Interior Columbia Basin and Northern Rockies

Species Summaries

LISTING STATUS: red (ESA listed as Threatened or Endangered), yellow (not ESA listed but federal sensitive species or state species of concern (majority of states), green (not listed in majority of states)

CURRENT RANGE: red (10 percent or less), yellow (11-25 percent), green (>25 percent)

HISTORICAL RANGE: red (<1,000 miles), yellow (1,000-10,000 miles), green (>10,000 miles)

TROUT UNLIMITED

Westslope Cutthroat Trout

Category	Status	Explanation
Listing status		Sensitive species (USFS, BLM) Species of Special Concern (OR, MT, ID, WY);Threatened in Canada
Current range		42 percent occupied by conservation populations in U.S.
Historical range		Historically occupied over 58,000 miles of stream habitat and 450,000 acres of lacustrine habitat in U.S.
Climate change		Wildfire risk compounded by forest health issues
Energy development		Higher risk in British Columbia portion of range on the Columbia River
Non-native species		Hybridization with rainbow trout and displaced by brook trout
Water demand		Impacts from agricultural diversions exist in valley bottoms but water quantity issues are minor
Data issues		Difficult to confirm abundance and genetics given expansive distribution and increasing pressure from non-native species.

Yellowstone Cutthroat Trout

Category	Status	Explanation
Listing status		Sensitive species (USFS) Species of Special Concern (ID, MT, WY)
Current range		41 percent occupied by conservation populations
Historical range		Historically occupied over 17,000 miles of stream habitat and 125,000 acres of lacustrine habitat
Climate change		Uncharacteristic wildfire, reduced snowpack and summer stream flow
Energy development		Minimal impact currently
Non-native species		Lake trout, brook trout, rainbow trout particularly problematic
Water demand		Impacts from agricultural diversions exist in valley bottoms but water quantity issues are minor
Data issues		Further genetic testing needed to monitor hybridization risk

Bull Trout

Category	Status	Explanation
Listing status		Listed as Threatened under the ESA; Sensitive Species (BLM, USFS) Species of Special Concern (CA, ID, MT, NV, OR, WA)
Current range		Occupy 22,400 miles of stream habitat; approximately 60 percent of historical range.
Historical range		Ranged broadly throughout Klamath, Upper Snake, Columbia, Coastal and McCloud River systems
Climate change		Very sensitive to rising water temperatures; wildfires a concern with reduced snowpack and forest drying
Energy development		Minimal impacts other than legacy hydroelectric developments
Non-native species		Lake trout, brook trout, brown trout and northern pike are particularly problematic
Water demand		Dams fragment habitat
Data issues		Status of many smaller populations is uncertain

Bull trout

Columbia River Redband Trout

Category	Status	Explanation
Listing status		Sensitive species (USFS, BLM), Species of Special Concern (ID, OR, WA)
Current range		44 percent of stream habitat currently occupied
Historical range		Historically occupied about 32,300 miles of stream habitat
Climate change		Wildfire, temperature and drought
Energy development		No known energy development projects
Non-native species		Introduced rainbow trout, brown trout, small-mouth bass
Water demand		Drought-prone landscape and agricultural demand
Data issues		Have only tested genetics on 18 percent of occupied habitat and still a fairly high level of uncertainty on current distribution and abundance

Lake Trout

Category	Status	Explanation
Listing status		Species of Special Concern (MT)
Current range		Remnant populations are reduced, but the species has been widely stocked for sportfishing
Historical range		Native to a few glacial refugia lakes in Montana, the Great Lakes Basin, and somewhat uncertain distribution in the northeast due to early, undocumented stockings.
Climate change		Warmer lake temperature may render some lakes unsuitable
Energy development		No known threats
Non-native species		Highly vulnerable to introduced salmonids
Water demand		No known issues
Data issues		Some native Montana populations lack adequate data

Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)*

Westslope cutthroat trout were first discovered by the Lewis and Clark expedition in 1805, ironically on the east side of the Continental Divide at the Great Falls of the Missouri River. The original geographic expanse of westslope cutthroat trout was the greatest of all cutthroat trout subspecies extending east-west from the upper Missouri basin to the Columbia River basin and eastern slopes of the Cascade Mountains, and north-south from the Saskatchewan River in Canada to the John Day River in Oregon. The discontinuous nature of its distribution is a product of geologic events during the Pleistocene. Frequent bursts of the ice dam holding back glacial Lake Missoula on today's Clark Fork River likely spilled millions of westslope cutthroat trout across eastern Washington and Oregon, leaving behind remnant populations in the John Day basin of eastern Oregon, as well as portions of the Methow, Lake Chelan and Yakima basins of central Washington. Large waterfalls formed during this period such as Albeni Falls, Kootenay Falls and Spokane Falls are believed to have isolated populations of westslope cutthroat trout in the streams and lakes above the falls while large lakes such as Priest, Coeur d'Alene and Flathead lakes left behind by the last glacial retreat have provided important lacustrine habitat to migratory populations of westslope cutthroat trout.

Today, westslope cutthroat trout have been extirpated from more than half of their historical habitat. Traditional land uses such as logging, mining, livestock grazing and agriculture have contributed to the loss of habitat for westslope cutthroat trout, while introduced non-native species are displacing them throughout much of their range, even in protected areas. Lake McDonald, the largest lake in Glacier National Park, is dominated by non-native kokanee salmon, lake trout and lake whitefish that have largely displaced the native westslope cutthroat trout through competition for food and direct predation. In streams, brook and brown trout have also displaced westslope cutthroat trout through competition and predation, while introduced rainbow trout and other cutthroat trout undermine the genetic integrity of westslope cutthroat trout through hybridization. Today about 60 percent of the conservation populations are believed to be genetically pure but three-fourths of these populations are isolated in small stream habitats less than six miles in extent where they are vulnerable to wildfire and floods. However, remaining large migratory populations of genetically pure westslope cutthroat trout in the Flathead Basin in Glacier National Park as well as portions of the Priest River, Clearwater and Salmon basins in Idaho, and the John Day in Oregon serve as reminders of westslope cutthroat trout's once expansive presence on the landscape as well as hope for its long-term persistence in the West.

Oncorhynchus clarkii bouvieri

Yellowstone Cutthroat Trout *(Oncorhynchus clarkii bouvieri)*

Yellowstone cutthroat trout were originally named in honor of U.S. Army Captain Bouvier in 1883 but were subsequently combined with westslope cutthroat trout until the 1960s when biologists formally recognized them as two distinct subspecies of cutthroat trout. Like westslope cutthroat trout, Yellowstone cutthroat trout are also found on both sides of the Continental Divide. They originally became isolated in the headwaters of the Snake River after the creation of Shoshone Falls about 30,000-60,000 years ago. Retreat of the Pleistocene alpine glaciers from the Yellowstone Plateau facilitated the movement of Yellowstone cutthroat trout from the Snake River into the Yellowstone River at the site known today as Two Ocean Pass in Yellowstone National Park. From there, Yellowstone cutthroat trout spread

downstream into Yellowstone Lake and the lower tributaries of the Yellowstone River, moving eastward as far as the Tongue River. Historically, one of the largest concentrations of cutthroat trout anywhere in the West was in Yellowstone Lake. From the early- to mid-1900s, Yellowstone Lake provided a hatchery operation which supported the distribution of Yellowstone cutthroat trout worldwide. On the west side of the Continental Divide, a finespotted form of Yellowstone cutthroat trout was once native to the large valley lakes in Grand Teton National Park from where they migrated into the mainstem of the Snake River. Today the finespotted form is found throughout much of the upper Snake River, frequently co-occurring with large-spotted Yellowstone cutthroat trout.

