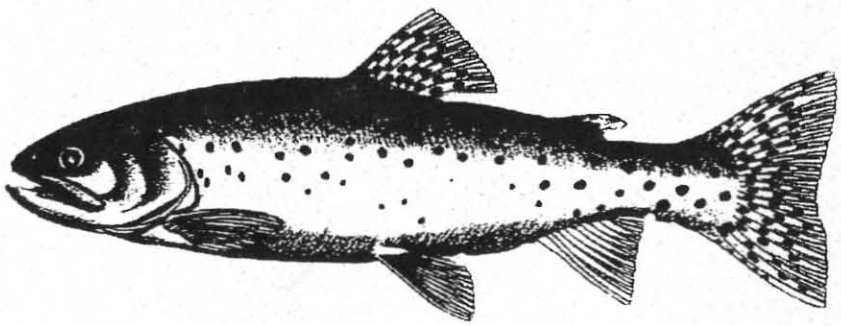
2000

Annual Progress Report for

Bonneville Cutthroat Trout

(*Oncorhynchus clarki utah*)

in the State of Utah



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We thank all the involved agencies for their conservation efforts in locating, preserving and expanding populations of Bonneville cutthroat trout in 2000. This document outlines, reiterates, and summarizes information provided by personnel from the Idaho Game and Fish Department, Utah Division of Wildlife Resources, Confederate Tribes of the Goshute Reservation, U.S. Forest Service and the Utah Council of Trout Unlimited. In particular, we want to thank Dick Scully, Buck Douglas, Don Duff, Paul Cowley, Jim Whelan, Todd Hogrefe, Kent Sorenson, Paul Thompson, Bryce Nielson, Charles Thompson, Dale Hepworth and Mike Ottenbacher for providing information and assistance with this document. We want to thank everyone who took the time to attend the two coordination meetings and participated in the continued conservation and management of Bonneville cutthroat trout in Utah.

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STATE OF UTAH
NATURAL RESOURCES
Division of Wildlife Resources

SPORT FISH RESTORATION

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INTRODUCTION

The Bonneville cutthroat trout (BVCT) is a unique subspecies of the cutthroat trout complex native to the Bonneville Basin. During the Pleistocene, Lake Bonneville and tributaries covered parts of Utah, Nevada, Idaho, and Wyoming. Historically, BVCT occurred throughout the basin. With desiccation of ancient Lake Bonneville, BVCT became restricted to headwater streams and lakes with suitable trout habitat. Past and present human activities such as water development, agricultural activities, energy development, mining, timber harvesting, grazing, over-fishing, and the introduction of non-indigenous species have directly impacted BVCT populations and altered the Bonneville Basin ecosystem. BVCT conservation efforts have been directed through federal, state, and local agencies to document existing populations and to expand BVCT within their historic range.

The Conservation Agreement and Strategy for Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) in the State of Utah (Conservation Agreement; Lentsch et al. 1997) was developed to expedite implementation of conservation measures for BVCT in Utah as a collaborative and cooperative effort among resource agencies. Threats that warrant BVCT listing as a sensitive species by state and federal agencies and as threatened or endangered under the Endangered Species Act of 1973, as amended, should be eliminated through implementation of the Conservation Agreement.

PURPOSE

The success of any conservation or recovery program depends on eliminating or reducing the impact of activities that threaten the species existence. The Conservation Agreement outlines a list of actions, by Geographic Management Unit (Figure 1), that would eliminate or reduce threats to Bonneville cutthroat trout persistence. The purpose of this annual progress report is to summarize activities that occurred during 2000. Activities that occurred from 1996 to 1999 are summarized in separate reports (Lentsch and Wilson 1998, Hudson and Pettengill 2001, Pettengill, 2001).

