

Colorado River Cutthroat Trout

(Oncorhynchus clarkii pleuriticus)

Data: Conservation Strategy for Colorado River Cutthroat Trout (2006); Range-Wide Status of Colorado River Cutthroat Trout (2010); Addendum: Updated Range-Wide Status Information for Colorado River Cutthroat Trout for the Period 2011-2015 (2020)



Introduction

The Colorado River Cutthroat Trout (CRCT) is a species of special concern in Colorado, a Species of Greatest Conservation Need (SGCN) in Wyoming, and a Tier I species in Utah (those species that are either federally listed, or for which a conservation agreement has been implemented). Prior to 1995, this species was a Federal Category 2 candidate species, but does not occur in the candidate list proposed by the U.S. Fish and Wildlife Service (FWS) in 1996 (50 CFR Part 17, 61 FR 7600); use of categories 1, 2, etc. was eliminated in that proposed rule. The CRCT is classified as a sensitive species by Regions 2 and 4 of the US Forest Service and by the Bureau of Land Management in Colorado, Wyoming, and Utah. Through the petition process of the Endangered Species Act (ESA), the FWS concluded in April 2004 that a 1999 citizen-based petition to list CRCT did not contain sufficient information to warrant listing (FR 69(76):21151-21158, 04/20/04).

Historical and Current Distribution

Colorado River Cutthroat Trout historically occupied portions of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Figure 1). The range of the CRCT has been divided into eight Geographic Management Units (GMUs) (Figure 2) to bring a finer level of stream known to be occupied by

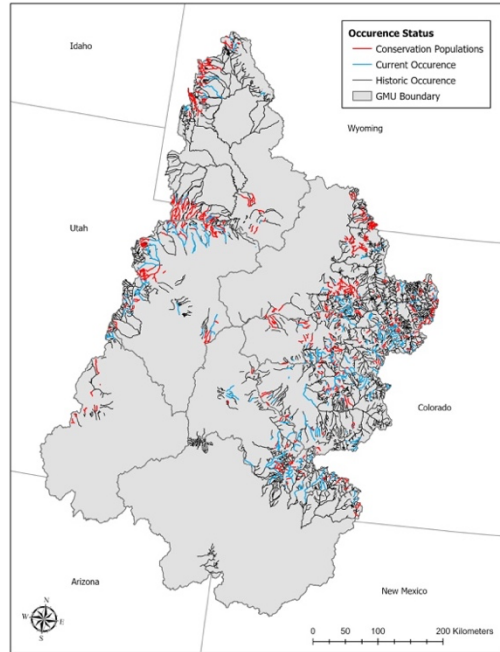


Figure 1. Colorado River Cutthroat Trout conservation populations, and current and historic occurrence.

resolution to population descriptions and habitat distribution.

Conservation populations are those known (genetic testing complete), or suspected to be, at least 90% genetically pure, or were otherwise determined to be important for CRCT conservation. There are 384 conservation populations occupying 3,615 km of stream habitat in Colorado, Utah, and Wyoming, which includes 394 km outside of historic habitat. Conservation populations currently occupy 11% of the historic range, up from 8% in 2005.

Changes in the number and distribution of conservation populations relative to 2005 were due to an increase in the amount of conservation populations, and the decrease



Figure 2. Colorado River CT GMUs.

in estimated historic habitat. Conservation populations occur in all eight GMUs (Figure 2) and in 40 of 51 4th-level Hydrologic Unit Codes (HUC) that contain historic habitat. Nine conservation populations are known to straddle state boundaries.

Prior to recent molecular testing, larger spots and more scales above the lateral line were phenotypic traits associated with Greenback Cutthroat Trout (*Oncorhynchus clarkii stomias*) compared to CRCT (Rogers 2018). However, recent molecular investigations using contemporary and century-old museum specimens revealed

that phenotypic differences among cutthroat trout in the Colorado River Basin correspond to three distinct genetic lineages of CRCT. These are provisionally designated the "blue lineage," native to the Yampa, Green and White River Basins; "green lineage" native to the Upper Colorado, Gunnison and Dolores basins, and the San Juan lineage, native to the San Juan basin and until recently believed to be extinct (Metcalf et al 2012; Rogers et al 2018; Bestgen et al. 2019).