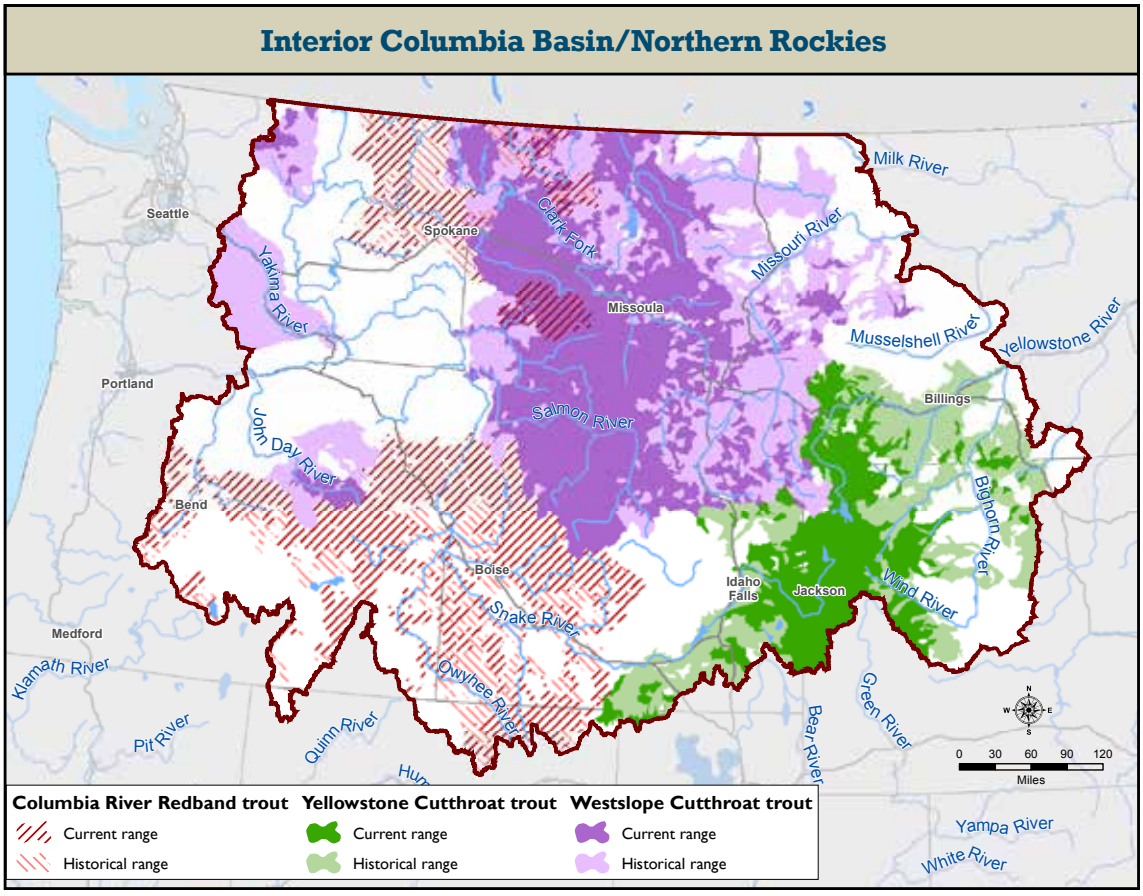
As with most of our native trout, the habitat quality for Yellowstone cutthroat trout has deteriorated since the early 1800s, particularly around the margins of the historical range where lower elevations and moderate terrain allowed for agricultural development, livestock grazing and logging. However, the rugged and remote landscape of the upper Snake and Yellowstone basins helped to preserve these watersheds so that today 28 percent of the streams currently occupied by Yellowstone cutthroat trout are found in National Parks or federally designated wilderness areas. Unfortunately, the spread of non-native species into these protected lands threatens remaining populations of Yellowstone cutthroat trout in some of the nation's otherwise most pristine landscapes. Building barriers to protect Yellowstone cutthroat trout from non-natives may fragment remaining migratory populations, increasing their risk to climate change, the effects of which are also permeating our protected lands. Fortunately, managing agencies, Trout Unlimited and many others are actively engaged in reducing the threat posed by non-native fish while striving to maintain Yellowstone cutthroat trout's inherent resilience to environmental change. (See the Yellowstone Lake success story at the end of this section for information on efforts to control non-native lake trout.)

Columbia River Redband Trout

(Oncorhynchus mykiss gairdneri)

The distribution of Columbia River redband trout in the Columbia Basin is a product of the landscape's dynamic past characterized by volcanism and continental glaciation interspersed with periods of major flooding. These dramatic events not only sculpted the land but also resulted in hydrologic shifts causing chance extinctions, recolonizations and long periods of isolation for the region's evolving fishes. While the Cascade Mountains are considered the dividing line between coastal rainbow trout (*O. m. irideus*) and Columbia River redband trout, recent genetic studies have also found significant distinctions between populations of Columbia River redband trout in the three major rivers that slice through the Cascade range from the interior to the ocean: Columbia, Klamath and Sacramento (1). Given this region's tumultuous geologic past, these large rivers and associated large lakes may have provided the only relatively stable aquatic environments for trout to evolve. So, as rainbow trout moved up these larger river systems to the interior they evolved in isolation from one another, creating what today is recognized as three distinct subspecies of interior redband trout, with the most broadly distributed of these being the Columbia River redband trout. Populations that are unable to migrate to the ocean due to a natural or man-made barrier are referred to as redband trout while those populations that are still able to migrate seaward are considered steelhead.

