

UNDERSTANDING CUTTHROAT TROUT



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I've been a big fan of Cutthroat Trout (historically, *Oncorhynchus clarkii*) for over 50 years, since that day in late June 1973 when I caught my first one from Yellowstone Lake in Yellowstone National Park (Figure 2). It was during a fishing trip to the Rocky Mountains with my dad, the highlight of my nearly 16 years of life up to that point, and still one of the best experiences I've ever had. In those days, I was obsessed with trout (still am), and I was thrilled by the chance to encounter new species. I had grown up fishing the streams of New York State and had caught many native Brook Trout *Salvelinus fontinalis* and non-native Rainbow Trout *Oncorhynchus mykiss* and Brown Trout *Salmo trutta*. But I had dreamed for years of fishing in the fabled trout waters of the West and seeing the different species found there. When I landed that first gorgeous Yellowstone Cutthroat Trout (historically, *Oncorhynchus clarkii bouvieri*), I whooped for joy and began a lifelong fascination with the species.

My dad and I had great fishing in 1973, and we made plans for another trip the following year. But when we returned to our magic spot on Yellowstone Lake in June 1974, we couldn't get a bite. As we dejectedly followed a small stream back to our car, the reason for our lack of success became clear. It had been a relatively early summer, and the Cutthroats had already left the lake and begun spawning in the tributaries. Stream fishing was closed to prevent disturbance of spawning fish, and although in those days I was more interested in catching than observing, I was nonetheless enthralled by what I saw. Fat ripe females dug redds in the gravel where they would lay their eggs while colorful males jockeyed and fought for access to mate with them. There were dozens of large Cutthroats splashing about in a stream that I could jump across in many places and in water only inches deep. It was one of the greatest wildlife spectacles I'd ever seen, and it made a huge impression. I didn't realize it at the time, but it triggered a deeper interest in fish biology and conservation and ultimately helped steer me to a career in ichthyology and fisheries science.

After two straight years of wonderful experiences on Yellowstone Lake, I figured I would continue to make regular trips



Figure 1. Yellowstone Cutthroat from the Greybull River, WY, in Shoshone National Forest, showing the characteristic red slash under the jaw from which the Cutthroat Trout take their name, July 2023.

Photos by the author unless otherwise indicated.

John Lyons is the Curator of Fishes at the University of Wisconsin Zoological Museum and retired Wisconsin Department of Natural Resources fisheries research scientist (1985–2017). He is a complete fish nerd, interested in all aspects of all fish species in all places, including research, conservation, fisheries management, sport fishing, keeping and breeding fish in aquaria, underwater observation, and cooking and eating fish. He has been fishing for trout since 1966 and working with the freshwater fishes of Wisconsin and the Great Lakes region professionally since 1979 and the freshwater fishes of Mexico since 1986. He received his PhD and MS in Zoology from the University of Wisconsin Madison and his BS in Biology from Union College, Schenectady, NY.



Figure 2. The author with his first Cutthroat Trout from Yellowstone Lake in June 1973. (Photo by Vincent Lyons)



Figure 3. The author after fishing Yellowstone Lake unsuccessfully in September 2015. Cutthroat Trout had become scarce because of non-native Lake Trout predation. (Photo by Mary Kay Lyons)

there to fish for Cutthroats. But life intervened, and it wasn't until 2015—41 years later—that I returned with my wife Mary Kay. My dad passed away in 2003. Yellowstone Lake looked as beautiful as ever, but underneath the surface it was a very different place. Twenty-five years earlier, some misguided soul had illegally stocked non-native Lake Trout *Salvelinus namaycush*, and this large predator had thrived and devastated the Cutthroat Trout population. Only an intensive Lake Trout netting and removal program organized by the National Park Service kept the Cutthroat population from collapsing. The bountiful spawning run I had observed in 1974 was largely a thing of the past, and the bears, eagles, and other wildlife that had preyed on the spawners and their offspring had suffered as a result. The entire ecology of the park had changed. I cast into the lake for

a couple of hours without seeing a fish or having a strike. I was saddened but not surprised (Figure 3).

A CUTTHROAT IS A CUTTHROAT, RIGHT?

Yellowstone National Park has long been a stronghold for Cutthroat Trout, but historically the species was abundant throughout much of the mountain and coastal west of North America. It occupied a vast range encompassing parts of Alaska, British Columbia, Alberta, Washington, Oregon, California, Nevada, Idaho, Montana, Utah, Wyoming, Colorado, New Mexico, and Texas (Figure 4). Across this huge area there was a tremendous variety of Cutthroat Trout forms that differed in appearance, behavior, feeding, habitat use, life history, and maximum size. In a small, icy, unproductive mountain brook, a Cutthroat might mature at 6 inches long and less than 4 ounces in weight and live for less than 3 years while feeding almost exclusively on invertebrates, whereas in a large, deep, productive lake, a Cutthroat might reach more than 30 inches, 20 pounds, and over 15 years of age and feed primarily on smaller fish. Early naturalists described multiple species and subspecies of Cutthroat Trout, often confusing them with each other and with the equally variable and closely related Rainbow Trout. It wasn't until the late 1900s, under the leadership of the late Dr. Robert Behnke of Colorado State University, that significant progress was made in sorting out the different types of Cutthroat Trout and understanding their relationships with each other and with Rainbow Trout (see Behnke 1992, 2002; Trotter 2008). But even today, as we'll see, there is still some uncertainty about the identity, taxonomy, and systematics of the various forms of the species.