Habitat Requirements

Maintenance of CRCT populations necessitates that aquatic habitats provide for all the life history requirements of the subspecies. Because of habitat degradation and replacement by non-native salmonids, CRCT are currently found in higher elevation small streams, beaver ponds, and lakes rather than large rivers. These habitats feature cold, clear-running, well-oxygenated water, cobble-boulder-gravel substrates, balanced pool-riffle ratios, pH ranging from 6–9, and good riparian cover. Colorado River Cutthroat Trout can persist in areas with high gradients, although that is not a necessary habitat requirement. Water temperatures should not exceed 21–22 degrees Celsius; the species optimally occurs in water temperatures in the 12–15 Celsius range. Given the high elevations these fish occur in, sufficient depth of pools is necessary for over-wintering.

Sportfishing

Colorado River Cutthroat Trout are considered a game fish by all state, federal, and tribal agencies that manage this subspecies. Consequently, all populations have sport fish value and are managed as such by the various states, national parks, and tribes, regardless of their genetic status.

Special regulations requiring catch-and-release, limited harvest, and terminal tackle restrictions have been applied, where needed, to maintain trout populations in all three states. Many CRCT populations tend to lie in remote headwater drainages with difficult access, which has served to minimize angling pressure. The tendency for these populations to be composed largely of small-sized fish may also reduce interest by anglers wishing to harvest fish. Wyoming has implemented some spring fishing closures to protect spawning trout from harvest and/or spawning grounds from trampling. Utah has imposed seasonal closures to protect spawning populations and wild brood stocks. Colorado has catch-and-release and terminal tackle restrictions on certain waters to protect high-value CRCT populations. In addition, the National Park Service has closed four CRCT waters to fishing to protect broodstocks, small populations, and spawning fish. Angler support for CRCT conservation management programs is strong in all three states.

Threats

Genetic hybridization, disease, habitat degradation, non-native salmonids, and climate change are the most significant risks to CRCT conservation populations.

Genetic Contamination Concerns:

The introduction and subsequent spread of nonnative trout has been one of the greatest threats to the status of CRCT since stocking in CRCT habitats first began more than 100 years ago. Hybridization from other salmonids, including rainbow, brook, and brown trout, as well as genetically compromised cutthroat, continue to pose a threat to the expansion and conservation of CRCT.

Genetic risk is defined by the nature of future introgression of non-CRCT genes into a conservation population. The biggest genetic concerns for CRCT are: 1) an accurate inventory of genetic status, 2) determination of which brood stocks to use in restoration, and 3) achieving agreement among geneticists on methods and status of populations.

A total of 193 conservation populations (50%) were ranked as having no risk of genetic contamination due to the presence of a secure barrier preventing immigration of hybridizing species. Thirty-six (9%) and 132 (34%) populations were at low or moderate risk, respectively. Twenty-two populations

(6%) were rated as being at high genetic risk. Low genetic risk was defined as hybridizing species being greater than 10 km away from the population; moderate risk was defined as hybridizing species being within 10 km of the population; and high genetic risk was defined as hybridizing species being sympatric with the population.

Disease Concerns:

Diseases of concern are those that cause severe and significant impacts to population health, and include, but are not limited to, whirling disease, furunculosis, and infectious pancreatic necrosis virus. Two hundred twenty-five populations (59%) were judged to have very limited risk from disease because disease and pathogens are not known to exist in the watershed, or a barrier provides complete blockage to upstream fish movement. Ninety-eight populations (26%) are at minimal disease risk because they are either further than 10 kilometers from significant diseases, or pathogens, or they are protected by a barrier, but the barrier may be at risk of failure. Forty populations (10%) were at moderate risk because disease or pathogens have been identified within 10 kilometers of the conservation population, but not within the same stream segment. Seven populations (2%) are at high risk because disease, or pathogens, are sympatric with the cutthroat population. Thirteen populations (3%) are known to be infected with a significant disease.

