

PINE CREEK (VI AB 010 B) 2008 ELECTROFISHING SURVEY

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Background: Pine Creek is located on the west slope of the Tushar Mountains, just north of the town of Sulphurdale. Most of the length of the stream lies within the Fishlake National Forest (FNF), while the lower one mile of stream runs across private land before being completely diverted for irrigation (Fig. 1). Brown and rainbow trout were removed from Pine Creek in 1979. Bonneville cutthroat trout (BCT) were introduced in 1980 from three populations: Reservoir Canyon, Water Canyon, and Birch Creek. A limited population of rainbow trout was discovered in the upper reaches of the stream in 1986. Two miles of Pine Creek were treated in 1987 with sodium cyanide and no rainbow trout have been observed since that treatment. In 1990 BCT were transplanted from Pine Creek to Manning Meadow Reservoir to establish a wild broodstock. Population monitoring has occurred regularly since the establishment of the population, with the last sampling being done in 2005 by FNF crews.

Methods: Stations 1 (just upstream of FNF boundary; Fig. 6), 2 (just upstream of the confluence with the South Fork; Fig. 6), 3 (just upstream of upper cattle enclosure, where the road leaves the stream; Fig. 8), and 4 (within the upper cattle enclosure; Fig. 8) were established in 1981, 1994, 1982, and 2005, respectively (Fig. 1). Electrofishing surveys were repeated at all four stations by UDWR and FNF personnel on July 29, 2008. At each station, a two-pass depletion was conducted using a battery-powered backpack electrofisher (Smith-Root model 12-B). All trout collected were measured (mm), and weighed (g), and returned to the stream. Ten wetted stream widths were measured at each station. Mean length (mm), weight (g), and condition (K_{TL}) were calculated for each station. Population estimates were calculated by the program MicroFish.

Results: BCT were the only fish collected in all four stations (Fig. 7, 9). Table 1 displays population estimates, mean size measures, and other results from the 2008 electrofishing survey. Population structure was similar at all stations, with at least three cohorts of BCT being observed (Fig. 2-5). Yearling BCT dominated the population at Station 1 and, therefore, mean size (total length and weight) was similar among stations 2-4, while slightly lower in Station 1. Condition (K_{TL}) was highest at stations 2 and 3. BCT density (fish per hectare) and biomass (kg per hectare) were lowest at Station 3.

Results of the 2008 electrofishing survey were compared to those from the previous surveys in 1994, 2001, and 2005 (Table 2). BCT density was highest at all stations in 2008. Subsequently, mean size decreased from 2005 at all stations. BCT biomass in 2008 was higher than all other years for all stations. The total length of stream occupied by BCT (5.0 km, 3.1 mi.) did not change between 2001 and 2008.

Discussion / Recommendations:

The majority of the fish-supporting length of Pine Creek is in Management Area 4A (Fish Habitat Emphasis), while the uppermost portion of the stream and surrounding uplands are in 6B (Intensive Livestock Management).

Stations 1 and 2 are typical of the lower and mid sections of stream where they occur. The adjacent road and open areas where livestock can congregate contribute sediment, but most of the stream is protected by thick brush. The upper Station 3 is in a narrow valley type where thick conifer and brush prevents any livestock access. Station 4 was added in 2005. This is an ~500 foot long exclosure just below Station 3. It has been generally protected from grazing for considerable time and is a more open herbaceous riparian habitat. It was added in 2005 for comparison to the brushier but grazed stations downstream.

Observations by fisheries personnel indicate that lack of quality pools and high levels of sedimentation are primary limiting factors in Pine Creek. Primary contributors of sediment are livestock grazing and a low-standard dirt road that parallels most of the fish-bearing portion of the stream. The FNF Travel Plan update has recently changed the upper road to a motorized trail. Thick riparian brush protects much of the stream from grazing, but open meadows are often observed to have heavy use levels and bank damage. The 1994 biomass levels were low, in part due to the prior removal of fish for stocking of Manning Meadow Reservoir. Biomass levels remained low in the 2001 samples, indicating that habitat conditions were limiting the fish population at low levels. Low stream flows through 2003 exacerbated the situation since there was not high spring “flushing” flows to clean riffles and scour pools. The drainage was rested from grazing in 2004 and grazed late in 2005 in conjunction with a 2004 prescribed fire project that burned about 12% of the watershed in two widely distributed areas. The fire was an upland treatment, but did escape in one area and burned about ½ mile of riparian habitat in the lower watershed. Higher winter snow levels led to a flushing flow in 2005. The combination of grazing rest and higher flows appeared to offset any negative effects from burning, except at Station 1 below the riparian burn, and overall biomass levels increased in 2005. Biomass levels increased further in the 2008. Unlike 1994 and 2001 levels, which would be considered below average for the southern region, the current biomass levels represent good levels of standing crop. Mean size values have fluctuated in the past and may be expected to do so in the future.

