

# Bonneville Cutthroat Trout

(*Oncorhynchus clarki utah*)

**Data:** Range-wide Status (May and Albeke 2005) - Updated in 2010 and 2015

**Partners:** Bureau of Land Management, Confederated Tribes of the Goshute Reservation, Idaho Game and Fish Department, National Park Service, Nevada Department of Wildlife, Trout Unlimited, Utah Division of Wildlife Resources, Wyoming Game and Fish Department, US Fish and Wildlife Service, US Forest Service, Utah Reclamation Mitigation and Conservation Commission

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## Species Status Review

The Bonneville Cutthroat Trout (BCT) is listed as a “Tier I Conservation Species” by the State of Utah, as a “Sensitive Species” by the US Forest Service, as a “Rangewide Imperiled (Type 2) Species” by the Bureau of Land Management, and as a “Vulnerable Species” by the State of Idaho. This species has been petitioned for, but precluded for, listing as Threatened or Endangered by the US Fish and Wildlife Service several times in the past decade. The most recent determination, that the species does not warrant listing as a threatened or endangered species under the Endangered Species Act was released on September 9, 2008.

The *State of Utah Conservation Agreement and Strategy (CAS) for Bonneville Cutthroat Trout* was completed and signed by all parties in 1997 (Lentsch et al. 1997). The Range-wide Conservation Agreement and Strategy was completed in 2000 (Lentch et al. 2000) and updated in 2018 (Oplinger et al. 2018). In 2004, the Utah Conservation Team completed a Post Implementation Assessment to present progress and accomplishments in BCT conservation in the State of Utah. Also during 2007, a comprehensive Range-wide Status Review was published. A Management Plan for Conservation of BCT in Idaho was submitted during 2006. The Nevada Conservation Agreement and Strategy was also finalized during 2006.

## BCT Sportfishing Status

BCT are considered a game fish by all state, federal, and tribal agencies that have management authority for this subspecies. Like other cutthroat subspecies, BCT are generally easy

to catch, and most populations are managed through the use of fishing regulations that protect population integrity and viability. In addition, many BCT populations occur in remote locations and receive limited fishing pressure making special regulations unnecessary. Due to protective regulations and/or the occurrence of BCT in remote areas, over-fishing is not considered to be a problem at this time. Short-term fishing closures are often imposed to promote the development of recently re-introduced populations of BCT. Spawning season closures are frequently used, particularly for brood populations. Other regulations requiring limited harvest, length restrictions (slot limits), catch-and-release, and terminal tackle restrictions have demonstrated effectiveness in maintaining populations of BCT. Special regulations are very popular with some groups of anglers. BCT (particularly the Bear Lake strain) are cultured extensively in the State of Utah, and used widely in sport fish management programs. Angler support for BCT conservation management programs is strong in all four states and is an important asset to conservation and management programs.

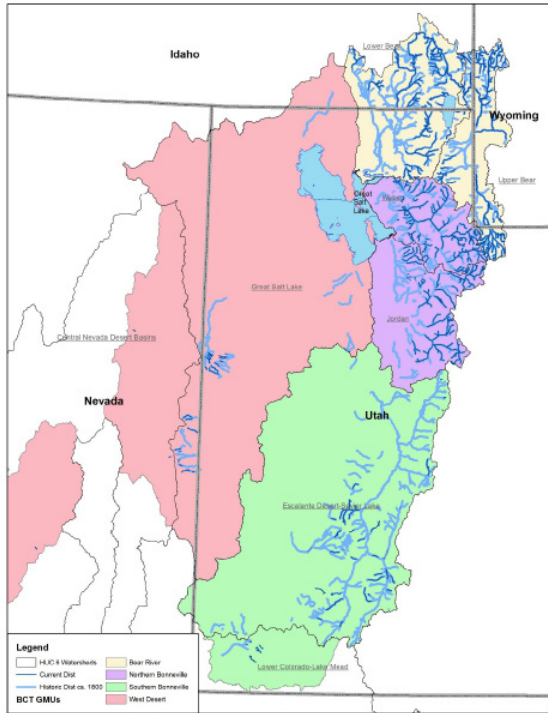
## BCT Distribution

Based on the 2015 Range-wide Status Update, At least 202 BCT populations collectively occupy about 2,728 miles of stream habitat in 21 watersheds in Utah, Idaho, Nevada, and Wyoming. These populations qualify as conservation populations under standards developed by the States. Of the 202 conservation populations, 55 percent are considered core populations.