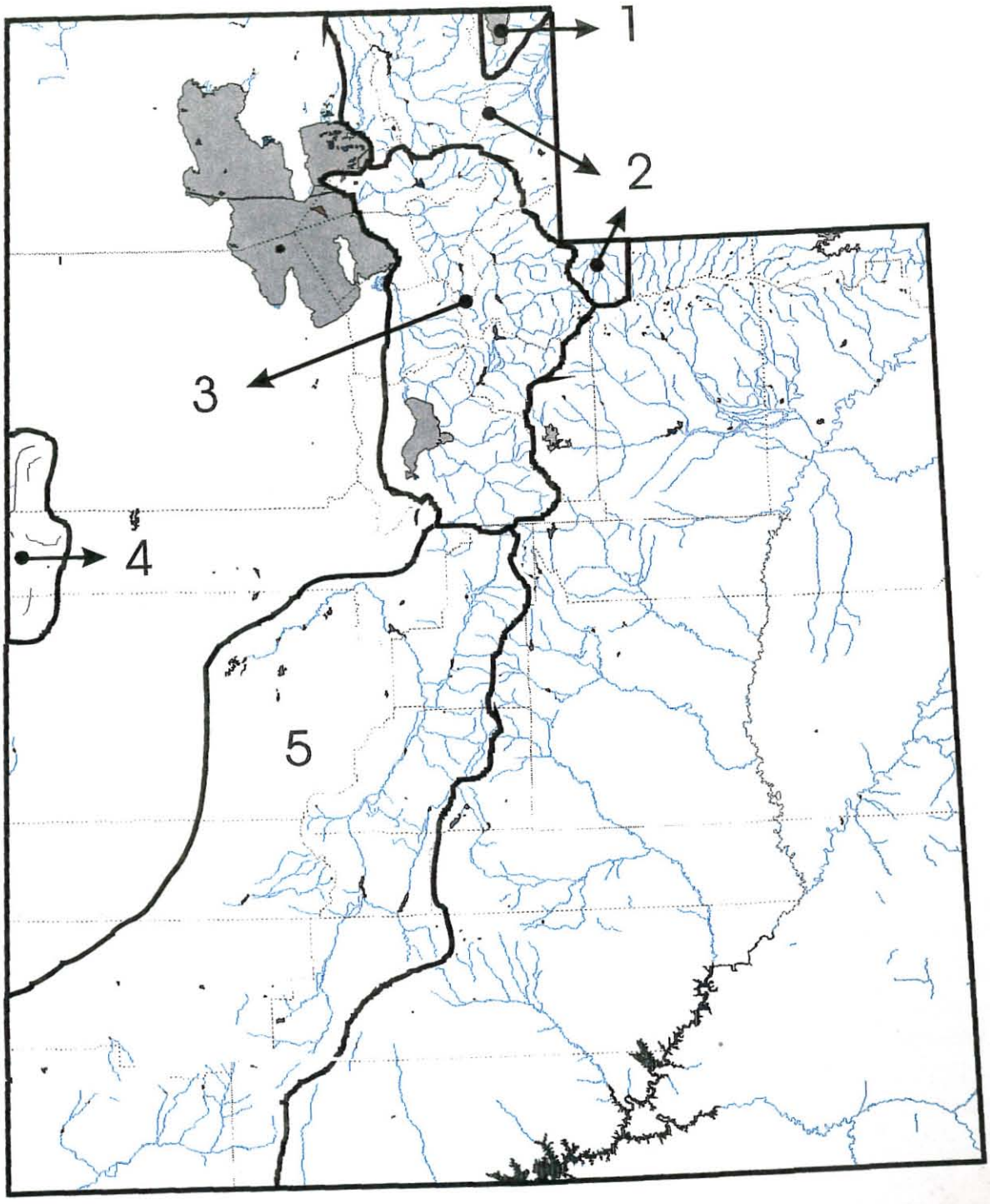

Figure 1. Geographic Management Units designated for BCT conservation within the State of Utah. 1=Bear Lake; 2=Bear River; 3=Northern Bonneville; 4=West Desert; 5=Southern Bonneville.

SUMMARY OF CONSERVATION ACTIONS IMPLEMENTED BY GEOGRAPHIC MANAGEMENT UNIT

Bear Lake Management Unit

Unit description:

Bear Lake is a natural lake that is at least 23,000 years old. It covers 70,000 surface acres and averages 80 feet deep. Bear Lake is bisected by the Utah-Idaho state line. Historically, Bear Lake was an oligotrophic, nitrogen limited, terminal lake with a pH exceeding 8.0. However, diversion of the Bear River into Bear Lake for irrigation water storage since 1917 is altering Bear Lake chemistry. Bear Lake's native fish community includes a lacustrine form of BVCT that is pisciverous and relatively long lived (Nielson and Lentsch 1988). In addition, the lake contains four endemic species of whitefish, cisco and sculpin.

Table 1. Conservation actions implemented within the Bear Lake GMU.

State Water ID #	Reach	Implemented Conservation Actions
IVAQ405	Bear Lake	The Lake population is monitored annually. Monitoring occurred in 2000. A total of 219,612 Bear Lake Bonneville cutthroat trout were stocked into the lake in 2000.
IVAQ120B	Swan Creek	380,000 eggs were taken at the Swan Creek trap by Utah Division of Wildlife Resources personnel. Significant natural reproduction was verified and there appears to be good survival of unmarked (naturally produced) cutthroat trout. Surveys were also completed above the trap. There is a wild population of rainbow trout in the headwaters. There also appears to be a resident population of Bonneville cutthroat trout. Some hybridization is occurring but rainbow trout were found mainly in the steep reaches of the headwaters of Swan Creek and resident cutthroats were found in downstream, low gradient reaches. On November 29, 2000 a total of 20,965 Bear Lake Bonneville cutthroat trout advanced fry (2") were stocked in several locations in Swan Creek.
IV AQ 120C 01	Big Spring Creek	A total of 20,350 advanced fry Bear Lake Bonneville cutthroat trout were stocked on December 1, 2000.
	Fish Haven Creek	On November 30, 2000 a total of 23,958 advanced fry Bear Lake Bonneville cutthroat trout were stocked into this tributary.

State Water ID #	Reach	Implemented Conservation Actions
	St. Charles Creek, ID.	Idaho Fish and Game Department hired a graduate student to work on this tributary to Bear Lake. Three diversion screens were tested and will be modified. Too much debris was clogging screens. The student also monitored the spawning run, redd location and spawning success. Most redds were in downstream reaches, below the diversions, and were left dry due to irrigation diversions before hatching. The student also looked at food habits of wild rainbow and brook trout to document predation on salmonid fry. Fry stocking has been discontinued during this study. Any fry found during the study would have to come from natural reproduction in the stream.
	Bear Hodges Timber Sale	Wasatch- Cache National Forest: The Bear Hodges Timber Sale was sold and is being implemented. This timber harvest should not have any affect on fish because there are no perennial streams in the sale area.