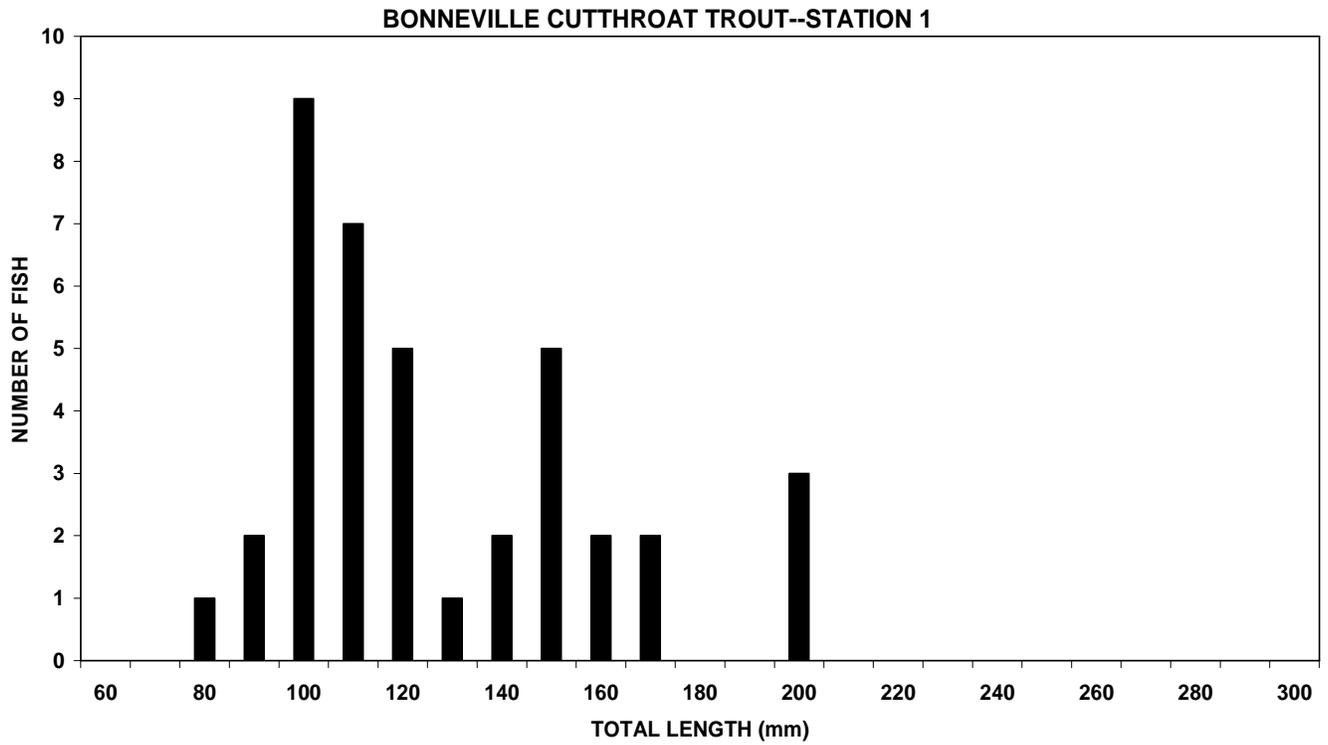


Figure 2. Length distribution of Bonneville cutthroat trout collected in Pine Creek, Station 1, on July 29, 2008.