Conservation populations have at least 90 percent cutthroat trout genes and core populations have at least 99 percent cutthroat trout genes.

Of the 2,728 miles of occupied habitat, 1,160 miles (49%) are associated with lands administered by the Federal Government. Almost 51% of BCT habitat occurs on land with non-federal administration, including Goshute Tribal lands (12 miles).

## Range and GMUs of the BCT



BCT Range and GMUs

A total of 202 separate BCT populations currently occupying 2,303 miles of habitat were designated as “conservation populations” (84% of currently occupied habitat). These conservation populations were spread throughout the historical range, occurring in 19 of the 23 hydrologic units historically occupied by BCT.

Thirty-three of these populations representing 1,509 miles existed in drainages with strong or moderate connectivity.

## BCT Habitat Requirements

Typical of most trout, BCT thrive in lotic habitats characterized by relatively cool, well oxygenated water; the presence of clean, well sorted gravels with minimal fine sediments for successful spawning; and habitat complexity composed of large woody debris and overhanging banks. However, BCT have been found to tolerate marginal habitat conditions as well (i.e., widely variable flows, high temperatures, poor instream structure, and high turbidity) due to the fact that they evolved in a desert environment.

One study (Kershner 1995) found spawning substrate size to be proportional to body size. For example, large adfluvial BCT typically spawn in large gravels or cobbles, while smaller, stream resident BCT spawn over coarse sand or small gravels.

## Concerns and Issues Relative to the Conservation and Improvement of BCT

Primary threats include isolation of streams, habitat quality, oil and gas development, resource extraction, grazing, water management, and climate change.

## Genetic Considerations

Most of the western states that have management and conservation authority for cutthroat trout participated in the development of a position paper on genetic management (Lentsch et al. 2000). This position paper describes a hierarchical classification for conserving cutthroat trout that includes:

- 1) a core component of genetically unaltered populations or individuals;
- 2) designated conservation populations that may be either genetically unaltered or slightly introgressed and have attributes worthy of conservation; and
- 3) populations that are managed primarily for their recreational fishery value.

Core populations are recognized as having important genetic value and could serve as donor sources for developing either captive or wild broods or for re-founding additional populations from existing BCT populations.

Management of conservation populations will emphasize conservation, including potential conservation populations. The Range-wide BCT Status Report provided a generalized population health assessment for each conservation population based on population demographics/productivity, temporal variability, connectivity, and size. Seventy-one BCT populations (46%) were rated as having either high general health (11 populations) or moderately high general health (60 populations). Fifty-six populations (37%) were rated as having moderately low general health and 26 populations (17%) were rated as having low general health.

## Habitat Concerns

Continued habitat degradation is one of the major threats to the abundance and improvement of BCT. Loss of habitat quality has been recognized as one of the two major human-induced influences in the loss of BCT populations. Major habitat concerns:

- Modification and fragmentation of habitat from barriers to fish passage, entrainment, and thermal barriers due to dams and water diversions.
- Aquatic habitat degradation and alteration from mining, forestry and agricultural land use practices that result in sediment loading, elevated temperatures, changes to stream structure and morphology, and changes in water quality.
- Flow depletion and water quality degradation due to water diversions for hydro-power, municipal and agricultural uses, and groundwater pumping for urban, mining, and power production.
- Secondary impacts of dams from reservoir pools in large river systems (i.e., hydro-power entrainment, gas supersaturation, modification of flow patterns, creation of nonnative fish habitat, and changes in tailwater water temperatures).
- Climate change influences, such as warmer water, changes in stream flow, and the increasing frequency and intensity of disturbances (Williams et al. 2008).