Bear River Management Unit

Unit Description:
This GMU is characterized by aspen and subalpine fir/spruce forests and willow dominated meadows. Lower elevations may be dominated by sagebrush communities. Elevation ranges from 5,000 to 11,000 feet. Stream gradient ranges from high gradient in canyon reaches to low gradient in meadows. Hydrology of streams is characterized by high spring runoff peaks during snowmelt and low to intermittent fall and winter base flows.

For management purposes, the Bear River Management Unit was divided into three geographic subunits: 1) Uinta Mountains and Upper Bear River drainage, 2)Rich County drainage and 3) Cache Valley drainage.

The U.S. Forest Service (USFS) provided funding for seasonal employees to assist the Utah Division of Wildlife Resources (UDWR), Northern Region personnel with Bonneville cutthroat trout monitoring and survey efforts. Other USFS personnel assisted with some of the surveys.

Table 2. Conservation actions implemented within the Cache Valley subunit.

State Water I.D. #	Reach	Implemented Conservation Actions
IV AQ 040A 03A1	Saddle Creek	A fish population survey was completed. The population estimate was 134 cutthroat trout/mile. Genetic samples were collected. An HQI habitat survey wasn't done. Wasatch-Cache National Forest improved three miles of the Saddle Creek Road. Additional water bars were added. A number of user defined roads, in the area, were scarified and seeded.
IV AQ 040A 07	Logan River, Right Fork, headwaters	The USFS surveyed the stream and collected aquatic insects. During the survey (a drought year) there appeared to be insufficient water to sustain a fishery. Natural barriers keep fish from this area. The stream is down-cut 3 - 5 feet.
IV AQ 040A 08	Temple Fork	The USFS completed rehabilitation work on the Temple Fork Road. The road was moved out of the riparian area.
IV AQ 040A 08A	Spawn Creek	A tributary to Temple Fork. The USFS closed the road going up Spawn Creek to full-sized vehicles. In the past the road actually went through the stream in several locations.
IV AQ 040	Logan River	The USFS acquired most of the private land in the upper part of Logan Canyon. Four dispersed campsites along the Logan River have been closed and rehabilitated.
IV AQ 010 02	Box Elder Creek, headwaters	Box Elder Creek was surveyed as a possible population expansion site. The channel was dry during late September 2000, consequently no reintroduction efforts are planned.

Paul Cowley, Fisheries Biologist, Wasatch-Cache National Forest, completed the stream survey report on Temple Fork, Logan River, Mill Creek, North Mill Creek, Stillwater Fork, Beaver Creek (Cache County) and the West Fork of the Bear River.

Table 3. Conservation actions implemented within the Rich County subunit.

State Water I.D. #	Reach	Implemented Conservation Actions
IV AQ 200	Woodruff Creek, Section 2	This area of Woodruff Creek is below Woodruff Creek Reservoir. Population surveys found 179 cutthroat trout $\geq$ age 1 per mile. This reach also contained brown and rainbow trout.

State Water I.D. #	Reach	Implemented Conservation Actions
IV AQ 200	Woodruff Creek, Section 3	Woodruff Creek, Section 3, is above Woodruff Creek Reservoir. No non-native fishes were found above Woodruff Creek Reservoir Dam. The only trout found above the dam phenotypically appeared to be Bonneville cutthroat trout. Cutthroat trout from Sugar Pine Creek, a tributary to this section of Woodruff Creek have been tested and examined several times and have consistently been classified as pure Bear River Bonneville cutthroat trout. mtDNA analysis (Toline, et. al. 1999) and meristic analysis (Behnke and Proebstel 1998) found cutthroat trout from Woodruff Creek Reservoir to be Bear River Bonneville cutthroat trout. This drainage has 35 miles of interconnected streams with cutthroat trout. This is probably the third meta-population in the Northern Region along with the Logan River and Chalk Creek . Three 2-pass electrofishing population estimates were made in this section. The lowest area surveyed had 1,680 $\pm$ 662 cutthroat trout $\geq$ age-1/mile. A mid-elevation station had 1,150 $\pm$ 162 cutthroat trout $\geq$ age-1/mile. The headwaters estimate was 2,073 $\pm$ 75 cutthroat trout $\geq$ age-1/mile. Genetic samples were collected at the two lower stations. HQI habitat surveys were completed at the same two locations.
IV AQ 200D	Big Spring Fork	A population estimate was completed and genetic samples were taken. The population estimate was 1,080 $\pm$ 68 cutthroat trout $\geq$ age-1/mile. An HQI survey was also completed at this station.
IV AQ 200C	Wheeler Creek	A population survey, genetic sample and HQI habitat survey was completed in this stream. The population estimate was 1,268 $\pm$ 64 cutthroat trout $\geq$ age-1/mile.