What is not uncertain is that Cutthroat Trout have suffered huge losses in distribution and abundance throughout their range. Many populations and distinctive forms have been eliminated and others barely hang on, and the species now occupies just a small fraction of the waters where it was once found. The usual litany of human impacts have caused the declines: water removal and diversions that dried up streams or made them too warm; sewage, industrial, mining, and agricultural discharges that polluted the water; straightening and ditching of streams that eliminated habitat; erosion and siltation from poor land-use that filled pools and smothered spawning gravels; construction of dams that flooded essential habitats, blocked spawning migrations, and unfavorably altered downstream flows and temperatures; and harmful introductions of non-native species that led to substantial losses, including whirling disease caused by the parasite *Myxobolus cerebralis*, competition with Brook Trout, predation from Brown Trout and Lake Trout, and interbreeding with Rainbow Trout to produce a hybrid form, the "Cutbow." The devastating Lake Trout addition to Yellowstone Lake was only the latest in a long list of destructive introductions. In many areas, Cutthroats are now restricted to remote, high-altitude, wilderness headwater areas, but even there, climate change looms as an existential threat.

Cutthroat Trout have always been a popular sport and food fish, but for many years, the great variety within the species was often not recognized or was ignored in fisheries management. Consequently, some past efforts to improve fishing instead contributed to population deterioration and loss of biodiversity within the species. From the earliest days of Euro-American settlement of the West, the various Cutthroat Trout forms were moved about and introduced well outside their native ranges with little regard

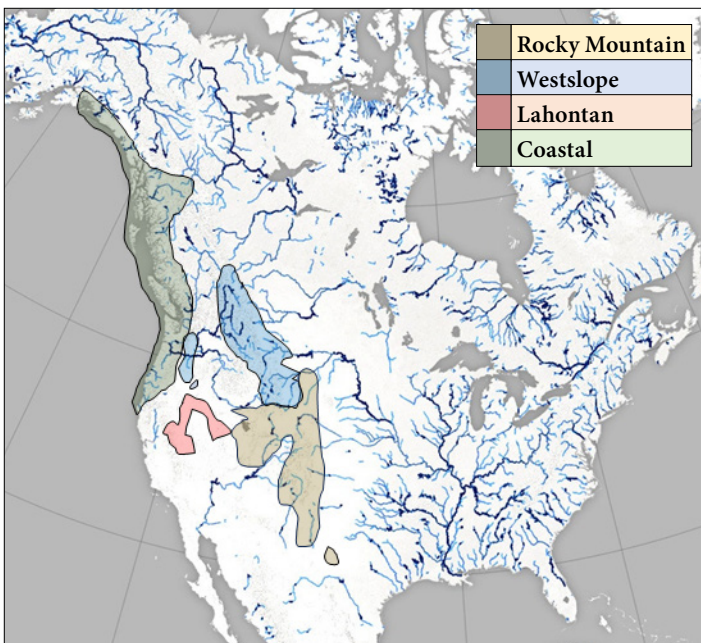


Figure 4. Map of the historical distribution of Cutthroat Trout.



Figure 5. Hidden Valley Creek, CO, in Rocky Mountain National Park, August 1984. What were thought to be Greenback Cutthroats had been reintroduced successfully here, but later genetic analyses revealed they were actually Colorado River Cutthroats.



Figure 6. A Colorado River Cutthroat (probably Green-Yampa UIEU) from Hidden Valley Creek, originally thought to be a Greenback Cutthroat, August 1984.

for the local adaptations each form had developed. Non-native forms of Cutthroat were stocked on top of native forms, resulting in hybridization and the loss of the characteristics that made each form unique. Mixing created populations of “mongrels” that often didn’t do as well as either of the original forms. Co-introductions of other trout species to diversify fishing opportunities usually resulted in the Cutthroat Trout declining. But interestingly, stocking sometimes preserved forms that otherwise would have gone extinct. Take, for example, the Greenback Cutthroat Trout (historically, *Oncorhynchus clarkii stomias*).

Prior to Euro-American settlement, the Greenback Cutthroat was found in the mountain reaches of the South Platte River drainage in the Missouri-Mississippi River basin to the west and north of Denver in north-central Colorado and southeastern Wyoming. Once widespread and abundant, it was believed to be extinct by 1937, a casualty of habitat loss, pollution, dams, and stocking of non-native trout. Then in the 1950s, a few small populations that appeared to be Greenback Cutthroats were discovered in remote mountain streams high up in the Rockies in the South Platte and Arkansas river drainages. The Arkansas River drainage is just south of the South Platte and, like the South Platte, ultimately flows into the Mississippi River and from there the Gulf of Mexico. Fish from these populations were brought into

hatcheries, propagated, and re-introduced in South Platte River drainage streams, primarily in Rocky Mountain National Park. The stocked fish did well and began to reproduce, and it appeared that the subspecies had been restored. The recovery of the Greenback Cutthroat was hailed as an important conservation success story. During a July 1984 visit to Rocky Mountain National Park, I fished one of the reintroduction streams, Hidden Valley Creek (Figure 5), and I was delighted to catch one of these re-established Cutthroats (Figure 6).

In the early 2000s, biologists began to employ newly developed genetic techniques to look at Cutthroat Trout relationships. When they examined the re-established populations from Rocky Mountain National Park and elsewhere, they found, to their dismay, that they were not Greenback Cutthroats but rather a different but very similar subspecies, the Colorado River Cutthroat Trout (historically, *Oncorhynchus clarkii pleuriticus*). This revelation was big news in the region and caused some embarrassment for the multi-agency restoration team that had worked so hard to bring back the Greenback Cutthroat. Colorado River Cutthroats are native to the upper Colorado River basin, which ultimately drains to the Gulf of California and the Pacific Ocean, in parts of Colorado, Wyoming, and Utah. It appears that the small high-mountain streams that had been believed to have native Greenback Cutthroats were really non-native populations established in the late 1800s from stockings of Colorado River Cutthroat Trout. Sadly, the Greenback Cutthroat, designated as the official state fish of Colorado in 1996, once more appeared to be extinct.

But then in 2012, ongoing genetic analyses provided some good news. Cutthroat Trout from Bear Creek, a somewhat degraded stream within the city limits of Colorado Springs and located in the Arkansas River drainage, were shown to be true Greenback Cutthroat Trout. This population was not native but had been established in the late 1800s by a transfer of Greenback Cutthroats from the South Platte drainage. The hatchery propagation program was restarted with fish from Bear Creek, and confirmed Greenback Cutthroats were stocked in the headwaters of Clear Creek, a tributary of the South Platte, beginning in 2014. In 2022, the first successful natural reproduction of these fish was confirmed, and the recovery team is hopeful that this time around they will be able to bring back the real Greenback Cutthroat Trout. In this case, the past stocking of the Greenback Cutthroat outside of its native range kept it from disappearing.