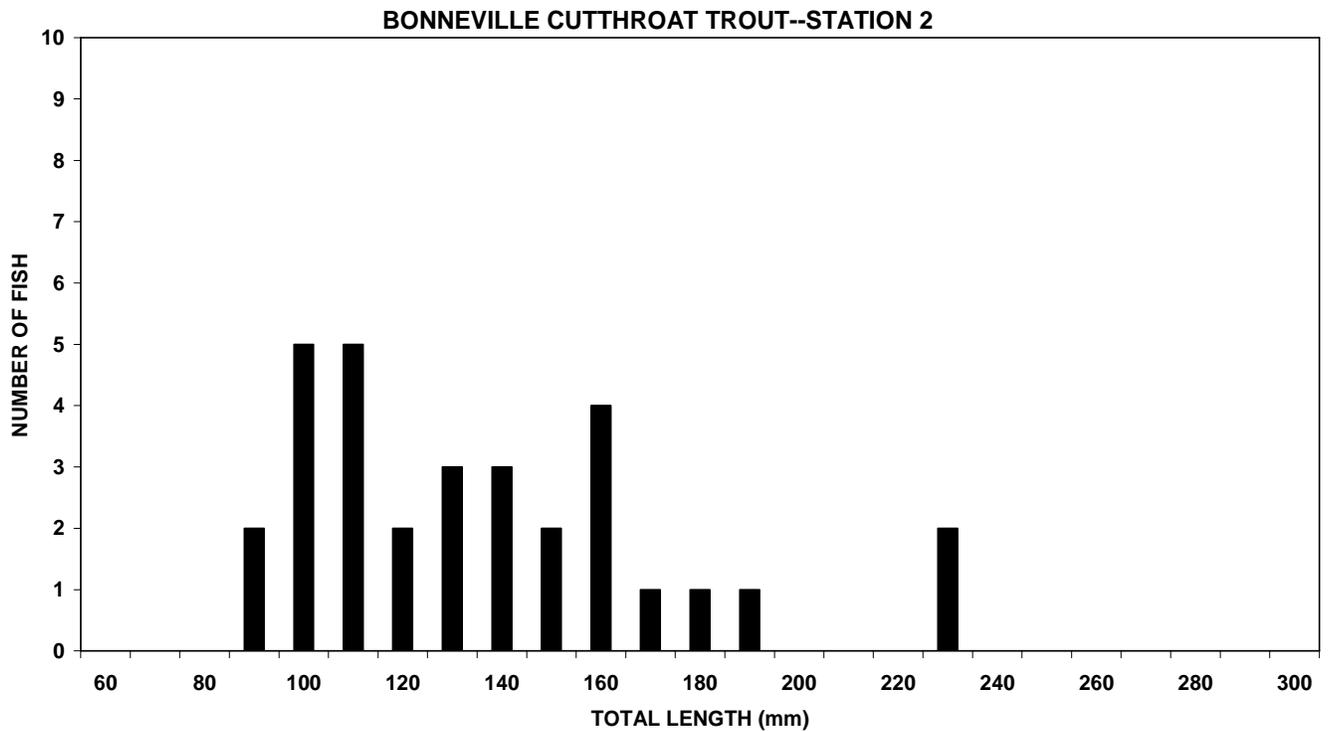


Figure 3. Length distribution of Bonneville cutthroat trout collected in Pine Creek, Station 2, on July 29, 2008.