Although the landscape has been stable geologically for thousands of years, the distribution of Columbia River redband trout is changing once again as humans are now the dominant force. In the Columbia River basin, Columbia River redband trout



Historical and current distributions of native trout and char in the Interior Columbia Basin/Northern Rockies Region.

currently occupy just 44 percent of their historical stream habitat. The degradation and fragmentation of aquatic systems from land conversion, roads and the development of natural resources has contributed to local extirpations of Columbia River redband trout, particularly at the lower elevations where these activities are the most prevalent. Dams, irrigation diversions and road culverts often create passage barriers for Columbia River redband trout, eliminating their ability to move between lake, river and stream habitats. Although non-native species such as brown trout and smallmouth bass have displaced Columbia River redband trout through competition for resources and direct predation, the greatest threat is from the widespread introduction of hatchery rainbow trout and non-native cutthroat trout which hybridize with Columbia River redband trout – 54 percent of streams currently occupied by Columbia River redband trout are believed to contain hybridized populations. The impacts to Columbia River redband trout from degraded habitat and non-natives are further compounded by climate change. As the hot and dry landscape that supports Columbia River redband trout gets hotter and drier with climate change, the impact on coldwater habitat will become more profound. The loss of the cooling shade provided by a healthy riparian area or diminished stream flows from agricultural diversions may render some streams unsuitable for Columbia River redband trout while increasing their suitability for warmwater species such as smallmouth bass. Fortunately, Columbia River redband trout are now receiving some much needed attention as they have traditionally been overshadowed by their more charismatic relative, the steelhead. State and federal agencies, Tribes and Trout Unlimited are all part of a rangewide conservation agreement dedicated to the conservation and restoration of this hardy fish.

Salvelinus confluentus

Bull Trout *(Salvelinus confluentus)*

Bull trout are widely distributed within the Interior Columbia Basin/Northern Rockies region. The species occupies a variety of large lakes, small headwater streams and larger river systems. In many areas, the species is highly migratory and maintenance of diverse life history expression is a primary recovery strategy. As such, habitat fragmentation caused by dams, poorly designed road crossings and other factors is a major legacy threat to bull trout. Non-native species are another primary threat. Most large lake systems inhabited by bull trout are also habitat for introduced populations of brook trout, brown trout, lake trout and, on occasion, northern pike. These species can prey on bull trout and are likely to compete for scarce resources. Many stream systems inhabited by bull trout also have large populations of brown and brook trout. The presence of brook trout is especially problematic because both brook and bull trout are fall spawners and readily hybridize.

As described in the Pacific Coast account for bull trout, this species prefers habitats characterized by the 4-Cs: cold, clean, connected and complex. Their habitat requirements are more specific than other native salmonids in the region. Bull trout require cold water, substrates that are clean of sediment and other pollutants, complex stream channels including deep pools and an interconnected stream network that facilitates spawning migrations and free movement up and down riverine corridors.

Climate change poses a dramatic risk for bull trout, especially warming of migratory and larger river habitats. Warming stream temperatures are constricting the lower-elevation range of bull trout in many areas. Wildfires are another increasing risk associated with climate change. Changes in winter precipitation within the region from snow to rain, earlier peak flows, forest drying and increased insect pests all favor increasing wildfires and subsequent stream sedimentation within the region.

Bull trout populations in this region are somewhat robust, especially compared to places like the Klamath system where populations of bull trout are highly fragmented. The U.S. Fish and Wildlife Service reports that the distribution of bull trout has changed little since the species was listed in 1999. However the latest draft recovery plan of the USFWS also reports that more than 60 percent of known core areas have imminent threats that are rated as moderate or substantial. There is inadequate data to assess the status of about 50 percent of core population areas. In 2010, the USFWS modified designated critical habitat pursuant to the ESA to include 19,729 stream miles and 488,252 acres of bull trout habitat.