WHAT IS A CUTTHROAT TROUT?

The Greenback Cutthroat story makes it clear that the conservation of the biodiversity within Cutthroat Trout requires a better understanding of the status and characteristics of each unique form and a surefire way to identify them. This is especially true for formal legal protection measures such as listing a population or subspecies under the US Endangered Species Act. But to date, scientists have not been able to come to a consensus about how many different Cutthroat Trout forms there are, how they are defined, what they should be called, and exactly where they still occur in a “pure” condition. Although many forms look quite different, there is enough variation and overlap in morphology that genetic analysis appears to be the only way to resolve identities. But years of stocking have intermingled different forms and created mixed populations. Hybridization with Rainbow Trout further confuses the picture. Genetic analyses

are more time consuming and expensive than morphological analyses, limiting the extent and degree to which they can be applied. But ichthyologists, fisheries scientists, and conservation biologists continue to work on the species, and each year our knowledge and understanding grows.

In 2015, a workshop was convened at the annual meeting of the American Fisheries Society in Portland, Oregon, that brought together key fisheries scientists, conservationists, and geneticists working on the Cutthroat Trout. The two days of presentations and discussions of the latest data and ideas about Cutthroat Trout classification and status and subsequent follow-up analyses were summarized in a fascinating book (Trotter et al. 2018). Although the group did not agree on all points and many areas of uncertainty remain, the workshop was a huge step forward and clarified many formerly confusing aspects of Cutthroat taxonomy. Let's review how the workshop has advanced our understanding of Cutthroat Trout.

Prior to the workshop and based mainly on the work of Behnke, who died in 2013, the Cutthroat Trout was thought to be most closely related to the Rainbow Trout and to have 14 different subspecies in four major lineages. The Coastal Cutthroat Trout *O. clarkii clarkii* lineage was found in Pacific Coast drainages from northern California to southcentral Alaska. The Westslope Cutthroat Trout *O. clarkii lewisi* lineage occurred in the northern Rocky Mountains straddling both sides of the Continental Divide from extreme northwestern Wyoming through Idaho, Montana, British Columbia, and Alberta, with isolated populations east of the Cascade Mountains in Washington and Oregon. The Lahontan Cutthroat Trout *O. clarkii henshawi* lineage was known from several drainages in the western and northern endorheic (i.e., interior basin with no outlet to ocean) Great Basin in northeastern California, southeastern Oregon, and northern Nevada, and contained four additional subspecies: Paiute *O. clarkii seleniris*, Humboldt *O. clarkii humboldtensis*, Alvord *O. clarkii alvordensis* (pure forms extinct), and Willow-Whitehorse (not formally described and sometimes considered part of the Humboldt Cutthroat). The Yellowstone Cutthroat *O. clarkii bouvieri* lineage occupied the upper Yellowstone River drainage on the east side of the Continental Divide, the upper Snake River drainage on the west side, and eastern drainages of the Great Basin, and included six additional subspecies: Bonneville *O. clarkii utah*, Colorado River *O. clarkii pleuriticus*, Snake River Fine-Spotted *O. clarkii behnkei*, Greenback *O. clarkii stomias*, Rio Grande *O. clarkii virginalis*, and Yellowfin *O. clarkii macdonaldi* (extinct). Behnke proposed that Cutthroat Trout first arose in the Pacific Coast region, making the Coastal Cutthroat the most primitive (earliest) lineage, and that this ancestral form then gave rise to the Westslope Cutthroat, which ultimately evolved into the Yellowstone and Lahontan lineages.

The 2015 workshop confirmed much of Behnke's classification, including the close relationship between Cutthroat and Rainbow Trout and the validity of the four main lineages of Cutthroats, Coastal, Westslope, Lahontan, and Yellowstone. But the participants proposed different evolutionary relationships between the four lineages, which most argued were distinct enough genetically to be considered full species, and they recognized a total of 25 different possible subspecies, or as they preferred to term them, "Uniquely Identifiable Evolutionary Units" or UIEUs. In their updated classification, the earliest Cutthroat Trout arose in the

Lahontan area of the Great Basin and then split into a form that became the Coastal Cutthroat lineage and a different form that eventually diversified into the Westslope, Rocky Mountain (which Behnke had termed Yellowstone), and modern Lahontan lineages. The workshop agreed with Behnke that there was only one form of Coastal Cutthroat, but they proposed nine UIEUs within the Westslope lineage (vs one), nine (one of which was now extinct) within the Rocky Mountain lineage (vs seven), and six (one of which was now extinct) within the Lahontan (vs five). Most additional UIEUs represented further subdivisions of Behnke's subspecies, but some UIEUs were newly defined and combined populations previously believed to be part of different subspecies. Of particular interest to anglers, the Snake River Fine-Spotted Cutthroat of Behnke, a popular sport fish in Grand Teton National Park in Wyoming, was subsumed into the Yellowstone Cutthroat. Even though the two forms differ in spotting patterns, they overlap in all other morphological characteristics and have no consistent genetic differences. But the status of the Snake River Fine-Spotted Cutthroat remains under investigation.

In 2023, based on the results of the 2015 workshop, the Names of Fishes Committee of the American Fisheries Society and the American Society of Ichthyologists and Herpetologists, which every 10 years or so publishes a list of official common and scientific names for North American fishes, concluded that there were now four different species of Cutthroat Trout rather than just one. They were the Coastal Cutthroat *Oncorhynchus clarkii* (with 1 UIEU), the Lahontan Cutthroat *O. henshawi* (6 UIEUs), the Westslope Cutthroat *O. lewisi* (9 UIEUs), and the Rocky Mountain Cutthroat *O. virginalis* (9 UIEUs) (Page et al. 2023). The Coastal Cutthroat retained the original Cutthroat Trout scientific name because it was the first of the four species to be formally described, and the Rocky Mountain Cutthroat was given the species name of the Rio Grande form rather than the Yellowstone form because the Rio Grande form had been described earlier and therefore had nomenclatural priority even though the lineage had been known as "Yellowstone" for many years. It will take a while for native fish enthusiasts and anglers to learn of and adopt these new names, but keep in mind that if you're a life-lister, you now have three new species to chase!

