

Native Cutthroat Trout

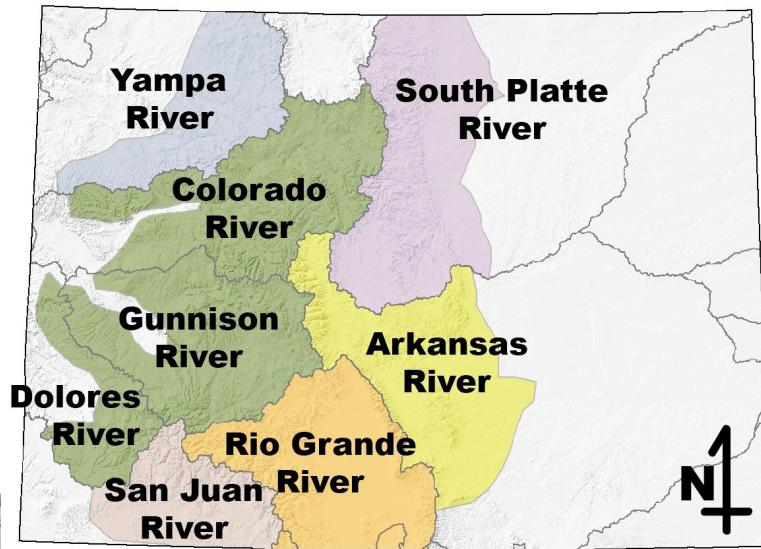
SEPTEMBER 2018



Rediscovery of the San Juan River basin's native trout

Nine years ago, the Greenback Cutthroat Trout Recovery Team commissioned a collaborative study by researchers from the University of Colorado, along with state, and federal biologists to examine Cutthroat Trout specimens collected in the late 1800s and housed in our nation's most prestigious museums. The goal of that study was to establish what the native range of these fish

was prior to European settlement. While these trout look similar to each other in outward appearance, inspection of their DNA revealed that six discrete lineages historically called Colorado home – essentially one in each major drainage basin. Four lineages are still found on the landscape today: two that comprise Colorado River Cutthroat Trout west of the Continental Divide, Greenback Cutthroat Trout in the South Platte River drainage, and Rio Grande Cutthroat Trout in their namesake river basin. The authors



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Specimen collected from the San Juan River by C. E. Aiken in 1874 (now at the National Museum of Natural History in Washington D.C.)

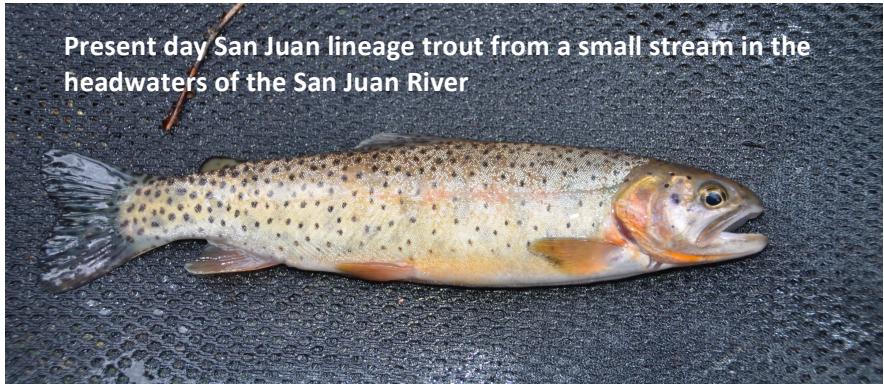
Distinct lineages of Cutthroat Trout evolved in six major drainage basins in Colorado

reported that the remaining two lineages were thought to be extinct: the Yellowfin Cutthroat Trout historically found in the headwaters of the Arkansas River, and one native to the San Juan River that was only known from two specimens collected near Pagosa Springs during the Wheeler Survey in 1874 while mapping the territories in what is now the American southwest.

After learning that a previously unknown lineage of Cutthroat Trout was native to the San Juan basin, we launched an intensive search to determine if any relict populations remained tucked away in the corners of the rugged San Juan Mountains of southwest Colorado.

Approach

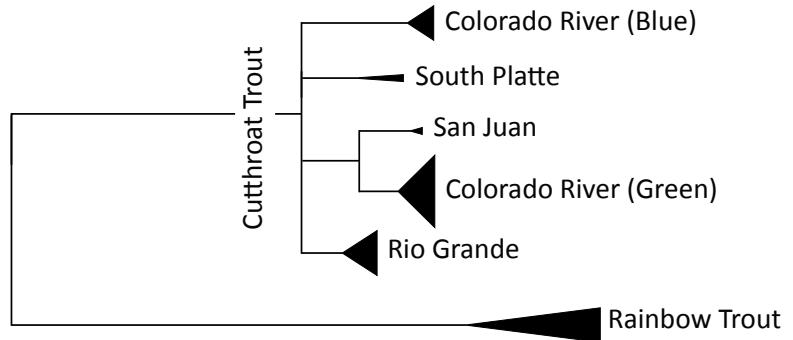
Armed with new genetic markers with which to identify this San Juan lineage trout, we gathered tissue samples (fin clips) from all known cutthroat trout populations in southwest Colorado. We isolated DNA and sequenced a specific mitochondrial gene to identify any candidate fish that might have the same marker as those found in the museum



specimens. We then examined their nuclear DNA to determine if any hybridization had occurred with Rainbow Trout or other subspecies of Cutthroat Trout, or if they appeared to be pure.

Results

- Surveyed the 20 waters thought to contain pure Cutthroat Trout in the San Juan River basin
- Eight of those waters harbored populations containing the same mitochondrial DNA marker found in the two museum specimens collected in 1874
- Examination of nuclear DNA also suggests they are a unique lineage
- No evidence of hybridization with Rainbow Trout or other nonnative Cutthroat Trout lineages was detected



DNA tree comparing relatedness of Colorado's native Cutthroat Trout lineages (from map figure) to each other and Rainbow Trout. Longer branches represent more distant relationships

Management implications

This represents an exciting conservation success story, and is testimony to the effectiveness of our recovery strategies for preserving native trout diversity. Though genetic tools to distinguish these fish were not available until recently, biologists recognized that hidden diversity was likely still out there, and protected populations accordingly. Our conservation efforts will now focus on replicating these populations and securing them from invasion by nonnative trout so that future generations can enjoy this rare piece of Colorado's legacy.