State Water I.D. #	Reach	Implemented Conservation Actions
IV AQ 200C 01	Silvia Hollow	In 2000, a drought year, this was an intermittent stream. The estimated population was 287 ± 48 cutthroat trout ≥ age-1/mile. A habitat survey was not completed and genetic samples were not collected.
IV AQ 200 B	Sugar Pine Creek	All surveys were completed. The population estimate was 1,174 ± 74 age-1 cutthroat trout/mile. Genetic samples were collected. This population has been tested several times and been consistently classified as pure Bear River Bonneville cutthroat trout. Wasatch-Cache National Forest purchased fencing materials to extend the exclosure fence in the Sugar Pine Creek drainage to protect the spring at Peggy Hollow. The fence will be installed in 2001.
IV AQ 200 A	Birch Creek	Three stations were surveyed. In Section 1, below Birch Creek Reservoir, rainbow trout were found along with cutthroat trout. The population estimate was 91 ± 0 cutthroat trout ≥ age-1/mile. No genetics tissue or habitat surveys were completed in this section. Two stations were surveyed on Birch Creek above Birch Creek Reservoir. At the lower station the population estimate was 266 ± 44 ≥ age-1 cutthroat trout/mile. The upper station had 1,377 ± 48 ≥ age-1 cutthroat trout/mile. Genetics samples were taken at both stations and an HQI habitat survey was completed at the upper station.

Spot electrofishing in the Woodruff Creek Drainage revealed limited numbers of cutthroat trout in 4 additional streams (Zeke Hollow, Big Mahogany Creek, Fence Creek, and Girl Hollow). Three additional streams (Walton Canyon, Road Hollow, and Dip Hollow) were surveyed that did not contain any fish.

Northern Bonneville Management Unit

Unit Description:
The North Bonneville Management Unit ranges in elevation from 5,000 to approximately 10,000 feet. Vegetation is characterized by high desert sagebrush at lower elevations, and aspen and subalpine fir/spruce communities at higher elevations. Riparian areas are generally dominated by willows or mountain maples and gamble oak. Stream gradient ranges from extremely high alpine streams to low gradient meadow meanders. Lower elevation areas have extensive agricultural and urban development whereas inaccessible high elevation areas tend to be more pristine. Habitat condition is highly variable among drainages and streams.

For management purposes, the Northern Bonneville Management Unit was divided into four management subunits: 1) the Ogden River drainage; 2) the Weber River drainage; 3) the Jordan River drainage; 4) the Utah Lake/ Provo River drainage.

Table 4. Conservation actions implemented within the Ogden River Drainage subunit.

State Water ID #	Reach	Implemented Conservation Actions
IV AP 030D	Ogden R., N. Fk. (low)	Population estimate and habitat survey completed. Some rainbows and hybrids were found so no genetics samples were collected. The cutthroat trout population estimate was 957 $\pm$ 139 $\geq$ age - 1/mile.
IV AP 030D	Ogden R., N. Fk. (high)	An irrigation dam protects this reach from the lower area that contains rainbows and hybrids. All of the cutthroats in this reach phenotypically looked like Bonneville cutthroat trout. A population estimate was made, genetic samples were collected, and an HQI habitat survey was completed. The population was 1,677 $\pm$ 240 $\geq$ age - 1 cutthroat trout/mile.
IV AP 030D01	Wolf Creek, Section 2	Wolf Creek, Section 2, and the South Fork Wolf Creek are isolated above a large irrigation diversion. Two stations were surveyed on Wolf Creek. Genetics samples were collected at the lower station. An HQI habitat survey was completed at the lower station. Fish population estimates were 846 $\pm$ 80 and 1280 $\pm$ 208 $\geq$ age - 1 cutthroat trout/mile at the lower and upper stations, respectively. These cutthroat trout phenotypically looked like Bonneville cutthroat trout.
	Wolf Creek, S. Fk.	Genetics samples were taken. Fish population and HQI habitat surveys were completed. These fish are isolated by a barrier. The population estimate was 1306 $\pm$ 193 $\geq$ age - 1 cutthroat trout/mile.

State Water ID #	Reach	Implemented Conservation Actions
IV AP 030D04	Cold Canyon	This tributary to the North Fork Ogden River contained fish that phenotypically appeared to be Bonneville cutthroat trout. Genetics samples were collected and a population estimate was made. An HQI habitat survey was completed. The population estimate was 615 $\pm$ 81 $\geq$ age - 1 cutthroat trout/mile.
IV AP 030D06	Cutler Creek	This tributary, like Cold Canyon, is isolated above a dam. The fish phenotypically looked like Bonneville cutthroat trout. Genetics samples were collected. A habitat (HQI) survey was done. The population estimate was 505 $\pm$ 16 $\geq$ age - 1 cutthroat trout/mile.
IV AP 030D05	Durfee Creek	Genetics samples were collected and an HQI survey was completed. The population estimate was 1145 $\pm$ 45 $\geq$ age - 1 cutthroat trout/mile.
	Sheep Creek	Genetics samples were collected and an HQI survey was completed. The population estimate was 1,521 $\pm$ 230 $\geq$ age - 1 cutthroat trout/mile.
IV AP 030D03	Broadmouth Canyon	Genetics samples were collected and an HQI survey was completed. The population estimate was 48 $\pm$ 0 $\geq$ age - 1 cutthroat trout/mile.
IV AP 030D02	Liberty Spring Creek	This stream contained native non-game fish but no cutthroat trout.
	Pole Canyon Creek	One culvert pool contained RBTxCT hybrids.