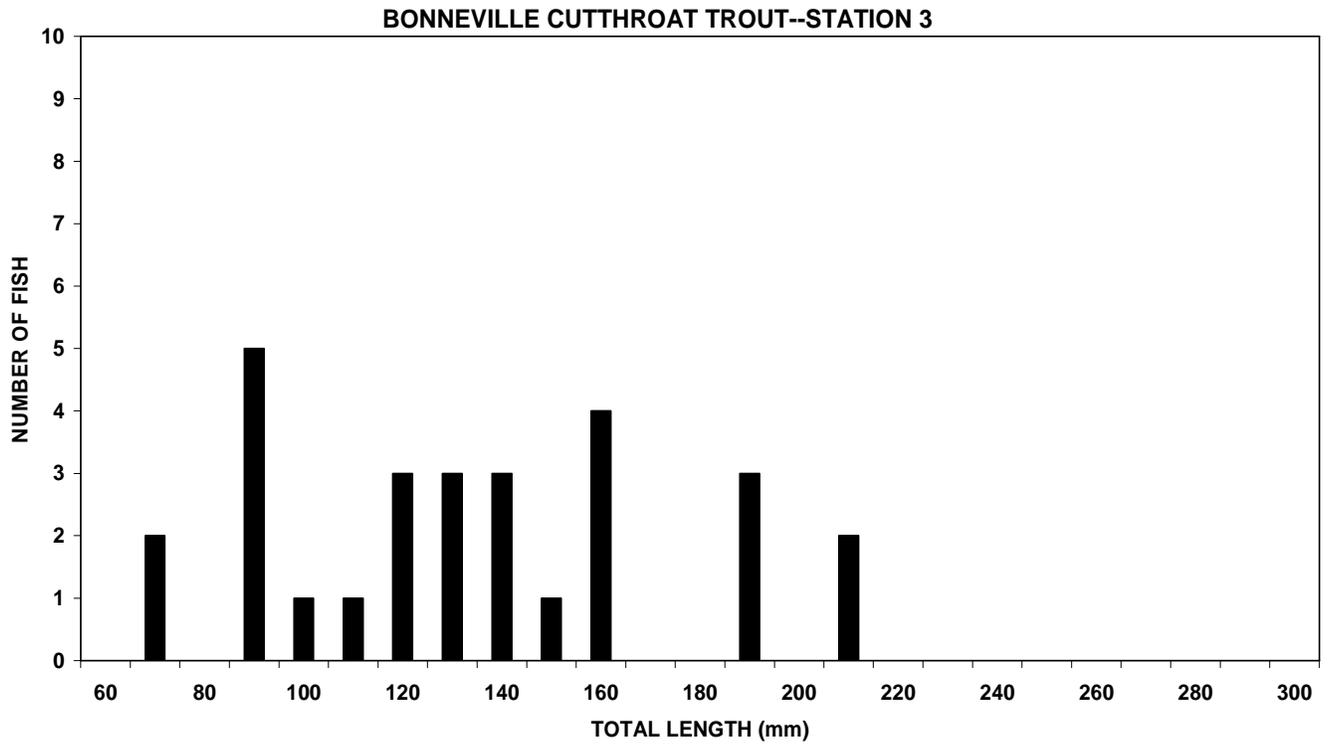


Figure 4. Length distribution of Bonneville cutthroat trout collected in Pine Creek, Station 3, on July 29, 2008.

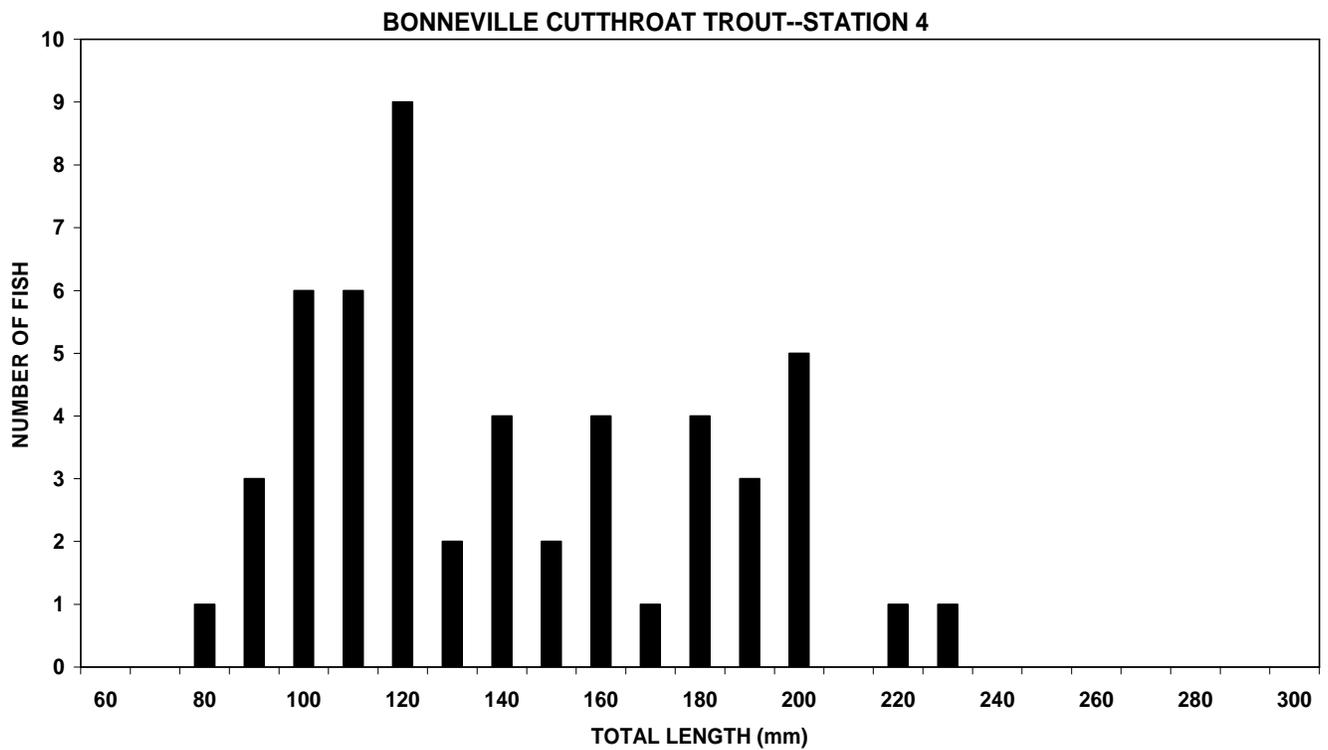


Figure 5. Length distribution of Bonneville cutthroat trout collected in Pine Creek, Station 4, on July 29, 2008.



