sheep Creek. UTM's for the station were: 0428954E and 4579586N.

Two-pass electrofishing resulted in the capture of three age-1 or older Bonneville cutthroat trout (30 ± 0 /stream km [48 ± 0 /stream mile]; 2 kg/ha [1 lb/acre]) (Table 15). Two of the three Bonneville cutthroat trout caught in the 100 m electrofishing station appeared to be age-1 (Figure 16). The HQI predicted a higher trout biomass (5 kg/ha) with cover, macro-invertebrates, water velocity, and stream width being the limiting factors. An additional 150 m of stream was spot electrofished to obtain a total of 22 whole Bonneville cutthroat trout for genetic analyses. The samples were frozen according to cutthroat trout collection

procedural manual (Toline and Lentsch 1999).

Broadmouth Canyon section 02 had been sampled once previously by the UDWR. In 1977, one-pass electrofishing in a 80 m reach, which was located approximately 0.8 km downstream from the 2000 survey yielded 23 Bonneville cutthroat trout (286/stream km; 460/stream mile) (Table 15). Fewer fish were encountered in 2000 than in the 1977 survey. It is difficult to determine the degree of hybridization between rainbow trout and Bonneville cutthroat trout present in 1977. All fish encountered in 1977, however, were identified as Bonneville cutthroat trout, consequently, hybridization within this stream appears to have taken place within the past 20 years.

Table 15. Population statistics for species sampled in Broadmouth Canyon section 02, 1977 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1977	≥age-1 BCT	286 ¹ (460 ¹)				
2000	≥age-1 BCT	30 ² (48 ²)	2 (1)	89 (53-154)	11 (1-30)	0.88

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

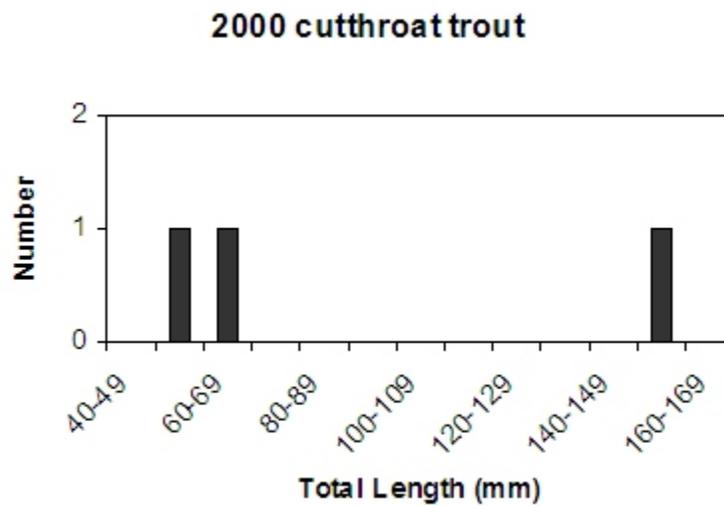


Figure 16. Size distribution of Bonneville cutthroat trout sampled in the 100 m station in Broadmouth Canyon section 02, 2000.

Cache Valley Creek**No water ID**

Cache Valley Creek is a tributary to Sheep Creek. Cache Valley Creek is in Weber County (Huntsville and James Peak USGS Quads). Over 90% of the drainage is private with the remainder being USFS land. Cache Valley Creek was surveyed at two locations on August 9, 2000. Spot electrofishing at the first Liberty/Avon Divide road crossing (UTMs 0427197E and 4580026N) produced no fish. Spot electrofishing at 0427838E and 4581595N produced no fish. Adequate flows and pools for a resident trout population were present in Cache Valley Creek. Cache Valley Creek had not been sampled previously by the UDWR.

Cobble Creek**No Water ID**

Cobble Creek is a tributary to the North Fork of the Ogden River. Cobble Creek is located in Weber county (North Ogden USGS Quad) with approximately 50% of the drainage being privately owned and 50% being USFS land. Cobble Creek has a poorly defined channel and likely only flows during spring runoff. A stream survey was attempted on Cobble Creek on August 22, 2000, however the stream was dry from the confluence with the North Fork of the Ogden River upstream to an environmental camp (UTMs 0424383E and 4579106N). Cobble Creek does not contain sufficient flows for a resident fish population. Cobble Creek had not been sampled previously by the UDWR.

Cold Canyon

IVAP030D04

Section 01

Cold Canyon section 01 (North Fork of the Ogden River to a diversion) is a tributary of the North Fork of the Ogden River. Cold Canyon Creek section 01 is in Weber County (North Ogden and Mantua USGS Quads) with the entire stream section being privately owned. Cold Canyon section 01 is routinely de-watered and does not contain a resident trout population. On July 31, 2000, Cold Canyon section 01 was dry just below the diversion (located at UTM's 0423740E and 4580329N). Cold Canyon section 01 does not contain adequate flows for a resident trout population. Cold Canyon section 01 had not been sampled previously by the UDWR.

Section 02

Cold Canyon section 02 (diversion to the headwaters) is a tributary to the North Fork of the Ogden River. Cold Canyon section 02 is in Weber County (North Ogden and Mantua USGS Quads) with over 80% of the stream section being owned by Weber County (North Fork Park) and the remainder USFS land. Fish species present in Cold Canyon section 02 are Bonneville cutthroat trout. Because no stocking records exist for Cold Canyon, and the diversion structure prevents the movement of fish upstream from the North Fork of the Ogden River, at least during low flows, these fish have had a lower potential for hybridization with rainbow trout. In addition, all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Cold Canyon should be considered for conservation status. Cold Canyon is classified as a class IVB fishery for Bonneville cutthroat trout.

Two reaches of Cold Canyon section 02 were surveyed. On July 31, 2000, spot electrofishing directly upstream from the diversion (UTM's 0423740E and 4580329N) produced four age-1 or age-2 Bonneville cutthroat trout and numerous age-0 Bonneville cutthroat trout. The primary survey of section 02 was completed with a 100 m station located within a campground. UTM's for this station were: 0423014E and 4580214N.

Two-pass electrofishing in the 100 m station resulted in the capture of 35 age-1 and older Bonneville cutthroat trout (366 ± 40 /stream km [589 ± 64 /stream mile]; 19 kg/ha [17 lb/acre]) and one age-0 Bonneville cutthroat trout (Table 16). The age-0

cutthroat trout was caught on the second electrofishing pass, consequently, a population estimate for this age group was not available. Most of the Bonneville cutthroat trout appeared to be age-1 fish (Figure 17). The HQI predicted a higher trout biomass (39 kg/ha) with water velocity, macro-invertebrates, and cover being limiting factors. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Cold Canyon section 02 had been sampled once previously by the UDWR. In 1976, one-pass electrofishing in a 81 m reach located directly upstream from the diversion yielded five rainbow trout (62/stream km; 100/stream mile) (Table 16). All of these fish were smaller than 115 mm TL with three fish being 45 mm TL (Table 16), consequently, the possibility exists that they were presumed to be rainbow trout because of the stocking history in the North Fork of the Ogden River and therefore mis-identified.

Table 16. Population statistics for species sampled in Cold Canyon section 02, 1976 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1976	≥age-1 RBT	62 ¹ (100 ¹)		66 (45-114)		
2000	≥age-1 BCT age-0 BCT	366 ² (589 ²) sparse	19 (17)	86 (53-230) 23	12 (1-125) <1	0.97

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

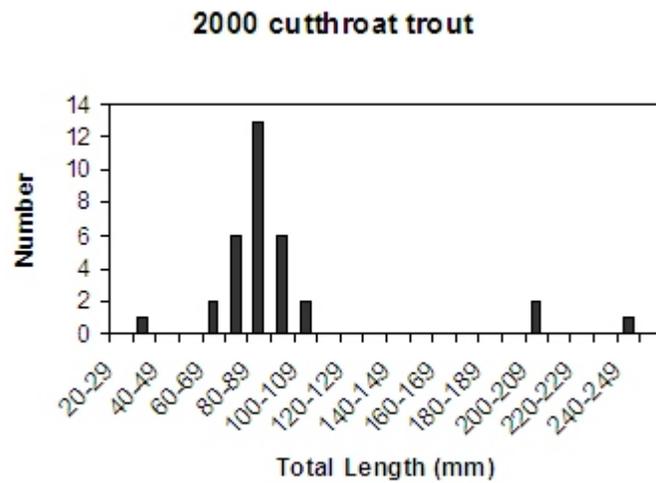


Figure 17. Size distribution of Bonneville cutthroat trout sampled in Cold Canyon section 02, 2000.