Black Canyon, Cobble Creek, Mill Canyon, and Cache Valley Creek in the North Fork Ogden River drainage were surveyed but did not contain fish.

Table 5. Conservation actions implemented within the Weber River Drainage subunit.

State Water ID #	Reach	Implemented Conservation Actions
IV AP 150A	Hardscrabble Creek	This stream is a tributary to East Canyon Creek. Meristic's analysis showed some hybridization. No genetic sample was taken. The population was surveyed in 1997. An HQI survey was completed in 2000. The population estimate was 1693 $\pm$ 171 $\geq$ age - 1 cutthroat trout/mile. This sampling was done above a diversion, that at least during low flows, acts as a barrier for non-native trout.

Rees Creek (IV AP 210C), a tributary to Echo Creek, was surveyed. At the low flows in the summer of 2000 conditions were not conducive to a resident fish population.

The surveys in the Ogden and Weber River subunits in 2000 were partially funded by the U. S. Forest Service.

Paul Cowley, fisheries biologist, Wasatch-Cache National Forest, completed the stream survey report for Temple Fork, Logan River, Mill Creek, North Fork Mill Creek, Beaver Creek (Cache County) and the West Fork Bear River.

Genetic samples analyzed, in 2000, using nuclear DNA showed that cutthroat trout from the East Fork Chalk Creek and Fish Creek (a tributary to the South Fork Chalk Creek) are pure Bonneville cutthroat trout without any introgression. These two populations will be designated "Core" conservation populations based on criteria accepted by 7 western states in UDWR Publication Number 00-26.

Table 6. Conservation actions implemented within the Utah Lake/Provo River subunit.

State Water ID #	Reach	Implemented Conservation Actions
IV 414B	Little Dell Reservoir	No attempt was made to estimate the Bonneville cutthroat trout population in the reservoir. Nearly every adult cutthroat trout running upstream to spawn was caught and tested for pathogens. This may indicate that the adult population in the reservoir is only 60 - 70 fish. Both cutthroat and brook trout were used for disease testing. This is the second consecutive year that fish have been found disease free.
IV AA 020	Red Butte Creek	60 cutthroat trout were tested and no prohibited pathogens were found. Ovarian fluid was also collected from 24 fish. Since it was below the required 60 fish sample this population was not given a fish health approval number in 2000. Eggs collected were taken to the Utah Division of Wildlife Resources, Fisheries Experiment Station for hatching and rearing. Approximately 5,000 fingerling Bonneville cutthroat trout from these eggs will be held for stocking in the spring of 2001. Tentative plans are to stock these fish back into Red Butte Creek and the upper end of Sixth Water Creek. Approximately 0.5 miles at the upper end of Sixth Water Creek is fishless.

West Desert Management Unit

Unit Description:
The West Desert is comprised of streams in the western part of the Bonneville Basin. These streams flow from mountains to desert valleys where they historically became intermittent or subterranean . Currently, many of the streams are diverted at higher elevations for agricultural use. The only BVCT habitat (historic or current) exists in small streams draining the relatively steep Deep Creek Mountain range.

The vegetation in the Deep Creek Mountains is characterized by high elevation, pinyon-juniper forests and sagebrush prairies. Riparian areas are commonly dominated by river birch and aspen. Elevation ranges from 6,000 to 9,000 feet for most streams. These relatively small, steep streams drain into Snake Valley.

The Goshute Indian Reservation is located on the west side of the Deep Creek Mountains. This area is mineral rich; hence, the potential for future mining activities exists and could threaten Bonneville cutthroat trout recovery efforts. However, the relatively isolated location of these mountains has discouraged land use and water development.

Table 7. Conservation actions implemented within the East Slope, Deep Creek Mountains.

State Water ID #	Reach	Implemented Conservation Actions
IV AR 410	Tom's Creek	A good population of Bonneville cutthroat trout were found in the upper sections of this stream but none in the lower area where they were stocked in 1996. It is uncertain if the stocked fish migrated upstream.
IV AR 360	Birch Creek	Buck Douglas, Ibapah Tribal members, and U.S. Fish & Wildlife Service biologists sampled the upper end of Birch Creek. Buck felt the population below the confluence of the North and South forks had increased since the last survey. The population in lower Birch Creek remains small.
IV AR 370	Trout Creek	Trout Creek continues to have a good population of Bonneville cutthroat trout in the area of the second and third road crossings. A total of 150 Bonneville cutthroat trout were collected and moved to Granite Creek. No fish were found on Bobcat Ranch.
IV AR 390	Red Cedar Creek	Rotenone was used to remove hybridized trout in October and November 1999. The stream was surveyed in 2000 and was found to be fishless. No Bonneville cutthroat trout have been transplanted back into this stream. Plans are to stock Bonneville cutthroat trout in 2001 if enough fingerlings are produced in Buck Douglas' Pond.
IV AR 380	Granite Creek	Hybrid RBTxCT were found in a small area of the upper part of Granite Creek. This area was treated with 1 ppm rotenone. A detox station was set up at the lower end of the treated section to protect Bonneville cutthroat trout below. The treatment and detox were successful. 150 Bonneville cutthroat trout were transplanted from Trout Creek into the treated area of Granite Creek.