A VISIT WITH SOME OF THE DIFFERENT FORMS OF CUTTHROAT TROUT

I still love to catch different kinds of trout, and one of my bucket list items is to see as many of the remaining 23 of the original 25 Cutthroat Trout UIEUs as I can before I die. Right now, I'm just at seven, eight if you count the Snake River Fine-Spotted. So, I've got a long way to go. Let's look at the forms I've encountered so far.

ROCKY MOUNTAIN CUTTHROAT TROUT: Yellowstone Cutthroat

Of course, this was the first form I ever saw. After 1973–74, the next time I caught them was on a fishing trip to the Boulder River, Montana, just northeast of Yellowstone National Park, in 1991, and then again, this past summer, in north-central Wyoming, east of Yellowstone National Park. In July 2023, I took a fishing trip to Wyoming with a good friend and fishing buddy, Greg Pils, and we tried to complete the Wyoming Game and Fish Department's "Cutt Slam." To complete this program, you



Figure 7. North Fork of the Tongue River, WY, in Big Horn National Forest, home of introgressed Yellowstone Cutthroat, July 2023.



Figure 8. Yellowstone Cutthroat from the North Fork of the Tongue River, WY, in Big Horn National Forest, July 2023. Fish here show evidence of introgression with Rainbow Trout. Note the more numerous and smaller spots, especially in the anterior part of the body, a Rainbow Trout characteristic. Compare with the Yellowstone Cutthroats in Figures 1 and 10.



Figure 9. South Fork of the Wood River, WY, in Shoshone National Forest, home of pure Yellowstone Cutthroat, July 2023.



Figure 10. Pure Yellowstone Cutthroat from South Fork of the Wood River with typical coloration, July 2023.

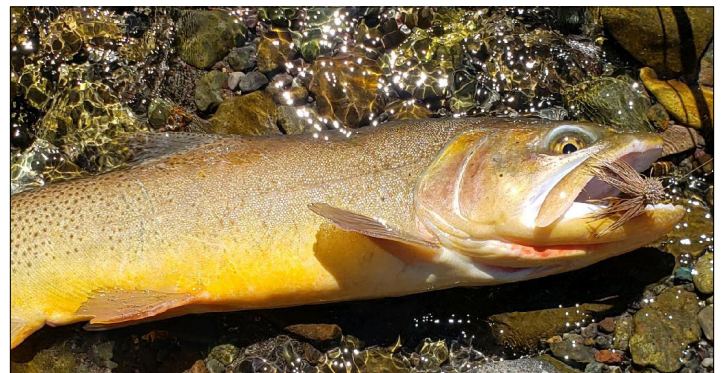


Figure 11. Pure Yellowstone Cutthroat from the Wood River, WY, in Shoshone National Forest, showing the yellow coloration of some fish, July 2023. Photo by Andy Pils.

must catch each of the four Cutthroat Trout subspecies/UEIUs currently found in Wyoming: Yellowstone, Snake River Fine-Spotted, Bear Lake (formerly part of Bonneville), and Colorado River. Greg's brother Andy is a wildlife biologist for the US Forest Service and a fine angler, and he guided us to great spots on the North Fork of the Tongue River in Big Horn National Forest and the Greybull, South Fork of the Wood, and Wood rivers in Shoshone National Forest, where he works, for Yellowstone Cutthroats. The fish we caught from the North Fork of the Tongue (Figure 7) were beautiful fish, but they didn't appear to be pure, having too many small spots (Figure 8). Apparently, they had a history of hybridization and introgression with Rainbow Trout. But the remaining three rivers yielded gorgeous unadulterated Yellowstone Cutthroats (Figure 9, 10). Even then, there was noticeable variation in cutthroat appearance within each river, with most fish having a tan or reddish cast but a few being distinctly yellowish. (Figure 11).

Snake River Fine-Spotted Cutthroat

Although the latest data suggest that these are merely Yellowstone Cutthroats with more spots, most anglers and fisheries management agencies still recognize and treat them separately because they look so dissimilar. They are also an iconic part of



Figure 12. Greg Pils fishing in the Gros Ventre River, WY, in Bridger-Teton National Forest, home of the Snake River Finespotted Cutthroat, July 2023.



Figure 13. Snake River Cutthroat from the Gros Ventre River, July 2023. Note the more numerous and smaller spots compared to the Yellowstone Cutthroats in Figure 1 and 10 even though there are minimal genetic differences between the two forms.

the Grand Teton National Park ecosystem. I had fished for them briefly during my 2015 western trip in the Gros Ventre River, a major Snake River tributary. The water had been low and clear and the fishing tough, and although I had briefly hooked a couple, I couldn't bring either to the net for a photo. In some ways losing a fish is worse than never having a strike at all, so I was determined to come back and have another go. During our July 2023 trip, Greg and I again fished the Gros Ventre (Figure 12) higher up than before and outside the National Park in the Bridger-Teton National Forest, but now the flows were greater and the fish more cooperative. Together we caught 10 fine specimens, and we marveled at how different they looked from the Yellowstone Cutthroats we'd caught in the days before (Figure 13). One of the best things about Cutthroat Trout fishing is that they live in beautiful places, and it's hard to image a more spectacular setting than the Grand Tetons (Figure 14).



Figure 14. The Grand Teton Mountains in Grand Teton National Park, center of the range of the Snake River Finespotted Cutthroat, July 2023.