The accumulation of these detrimental influences through time has led to isolation and fragmentation of habitat and reductions in range, which adversely impact the stability and viability of BCT populations.

## Disease Concerns

A disease risk assessment was made for each conservation population using a ranking of 1 to 5 based on the level of risk with a ranking of 1 being the lowest level and 5 being the highest level.

Population isolation and security were important considerations, but they were not viewed as absolutes. Diseases of concern included, but were not limited to, whirling disease, furunculosis and infectious pancreatic necrosis virus. Other concerns are invasive species such as New Zealand mud snails and parasites such as pleistophora and epitheliocystis. A new and very serious invasive threat is the quagga mussel, a close relative of the zebra mussel that appears to have no elevational limit. With regard to risks associated with catastrophic diseases, 121 (60%) of the conservation populations were considered to be at limited risk, 25 (12%) were at moderate risk, and 24 (12%) were already infected with significant disease. No un-infected populations were considered at high present risk for disease.

## Introduced Species Threats

Competition, predation, and hybridization from introduced salmonids including rainbow, brook and brown trout, as well as genetically compromised cutthroat trout, continue to pose a threat to the expansion and conservation of BCT. Genetic risk is defined by the nature of the potential for future introgression of a non-native genome into a conservation population. The 2015 Range-Wide Status Review provided a genetic risk assessment for BCT conservation populations. A total of 117 populations (58%) were ranked as being at low risk of genetic con-

tamination. Thirty-four populations (17%) were rated as being at high genetic risk.

## Population Viability Concerns

For the purposes of conservation and recovery, BCT populations in the four states have been partitioned into a hierarchical classification system. A sub-basin or basin where a group of genetically pure local populations may share common foraging, spawning, migrating, or over-wintering habitat and function as a meta-population are termed “Core populations”.

Populations were also designated as “conservation populations” based on whether they represent a core conservation population having no genetic alteration, or there were identified unique attributes such as expression of unique or multiple life-history strategies, adaptation to specific environmental habitat conditions, and geographic location. These populations can be further aggregated into “Geographical Management Units” –GMU’s that may cross jurisdictional boundaries.

BCT are widely distributed over a large geographic area. Increased habitat fragmentation from dams, diversions, land and water management practices, and human development has reduced the amount of available well connected habitat. Increased isolation of local populations and the occurrence of non-native salmonids increase the risk of losing genetically pure populations. Although the effects of human activities over the past century have reduced their overall distribution and abundance, BCT are recovering.

## Overutilization Concerns

There are numerous federal and state regulatory mechanisms that, if properly administered and implemented, protect BCT and their habitats throughout the range of the subspecies, such as 404 and water quality discharge permitting. However, effective implementation of these regulatory mechanisms depends largely upon the appropriation of adequate funding and, ultimately, commitment on the part of the management or regulatory agencies to fulfill their respective responsibilities.

Adequate angling regulations are in place to protect BCT populations from impacts due to fishing by recreational anglers, minimizing concerns that recreational harvest is a problem. In addition, controls governing collections for scientific purposes and genetic testing have helped to reduce the risk that monitoring and sampling programs may result in a reduction of BCT populations.

## Oil and Gas Development Threats

There may be increased pressure on BCT habitats from energy exploration in the near future. The potential for development is most likely to occur in Utah and Wyoming, with habitat degradation and loss of water constituting the greatest concerns.

## Opportunities to Improve the Status of BCT

The objective of BCT conservation and restoration is to ensure the long-term persistence of self-sustaining populations across the species native range. To meet this objective, managers will need to maintain multiple inter-connected

populations of BCT across the diverse habitats of their native range as well as preserve the diversity of their life-history strategies. Specific conservation measures to improve the status of BCT can be grouped into several major categories, including:

- fish population manipulation (non-native removal, re-introduction, supplemental stocking, spawn-taking, etc.)
- habitat manipulation (barrier placement or removal, in-stream structure, flow enhancement, increasing connectivity, isolation of fragments, etc.)
- regulatory actions (fishing regulations, water use, land management, etc.)