Durfee Creek

IVAP030D05

Durfee Creek section 01 (confluence with the North Fork of the Ogden River to the headwaters) is a tributary to the North Fork of the Ogden River. Durfee Creek is in Weber County (Mantua USGS Quad) with approximately 75% of the drainage in private ownership with the remaining 25% being USFS land. Fish species present in Durfee Creek are Bonneville cutthroat trout and rainbow trout x Bonneville cutthroat trout hybrids. Because no stocking records exist for Durfee Creek, the presence of hybrids in the stream likely originated from its connection with the North Fork of the Ogden River where rainbow trout have been stocked by the UDWR. Of the 30 fish collected in Durfee Creek in 2000, 26 phenotypically looked like Bonneville cutthroat trout and four appeared to be hybridized. The genetic sample collected from Durfee Creek should be analyzed because most of the cutthroat trout caught in 2000 phenotypically looked like Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Durfee Creek should be considered for conservation status. Durfee Creek is classified as a class IVB fishery for Bonneville cutthroat trout.

The stream survey on Durfee Creek was completed on August 14, 2000. Section 01 was surveyed with one 107 m station located from the road crossing of 6825 North, upstream. The station was located approximately 1.6 km upstream from the confluence with the North Fork of the Ogden River. UTM coordinates for the station were: 0424946E and 4581383N.

Two-pass electrofishing resulted in the capture of 73 age-1 or older Bonneville cutthroat trout (693 ± 28 /stream km [1115 ± 45 /stream mile]; 40 kg/ha [36 lb/acre]) and two age-0 Bonneville cutthroat trout (19 ± 0 /stream km; 30 ± 0 /stream mile) (Table 17). Several age classes of Bonneville cutthroat trout were present (Figure 18). The HQI predicted a much lower trout biomass (2 kg/ha) with macro-invertebrates, flow, and stream width being limiting. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Durfee Creek had been sampled once previously by the UDWR. In 1977, one-pass electrofishing in a 80 m reach located at the road crossing of 6550 North, yielded 52 rainbow trout x Bonneville

cutthroat trout hybrids (646/stream km; 1040/stream mile) (Table 17). Both of the surveys in 1977 and 2000 demonstrate that Durfee Creek is highly productive and can support trout. The hybridization of cutthroat trout in this stream does not appear to be recent.

Table 17. Population statistics for species sampled in Durfee Creek, 1977 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1977	≥age-1 BCT ¹	646 ¹ (1040 ¹)		108 (73-125)	16 (7-40)	1.18
2000	≥age-1 BCT ²	693 ² (1115 ²)	40 (36)	90 (40-191)	12 (1-57)	1.10
	age-0 BCT	19 ² (30 ²)		34 (29-38)	<1	

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

³ includes hybrid trout

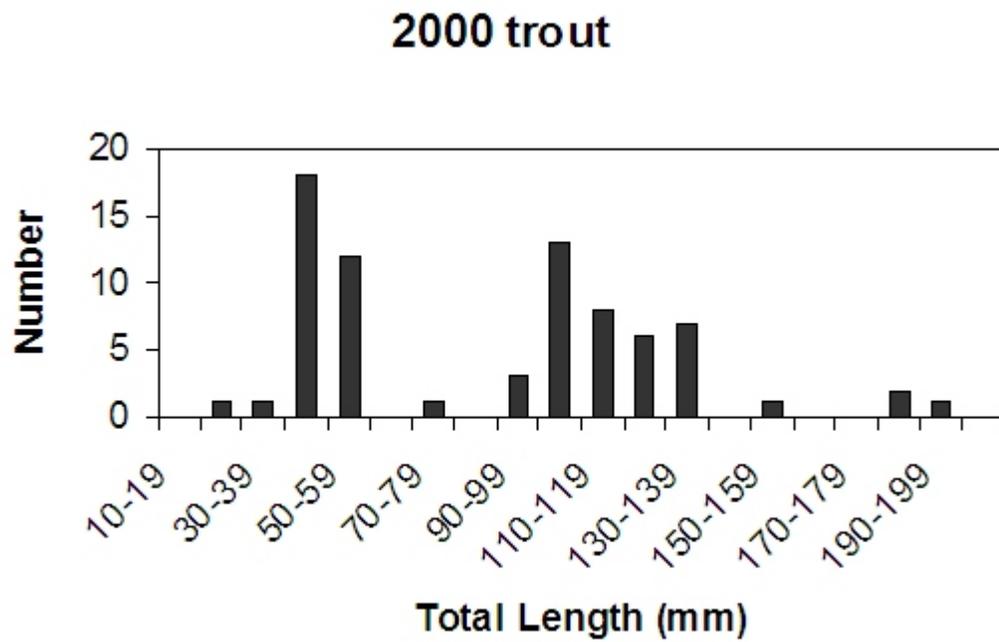


Figure 18. Size distribution of Bonneville cutthroat trout and Bonneville cutthroat trout x rainbow trout hybrids sampled in Durfee Creek, 2000.

Cutler Creek

IVAP030D06

Cutler Creek section 01 (Utaba Reservoir #1 to the headwaters) is a tributary to the North Fork of the Ogden River. Cutler Creek is in Weber County (North Ogden and Mantua USGS Quads) with approximately 50% of the drainage being owned by Weber County (North Fork Park) and 50% being administered by the USFS. Fish species present in Cutler Creek are Bonneville cutthroat trout and mottled sculpin. Because no stocking records exist for Cutler Creek, and Utaba Reservoir acts as a migration barrier from fish in the North Fork of the Ogden River section 02, these fish have less potential for hybridization than those located in the North Fork of the Ogden River section 02. In addition, all cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Cutler Creek should be considered for conservation status. Cutler Creek is classified as a class IIIIB fishery for Bonneville cutthroat trout.

The stream survey on Cutler Creek was completed on August 8, 2000. Section 01 was surveyed with one 100 m station located approximately 1.6 km upstream from the confluence with Utaba Reservoir #1. UTM's for the station were: 0422742E and 4581840N.

Two-pass electrofishing resulted in the capture of 30 age-1 or older Bonneville cutthroat trout ($301 \pm 10/\text{stream km}$ [$485 \pm 16/\text{stream mile}$]; 26 kg/ha [23 lb/acre]) (Table 18). One age-0 Bonneville cutthroat trout was caught on the second electrofishing pass, consequently, a population estimate was not available for this age group. Many year classes of Bonneville cutthroat trout were present with age-1 fish being the most abundant (Figure 19). Mottled sculpin were abundant. The HQI predicted a higher trout biomass (47 kg/ha) with cover and macro-invertebrates being the limiting factors. Thirty whole Bonneville cutthroat trout were collected for genetic analyses. The samples were frozen according to the cutthroat trout collection procedural manual (Toline and Lentsch 1999).

Cutler Creek had been sampled once previously by the UDWR. In 1976, one-pass electrofishing in a 161 m reach located directly upstream from Utaba Reservoir #1 yielded seven Bonneville cutthroat trout ($44/\text{stream km}$; $70/\text{stream mile}$) (Table 18). Mottled sculpin were abundant. Bonneville cutthroat trout density in Cutler Creek appears to be higher in 2000 than in 1976.

Table 18. Population statistics for species sampled in Cutler Creek, 1976 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1976	≥age-1 BCT MSC	44 ¹ (70 ¹) abundant		108 (73-125)	16 (7-40)	1.18
2000	≥age-1 BCT age-0 BCT MSC	301 ² (485 ²) sparse abundant	26 (23)	127 (69-275) 35	33 (4-188) 1	0.97

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

2000 cutthroat trout

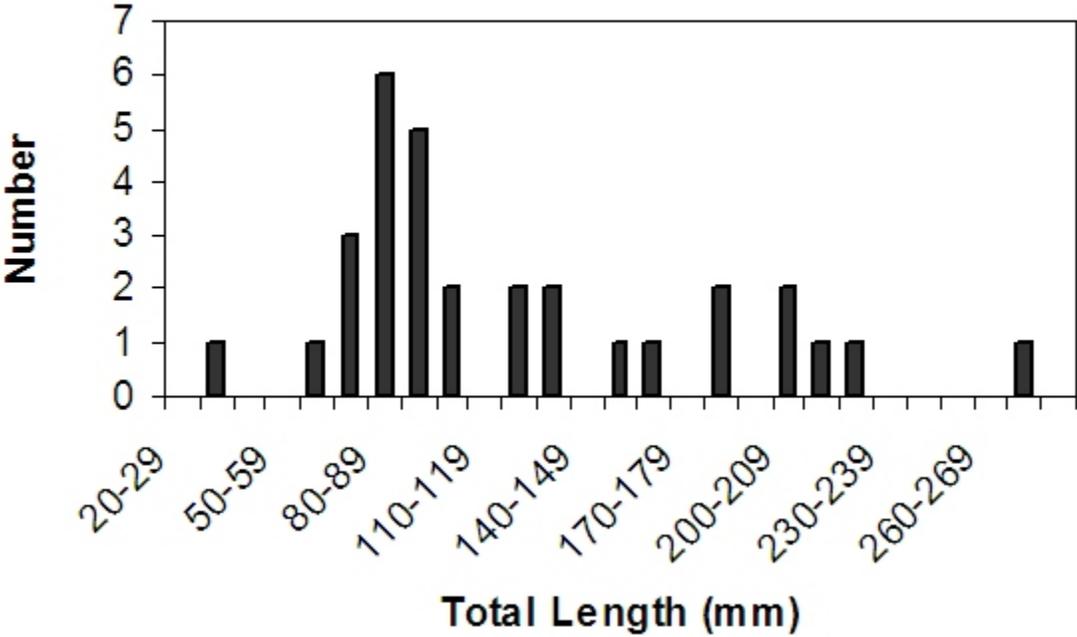


Figure 19. Size distribution of Bonneville cutthroat trout sampled in Cutler Creek, 2000.