Figure 6. Stations 1 (left) and 2 (right) in Pine Creek.



Figure 7. Bonneville cutthroat trout collected at Pine Creek, Station 2.



Figure 8. Stations 3 (left) and 4 (right) in Pine Creek.



Figure 9. Bonneville cutthroat trout collected at Pine Creek, Station 4.

Table 1. Results from the 2008 electrofishing survey in Pine Creek.

Pine Creek-- NATIVE TROUT POPULATION SURVEY FORM

1. General Information-- Date: **July 29, 2008**
 Biologist: **M. Hadley, J. Whelan**
2. Stream Information--
 Name, catalog #, section, county: **Pine Creek, VI AB 010 B, 01, Beaver**
3. Survey Site Information (see attached map)--
 Upstream range of native trout (general description and GPS): **Confluence of headwater forks--120365787E 4261725N**
 Downstream range of native trout (general description and GPS): **irrigation diversion-- 120361740E 4263047N**
 Location (GPS) and description of barriers: **diversion; also naturally isolated by desert environment downstream**
 Stream Length-- Occupied habitat: **5.0 km** Available habitat: **5.0 km**
 Survey method & equipment: **backpack battery electrofisher; two pass depletion**
 Survey sites (general description and UTM)--
 Station 1: **just above Forest boundary; 120362096E 4262839N**
 Station 2: **just above confluence w/ South Fork; 120363850E 4262494N**
 Station 3: **just above upper cattle exclosure, where road leaves stream; 120365102E 4262069N**
 Station 4: **upper cattle exclosure; 120364892E 4262271N**

Parameter	Station 1	Station 2	Station 3	Station 4
Station length (m)	100 m	100 m	100 m	171 m
Mean stream width (m) (n)	1.58 m	1.44 m	1.85 m	1.46 m
Station area (hectares)	0.0158	0.0144	0.0185	0.0250
<u>Bonneville Cutthroat Trout</u>				
Removal Pattern	34 5	28 3	22 6	45 7
Population estimate (95 % CI)	39 (39-41)	31 (31-32)	29 (29-33)	52 (55-54)
Capture probability	0.886	0.912	0.778	0.881
Mean length (mm) (n)	123 (39)	131 (31)	130 (28)	137 (52)
Mean weight (g) (n)	24 (39)	33 (31)	31 (28)	33 (52)
Mean ktl (n)	1.05 (39)	1.13 (31)	1.14 (28)	1.03 (52)
Number fish per km	390	310	290	304
Number fish per hectare	2468	2153	1568	2083
Biomass (kg per hectare)	60	71	48	69

4. Comments:

Other species sampled:

Table 2. Comparison of electrofishing survey results from 1994 to 2008 at Stations 1-4 in Pine Creek (Station 4 established in 2005). ^a—Weight estimated from length/weight regression. ^b—Poor depletion.

<u>Station</u> <u>Year</u>	<u>Mean</u> <u>Length (mm)</u>	<u>Mean</u> <u>Weight (g)</u>	<u>Mean</u> <u>K_{TL}</u>	<u>Fish per</u> <u>hectare</u>	<u>Biomass</u> <u>(kg/hectare)</u>
Station 1					
1994	127	19 ^a	--	1470	28
2001	137	30	1.01	1316	40
2005	146	40	1.04	^b	^b
2008	123	24	1.05	2468	60
Station 2					
1994	119	16 ^a	--	1236	20
2001	106	13	1.04	1471	19
2005	154	58	1.10	798	46
2008	131	33	1.13	2153	71
Station 3					
1994	131	21 ^a	--	968	20
2001	108	15	1.05	1421	21
2005	162	60	1.19	582	35
2008	130	31	1.14	1568	48
Station 4					
2005	157	58	1.16	1620	94
2008	137	33	1.03	2083	69