State Water ID #	Reach	Implemented Conservation Actions
	Buck Douglas Pond (Deep Creek Mountain Ranch)	Reproduction occurred in the spawning channel in 2000. An undetermined number of juveniles are being held in the rearing pond. These fish will be held until spring 2001after spring run-off for stocking into Red Cedar and Granite creeks. The fish spawned early in 2000 and redds covered the entire 100 foot spawning channel. Approximately 300 eggs were collected from some late spawners. The eggs were placed in a stream side incubator. Hatching was estimated at 90% from green eggs to swim-up fry.

Genetic samples collected from Bonneville cutthroat trout in Emigration Creek (IV AA 030), City Creek (IV AA 010 02), Spring Creek (West Slope Deep Creek Mountains) and the South Fork Johnson Creek (West Slope Deep Creek Mountains) were analyzed in 2000 using nuclear DNA analysis. All of these populations showed some introgression. The percent introgression is yet to be determined.

Trout Unlimited members assisted UDWR, USFS, and Salt Lake City with Bonneville cutthroat trout activities along the Wasatch Front and in the west desert:

- assisted UDWR in spawning activities at Red Butte Creek.

- assisted UDWR/Salt Lake City in activities in Little Dell and Parleys creeks.

- Coordinated with the Salt Lake City Mayor to reactivate the City Creek Citizens Advisory Committee for coordinated resource management in City Creek. Plans are to re-introduce Bonneville cutthroat trout into the City Creek drainage.

- Trout Unlimited members assisted with much of the work in the West Desert GMU.

Southern Bonneville Management Unit

Unit Description:
This GMU encompasses what was once the southwest area of pluvial Lake Bonneville. Today, this area comprises the Sevier River drainage, including the relatively discrete Beaver River sub-drainage. The Southern Bonneville GMU also contains a portion of the Virgin River drainage. Although the Virgin River drains into the Colorado River system, the presence of BVCT in some streams on the Pine Valley Mountains (a portion of the Virgin River basin) suggests a recent geologic stream capture event. The elevation of the Southern Bonneville GMU ranges from 5,000 to over 10,000 ft. This area is characterized by a high elevation desert climate with pinyon-juniper forests and sagebrush prairie. Stream hydrology is typical for high mountain desert systems, with spring flooding and low to intermittent fall and winter base flows.

Table 8. Conservation actions implemented within the Sevier River Drainage.

State Water ID #	Reach	Implemented Conservation Actions
VI AA 680	Threemile Creek	Limited electrofishing was conducted above and below a new barrier on BLM lands. No nonnative fishes were found above the barrier. A few brown trout along with Bonneville cutthroat trout were found below the barrier. An EA was completed to allow chemical renovation of lower Threemile Creek if needed. The headwaters of Delong Creek, above a natural barrier, was the only area in the Threemile Creek drainage that wasn't occupied by Bonneville cutthroat trout. In August 2000, 115 Bonneville cutthroat trout were moved from occupied areas of the drainage into this headwater reach.
VI AA 440	Tenmile Creek	An upstream fish migration barrier was constructed. Funding for the barrier came from the USFS and the Native Utah Cutthroat Association. The stream is de-watered most of the year below this barrier. The first of two rotenone treatments was completed in 2000. The second treatment will be completed in 2001. Bonneville cutthroat trout will be introduced following the second treatment. This project will restore about 6 miles of stream.
VI AA 510M	Ranch Creek	USFS plans progressed during 2000 including the completion of NEPA requirements. An EA was developed regarding habitat improvement. A Decision Notice was completed and published along with a notice for final public appeal. Plans are for riparian fencing, habitat structures, and other habitat improvements.
VI 402	Manning Meadow Reservoir	The 9th consecutive Bonneville cutthroat trout egg take was completed. For the first time over 1,000 spawners were caught in the trap. Over 174,000 eggs were taken. More were available but not needed. Disease checks were completed. Brood stock replacement stocking was completed. A UDWR Publication (Hepworth et. al. 2000) summarizing spawning operations from 1992 through 1999 was completed. A report on the 2000 spawning activities was also completed.
VI AA 510C	Pole Canyon Creek	A reconnaissance-type survey was completed after local residents reported the presence of native trout. Only non-native or hybrid trout were found.
VI 345	Robs Reservoir	Work on an EA is nearing completion for treatment of this reservoir and the introduction of Bonneville cutthroat trout. This reservoir drains to Center Creek.

State Water ID #	Reach	Implemented Conservation Actions
	Center Creek	An EA is being completed to treat this stream and restore Bonneville cutthroat trout to 5.3 miles of stream.
VI 336	Panguitch Lake	Southern Bonneville cutthroat trout are being studied in comparison with Bear Lake Bonneville cutthroat trout and rainbow trout in this large reservoir with an abundant Utah chub population. 20,000 of each species/subspecies were marked and stocked in 2000.

Table 9. Conservation actions implemented within the Beaver River sub-drainage (Sevier River drainage).