Black Canyon

No water ID

Black Canyon is a tributary to Cutler Creek. Black Canyon is located in Weber county (Mantua USGS Quad) with the entire drainage being USFS land. The confluence of Black Canyon with Cutler Creek was visually examined on August 14, 2000. This portion of Black Canyon had extremely high gradient combined with very little flow. No electrofishing was conducted because of the low probability that this stream contained a resident cutthroat trout population. Black Canyon had not been sampled previously by the UDWR.

Weber River subunit

Weber River

IVAP

Section 02

The Weber River section 02 (Slaterville Diversion to the mouth of Weber Canyon) is a tributary to the Great Salt Lake. The Weber River section 02 is in Weber and Davis counties (Ogden USGS Quad) with approximately 15% being owned by the UDWR, 30% by Riverdale City, and the remaining 55% being privately owned. Fish species present in the Weber River section 02 are brown trout, rainbow trout, mountain whitefish, speckled dace, longnose dace, mountain sucker, Utah sucker, mottled sculpin, redbside shiner, green sunfish, and common carp. Green suckers (reclassified as bluehead suckers *Catostomus discobolus*) and smallmouth bass (*Micropterus dolomieu*) have been caught during past surveys and Bonneville cutthroat trout may occur in the upper portion of this section. Rainbow trout are currently being stocked and have been stocked extensively in section 02, however, brown trout and smallmouth bass also have been stocked through time. The Weber River section 02 is classified as a class III fishery for rainbow trout, brown trout, and mountain whitefish.

Two stream surveys were completed on August 17, 2000 on the Weber River section 02. The lower survey (200 m in length) was completed on UDWR land at UTMs: 0417513E and 4556431N. The higher survey (200 m in length) was completed immediately downstream from the Uinta Bridge. UTMs for this station were: 0419506E and 4555370N.

UDWR Riverdale land

Two-pass electrofishing did not result in the capture of any Bonneville cutthroat trout. The survey did result in the capture of 34 brown trout ($204 \pm 75/\text{stream km}$ [$328 \pm 120/\text{stream mile}$; 85 kg/ha [76 lb/acre]), 13 mountain whitefish ($81 \pm 50/\text{stream km}$ [$130 \pm 81/\text{stream mile}$]; 11 kg/ha [10 lb/acre]), 30 mountain sucker ($150 \pm 0/\text{stream km}$; $241/\text{stream mile}$), and one Utah sucker ($5 \pm 0/\text{stream km}$; $8 \pm 0/\text{stream mile}$) (Table 19). Mottled sculpin, speckled dace, and longnose dace were abundant; redbase shiner were common. Because these species are difficult to net, population estimates were not attempted. One green sunfish was caught on the second electrofishing pass. The HQI predicted a considerably lower salmonid biomass (32 kg/ha) with cover and macro-invertebrates being limiting.

Uinta Bridge

Two-pass electrofishing did not result in the capture of any Bonneville cutthroat trout. The survey did result in the capture of six brown trout ($31 \pm 11/\text{stream km}$ [$50 \pm 17/\text{stream mile}$; 7 kg/ha [6 lb/acre]), four mountain whitefish, and seven common carp ($35 \pm 0/\text{stream km}$; $56 \pm 0/\text{stream mile}$) (Table 19). More mountain whitefish were caught on the second electrofishing pass, consequently, a population estimate was not available. The HQI predicted a higher salmonid biomass (79 kg/ha) with cover and macro-invertebrates being limiting.

The most recent surveys on the Weber River section 02 were completed in 1987, 1988, and 1991. In 1987, two-pass electrofishing in one 161 m station located at the mouth of Weber Canyon, produced 47 mountain whitefish ($292 \pm 0/\text{stream km}$ [$470 \pm 0/\text{stream mile}$]; 23 kg/ha [20 lb/acre]), six age-1 and older Bonneville cutthroat trout ($37 \pm 0/\text{stream km}$ [$60 \pm 0/\text{stream mile}$]; 8 kg/ha [6 lb/acre]), nine age-1 and older rainbow trout, and 12 brown trout (Table 19). More rainbow trout and brown trout were caught on the second electrofishing pass, consequently, a population estimate was not available for these species. Utah sucker, mountain sucker, speckled dace, longnose dace, and mottled sculpin were abundant. Redside shiner were common. In 1988, two-pass electrofishing in one 161 m station located at the 31st Street Bridge, 112 mountain whitefish ($706 \pm 19/\text{stream km}$ [$1136 \pm 30/\text{stream mile}$; 77 kg/ha [68 lb/acre]), 31 brown trout ($374 \pm 474/\text{stream mile}$ [$602 \pm 763/\text{stream mile}$]; 35 kg/ha [31 lb/acre]),

and 1 age-1 and older Bonneville cutthroat trout (6 ± 0 /stream km [10 ± 0 /stream mile]; 2 kg/ha [2 lb/acre]) (Table 19). Mottled sculpin, bluehead sucker, Utah sucker, and redbside shiner were common. Mountain sucker and common carp were sparse. In 1991, three 161 m stations were completed in the lower reaches of section 02. At Fort Buenaventura, two-pass electrofishing produced one brown trout and one age-1 and older rainbow trout (Table 19). Utah sucker and speckled dace were abundant; redbside shiner, mountain sucker, and common carp were common; smallmouth bass and mottled sculpin were sparse. At the 31st Street bridge, two-pass electrofishing produced two brown trout and one age-1 and older rainbow trout (Table 19). Utah sucker, speckled dace, and mottled sculpin were abundant; bluehead sucker, redbside shiner, and common carp were common; smallmouth bass, mountain sucker, and longnose dace were sparse. At the Riverdale Road crossing, two-pass electrofishing produced one brown trout (Table 19). Speckled dace and redbside shiner were abundant; bluehead sucker and common carp were common; smallmouth bass, black bullhead, mountain sucker, mottled sculpin, longnose dace, and green sunfish were sparse.

Surveys on the Weber River section 02 during the past 15 years indicate that salmonid habitat becomes extremely limited at the downstream portion of this section (Table 19). Bonneville cutthroat trout were caught in the upstream portion of this section in 1987 (Table 19) and in the lowest station of section 03 completed in 2000 (Power Plant, see Weber River section 03), consequently, they likely remain in low numbers in the upstream end of this section.

Table 19. Population statistics for species sampled in the Weber River section 02, 1987, 1988, 1991, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL(mm)	Avg WT(g)	Avg K
1987 mouth Weber Canyn	MWF ≥age-1 BCT ≥age-1 RBT BNT	292 (470) 37 (60) sparse sparse	23 (20) 8 (6)			
1988 31 st St Bridg	MWF ≥age-1 BCT BNT	706 (1136) 6 (10) 374 (602)	77 (68) 2 (2) 35 (31)			
1991 FT. Buena	BNT ≥age-1 RBT	6 (10) 6 (10)				
1991 31 st St Bridg	BNT ≥age-1 RBT	12 (20) 6 (10)				
1991 Rivdl Road	BNT	6 (10)				
2000 UDWR River dale land	BNT MWF MTS UTS RSS SPD LND MSC GSF	204 (328) 81 (130) 150 (240) 5 (8) common abundant abundant abundant sparse	85 (76) 11 (10)	332 (63-537) 250 (107-360)	614 (2-1650) 206 (16-450)	1.20 1.17
2000 Uinta Bridg	BNT MWF CRP	31 (50) sparse 35 (56)	7 (6)	276 (75-470) 198 (113-340)	433 (4-1160) 101 (12-290)	1.06 0.80

Section 03

The Weber River section 03 (mouth of Weber Canyon to Gateway) is a tributary to the Great Salt Lake. The Weber River section 03 is in Morgan and Davis counties (Ogden and Snow Basin USGS Quads) with close to 100% of the river corridor being owned by the State of Utah and administered by the Utah Department of Transportation. Fish species present in the Weber River section 03 are brown trout, Bonneville cutthroat trout, mountain whitefish, mottled sculpin, Utah sucker, and mountain sucker. Rainbow trout, speckled dace, longnose dace, and redbreast shiner were not caught in the 2000 surveys, but may be present in low numbers. No fish are currently being stocked into the Weber River section 03, however, rainbow trout and brown trout have been stocked in the past. All cutthroat trout caught in 2000, phenotypically resembled Bonneville cutthroat trout. The Weber River section 03 should be considered a sport fishery for Bonneville cutthroat trout. The Weber River section 03 is classified as a class II fishery for Bonneville cutthroat trout, brown trout, and mountain whitefish.