Lake Trout *(Salvelinus namaycush)*

Lake trout have a broad native range across northern environments, including northern Canada, Alaska, the Great Lakes and parts of the northeastern United States. The species inhabits large, coldwater lakes and is our largest native char, reaching weights over 50 pounds. Lake trout appear to be native to a small number of lakes in Montana. In addition, they have been broadly introduced into many larger western lakes. These introduced populations, such as in Yellowstone and Flathead lakes, can expand rapidly with lake trout preying on the native trout in the system.

Lake trout are slow-growing, long-lived fish that mature at 6 or 7 years of age. Unlike many native salmonids, they live and spawn in lakes during the fall without entering stream systems. The slow growth and late maturation make them vulnerable to overfishing. Pollution and the introduction of non-native fishes are other common problems for naturally-occurring populations.

According to Montana Department of Fish, Wildlife and Parks, the native populations in Montana are remnant populations that survived the last ice age. In western Montana, lake trout are native to Waterton, Glenns, Cosley and St. Mary lakes in Glacier National Park and nearby Lower St. Mary Lake. They are believed to be native to a few, scattered lakes (Twin Lakes and Elk Lake) in southwestern Montana. Other Montana populations have resulted from introductions. The status of these populations are not well known, however the habitats of many of the native populations in Montana are protected by their location in Glacier National Park.

Regional Trends

The Interior Columbia Basin/Northern Rockies region stretches from the upper

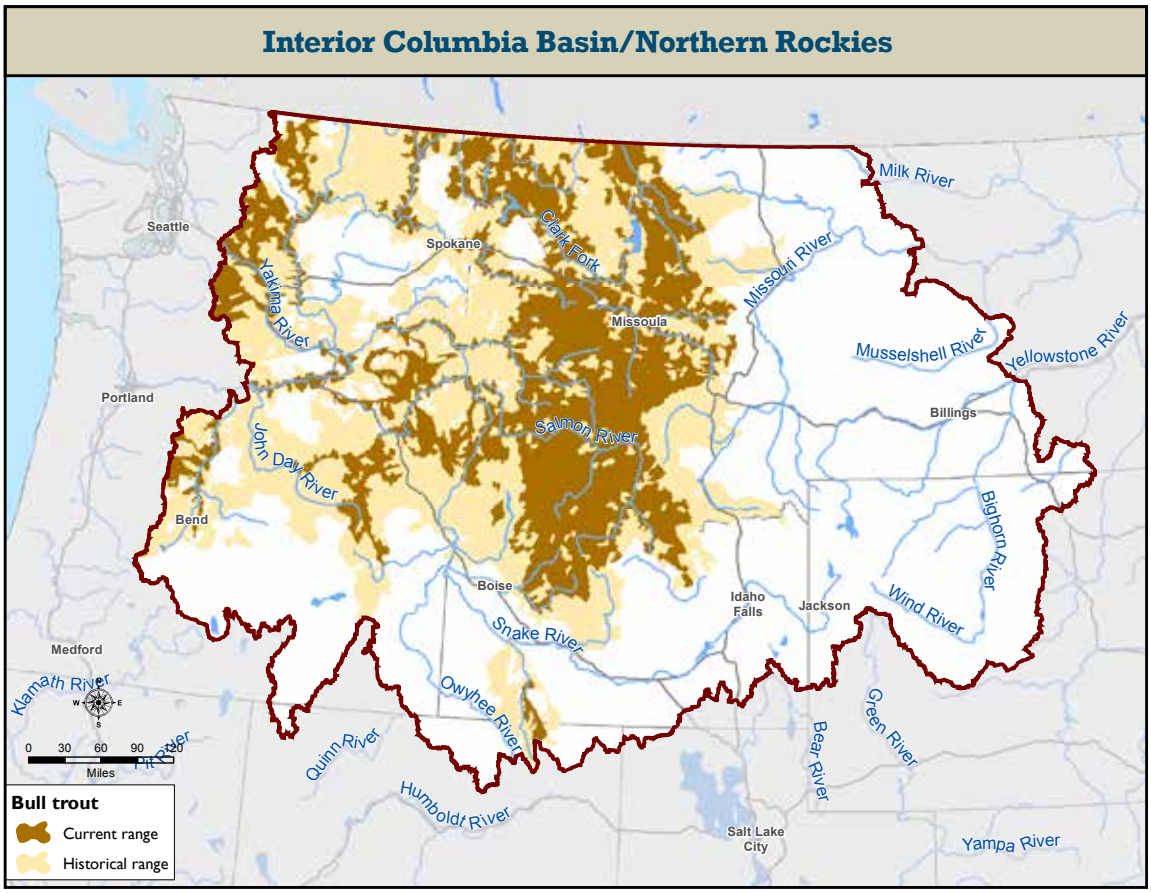
Missouri River basin on the east side of the Continental Divide to the crest of the Cascade Mountains in Washington and Oregon. The diverse landscapes range from the high peaks of the Continental Divide to the moist temperate forests of northern Idaho and the arid grasslands of eastern Oregon and Washington. The region is drained by some of the West's great rivers, including the Missouri, Yellowstone, Columbia, Snake and Salmon rivers. These rivers drain the high elevations, bringing water to the more arid lower elevations and providing the region's native trout with a well-connected network of lakes, large rivers and small streams capable of supporting large populations and a diversity of life histories.