Habitat Degradation Concerns:

Continued habitat degradation is one of the major threats to continued improvement of the CRCT status. The CRCT status report and conservation strategy identified poorly managed water development projects, water withdrawal and associated fragmentation by diversion structures, livestock grazing, oil and gas energy development, mining, poor timber management, and associated road building as significant habitat threats to CRCT. The main concern is continued or increased isolation and fragmentation of CRCT populations as a result of habitat perturbations.

Climate Change Concerns:

The impact of climate change on stream environments is an emerging risk to salmonid populations in the western United States. Native CRCT, which are now relegated to isolated high-elevation (>1700 m) headwater stream fragments in the Upper Colorado River Basin, are threatened by predicted changes in climate (i.e., temperature and precipitation) and resulting changes in stochastic physical disturbances (i.e., wildfire, debris flow, and channel drying and freezing) that could further threaten remaining CRCT populations (Roberts et al. 2013). Populations in short stream fragments (<7 km long), and those at the lowest elevations, are at the highest risk of extirpation (Roberts et al. 2013).

Thus, the greatest conservation need is increasing fragment lengths to forestall risks (Roberts et al. 2013).

A US Geological Survey publication, *The Potential Influence of Changing Climate on the Persistence of Salmonids of the Inland West* (Haak et al. 2010), describes a coarse filter analysis conducted using Geographic Information Services. Across the historic range of CRCT, risk scores were aggregated by sub-watershed to determine an area-weighted average score within historic and current range. Increased summer temperature, increased winter flooding, increased wildfire risk, and protracted drought are key climate change concerns.

It is nearly certain that the effects of climate change on CRCT populations will be variable: habitat losses associated with disturbance in one area may be offset by range expansion in another (Wenger et al. 2011). It seems ongoing climate change has resulted in minimal changes to the current range of CRCT, but it is possible changes could accelerate in the future.

Wholesale losses of cutthroat trout populations are unlikely for at least the next several decades (Roberts and Fausch 2012); however, well-defined monitoring programs for both stream temperature and CRCT distribution are necessary to determine where and how cutthroat trout are responding to a warming environment.

Conservation

The goal of the Conservation Strategy for CRCT is to assure the long-term viability of CRCT throughout their historic range. Areas that currently support CRCT will be maintained, whereas other areas will be managed for increased abundance. New populations will be established where ecologically and economically feasible, whereas the genetic diversity of the species is maintained. Cooperators envision a future in which threats to wild CRCT are either eliminated or reduced to the greatest extent possible. Conservation actions that have been implemented for conservation populations include:

- Population restoration and expansion.
- Spawning habitat improvement.
- Riparian restoration.
- Public outreach.
- Culvert replacement.

CRCT Population Surveys, Genetic Analyses, and Fish Population Manipulation:

Key actions will include:

- Continue to locate and assess CRCT populations.
- Conduct standardized surveys and genetic analyses to measure introgression, or purity.
- Expand CRCT

populations through restoration, reintroductions, and nonnative fish control in priority watersheds.

- Maintain an up-to-date database at the Wyoming Geographic Information Science Center with data from a well-designed field monitoring program, to monitor the status of CRCT through time.

CRCT Habitat Manipulations:

Restoration of CRCT habitat needs to address both habitat quality issues and issues of spatial limitations. Current efforts have been directed at improving in-stream conditions and restoring limited stream fragments as well as implementing protective barriers to isolate key populations.

Key actions will include:

- Restore and improve altered channel and riparian zone habitats.
- Restore and enhance water flow, quality, and sediment regimes.
- Address public and private land management, and oil and gas development to protect habitat.
- Monitor and evaluate natural catastrophe impacts, such as fire and drought.

Regulatory Actions to Enhance CRCT Status:

Maintaining the sportfish status of CRCT and using regulations to control overuse will be an important component of maintaining the health of CRCT populations. In addition, working with others to maintain appropriate regulations for prevention of disease, water quality impairment, and habitat disturbance are important considerations.