Two stream surveys were completed on September 5, 2000 on the Weber River section 03. The lower survey (94 m in length) was completed adjacent to the Utah Power and Light Power Plant. UTM coordinates for this station were: 0426105E and 4554205N. The higher survey (94 m in length) was completed immediately upstream from the train trestle. UTM coordinates for this survey were: 0427832E and 4554270N.

Utah Power and Light

Two-pass electrofishing resulted in the capture of 15 age-1 and older Bonneville cutthroat trout (160 ± 11 /stream km [258 ± 17 /stream mile]; 38 kg/ha [34 lb/acre]), 29 brown trout (317 ± 21 /stream km [510 ± 34 /stream mile]; 149 kg/ha [133 lb/acre]), 6 mountain whitefish (64 ± 0 /stream km [103 ± 0 /stream mile]; 19 kg/ha [17 lb/acre]), 2 mountain sucker (21 ± 0 /stream km; 34 ± 0 /stream mile), and 8 Utah sucker (87 ± 11 /stream km; 140 ± 18 /stream mile) (Table 20). All Bonneville cutthroat trout were adult fish (Figure 20). Mottled sculpin were common. Because mottled sculpin are difficult to net, population estimates were not attempted. The HQI predicted a slightly higher salmonid biomass (282 kg/ha) with no factors being limiting. No genetic samples were collected.

Train Trestle

Two-pass electrofishing resulted in the capture of 10 age-1 and older Bonneville cutthroat trout ($108 \pm 11/\text{stream km}$ [$173 \pm 17/\text{stream mile}$; 20 kg/ha [18 lb/acre]), 29 brown trout ($331 \pm 53/\text{stream km}$ [$533 \pm 86/\text{stream mile}$]; 29 kg/ha [25 lb/acre]), 18 mountain whitefish ($209 \pm 52/\text{stream km}$ [$336 \pm 84/\text{stream mile}$]; 60 kg/ha [54 lb/acre]), and 6 mountain sucker ($67 \pm 22/\text{stream km}$; $107 \pm 36/\text{stream mile}$) (Table 20). All Bonneville cutthroat trout were adult fish (Figure 20). Mottled sculpin were common. Because mottled sculpin are difficult to net, population estimates were not attempted. The HQI predicted a higher salmonid biomass (151 kg/ha) with cover being the limiting factor. No genetic samples were collected.

The most recent surveys on the Weber River section 03 were completed in 1988. In 1988, two stations were surveyed. The lower station 0.8 km (124 m in length) upstream from the Utah Power and Light Power Plant produced 57 age-1 and older Bonneville cutthroat trout ($465 \pm 24/\text{stream km}$ [$748 \pm 38/\text{stream mile}$]; 69 kg/ha [61 lb/acre]), 3 brown trout ($34 \pm 0/\text{stream km}$ [$38 \pm 0/\text{stream mile}$]; 4 kg/ha [3 lb/acre]), 94 mountain whitefish ($757 \pm 24/\text{stream km}$ [$1218 \pm 38/\text{stream mile}$]; 59 kg/ha [53 lb/acre]), and 3 age-1 and older rainbow trout ($24 \pm 0/\text{stream km}$ [$38 \pm 0/\text{stream mile}$]; 5 kg/ha [5 lb/acre]) (Table 20). Mountain sucker were common and mottled sculpin were abundant. The higher station was located upstream from the drop structure which is located under the freeway bridge. This station was approximately 200 m downstream from the higher station completed in 2000. This survey produced 24 age-1 and older Bonneville cutthroat trout ($325 \pm 354/\text{stream km}$ [$523 \pm 569/\text{stream mile}$]; 11 kg/ha [10 lb/acre]), 8 brown trout ($86 \pm 39/\text{stream km}$ [$139 \pm 62/\text{stream mile}$]; 15 kg/ha [13 lb/acre]), and 54 mountain whitefish ($658 \pm 222/\text{stream km}$ [$1059 \pm 358/\text{stream mile}$]; 25 kg/ha [22 lb/acre]). (Table 20). Mountain sucker were common and mottled sculpin were abundant.

Bonneville cutthroat trout appear to be in lower densities in the 2000 survey as compared to the 1988 survey in the Weber River section 03 (Table 20). All of the Bonneville cutthroat trout caught in 2000 were adult fish (Figure 20) and likely originated from the many tributaries of section 04 that contain Bonneville cutthroat trout. The movement of Bonneville cutthroat trout downstream from section 04 appears to be sustaining the cutthroat trout fishery in this section.

Table 20. Population statistics for species sampled in the Weber River section 03, 1988 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL(mm)	Avg WT(g)	Avg K
1988 Power Plant	MWF	757 (1218)	59 (53)	192 (132-375)	81 (20-470)	0.95
	≥age-1 BCT	465 (748)	69 (61)	208 (117-455)	149 (20-970)	1.02
	≥age-1 RBT	24 (38)	5 (5)	277 (250-315)	235 (170-325)	1.09
	BNT	24 (38)	4 (3)	236 (167-304)	153 (50-260)	1.05
	MTS	common				
	MSC	abundant				
1988 Train Tres.	MWF	658 (1059)	25 (22)	155 (130-260)	36 (20-150)	0.93
	≥age-1 BCT	325 (523)	11 (10)	148 (104-225)	33 (15-100)	1.00
	BNT	86 (139)	15 (13)	223 (145-332)	161 (35-400)	1.23
	MTS	common				
	MSC	abundant				
2000 Power Plant	BNT	317 (510)	149 (133)	332 (122-503)	515 (22-1436)	1.07
	≥age-1 BCT	160 (258)	38 (34)	293 (231-392)	259 (204-584)	0.99
	MWF	64 (103)	19 (17)	265 (155-392)	329 (34-778)	1.08
	UTS	87 (140)				
	MTS	21 (34)				
	MSC	common				
2000 Train Tres.	BNT	331 (533)	29 (25)	190 (41-352)	126 (2-498)	1.18
	≥age-1 BCT	108 (173)	20 (18)	292 (197-377)	276 (72-528)	0.99
	MWF	209 (336)	60 (54)	320 (154-357)	422 (30-576)	1.26
	MTS	67 (107)				
	MSC	common				

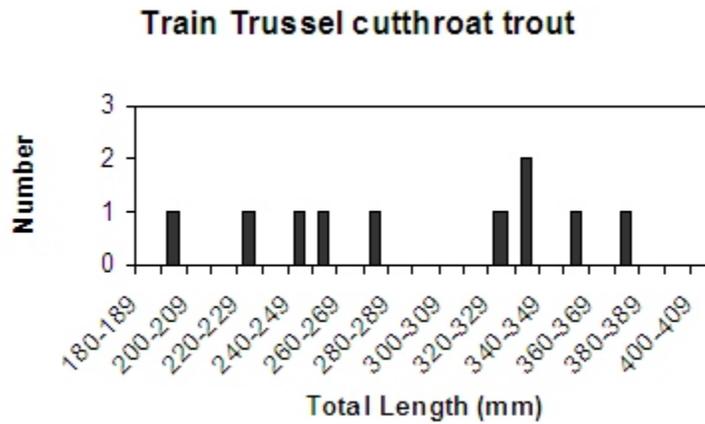
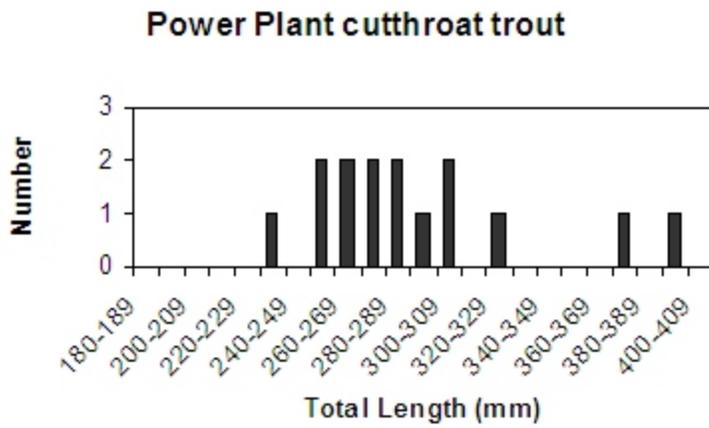


Figure 20. Size distribution of Bonneville cutthroat trout sampled in the Weber River section 03, 2000.