State Water ID #	Reach	Implemented Conservation Actions
VI AB 050A 02	Birch Creek	Genetic samples were collected.
IV AB 070A	North Creek, N. Fk.	Genetic samples were collected. This evaluation will allow DNA comparisons to be made among (1) fish from headwater areas originally deemed to be relatively pure BCT by visual and meristic data, (2) fish restored to the lower stream reaches by treatment projects, and (3) fish present downstream from a migration barrier. The evaluation will show the effectiveness of management utilizing earlier methods of genetics analysis and at what level hybrids were removed based on reliance of early techniques.

The following work was funded by the USFS. Two seasonal employees were funded to assist the Cooperative USFS/DWR biologist. Most survey work was conducted in the Salina Creek area.

Table 10. Conservation actions implemented within the Salina Creek watershed (Sevier River drainage).

State Water ID #	Reach	Implemented Conservation Actions
VI AA 200	Salina Creek	13 fish population surveys were completed. The upper roadless section was spot-sampled to check species distribution. The upper mile, above a series of barriers, was barren. Fish that phenotypically appeared to be Bonneville cutthroat trout were found below the barriers. Lower stream reaches were occupied by rainbow trout and fish that phenotypically appeared to be Yellowstone cutthroat trout. Lower sections along the road were spot shocked. Three stations were sampled (single pass) above the freeway. Cutthroat, rainbow and brown trout were collected. Populations ranged from 177 to 370 fish/mile and 41 - 87 lbs./acre. Native non-game fish (dace, sculpins, suckers, and chubs) were present below the confluence with Skumpah Creek. Three stations were surveyed along the freeway. Cutthroat, rainbow and brown trout were collected. Populations ranged from 115 - 150 fish/mile and 13 - 41 lbs./acre. Native non-game fish were present. Only native non-game fish were found at the lowest three stations, below the confluence with Maple Springs Hollow. One lone cutthroat trout was found.
VI AA 200J	Jump Creek	Completed habitat surveys. A visual reconnaissance survey determined water flows were too low to support trout in 2000.
VI AA 200G	Beaver Creek	Two single-pass population surveys were conducted. The lower station, just above Salina Creek, had brown trout, rainbow-cutthroat hybrids and cutthroat trout. The estimated population was 197 fish/mile and 52 lbs./acre. A mile upstream another station was sampled. Brown and cutthroat trout occupied this stream reach. These cutthroats phenotypically appeared to be Bonneville cutthroat trout. The population estimate was 600 fish/mile and the biomass was 90 lbs./acre. There does not appear to be any barrier between the lower and upper stations. A genetic's sample was collected from the cutthroat trout at the upper station.

State Water ID #	Reach	Implemented Conservation Actions
VI AA 200F	Skumpah Creek	Completed habitat surveys. A visual reconnaissance survey of portions of Skumpah Creek determined some portions had insufficient flow to support trout. The remainder of the drainage will be surveyed in 2001.
VI AA 200D	Niotche Creek	Five fish population surveys were completed and the fish appeared to be hybrids. Three single-pass surveys were completed in the upper area of this stream. Populations ranged from 199 fish/mile and 14 lbs./acre in a high gradient reach to 916 fish/mile and 407 lbs./acre in the best reach. All fish were cutthroat trout. Some of the upper fish appeared to be hybridized. Two single-pass surveys were conducted on lower Niotche Creek. One had 317 rainbow trout/mile. Some mountain suckers were also found at that station. A small tributary had suckers, leatherside chubs and dace.
VI AA 200E01	Yogo Creek	Two fish population surveys were completed and the fish appeared to be rainbow trout and hybrids. The lower station had 739 rainbow trout/mile. The upper station had 598 hybrids (rainbow x cutthroat trout)/mile. The headwaters need to be checked for a remnant cutthroat trout population.
VI AA 200E01A	Blackham Creek	Three fish population surveys were completed and the fish appeared to be hybrids. Trout numbers ranged from 192 - 981 fish/mile. The headwaters of this stream needs to be surveyed for cutthroat trout.
VI AA 200B	Gooseberry Creek	One fish population survey was completed and rainbow trout were caught. The population was likely bolstered by stocking. The population was 1458 fish/mile with a biomass of 301 lbs./acre.
VI AA 210A	Little Lost Creek	Three single-pass fish population surveys were completed. Only brown trout and mountain suckers were found in this stream. The brown trout population estimate ranged from 251/mile to 1167/mile. Biomass estimates ranged from 118 to 172 lbs./acre.
VI AA 240	Willow Creek	Five fish population surveys were completed. The lower four stations contained only rainbow trout. Population estimates of rainbow trout ranged from 177 to 998 fish/mile. The upper most station had mature cutthroat trout but some rainbow trout influence may have been evident in juvenile fish. This station had 456 fish/mile. Headwater areas may be further evaluated in 2001.

Table 11. Conservation actions implemented within the Clear Creek watershed (Sevier River drainage).