Colorado River Cutthroat (Green-Yampa UIEU)

My first encounter with this subspecies was my 1984 non-native fish from Rocky Mountain National Park, but during my July 2023 trip I had a chance to see this form within its native range. All the online sources as well as my colleague and fishing friend Bryan Maitland, who had gotten his Ph.D. at the University of Wyoming and completed the Wyoming Cutt Slam, recommended that the most easily accessible place to catch them was Labarge Creek in southwestern Wyoming, a tributary of the Green River. This creek held Colorado River Cutthroat historically, but they had nearly disappeared by the late 1900s because of interactions with non-native trout. In the early 2000s the entire upper creek system was poisoned to kill all fish present, a dam was built to prevent recolonization from downstream, and pure Colorado River Cutthroats were stocked. Soon these Cutthroats were reproducing, and the stream was re-opened to sport fishing with strict regulations to preserve the population.

Labarge Creek flows through a beautiful valley, and it was a delight driving up a lightly traveled dirt road from the sagebrush cattle ranches of the lower elevations to the pines and spruces of higher elevations in Bridger-Teton National Forest. We passed the barrier dam and several pull-offs with signage describing the Colorado River Cutthroat restoration. A few miles farther upstream we found a good spot and prepared to fish. As we were rigging up, a Wyoming Game and Fish Department Conservation Warden stopped to chat. He was friendlier and more laid-back than the conservation wardens I worked with from Wisconsin, and we got into a discussion about fishing. When I asked him for advice about fishing Labarge Creek, he said "Go somewhere else." Apparently, the fishing in the creek had been terrible, and he had yet to talk to any anglers in 2023 who had actually caught anything. This was not good news, but it was too far to go to another Colorado River Cutthroat stream, so we resigned ourselves to give Labarge Creek a try. Maybe we were better anglers than all those others?

After an hour of fishing, it was clear that we were not. We covered some beautiful water with a variety of flies but had no strikes. We even walked through several good holes trying to get a glimpse of any trout present scurrying away. But the water appeared fish-

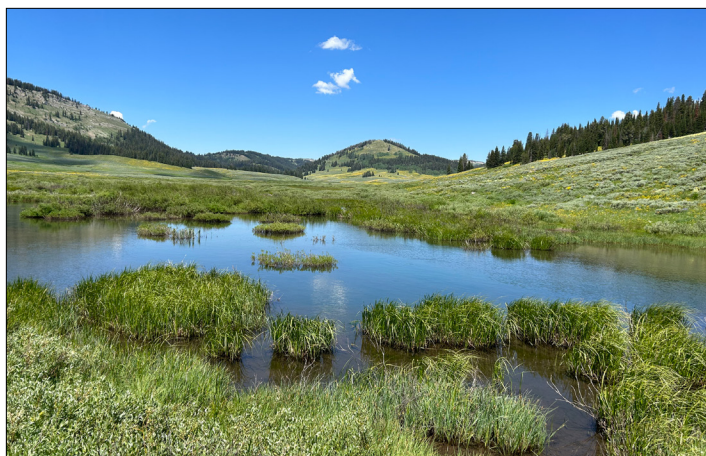


Figure 15. Labarge Creek, WY, beaver ponds in Labarge Meadows in Bridger-Teton National Forest, home of the Colorado River Cutthroat, July 2023.



Figure 16. Colorado River Cutthroat (Green-Yampa UIEU) from Labarge Creek, July 2023.



Figure 17. The lower reaches of Smiths Fork, WY, downstream of Bridger-Teton National Forest, home of the Bear Lake Cutthroat, July 2023.



Figure 18. Bear Lake Cutthroat from Smiths Fork, July 2023. Photo by Greg Pils.

less. Dismayed, we continued up the valley and speculated about what might have happened to all the fish.

Near the top of the valley, we reached Labarge Meadows, an important resting area on the Oregon Trail used by westward migrants during the 1800s. It was a beautiful spot, and we stopped to admire the view. The creek at this point was quite small and had been impounded into a series of marshy beaver ponds (Figure 15). This was where Bryan had caught his Colorado River Cut. In one of the ponds, I saw a fish rise to the surface to take an insect. We investigated further and noticed a few small trout. This was all the encouragement we needed, and we grabbed out gear and began to fish. Right away Greg caught a small Colorado River Cutthroat. I took pictures (Figure 16) and expected that we would soon catch more. But the fish proved to be scarce and not very cooperative. We worked hard for the next three hours, and we each had a couple of strikes, but that was it. We had to move on to stay on schedule. Greg was still in the running for the Cutthroat Slam, but I was out. Fortunately, I had some good pictures. But why the Colorado River Cutthroats in Labarge Creek had declined so much remains a mystery.

Bear Lake Cutthroat

At the top end of the valley of Labarge Creek, we crossed a basin divide and entered the range of the Bear Lake Cutthroat, formerly considered part of the Bonneville Cutthroat. We drove down the valley of the Smiths Fork, which flows into the Bear River and ultimately the Great Salt Lake. The Smiths Fork was just as beautiful as Labarge Creek, flowing through a steep and heavily wooded mountain valley. Once we got to a point where the stream had sufficient water, we stopped to try our luck. But it was déjà vu all over again, and as in Labarge Creek, the great-looking habitat apparently had no fish. What was going on?

After two fruitless hours, we continued downstream into the lowlands to spend the night in Cokeville. There we talked to our motel clerk who had had good Cutthroat fishing in the lower Smiths Fork just the week before. Buoyed by that knowledge, the next morning we fished where he recommended, which was much lower down in elevation and in sagebrush rangeland instead of

mountain forest (Figure 17), and between us we landed nine Bear Lake Cutthroats. I thought that one of the fish that Greg caught was the prettiest cutthroat of our trip (Figure 18), and that's saying something. Our difference in success between upstream and downstream was curious, and we hypothesized that the Cutthroats in Smiths Fork must move downstream to bigger water during the winter and spring and only occupy the cold headwaters during the hottest part of the year in late summer. But regardless of the explanation, Greg had successfully completed the Wyoming Cutthroat Slam!