## BCT Restoration Potential

The 2015 status update evaluated the potential of restoration or expansion of BCT and found that 3,983 miles of historical habitat did not support conservation populations of BCT.

The reestablishment of population connectivity will be a primary focus of future restoration if the risks to BCT are to be minimized over the long-term. Conservation population designations suggest that two different conservation strategies are needed to conserve BCT. One strategy concentrates on preventing introgression, disease and competition from other salmonids; the second concentrates on preserving local population networks of various sizes that maintain meta-population function, multiple life-history strategies and expand the amount of occupied habitat by increasing the amount of connected habitat.

## Population Surveys, Genetic Analyses, and Fish Restoration Projects

Key actions include:

- Maintain and improve the connectivity and genetic integrity of BCT populations in designated sub-basins (GMUs).
- Maintain current distribution of BCT within core areas as described in recovery conservation plans, and restore distribution where recommended in sub-basins.
- Characterize, conserve, and monitor genetic diversity and gene flow among local populations of BCT.
- Control or eradicate nonnative species (i.e., rainbow, brook, non-native strains of cutthroat and hybrid BCT) where feasible and appropriate.
- Develop and implement consistent methods for fish population status and trend analyses.
- Locate and assess BCT populations.
- Conduct standardized surveys and genetic analyses.
- Expand BCT populations through restoration, reintroductions, and non-native fish control in priority watersheds.
- Maintain BCT broodstock sources and adequate hatchery production to meet sport fish and conservation needs in each GMU.

## BCT Habitat Manipulations

Restoration of BCT habitat will have to address both habitat quality issues and issues of spatial limitations. Current efforts to recover BCT have been directed towards improving in-stream conditions, restoring limited stream fragments, and removing or placing in-stream barriers to improve connectivity or protect populations from intrusion by non-native salmonids.

Key habitat actions include:

- Restore and enhance water flow water quality, natural sediment regimes, and physical integrity of channels where feasible.
- Restore and improve altered channel and riparian zone habitats.
- Expand small, isolated populations where possible, and maintain or enhance high quality habitats to prevent extirpation due to small population size or stochastic events.
- Monitor and evaluate natural catastrophic impacts, such as fire and drought.
- Identify and implement best management practices on US Forest Service, Bureau of Land Management, and private lands to benefit BCT habitats.

## Regulatory Actions to enhance BCT status

Maintaining the sportfish status of the BCT and utilizing regulations to control over-utilization will be an important component of maintaining the health of BCT populations. In addition, working with others to maintain ap-

appropriate regulations for prevention of disease, water quality impairment, and habitat disturbance are important considerations

- Provide technical information, administrative assistance, and financial resources to assure compliance with the listed objectives and encourage conservation of BCT on private lands.
- Maintain and protect BCT habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.
- Enforce regulatory mechanisms that prevent impacts associated with recreational angling.
- Enhance and maintain regulatory mechanisms that prevent diseases or illegal introduction of nuisance species.
- Work through the FERC re-licensing process to require impoundment operators to operate dams to minimize impacts where necessary to meet cooperative agreement objectives.

## Recommended Actions to Improve the Status of BCT

Highest Priority Actions for BCT include the following:

### Bear River GMU

(not necessarily in priority order)

- Continue to monitor core and high priority conservation populations on a

regular rotation based on monitoring schedule.

- Conduct whirling disease (WD) monitoring and public outreach to inform the public and prevent the spread of WD.
- Continue surveys for potential new BCT populations and conduct genetic analysis to determine purity and/or assess any possible introgression from non-native salmonids.
- Identify habitat improvement opportunities for BCT. Work with private landowners and management agencies to protect and improve habitat for BCT.
- Pursue conservation easements to protect habitat from development and other impacts.
- Explore opportunities for treatment to remove non-native species for reintroduction and/or expansion of BCT into presently unoccupied historical habitat. Conduct NEPA analysis as necessary.
- Explore opportunities for removing or installing barriers for fish passage issues, and conduct barrier monitoring.
- Expand the range of isolated populations by increasing connectivity between headwater streams and river systems.
- Review current stocking of sportfish, and if necessary and feasible, change stocking programs to protect current BCT populations.
- Pursue appropriate BCT conservation outreach opportunities.