State Water ID #	Reach	Implemented Conservation Actions
VI AA 360D	Three Creeks	A visual reconnaissance survey was conducted. Above the confluence with Pole Creek flow was too low to support trout.
VI AA 360D01	Pole Creek	Fish that phenotypically appeared to be Bonneville cutthroat trout were present in the headwaters. Rainbow trout were found in the lower areas of the stream. No barrier. May be losing fish from this population.
VI AA 360D02	Birch Creek	One fish population survey was completed. This stream has a remnant Bonneville cutthroat trout population that has been evaluated by repeated genetic tests and found to be pure. Population numbers were low, likely because of recent drought conditions.

MERISTIC ANALYSIS

Utah Division of Wildlife Resources employs a full time person to do meristic analysis on cutthroat trout populations. Meristic analysis was completed on a number of putative Bonneville cutthroat trout populations in 2000. Table 12 below shows the populations that were examined, when the analysis was done, the Hybrid Index Values, and comments about the analysis. The Hybrid Index Values for each population were obtained by calculating a mean value for individual fish based on five separate meristic character counts and then combining individual means to obtain the gross score. The gross score is divided by the number of individuals analyzed. Hybrid Index Values range from 0 to 100. A value between 0 and 30 represents a cutthroat trout. Hybrid Index Values between 30 and 70 indicate hybridized populations. A value above 70 would represent a rainbow trout population.

Table 12. Meristic analysis of putative Bonneville cutthroat trout populations completed in 2000.

State Water ID #	Reach	Hybrid Index Value	Comments
	Wimmer Ranch Creek	17.1	None
	Peteetneet (Payson) Creek	21.7	Some individuals had lateral line scale counts that exceeded the range of Bonneville cutthroat trout.
IV AA 020	Red Butte Creek	14.2	Lateral line scale counts from three individuals indicated possible hybridization with rainbow trout.

State Water ID #	Reach	Hybrid Index Value	Comments
IV AP 140	Deep Creek, S. Fk.	29.4	Only five individuals were sent to UDWR for analysis.
IV AP 140	Deep Creek, N. Fk.	10.7	Only five individuals were sent to UDWR for analysis.
IV AP 150A 02	Arthur Fork Creek	17.0	Lateral line scale counts for two individuals suggest possible hybridization with rainbow trout.
IV AP 150O 01	Toll Canyon Creek	9.0	Two individuals had lateral line scale counts slightly below the typical range for Bonneville cutthroat trout.
IV AP 230 01	Chalk Creek	20.3	
IV AP 230B 01	Huff Creek	23.1	Six individuals had basibranchial teeth counts that were below the average for Bonneville cutthroat trout.
IV AQ 040A 07	Logan River	9.8	Basibranchial teeth counts were below average for three individuals.
V AK 020B 01	Little Diamond Creek	32.8	Meristic data indicates hybridization with rainbow trout has occurred within this population.
V AK 020G 01	Cottonwood Creek	29.3	Possible hybridization with rainbow trout.
V AK 040H 01	Clear Creek, R. Fk.	12.8	
VI AB 070A	North Creek, N. Fk. (upper)	13.0	
VI AB 070A	North Creek, N. Fk. (middle)	25.4	Five individuals with below average basibranchial teeth counts.

ADDITIONAL BONNEVILLE CUTTHROAT TROUT CONSERVATION ACTIONS

Seven states met in Salt Lake City in February 2000 to develop criteria for designation of inland cutthroat trout populations. A sub-committee was formed to establish genetic criteria for population analysis. A report of those activities was completed and signed by the seven states in December, 2000 (UDWR Publication 00-26). "Core" conservation populations are composed of individuals that have been determined to be >99% pure, from a genetic standpoint and are phenotypically true. These are the populations that will be the primary source for introductions and re-introductions through transplants and brood stock development. "Conservation" populations are those that generally have less than 10% introgression. These populations still

contain all of the phenotypic characteristics of the subspecies but are slightly introgressed. They have some unique ecological or behavioral characteristics that make the population valuable and worth preservation. Further introgressed populations that still phenotypically represent cutthroat populations may be preserved as "Sport Fishery Populations." Goals for these populations would be tied to management goals of specific sport fisheries. Populations of cutthroat trout that appear phenotypically true but that have not yet been examined by meristic's and genetic's are classified as "Status Unknown" and may eventually be classified as Core, Conservation or Sport Fishery populations. "Status Unknown" populations will be protected as populations representing a particular subspecies until analysis is completed.

A Range-Wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) (Lentsch et.al. 2000) was completed in December, 2000. This represents the first range-wide agreement for the management and conservation of this subspecies of cutthroat trout.

Utah Division of Wildlife Resources has continued to sponsor semi-annual meetings for planning and monitoring conservation activities for Bonneville cutthroat trout. At the spring meeting (generally held about mid-March) agencies report on planned field activities for the upcoming field season. At the fall meeting (generally held in November) agencies report on their field activities and any deviations from proposed work plans. Several states, federal agencies and the Confederated Tribes of the Goshute Reservation have participated. Trout Unlimited has also been a regular participant.

In 2000, Utah Division of Wildlife Resources, Aquatic Section discontinued stocking Yellowstone cutthroat trout within the Bonneville Basin. They also made the decision to work towards only stocking triploid rainbow trout. It may take a few years to finally reach the goal for all triploid rainbow stocking. Both of these decisions will help conservation efforts for native cutthroat trout in Utah.

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