Bonneville Cutthroat

As if the Wyoming Cutt Slam wasn't enough, in fall 2023 I continued my quest to find different Cutthroat UIEUs. On vacation in late September with my wife, Mary Kay, we traveled to Great Basin National Park in eastern Nevada to look for, among other things, Bonneville Cutthroat Trout. This is the most remote and least visited national park in the Lower 48, a mountainous "sky island" of relatively moist high-elevation habitats surrounded by desert, and it is well known for its clear air, dark night skies, and brilliant stars. Because of its isolation and lack of visitors, accommodations are quite limited, and we ended up staying in a cabin at Hidden Canyon Ranch Resort, about 15 miles outside the park and down a long dirt road that would be dicey in any sort of rain. But the cabin was fine, if basic. The canyon was beautiful, and the night skies were amazing. Best of all, it had a stream, Big Wash, purported to hold Bonneville Cutthroat. Bonneville Cuts were also known from a few streams in the park, but having them where I was staying was a big appeal.

We arrived at the resort in the late afternoon after a long but enjoyable drive from Las Vegas through many miles of empty, open, high desert. As we checked into our cabin, I asked the clerk how the fishing was in Big Wash. She gave me a strange look and said that no one fished in the stream because it didn't have any fish. I replied that their website had said that trout were present. On no, she said, there might be some trout farther downstream, but at the resort the stream was "too fast" for trout.

I was dismayed by this and a bit down as we went to our cabin, though the "too fast" comment didn't make sense to me. I could hear the stream rushing through the thick brush nearby as we unloaded our luggage, so I decided to take a look. It took some effort to get to the stream, but once I pushed my way through the thick vegetation, I was excited by what I saw. There was a small check dam, designed to prevent headward erosion and to allow water diversion for irrigation, and below it was a particularly trouty-looking deep plunge pool (Figure 19). I hustled back to the cabin and grabbed my gear. On my first cast with a small sinking fly, a nice trout flashed out from underneath the bank and grabbed it, but it quickly shook free. I was pumped! There was at least one trout in the stream, and only 50 feet from where we were staying! I flipped my fly back in, and the trout grabbed it again, but once more shook off. The next cast, the same thing happened. By now, the trout had apparently learned its lesson, and subsequent casts elicited no response. I was worried. Maybe this was the only pool in the whole creek with trout, and maybe I had blown it. I took a few deep breaths and changed to a float-
ing fly. On my first cast, I watched a trout, maybe the same one,



Figure 19. Plunge pool below a small check dam on Big Wash, NV, home of the Bonneville Cutthroat, September 2023.



Figure 20. Bonneville Cutthroat from Big Wash, NV, September 2023.

slowly rise up and sip in my fly. For once I didn't strike too soon or too hard and I hooked the fish. I played it carefully for about 20 seconds and was just getting ready to land it, but suddenly it came loose. I couldn't believe it. My heart was pounding, and my blood pressure was skyrocketing. This couldn't be happening! I really was going to blow it.



Figure 21. The pool on “Stream X,” NM, where I was successful at catching a Rio Grande Cutthroat, October 2023.

Despondent, I sat for a while to calm down. Then, not expecting much, I put on a different floating fly and cast into the pool. To my amazement, a different trout emerged, slowly rose, and took the fly. I was so surprised I didn’t have time to over-react, and the trout hooked itself. My luck changed and the fish remained on the line, and I was soon able to slide a beautiful 10” Bonneville Cutthroat into my net (Figure 20). I was ecstatic, and my pulse and blood pressure rose even further, but for a very different reason.

By then it was getting dark, so I quit for the day. But at first light I was back, fishing the entire half mile of stream within the resort. The stream was small, steep, and extremely brushy, and the going was tough. Most areas were too shallow and fast to hold trout, so the clerk hadn’t been completely off base. But there were about a half dozen more check dams that had good pools. Not all held fish, but from them I managed to catch two more Bonneville Cutthroats and lose a couple more. And it turned out that it was good that I had succeeded in Big Wash. The streams in Great Basin National Park that I saw were even smaller, steeper, brushier, and had significantly less favorable holding water than Big Wash, and it would have taken a lot of effort to catch any trout from them. Quite happy with my fish from the resort, I didn’t even try to fish in the park and instead just enjoyed the beauty of a really wonderful place.



Figure 22. Rio Grande Cutthroat Trout (Pecos Strain) from Stream X, October 2023.

Rio Grande Cutthroat

You may recall my expedition to find this subspecies in 2022 as recounted in “In Search of New Mexico’s Native Trout” in the Spring 2023 (volume 48, number 2) issue of *American Currents*. There I told how I spent two days stumbling around the southwestern Sangre de Cristo Mountains on a bit of a wild goose chase searching for Rio Grande Cutthroats before finally catching one that had some Rainbow Trout in it as well and then promptly fumbling it and letting it escape back to the stream before I could take a picture. The article triggered a contact from fellow native trout enthusiast, Craig Springer, who generously revealed to me a different fishing spot near Santa Fe. His only condition was that I not divulge the name or precise location of the stream. So, in October 2023, on a visit to Albuquerque to meet some old high-school friends and on my third trip of the year to Cutthroat Country, I took a day to visit “Stream X” in the Pecos Wilderness of the Santa Fe National Forest in the southeastern Sangre de Cristo Mountains. Unlike my 2022 streams, which drained to the Rio Grande River, this stream ultimately drained to the Pecos River, and the Cutthroats it held looked somewhat different than my 2022 fish, although both populations were part of the same UIEU.

I arrived at the stream about noon on a cool mid-October day after a long drive. The stream was absolutely beautiful, as is the case for all areas where Cutthroats still thrive, but it was quite brushy, small, and steep and full of obstructions and the going was difficult (Figure 21). Following Craig’s advice, I worked my way a few hundred yards upstream of my access point before I started. Things did not start well. I first managed to catch my fly rod in a tree branch and break the tip. This didn’t make the rod unusable, but it made my casting more erratic. Then, more seriously, I stumbled while climbing over a large fallen tree and nearly impaled myself on a broken branch. For once, my big belly proved an asset, cushioning my fall and preventing the branch from penetrating my stomach. But it left a nice bruise. And it was sobering to think that if I’d fallen a little harder or if the branch had been a little sharper, I would have found myself with an abdominal punc-



Figure 23. Avalanche Lake, MT, in Glacier National Park, home of the Westslope Cutthroat Trout, September 2015.