- Monitor oil and gas exploration, timber harvest, grazing, and recreation activities on the Wasatch-Cache National Forest.
- Review and analyze all culverts on the Wasatch-Cache National Forest for fish passage.
- Continue to promote harvest of non-native brook trout through liberal limits and bait fishing.
- Continue to explore ways to improve Bear Lake tributaries through habitat manipulations designed to maximize natural reproduction of BCT.
- Monitor the effectiveness of fish passage projects and reconnect tributaries on the Thomas Fork.
- Monitor existing populations in First, Second and Third Creeks and evaluate opportunities to enhance habitat.
- Complete BCT surveys of the Nounan reach of the Bear River.
- Investigate fish passage opportunities on FERC re-licensing of Bear River hydroelectric facilities.
- Renovate Deadman Creek.
- Minimize effects of domestic cattle and sheep grazing on Thomas Fork and Smiths Fork watersheds.
- Explore opportunities for restoring the South Fork of the Little Bear River.

### **Northern GMU** (not necessarily in priority order)

- Continue to monitor core and high priority conservation populations on a regular rotation based on monitoring schedule.
- Conduct whirling disease (WD) monitoring and public outreach to inform the public and prevent the spread of WD.
- Continue surveys for potential new BCT populations and conduct genetic analysis to determine purity and/or assess any possible introgression from non-native salmonids.
- Identify habitat improvement opportunities for BCT. Work with private landowners and management agencies to protect and improve habitat for BCT.
- Pursue conservation easements to protect habitat from development and other impacts.
- Explore opportunities for treatment to remove non-native species for reintroduction and/or expansion of BCT into presently unoccupied historical habitat. Conduct NEPA analysis as necessary.
- Explore opportunities for removing or installing barriers for fish passage issues, and conduct barrier monitoring.
- Expand the range of isolated populations by increasing connectivity between headwater streams and river systems.
- Review current stocking of sportfish, and if necessary and feasible, change stocking programs to protect current BCT

populations.

- Pursue appropriate BCT conservations outreach opportunities.
- Monitor streams in Tooele, Davis and Salt Lake Counties on the Wasatch-Cache National Forest.
- Review and analyze all culverts on the Wasatch-Cache National Forest for fish passage.
- Maintain a brood source for re-establishment and maintenance of other Northern BCT populations. Conduct annual egg taking operations.
- Stock mountain lakes on the GMU with fish derived from brood stock.
- Conduct fish population surveys in Tie Fork, Little Deer Creek, North Fork American Fork, Dairy Fork, and Spencer Fork.
- Monitor existing BCT populations in Red Butte Reservoir and City Creek.
- Evaluate the restoration potential of Little South Fork Provo River below Deer Creek Reservoir.
- Conduct fish population surveys in Lost Creek and East Canyon Creek Drainage.
- Monitor existing BCT populations in Strawberry Creek, Gordon Creek, Hard-scrabble Creek, Arthur Creek, and Lost Creek.

### **West Desert GMU** (not necessarily in priority order)

- Continue to monitor core and high priority conservation populations on a regular rotation based on monitoring schedule.
- Conduct whirling disease (WD) monitoring and public outreach to inform the public and prevent the spread of WD.
- Continue surveys for potential new BCT populations and conduct genetic analysis to determine purity and/or assess any possible introgression from non-native salmonids.
- Identify habitat improvement opportunities for BCT. Work with private landowners and management agencies to protect and improve habitat for BCT.
- Explore opportunities for treatment to remove non-native species for reintroduction and/or expansion of BCT into presently unoccupied historical habitat. Conduct NEPA analysis as necessary.
- Explore opportunities for removing or installing barriers for fish passage issues, and conduct barrier monitoring.
- Expand the range of isolated populations by increasing connectivity between headwater streams and river systems.
- Pursue appropriate BCT conservations outreach opportunities.
- Accomplish genetic verification for BCT populations on Goshute Tribal Lands.
- Monitor restored populations of BCT to evaluate needs for supplemental stocking

on Goshute Tribal Lands.