Section 04

The Weber River section 04 (Gateway to the Stoddard Diversion) is a tributary to the Great Salt Lake. The Weber River section 04 is in Morgan County (Snow Basin, Peterson, and Morgan USGS Quads) with approximately 25% being owned by UDWR, 1% by Weber Basin, 3% by the State of Utah and administered by the Utah Department of Transportation, 3% by the railroad, and the remainder being privately owned. Fish species present in the Weber River section 04 are brown trout, Bonneville cutthroat trout, mountain whitefish, rainbow trout, mottled sculpin, Utah sucker, mountain sucker, speckled dace, longnose dace, and redbreast shiner. Rainbow trout, brown trout, and Yellowstone cutthroat trout (Snake River form) have been historically stocked into Section 04. Only one cutthroat trout caught in 2000 was visually identified as potentially being hybridized with rainbow trout. The remaining cutthroat trout phenotypically resembled Bonneville cutthroat trout. The Weber River section 04 should be considered a sport fishery for Bonneville cutthroat trout. The Weber River section 04 is classified as a class II fishery for Bonneville cutthroat trout, brown trout, and mountain whitefish.

Two stream surveys were completed on August 10, 2000 on the Weber River section 04. The lower survey (200 m in length) was completed on UDWR land at the Red Barn property. UTM coordinates for this station were: 0436528E and 4551011N. The higher survey (200 m in length) was completed on UDWR land at the Ranch Land property. UTM coordinates for this survey were: 0437564E and 4548741N.

Red Barn

Two-pass electrofishing resulted in the capture of 7 age-1 and older Bonneville cutthroat trout (42 ± 31 /stream km [67 ± 50 /stream mile]; 4 kg/ha [4 lb/acre]), 162 brown trout (924 ± 105 /stream km [1486 ± 169 /stream mile]; 85 kg/ha [76 lb/acre]), 62 mountain whitefish (353 ± 65 /stream km [568 ± 104 /stream mile]; 2 kg/ha [2 lb/acre]), 1 age-1 and older rainbow trout (5 ± 0 /stream km [8 ± 0 /stream mile]; 2 kg/ha [1 lb/acre]), 5 Utah sucker (45 ± 129 /stream km; 72 ± 208 /stream mile) (Table 21), and 52 mountain sucker. More mountain sucker were caught on the second electrofishing pass, consequently, a population estimate was not available. All Bonneville cutthroat trout were adult fish (Figure 21). Mottled sculpin and speckled dace were abundant. Longnose dace and redbreast shiner were common. Because these species are

difficult to net, population estimates were not attempted. The HQI predicted a higher salmonid biomass (156 kg/ha) with cover being limited. No genetic samples were collected.

Ranch Land

Two-pass electrofishing resulted in the capture of 6 age-1 and older Bonneville cutthroat trout (30 ± 0 /stream km [48 ± 0 /stream mile]; 6 kg/ha [5 lb/acre]), 57 brown trout (307 ± 35 /stream km [494 ± 57 /stream mile]; 106 kg/ha [95 lb/acre]), 198 mountain whitefish (1078 ± 75 /stream km [1735 ± 120 /stream mile]; 318 kg/ha [284 lb/acre]), 14 mountain sucker (160 ± 441 /stream km; 258 ± 710 /stream mile), and 1 Utah sucker (5 ± 0 /stream km; 8 ± 0 /stream mile) (Table 21). All Bonneville cutthroat trout were adult fish (Figure 21). Speckled dace were abundant and mottled sculpin and longnose dace were sparse. Because these species are difficult to net, population estimates were not attempted. The HQI predicted a lower salmonid biomass (156 kg/ha) with cover being the limiting factor. No genetic samples were collected.

The most recent surveys on the Weber River section 04 were completed in 1985 and 1987. In 1985, four 161 m stations were surveyed near Peterson, Utah. The most downstream station (Station 1) was approximately 0.5 km downstream from the Peterson Bridge and the most upstream station (Station 4) was directly upstream from the Peterson Bridge. Station 1 produced 61 mountain whitefish (424 ± 68 /stream km; 682 ± 110 /stream mile) and 2 age-1 and older Bonneville cutthroat trout (12 ± 0 /stream km; 20 ± 0 /stream mile) (Table 21). Mottled sculpin and suckers (mountain and Utah) were common and speckled dace were sparse. Station 2 produced 24 mountain whitefish (270 ± 160 /stream km; 435 ± 258 /stream mile) and 2 age-1 and older Bonneville cutthroat trout (Table 21). Both cutthroat trout were caught on the second electrofishing pass, consequently, a population estimate was not available. Suckers (mountain and Utah) were sparse. Station 3 produced 148 mountain whitefish (924 ± 12 /stream km; 1486 ± 20 /stream mile), 21 age-1 and older Bonneville cutthroat trout (134 ± 12 /stream km; 216 ± 20 /stream mile), and 24 brown trout (160 ± 31 /stream km; 258 ± 50 /stream mile) (Table 21). Suckers (mountain and Utah) were common and common carp were sparse. Station 4 produced 29 mountain whitefish (181 ± 6 /stream km; 292 ± 10 /stream mile), 5 age-1 and older Bonneville cutthroat trout (31 ± 0 /stream km; 50 ± 0 /stream mile), 17 brown trout (108 ± 6 /stream

km; 173 ± 10 /stream mile), and 2 age-1 and older rainbow trout (12 ± 0 /stream km; 20 ± 0 /stream mile) (Table 21). Suckers (mountain and Utah) and dace (speckled and longnose) were sparse and mottled sculpin were common.

In 1987, three 161 m stations were surveyed. The most downstream station (Station 1) was approximately 1.6 km upstream from Mountain Green, Station 2 was located approximately 0.5 km downstream from the Peterson Bridge, and Station 3 was located directly downstream from the Stoddard Slough. Non-game species were not recorded in these surveys. Station 1 produced 224 mountain whitefish (1457 ± 62 /stream km [2344 ± 100 /stream mile]; 167 kg/ha [149 lb/acre]), 46 age-1 and older Bonneville cutthroat trout (430 ± 255 /stream km [692 ± 411 /stream mile]; 46 kg/ha [41 lb/acre]), and 29 brown trout (194 ± 19 /stream km [312 ± 30 /stream mile]; 138 kg/ha [123 lb/acre]) (Table 21). Station 2 produced 27 age-1 and older Bonneville cutthroat trout (183 ± 38 /stream km [294 ± 61 /stream mile]; 34 kg/ha [30 lb/acre]), 24 brown trout (180 ± 68 /stream km [289 ± 110 /stream mile]; 78 kg/ha [70 lb/acre]), and 3 age-1 and older rainbow trout (Table 21). Two rainbow trout were caught on the second electrofishing pass, consequently, a population estimate was not available. Station 3 produced 199 mountain whitefish (1393 ± 131 /stream km [2242 ± 210 /stream mile]; 209 kg/ha [186 lb/acre]), 40 age-1 and older Bonneville cutthroat trout (280 ± 56 /stream km [450 ± 90 /stream mile]; 20 kg/ha [18 lb/acre]), 41 brown trout (266 ± 25 /stream km [428 ± 40 /stream mile]; 86 kg/ha [77 lb/acre]), and 4 age-1 and older rainbow trout (28 ± 17 /stream km [45 ± 27 /stream mile]; 5 kg/ha [4 lb/acre]) (Table 21).

Bonneville cutthroat trout density in the Weber River was lower in 2000 as compared to 1987, but similar to surveys completed in 1985. The highest density of any survey was in 1987 station 1, which was located approximately 1.6 km upstream from Mountain Green, Utah. Several tributary streams that contain Bonneville cutthroat trout populations feed section 04 and many of the cutthroat trout that enter the Weber River become concentrated in the lower reaches of section 04. The majority of Bonneville cutthroat trout caught in all stream surveys were adult fish (Table 21), and likely originated from the tributaries to section 04.