Historically the region's four species/subspecies of native trout (i.e. westslope cutthroat trout, Yellowstone cutthroat trout, bull trout and redband trout) were broadly distributed across the region in a variety of habitats. Having evolved in a dynamic landscape, these fish have been able to adapt to environmental changes for thousands of years. Their ability to migrate long distances to support different life cycle stages (e.g. spawning, growing) and find suitable habitat as conditions change, has been an important part of their success in the region.

Although this region encompasses national parks and the largest wilderness complex in the lower 48 states, all four native trout have experienced significant range contractions. The fact that they all still occupy a large number of stream miles, particularly when compared to other native fish in the West, can be attributed to their expansive historical distribution rather than an indicator of their rangewide health today. Dams for hydropower, water storage and flood control block passage on many of the larger river systems, while agricultural development in the valley bottoms has contributed to degraded water quality with diversions that reduce flows and also impede movement between tributary streams and larger mainstem habitat. A history of intensive livestock grazing on the more arid rangelands and clearcut logging and the associated road network in the forested landscape have further contributed to degraded and fragmented aquatic systems in the region.

The central Idaho wilderness complex and the wildlands of and adjacent to Yellowstone and Glacier national parks provide high quality habitat for bull trout, westslope cutthroat trout and Yellowstone cutthroat trout and still allow for large migratory populations occupying several hundred miles of interconnected habitat. However, these well-connected networks also increase the exposure of native trout to invading non-native species such as lake, rainbow, brown and brook trout. All of these non-natives may displace the native trout through competition for food and cover, as well as the significant threat of hybridization. Brown trout can be aggressive predators on native trout and their higher tolerance of degraded water quality and warmer water temperatures leaves them well positioned to exploit the valley bottoms previously occupied by the native species. Predatory lake trout have contributed to the crash of Yellowstone cutthroat trout populations in the Yellowstone River although aggressive control measures over the past five years are coming to fruition as Yellowstone cutthroat trout populations begin to rebound (see Success Story). A similar situation exists in Flathead Lake where introduced lake trout threaten native bull trout, having also invaded a series of interconnected lakes between the Flathead and Glacier National Park. Unfortunately, control of non-natives in large interconnected stream and lake habitats is complex, leading managers in some situations to advocate for the construction of instream barriers to protect populations of native trout but at the expense of their migratory life history.

The ability to move has characterized the



Historical and current distributions of native trout and char in the Interior Columbia Basin/Northern Rockies Region.

evolutionary history of native trout in this region and although the area has been fairly stable geologically now for thousands of years, the ecological processes that shape the landscape continue to alter aquatic ecosystems. Although wildfire has been a force in this region for thousands of years, changing forest conditions over the past century, in conjunction with climate change, have altered the impact of wildfires on forests and the streams that run through them. Decades of fire suppression on western forests in the 1900s has contributed to a build-up of fuels and in some situations has also inhibited the growth of new trees as stands become more dense without the thinning effect of low-intensity wildfires. Clearcut logging practices, particularly from the end of the 19th Century into the mid-20th Century, led to the creation of large stands of even-aged trees. As these stands have aged they have become highly susceptible to disease, particularly bark beetle outbreaks. Since 1990 bark beetles have killed billions of trees across the West and although these infestations are a natural force in forested ecosystems, many of the outbreaks being experienced today are unprecedented. Add in longer and drier summers, reduced mountain snowpack and earlier snowmelt due to climate change and you have the perfect formula for uncharacteristically large wildfires.