Figure 24. Westslope Cutthroat Trout (Neoboreal UIEU) from Avalanche Lake, September 2015. Photo by Mary Kay Lyons.

ture wound a half-mile of difficult walking from my car in an area with no cell service.

Worst of all, the fishing was terrible. There were lots of good habitat, and I covered it thoroughly, but I had no response. In many pools I could see fish finning in the open. They weren't alarmed by my casting, but no matter what I tried, they showed no interest in my flies. Nothing worked. Finally, I got to a nice pool where I could see four to five fish. I was running out of time and that now all-too-familiar feeling of panic that I was blowing my one chance threatened to overwhelm me. I determined that I would fish this pool until I either spooked all the fish or caught something. I first tried some sinking flies that drifted right in front of the fish. They ignored them. Then I used some floating flies that Craig had recommended, but they passed overhead unnoticed. After several casts with no reaction, one of my floating flies sunk, and I began to pull it slowly through the pool in preparation for another cast. To my surprise and delight, a small fish turned and inhaled it as if it was the one food item it had been waiting for all day. I set the hook, quickly derricked the poor fish out on to the bank, and pounced on it before it could flop back into the stream. Woo Hoo! What a beautiful trout (Figure 22)! I held the fish carefully and snapped several pictures before gently releasing it back to the stream. I was elated.

OK, I had cracked the code and would now catch many more trout, right? You can guess the answer. No. I tried the sinking fly technique for the other fish in this pool and in several more pools but got no reaction whatsoever. The fish just weren't biting. The fickle fish gods had smiled briefly, and I had been able to seize my one and only chance. I was happy, and I quit for the day and began the long drive back to Albuquerque to meet up with my friends.

WESTSLOPE CUTTHROAT TROUT: Neoboreal Cutthroat UIEU

During my 2015 western trip, we visited Glacier National Park, a stronghold for Westslope Cutthroats. Although fishing was not the primary goal, I was determined to spend an hour or two trying for this species. A hike into Avalanche Lake

provided me with an opportunity. There was a popular, well-worn, and relatively easy 2.5-mile trail into this spectacular high-mountain lake, and we walked with several other people. Normally I prefer solitude in wild areas, but here I was happy to have company. Grizzly bears are common in Glacier and represent a small but real risk, and I figured that the more people there were, the less of a target I would be. I knew I couldn't outrun a grizzly, but I was pretty sure I was faster than the elderly couple just ahead of us.

Avalanche Lake absolutely lived up to the hype and was incredibly beautiful (Figure 23). Its water looked transparent and evoked hackneyed descriptors used by past fishing writers such as "gin clear" or "pellucid." It was easy to see Westslope Cutthroats finning through the shallows and occasionally rising to the surface to inhale small insects. I was excited. As soon as I had caught my breath from the high-altitude hike and had taken a few photos, I quickly rigged up my fly rod. My first cast to a rising fish produced a strike, but the fish shook itself off. A few minutes later I hooked another fish, but it again escaped, and the process repeated itself a few minutes after that. I was in my usual panic. My fishing had spooked the remaining fish within casting range, and I feared I had missed my one chance at a Westslope Cutthroat. I kept casting despite not seeing any more feeding fish. But then my luck turned. As I checked my watch to see how few minutes I had before we needed to start



Figure 25. Coastal Cutthroat Trout. (Drawing by Joseph Tomelleri, used with permission)

our walk back, a Westslope Cutthroat rose from the bottom and took my fly. I played the fish as carefully as I could and finally beached it in the shallows. The fish was as beautiful as the lake and well worth the exertion of the hike and the tension of the fishing (Figure 24).

COASTAL CUTTHROAT TROUT

The Coastal Cutthroat Trout (Figure 25) is the only Cutthroat species I've caught while doing scientific sampling rather than sport angling. In June 1997, my late colleague and great friend Phil Cochran and I traveled to the annual meeting of the American Society of Ichthyologists and Herpetologists in Seattle, Washington. Phil and I were studying non-parasitic "brook" lampreys at the time, so we arranged to arrive a couple of days early and survey streams in the Seattle area for the Western Brook Lamprey *Lampetra richardsoni*. We visited a variety of sites and were ultimately successful, although the place where we found the lampreys was a bit unexpected. Juanita Creek was in a heavily suburbanized area east of Seattle and flowed through people's backyards. Usually streams in this sort of setting show evidence of degradation, but the habitat here had remained good and the fish community healthy, and, to my delight, we also caught numerous small Coastal Cutthroats and Coho Salmon *Oncorhynchus kisutch*. Coastal Cutthroats have many more spots than most other forms of Cutthroat Trout and we were struck by the similarity of them to Rainbow Trout, with which they often co-occur naturally but only rarely hybridize. Only the red slash under their jaws convinced us that we'd actually caught Cutthroats. We preserved some of the lampreys we caught, but foolishly took no pictures of the habitat or the Cutthroats or Cohos. In the era before cell phone cameras, I missed many great photo opportunities.

The Coastal Cutthroat is the only Cutthroat that goes to sea, although not all populations do, even if they have ready access. The ocean-going Coastal Cutthroats typically occur alongside anadromous Pacific Salmon species, as we found in Juanita Creek, but their life histories are a bit different. Salmon spend their early life in a freshwater stream or river and then migrate to the ocean at a small size and early age. They live there continuously for one to four years, often moving hundreds or even thousands of miles from the coast, and they grow large, from 5 to 50 pounds depending on the species. They then return to fresh water to mature, spawn, and die. In contrast, Coastal Cutthroats may move back and forth between the ocean multiple times during their

life, occupying the ocean for the summer and fall each year for feeding before moving back into fresh water to overwinter and then spawn in the spring. While in the ocean, they rarely go far from the mouth of their home river, and they don't grow nearly as much as salmon. Most adult ocean-going Coastal Cutthroats are only 1-2 pounds, and anything over 5 pounds is a trophy. They do not automatically die after reproduction, and they may spawn multiple times during their lifespan. Coastal Cutthroats remain common in some areas, but, like their salmon cousins, they have declined because of dams, habitat loss, pollution, and introductions of non-native species.