Table 21. Population statistics for species sampled in the Weber River section 04, 1985, 1987, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1985 St.#1	>age-1 BCT MWF SPD MSC suckers	12 (20) 424 (682) sparse common common		223 (215-231) 273 (155-398)	188 (175-200) 260 (37-650)	1.69 1.23
1985 St.#2	>age-1 BCT MWF suckers	270 (435) sparse		238 (230-245) 291 (143-370)	145 (100-190) 270 (10-475)	1.12 0.99
1985 St.#3	>age-1 BCT MWF BNT suckers CRP	134 (216) 924 (1486) 160 (258) common sparse		236 (111-329) 298 (224-378) 390 (123-640)	168 (8-360) 286 (110-495) 7085 (10-2825)	1.07 1.05 0.90
1985 St.#4	>age-1 BCT BNT MWF >age-1 RBT suckers MSC dace	31 (50) 108 (173) 181 (292) 12 (20) sparse common sparse		211 (164-277) 229 (116-435) 323 (230-383) 293 (270-315)	106 (40-250) 206 (10-750) 357 (125-550) 250 (200-300)	0.95 0.86 1.02 0.99
1987 St.#1	>age-1 BCT MWF BNT	430 (692) 1457 (2344) 194 (312)	46 (41) 167 (149) 138 (123)	223 (139-422) 205 (101-420) 377 (93-575)	136 (25-700) 146 (6-855) 907 (8-1980)	0.99 1.11 1.15
1987 St.#2	>age-1 BCT BNT >age-1 RBT	183 (294) 180 (289)	34 (30) 78 (70)	272 (162-426) 310 (90-595) 257 (250-267)	284 (40-960) 662 (10-2450) 160 (140-200)	1.24 1.17 0.93
1987 St.#3	>age-1 BCT MWF BNT >age-1 RBT	280 (150) 1393 (2242) 266 (428) 28 (45)	20 (18) 209 (186) 86 (77) 5 (4)	189 (129-315) 208 (72-425) 258 (70-570) 258 (228-281)	82 (20-308) 168 (5-918) 363 (4-1920) 191 (138-248)	1.05 1.13 1.06 1.09
2000 Red Barn	BNT >age-1 BCT MWF >age-1 RBT UTS MTS MSC SPD LND RSS	924 (1486) 42 (67) 353 (568) 5 (8) 45 (72) abundant abundant abundant common common	85 (76) 4 (4) 2 (2) 2 (1)	161 (66-535) 220 (142-411) 114 (103-130) 384	145 (2-1299) 166 (19-605) 11 (6-19) 511	0.93 0.82 0.76 0.90
2000 Ranch Land	BNT >age-1 BCT MWF UTS MTS MSC SPD LND	307 (494) 30 (48) 1078 (1735) 5 (8) 160 (258) sparse abundant sparse	106 (95) 6 (5) 318 (284)	325 (96-476) 304 (218-371) 320 (103-480)	444 (7-972) 248 (117-320) 378 (7-1048)	1.01 0.89 1.01

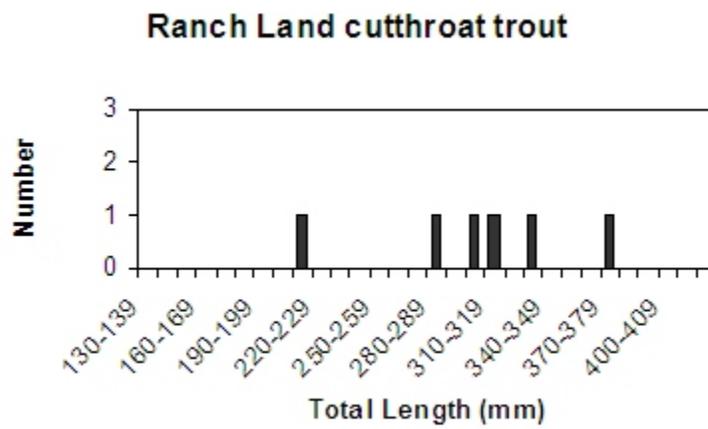
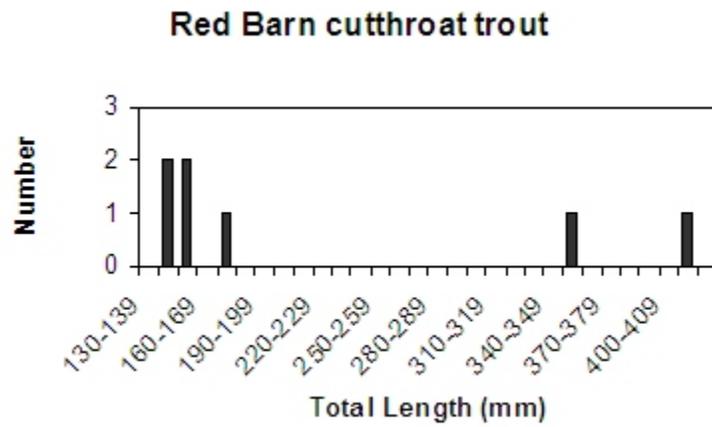


Figure 21. Size distribution of Bonneville cutthroat trout sampled in the Weber River section 04, 2000.

Section 05

The Weber River section 05 (Stoddard Diversion to Lost Creek confluence) is a tributary to the Great Salt Lake. The Weber River section 05 is in Morgan County (Morgan and Devils Slide USGS Quads) with approximately 20% being owned by the State of Utah and administered by the Utah Department of Transportation, 8% by Morgan County, and the remainder being privately owned. Fish species present in the Weber River section 05 are brown trout, Bonneville cutthroat trout, mountain whitefish, rainbow trout, mottled sculpin, Utah sucker, mountain sucker, speckled dace, longnose dace, black crappie, and yellow perch. Rainbow trout, brown trout, and Yellowstone cutthroat trout (Snake River form) have been historically stocked into section 05. All cutthroat trout caught in 2000 phenotypically resembled Bonneville cutthroat trout. The Weber River section 05 should be considered a sport fishery for Bonneville cutthroat trout. The Weber River section 05 is classified as a class II fishery for Bonneville cutthroat trout, brown trout, and mountain whitefish.

Two stream surveys were completed on November 28, 2000 on the Weber River section 05. The lower survey (200 m in length) was completed in the Morgan County Fairgrounds. UTM coordinates for this station were: 0444734E and 4543078N. The higher survey (200 m in length) was completed approximately 600 m upstream from the Taggart exit. UTM coordinates for this survey were: 0450696E and 4545295N.

Morgan County Fairgrounds

Two-pass electrofishing resulted in the capture of 5 age-1 and older Bonneville cutthroat trout (25 ± 0 /stream km [40 ± 0 /stream mile]; 6 kg/ha [6 lb/acre]), 149 brown trout (789 ± 45 /stream km [1269 ± 73 /stream mile]; 157 kg/ha [140 lb/acre]), 437 mountain whitefish (2310 ± 80 /stream km [3716 ± 129 /stream mile]; 699 kg/ha [622 lb/acre]), 1 age-1 and older rainbow trout (5 ± 0 /stream km [8 ± 0 /stream mile]; 1 kg/ha [1 lb/acre]), and 3 mountain sucker (15 ± 0 /stream km; 24 ± 0 /stream mile) (Table 22). All Bonneville cutthroat trout were adult fish (Figure 22). Mottled sculpin were abundant and yellow perch were sparse. Because these species are difficult to net, population estimates were not attempted. No HQI or genetic samples were collected.

Taggart

Two-pass electrofishing resulted in the capture of 13 age-1 and older Bonneville cutthroat trout ($107 \pm 153/\text{stream km}$ [$172 \pm 246/\text{stream mile}$; 37 kg/ha [33 lb/acre]), 288 brown trout ($1600 \pm 110/\text{stream km}$ [$2574 \pm 177/\text{stream mile}$]; 139 kg/ha [124 lb/acre]), 150 mountain whitefish ($755 \pm 10/\text{stream km}$ [$1214 \pm 16/\text{stream mile}$]; 414 kg/ha [369 lb/acre]), 5 age-1 and older rainbow trout ($25 \pm 0/\text{stream km}$ [$40 \pm 0/\text{stream mile}$]; 5 kg/ha [5 lb/acre]) (Table 22), 6 mountain sucker, and 2 Utah sucker. All Bonneville cutthroat trout were adult fish (Figure 22). More mountain sucker and Utah sucker were caught on the second electrofishing pass, consequently, a population estimate was not available. Mottled sculpin were abundant and longnose dace, speckled dace, and yellow perch were sparse. Because these species are difficult to net, population estimates were not attempted. No HQI or genetic samples were collected.