- Survey BCT restored reaches to determine genetic risks and install barriers as necessary on Goshute Tribal Lands.
- Protect and maintain stream habitat conditions, with a focus on flow maintenance on Goshute Tribal Lands.
- Enhance and restore habitat where feasible on Goshute Tribal Lands including fencing and instream habitat improvements.
- Monitor and evaluate habitat/water quality conditions due to drought, groundwater extraction, and fire in Deep Creek Range (UT), North and South Snake Range (NV), Cherry Creek Range (NV), and Quinn Range (NV).
- Accomplish non-native fish eradication, barrier placement, and re-establishment of BCT in Silver Creek on the North Snake Range (NV). (Silver Creek is the last remaining stream on the North Snake Range to be restored).
- Monitor BCT populations in Basin Creek, Birch Creek, Trout Creek, Toms Creek, Red Cedar Creek, Indian Farms Creek, and Granite Creek. Accomplish supplemental stocking of BCT as needed.
- Work towards meeting persistence criteria in five populations within GMU.
- Complete restorations of Snake Creek and Strawberry Creek.
- Develop at broodstock at Big Wash.

### **Southern GMU** (not necessarily in priority order)

- Continue to monitor core and high priority conservation populations on a regular rotation based on monitoring schedule.
- Conduct whirling disease (WD) monitoring and public outreach to inform the public and prevent the spread of WD.
- Continue surveys for potential new BCT populations and conduct genetic analysis to determine purity and/or assess any possible introgression from non-native salmonids.
- Identify habitat improvement opportunities for BCT. Work with private landowners and management agencies to protect and improve habitat for BCT.
- Pursue conservation easements to protect habitat from development and other impacts.
- Explore opportunities for treatment to remove non-native species for reintroduction and/or expansion of BCT into presently unoccupied historical habitat. Conduct NEPA analysis as necessary.
- Explore opportunities for removing or installing barriers for fish passage issues, and conduct barrier monitoring.
- Expand the range of isolated populations by increasing connectivity between headwater streams and river systems.
- Pursue appropriate BCT conservation outreach opportunities.
- Brood stock maintenance and disease

certification at Manning Meadow.

- Complete re-establishment of BCT in Upper Clear Creek (Sevier County).
- Complete restoration of Mammoth Creek and Upper East Fork of the Sevier River

Native cutthroat restoration in the Middle Fork Sheep Creek drainage (UT) (2012) - \$72,000

Clear Creek (UT) native Bonneville Cutthroat Trout restoration (2013) - \$34,000

Mill Creek (UT) watershed restoration (2016) - \$41,000

Mill Creek (UT) watershed restoration (2017) - \$25,000

Jacobs Creek (UT) upper culvert fish passage (2017) - \$3,000

## WNTI Completed and Ongoing Projects

Transtrum Diversion fish passage restoration for Bonneville Cutthroat Trout in St. Charles Creek (ID) (2007) - \$75,000

Bonneville Cutthroat Trout culvert renovation for 3 miles on South Fork Chalk Creek (UT) (2007) - \$44,286

Georgetown Creek (ID) hydro headgate fish ladder (2008) - \$15,000

Georgetown Road relocation project, Bear River Basin (ID) for Bonneville Cutthroat Trout (2009) - \$15,750

East Fork Bear River (UT) fish screen design and placement for Bonneville Cutthroat Trout (2009) - \$105,000

Streambank stabilization and fish screen in St. Charles Creek (ID) (2010) - \$71,400

Chalk Creek (UT) fish passage and screening (2011) - \$23,000

Weber River (UT) watershed improvements to enhance Bonneville Cutthroat Trout habitat beyond 3 restrictive barriers (2012) - \$78,500

Bonneville Cutthroat Trout telemetry survey, Upper Bear River (WY) (2012) - \$2,250

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