LAHONTAN CUTTHROAT TROUT

I've yet to see any Lahontan Cutthroats (Figure 26), although catching one is at the top of my list. This species produced the largest Cutthroat Trout ever caught, a 42-pound fish from Pyramid Lake, Nevada, in 1925. Pyramid Lake, located about 30 miles north of Reno, is the largest and deepest lake remaining from vast glacial Lake Lahontan, which filled much of the northwestern Great Basin at the end of the last ice age. During the late 1800s and early 1900s, Pyramid Lake was well known for its numerous and large Cutthroats and supported a commercial fishery that provided fresh fish to San Francisco and a sport fishery that attracted anglers interested in catching trophies. But even as the lake was yielding massive fish, human activities were dooming the population. In 1905, Derby Dam was built on the Truckee River about 45 miles upstream of Pyramid Lake to provide irrigation water for regional agriculture. The Truckee River was the primary spawning area for Pyramid Lake Cutthroats. The dam blocked access to upstream spawning areas and diverted so much water that no spawning habitat remained downstream. Over the ensuing decades, the lack of water inflow caused the level of Pyramid Lake to drop by 80 feet, and a huge shallow delta developed at the mouth that further blocked access to the river from the lake even in those rare wet years when the lower Truckee River had sufficient water. Pyramid Lake Cutthroats are long-lived, and they persisted for many years after the dam became operational, but with no reproduction the population steadily declined, and by the late 1930s they were gone.

Pyramid Lake lies within the reservation of the Pyramid Lake Paiute Indian Tribe, and Cutthroat Trout have always been important to the tribe. In the 1970s, the Paiutes, along with the US Fish and Wildlife Service and the State of Nevada, began a stocking program to restore the Pyramid Lake population. The source of most of the stocked fish was Summit Lake, located about 100 miles north and not connected to Pyramid Lake and wholly within the reservation of the Summit Lake Paiute Indian Tribe. Owing to the habitat protections and management of the tribe, Cutthroat Trout still thrived in Summit Lake. The stocking program was successful, and a Cutthroat Trout population was re-established in Pyramid Lake. However, natural reproduction was negligible and regular additions of Summit Lake fish were required to maintain it. Anglers returned to the lake and began catching nice-sized Cutthroats, although not nearly as big as in the early 1900s.

The historically large size of Pyramid Lake Cutthroats seems to have a genetic basis. Summit Lake Cutthroats are not identi-



Figure 26. Lahontan Cutthroat Trout from Pyramid Lake, NV. (Drawing by Joseph Tomelleri, used with permission)

cal to the original Pyramid Lake Cutthroats even though they are similar enough genetically to be classified within the same Lahontan Cutthroat Trout UIEC. However, once again, the indiscriminate stocking of the last 100+ years proved to have a silver lining. An introduced population of Cutthroat in a small stream in the Pilot Peak region in western Utah, hundreds of miles away and in a different river basin from Pyramid Lake, proved to be a remnant of the original Pyramid Lake stock. Propagation and addition of progeny from the Pilot Peak population into Pyramid Lake began in the early 2000s, and since then Cutthroats of more than 20 pounds have become much more common. Nearly all these large fish have been from the Pilot Peak stockings. Both Pilot Peak and Summit Lake Cutthroats are still stocked in Pyramid Lake, with Summit Lake fish providing most of the fish caught by anglers but Pilot Peak fish most of the trophies.

The Pyramid Lake Paiute Tribe has long fought to re-establish Cutthroat Trout spawning in the lower Truckee River. The tribe battled in the courts for many years before finally being able to assert water rights to guarantee adequate river flows during the spawning period. They also worked with federal and state agencies to provide fish passage through the delta at the mouth of the Truckee and at other movement barriers for fish in the river. Their hard work paid off, and in 2014, successful natural reproduction of Pyramid Lake Cutthroat Trout occurred in the lower Truckee River for the first time since the 1930s. The tribe and cooperators are continuing to work on fish passage

in the lower Truckee River with ground broken in 2023 on a new fish passage facility at the Numana Diversion Dam, about 11 miles upstream of the lake. Successful reproduction in the lower Truckee River has occurred every year since 2014, and the Pyramid Lake population is moving towards self-sufficiency. However, with ongoing climate change, the warmer and drier conditions projected for the future make these gains precarious. Only continued human management and conservation actions will preserve the Pyramid Lake Cutthroat and, more broadly, all Cutthroat Trout.

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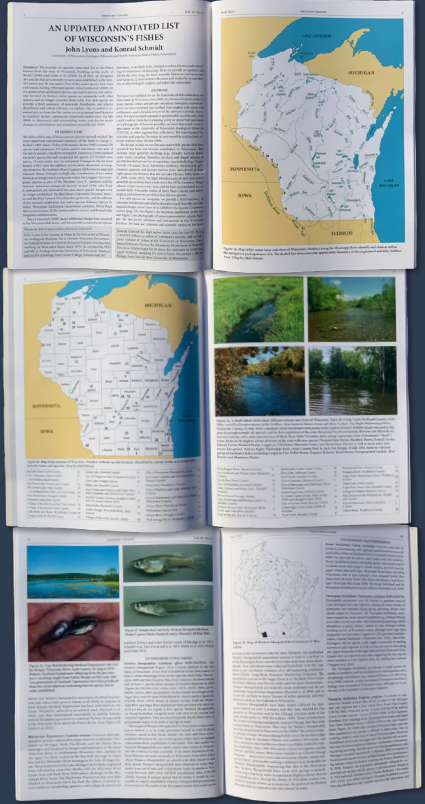
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