The most recent survey on the Weber River section 05 was completed in 1989. In 1989, one station was surveyed at the same locality as the 2000 Taggart exit survey. The 1989 survey produced 26 age-1 and older Bonneville cutthroat trout ($178 \pm 37/\text{stream km}$ [$286 \pm 59/\text{stream mile}$]; 26 kg/ha [23 lb/acre]), 45 brown trout ($290 \pm 25/\text{stream km}$ [$466 \pm 40/\text{stream mile}$]; 28 kg/ha [25 lb/acre]), 57 mountain whitefish ($371 \pm 31/\text{stream km}$ [$597 \pm 50/\text{stream mile}$]; 102 kg/ha [91 lb/acre]), and 2 age-1 and older rainbow trout (Table 22). One rainbow trout was caught on each electrofishing pass, consequently, a population estimate was not available. Mottled sculpin were abundant, speckled dace were common, and Utah sucker, black crappie, and mountain sucker were sparse. Five fish were identified as green sucker (bluehead sucker), however, these fish may have been misidentified and were actually mountain sucker.

Bonneville cutthroat trout density at the Taggart site was slightly lower in 2000 as compared to 1989, however, the cutthroat trout caught in 2000 were larger fish (Table 22). The Weber River section 05 appears to sustain a resident Bonneville cutthroat trout population, however, this population is likely maintained at its present density by immigration from tributary streams within sections 04 and 05 where healthy Bonneville cutthroat trout populations still exist.

Table 22. Population statistics for species sampled in the Weber River section 05, 1989 and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1989 Tagrt	BNT	290 (466)	28 (25)	207 (108-492)	136 (10-1320)	1.01
	≥age-1 BCT	178 (286)	26 (23)	229 (83-448)	203 (4-951)	0.91
	MWF	371 (597)	102 (91)	342 (225-462)	388 (122-856)	0.94
	≥age-1 RBT			306 (304-307)	280 (259-300)	0.98
	MTS	sparse				
	UTS	sparse				
	SPD	common				
	MSC	abundant				
BLC	sparse					
2000 Fair grnds	BNT	789 (1269)	157 (140)	209 (51-495)	167 (1-1193)	0.89
	≥age-1 BCT	25 (40)	6 (6)	279 (230-382)	210 (88-554)	0.80
	MWF	2310 (3716)	699 (622)	287 (112-413)	254 (10-510)	0.84
	≥age-1 RBT	5 (8)	1 (1)	243	119	0.83
	MTS	15 (24)				
	MSC	abundant				
	YEP	sparse				
2000 Tagrt	BNT	307 (494)	106 (95)	325 (96-476)	444 (7-972)	1.01
	≥age-1 BCT	107 (172)	37 (33)	304 (226-418)	289 (90-748)	0.90
	MWF	755 (1214)	414 (369)	368 (138-428)	461 (20-650)	0.90
	≥age-1 RBT	25 (40)	5 (5)	267 (248-296)	182 (150-272)	0.93
	MTS	sparse				
	UTS	sparse				
	SPD	sparse				
	MSC	abundant				
	LND	sparse				
	YEP	sparse				

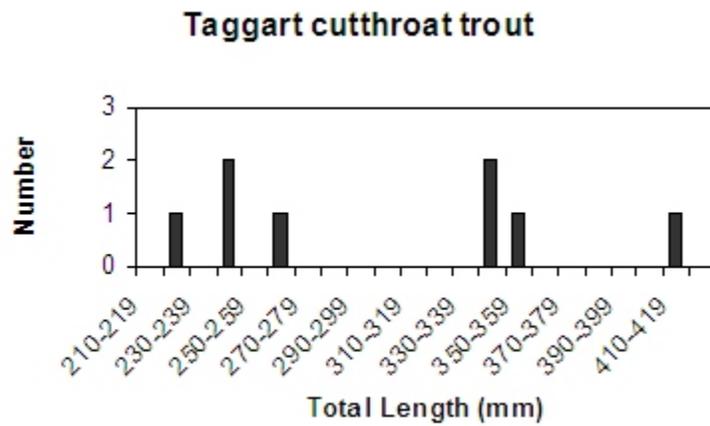
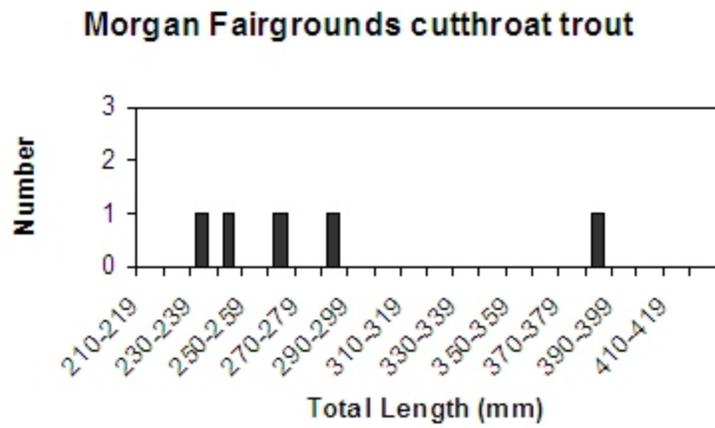


Figure 22. Size distribution of Bonneville cutthroat trout sampled in the Weber River section 05, 2000.

Hardscrabble Creek

IVAP150A

Hardscrabble Creek section 01 (East Canyon Creek to the headwaters) is a tributary to East Canyon Creek. Hardscrabble Creek is in Morgan County (Mountain Dell and Porterville USGS Quads) with over 95% of the river corridor being privately owned and the remainder being administered by the Bureau of Land Management. Fish species present in Hardscrabble Creek are Bonneville cutthroat trout and mottled sculpin. Rainbow trout and brown trout are likely present in the lower reaches of the stream. The lower reaches of Hardscrabble Creek have been extensively stocked with rainbow trout (Thompson and Schmitz 1997), however a diversion exists (UTMs 0440153E and 4533873N) that likely prevents the upstream movement of fish, at least during low flows. Consequently, the cutthroat trout in Hardscrabble Creek and its tributaries upstream from the diversion have phenotypically resembled Bonneville cutthroat trout (Thompson and Schmitz 1997). In addition, all cutthroat trout caught in the 2000 stream survey phenotypically resembled Bonneville cutthroat trout. Pending genetic analyses, Bonneville cutthroat trout in Hardscrabble Creek should be considered for conservation status. Hardscrabble Creek is classified as a IIIB fishery for Bonneville cutthroat trout.

Hardscrabble Creek (upstream from the diversion) was sampled extensively in 1997 (Thompson and Schmitz 1997), however, a main-stem station was not completed in the lower portion of the stream. The stream survey on Hardscrabble Creek (upstream from the diversion approximately 0.5 km) was surveyed on September 6, 2000 with one 94 m station. UTM coordinates for the station were: 0439760E and 4533727N.

Two-pass electrofishing resulted in the capture of 91 Bonneville cutthroat trout (1050 ± 106 /stream km [1690 ± 171 /stream mile]; 58 kg/ha [52 lb/acre]) (Table 23; Figure 23). Many year classes of cutthroat trout were present with age-1 fish being the most abundant (Figure 23). Mottled sculpin were abundant. The HQI predicted a higher trout biomass (110 kg/ha) with cover being the limiting factor. Cutthroat trout genetic samples were not collected because samples had been collected from multiple locations within the Hardscrabble Creek Drainage (Thompson and Schmitz 1997).

Hardscrabble Creek had been sampled three times previously by the

UDWR. In 1954, one-pass electrofishing yielded 32 Bonneville cutthroat trout (199/stream km; 320/stream mile) and 6 rainbow trout (37/stream km; 60/stream mile) (Table 23) in a 161 m station located within a couple of kilometers of the East Canyon Creek confluence. Mottled sculpin were sparse. In 1965, one-pass electrofishing yielded 83 Bonneville cutthroat trout (516/stream km; 830/stream mile) and 21 rainbow trout (131/stream km; 210/stream mile) (Table 23) in a 161 m station located within a couple of kilometers of the East Canyon Creek confluence. Mottled sculpin were abundant. In 1997, two-pass electrofishing yielded 52 age-1 and older Bonneville cutthroat trout (533 ± 112/stream km [858 ± 181/stream mile]; 114 kg/ha [101 lb/acre]) (Table 23) in a 100 m station located near the headwaters. Mottled sculpin were abundant. The Bonneville cutthroat trout population in Hardscrabble Creek has maintained at moderate/high densities through time.

Table 23. Population statistics for species sampled in Hardscrabble Creek, 1954, 1965, 1997, and 2000.

Year	Species	#/km (#/mile)	kg/ha (lb/acre)	Avg TL (mm)	Avg WT (g)	Avg K
1954	all BCT all RBT MSC	199 ¹ (320 ¹) 37 ¹ (60 ¹) sparse				
1965	all BCT all RBT MSC	516 ¹ (830 ¹) 131 ¹ (210 ¹) abundant				
1997	≥age-1 BCT MSC	533 ² (858 ²) abundant	114 (101)	159 (40-280)	69 (1-280)	1.19
2000	≥age-1 BCT MSC	301 ² (485 ²) abundant	58 (52)	121 (45-311)	33 (1-308)	0.87

¹ Based on one-pass electrofishing.