Key actions will include:

- Maintain or enhance regulatory actions to prevent destruction of habitat.
- Enforce regulatory mechanisms that prevent impacts associated with recreational angling.
- Enhance and maintain regulatory mechanisms that prevent diseases or illegal introduction of nuisance species.

Highest Priority Actions for CRCT by GMUs:

Dolores GMU - Highest Priority Watersheds and projects include:

- Woods Lake 20 miles
- Muddy Creek 2.5 miles
- Fall Creek 4 miles
- Priest Lake 9.9 acres

Gunnison GMU - Highest Priority
Watersheds and projects include:

- Cochetopa Creek 3 miles
- Henson Creek 5 miles
- Deep Creek
- Big Dominguez Creek

Lower Colorado GMU - Highest Priority
Watersheds and projects include:

- Short Lake (East Fork Boulder Cr) 2-acre lake
- Tasha Creek 5 miles
- Boulder Creek 7.5 miles
- Lower Pine Creek 8.5 miles
- Calf Creek 5 miles
- Kolob Reservoir Broodstock Dougherty Basin Fish trap

Lower Green GMU - Highest Priority
Watersheds and projects include:

- None described

San Juan GMU - Highest Priority
Watersheds and projects include:

- Navajo River 2.5 miles
- Hermosa Creek #2 (45802) 5 miles

Upper Colorado GMU - Highest Priority
Watersheds and projects include:

- Payne Creek 1 miles
- Pettingell Lake 1 miles (+10-acre lake) Ranch Creek (South Fork) 1 miles
- Swan River (North Fork) 2.5 miles Butler Creek 3 miles

- Parachute Creek (East Fork) 2 miles Abrams Creek 3 miles Cunningham Creek 2.5 miles Battlement Res #3 10-acre lake

Upper Green GMU - Highest Priority
Watersheds and projects include:

- Middle Fork Sheep Creek 9 miles Tamarack Lake 79 acres
- Lost Lake 3 miles

Yampa GMU - Highest Priority
Watersheds and projects include:

- Coal Creek (East and West) 8 miles
- Cabin Creek (Little Trappers) 2 miles (+30-acre lake)
- Slater Creek (Upper) Muddy Creek 16 miles
- Haggerty Creek (Little and Upper) 1 miles Little Snake (North Fork)
- East Douglass Creek 2 miles Cathedral Complex 4.5 miles Roaring Fork 12 miles

WNTI Completed/Ongoing Projects

Restoring Colorado River Cutthroat Trout in the LaBarge drainage, WY(2006) - \$50,000

N. Fork Little Snake River barrier for Colorado River Cutthroat Trout (CO and WY) (2007) - \$75,000

Bonneville Cutthroat and Colorado River Cutthroat culvert renovation for 3 mi on South Fork Chalk Creek, UT (2007) - \$44,286

Trapper Creek (CO) Fence Enclosure Repair to benefit Colorado River Cutthroat Trout (2008) - \$7,750

Reconnecting 2.4 miles of North Thompson Creek (CO) for Colorado River cutthroat trout (2009) - \$45,000

Riparian Fence Enclosure on Middle Fork

Thompson Creek for Colorado River Cutthroat, CO (2010) - \$6,690

Native Colorado River Cutthroat restoration in the Middle Fork Sheep Creek Drainage Utah (2012) - \$72,000

Fish Passage Milk Creek (CO) Native Colorado Cutthroat Trout Habitat Restoration (2013) - \$50,000

Butler Creek Riparian Restoration (2017) - \$1,150

Wyoming GIS Center Proposal to Develop a Web-based Application for Viewing, Editing, Maintaining Native Cutthroat Databases (2013) - \$18,000

Confluence Barrier-Disturbed Area and Riparian Rehabilitation (2018) - \$2,000

Brewery Outreach/Know Your Native Campaign (2018) - \$3,000

Sheep Creek Lake Fish Trap Kiosk/signage Construction (2018) - \$3,000

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