² Based on two-pass electrofishing.

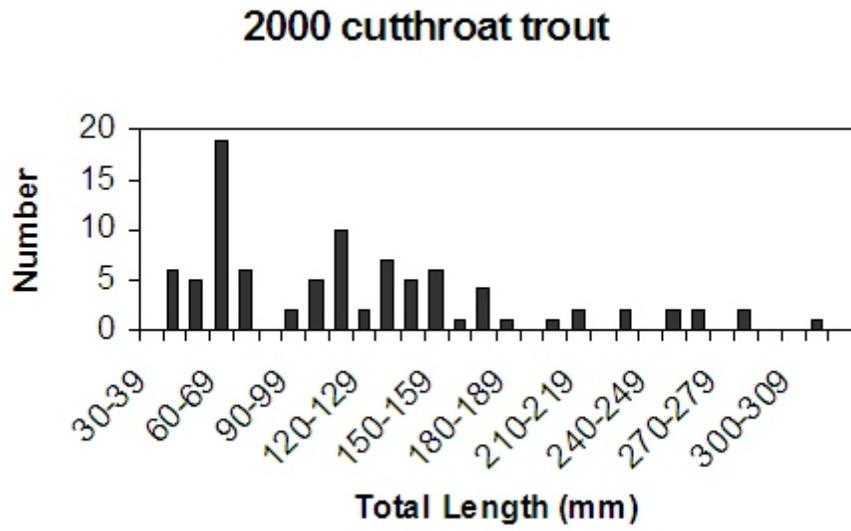


Figure 23. Size distribution of Bonneville cutthroat trout sampled in Hardscrabble Creek, 2000.

Rees Creek

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Rees Creek section 01 (Echo Creek confluence to the headwaters) is a tributary to Echo Creek. Rees Creek is in Summit County (Castle Rock and Porcupine Ridge USGS Quads) with 100% of the drainage being privately owned. The entire stream was dry on August 17, 2000 with the only water existing in stock ponds in the headwater drainages. No fish movement was observed in the stock ponds. Rees Creek was surveyed in 1979 and found to be dry as well. Rees Creek does not contain sufficient water flow to sustain a resident fish population.

DISCUSSION

Thirty-three two-pass electrofishing stream surveys were completed on 25 streams/stream sections in 2000 (Table 1). An additional 15 streams/stream sections were spot electrofished or visually examined and found dry. Of these 15 streams/stream sections, Bonneville cutthroat trout occupied the lower portion of 5 streams. In total, the stream surveys completed in 2000 documented 140.3 stream km (87.4 stream miles) that remain occupied by Bonneville cutthroat trout.

Woodruff Creek Drainage

Based on the stream surveys in 2000, Bonneville cutthroat trout occupy approximately 59 stream km (36.8 stream miles) in the Woodruff Creek Drainage. A strong metapopulation of Bonneville cutthroat trout exists in Woodruff Creek section 03 and its major tributaries: Sugar Pine Creek, Wheeler Creek, and Big Spring Fork (Table 1). Multiple age classes of Bonneville cutthroat trout were sampled in Sugar Pine Creek, indicating that this stream contains a resident population of cutthroat trout. The majority of cutthroat trout caught in all other tributaries of Woodruff Creek section 03 were age-1 fish, consequently, these tributaries appear to be important spawning streams for the resident Bonneville cutthroat trout in Woodruff Creek section 03. Genetic information has been collected from Woodruff Creek Reservoir (Toline et al. 1999), Sugar Pine Creek (Martin and Shiozawa 1982), and Wheeler Creek (Shiozawa and Evans 1994) and all information indicates that the Bonneville cutthroat trout metapopulation upstream from Woodruff Creek Dam does not have rainbow trout introgression. The Woodruff Creek section 03 metapopulation

should be considered a core conservation metapopulation of Bonneville cutthroat trout. No non-native salmonid threats exist for this portion of Woodruff Creek because of Woodruff Creek Dam.

A potentially pure population of Bonneville cutthroat trout remains in Birch Creek Reservoir and Birch Creek section 02 in spite of the historical stocking of rainbow trout in Birch Creek Reservoir. All cutthroat trout sampled in Birch Creek Reservoir (1998), and in Birch Creek section 02 low (2000) and high (2000) phenotypically resembled Bonneville cutthroat trout. A sample of Bonneville cutthroat trout should be collected from Birch Creek Reservoir for genetic analyses to determine if the reservoir population of cutthroat trout is pure. The hybridization threat of Bonneville cutthroat trout with rainbow trout in Birch Creek Reservoir has been eliminated with the discontinuation of stocking, even though multiple decades of rainbow trout stocking did not appear to have influenced the Bonneville cutthroat trout. The resident stream population of Bonneville cutthroat trout in Birch Creek section 02 has a high probability of being pure. Approximately 5 km of the 7 km of Birch Creek section 02 is a series of beaver complexes with many beaver dams being 1-2 m in height. The processing of Bonneville cutthroat trout from the Birch Creek section 02 (high) station will be a priority to determine purity within this population. Pending genetic analyses, Birch Creek section 02 and Birch Creek Reservoir should be considered for conservation status.

North Fork of the Ogden River Drainage

Based on the stream surveys in 2000, Bonneville cutthroat trout occupy approximately 25.5 stream km (15.9 stream miles) in the North Fork of the Ogden River Drainage. Several strong populations of Bonneville cutthroat trout remain in this drainage. Cutler Creek and the North Fork of the Ogden River section 03 remain protected from non-native salmonid invasion with the presence of Utaba Reservoir #1. These two populations occupy 8.5 interconnected stream km (5.3 stream miles). Bonneville cutthroat trout are protected from non-native salmonid invasion in Wolf Creek section 02 and the South Fork of Wolf Creek with the presence of the diversion barrier at the lower end of Wolf Creek section 02. These populations occupy 5.8 interconnected stream km (3.6 stream miles). Due to a diversion barrier on Cold Canyon Creek, this Bonneville cutthroat trout population has been reduced

to 1.6 stream km (1.0 stream miles). This diversion, while limiting the population in occupied stream km, has protected it from rainbow trout invasion. Pending genetic analyses, all of these Bonneville cutthroat trout populations should be considered for conservation status.

The Bonneville cutthroat trout population in the North Fork of the Ogden River section 02 and its remaining connected tributaries, appear to have some rainbow trout introgression. However, most of the cutthroat trout in this section and the tributaries: Broadmouth Canyon, Sheep Creek, and Durfee Creek still phenotypically resembled Bonneville cutthroat trout. Rainbow trout stocking in the North Fork of the Ogden River section 02 should be discontinued to prevent further introgression of rainbow trout into this population. The resident population of cutthroat trout (522/stream km; 840/stream mile) will maintain this sport fishery.

Weber River

Based on the 2000 surveys, the Bonneville cutthroat trout population in the Weber River section 02 does not currently remain. This is an important urban fishery, however, and is not a priority for Bonneville cutthroat trout management. Because of the angling pressure on this section, the stocking of rainbow trout catchables should be continued. Bonneville cutthroat trout in the Weber River sections 03-05, while somewhat depressed when compared to past surveys, still remain and provide a unique species fishery in these sections. The population of cutthroat trout in these sections is likely maintained from the immigration of Bonneville cutthroat trout from tributary streams. While more extensive surveys were completed in 1997 on Hardscrabble Creek (see Thompson and Schmitz 1997), a strong population of Bonneville cutthroat trout remains in this stream and is protected from non-native salmonid invasion, at least during low flow conditions, by a diversion barrier. The headwaters of Hardscrabble Creek contain an additional five tributaries with Bonneville cutthroat trout and constitute a small metapopulation. Pending completion of genetic analyses from samples collected in 1997 in the Hardscrabble Creek Drainage, this metapopulation should be considered for conservation status.

RECOMMENDATIONS

- 1) Update the Conservation Strategy for Bonneville cutthroat trout in Utah based on information gained in the 2000 stream surveys.
- 2) Complete genetic analyses on tissue samples collected in the 2000 surveys to determine if rainbow trout influence is in the tributaries of the North Fork of the Ogden River that still contain Bonneville cutthroat trout.
- 3) Gill net Birch Creek Reservoir to obtain a genetic sample of Bonneville cutthroat trout. Complete genetic analyses on this sample to determine if rainbow trout influence is present in the Bonneville cutthroat trout that are residents of the reservoir.
- 4) Discontinue the stocking of rainbow trout into the North Fork of the Ogden River section 02 to prevent further introgression of rainbow trout into this Bonneville cutthroat trout population.

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