The magnitude and intensity of wildfires has been increasing in the Rocky Mountains for the past several decades due to increased fuels and a longer fire season (2). While many of these fires may ultimately be beneficial to the forests through which they burn, high intensity fires can pose problems for the forest streams and the fish they support in the near term. In addition to direct mortality during the fire, watersheds that are completely burned may experience more rapid runoff during rainstorms that can lead to debris flows and other channel-altering events. This

SUCCESS STORY:

Yellowstone Lake

Yellowstone National Park 'Turning the Corner' on Native Cutthroat Trout Recovery

Historically, Yellowstone Lake provided habitat for what was likely the largest population of cutthroat trout anywhere in the world. The large population was not only a boon to anglers but also the ecosystem, as large spawning runs of Yellowstone cutthroat trout made their way to small headwater streams where everyone from grizzly bears to otters feasted on the bounty. All that changed when predatory lake trout were illegally introduced and their population exploded. The populations of Yellowstone cutthroat trout crashed in response.

For more than eight years, the National Park Service has conducted gill-netting operations and other efforts to reduce lake trout populations and give native Yellowstone cutthroat trout a chance to recover. Those efforts now are paying off as recent data indicate that culling efforts are working to suppress invasive lake trout and restore the native cutthroat trout fishery.

Lake trout netting effort in 2009. These fish were collected in large gill net sets by contractors of the National Park Service.

According to NPS staff, an analysis of data shows progress on several fronts:

- Annual monitoring suggests an increase in abundance of juvenile cutthroat trout within Yellowstone Lake over the last two years.
- Lake trout suppression efforts, especially in the larger-mesh gill nets, have significantly increased in recent years with approximately 300,000 lake trout caught annually.
- Beginning in 2013, the catch-per-unit-effort of lake trout has decreased despite increased effort, indicating a decrease in overall lake trout numbers.
- New analyses from Montana State University indicate that suppression efforts have put the lake trout population into a state of "negative

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threat is compounded by the increasing risk of uncharacteristic winter flooding in the mid-elevations where rain on snow events are increasing due to warm winter storms characterized by the 'pineapple express' (3). When the drainage network is well connected and fish are able to move, they can vacate the burned watershed and find more suitable habitat elsewhere until the watershed recovers and they can then recolonize its streams. However, populations that are isolated behind a barrier and unable to leave have an increased risk of experiencing local extirpations.

The lower elevation arid rangelands occupied by Columbia River redband trout in southeast Oregon, southwest Idaho, and northern Nevada are also experiencing larger and more frequent fires due to climate change and the spread of highly flammable non-native annual grasses. Although range fires do not typically burn as hot as forest fires, they can still be problematic for trout. The loss of riparian vegetation can contribute to increasing water temperatures that may exceed the thermal tolerances of coldwater species and instead favor non-native fish such as brown trout and smallmouth bass that are more tolerant of the warmer waters and will prey on the native trout. The presence of beaver ponds or other wetlands can help reduce the fire effects in the riparian area and thus maintain the stream's cooling shade. Livestock grazing may also contribute to warming water temperatures for Columbia River redband trout through the removal of streamside vegetation and widening of the stream channel. Streams in the arid rangelands are more vulnerable to periods of drought than the forested watersheds due to typically low summer base flows and agricultural demand that frequently takes precedent over maintaining instream flows during dry years. Reduced flows during the warm summer months may also contribute to rising water temperatures and the displacement of native trout.

growth"—meaning that netting efforts are causing the population to decline.

After reviewing the data, the Yellowstone Science Review Panel recently concluded that the native cutthroat recovery campaign is making "significant progress," and that Yellowstone National Park should continue culling efforts at present levels.

At the same time, National Park Service and U.S. Geological Survey biologists are finding more sophisticated methods of controlling the lake trout population, such as using electricity to destroy lake trout eggs and larvae at spawning grounds—efforts that the independent science panel said show great promise.

"While we likely will never completely rid Yellowstone Lake of this invasive species, recent analyses suggest that, with a sustained effort, we can successfully manage the lake trout population and provide an environment where Yellowstone cutthroat trout can once again thrive in Yellowstone Lake, be a key component of a healthy ecosystem and a source of recreation for anglers and visitors," said Dave Hallac, chief of resources at the park.

That is a huge and historic win for conservation.

"The Yellowstone native cutthroats are as integral to Yellowstone's larger ecosystem as bison and grizzlies," said Jack Williams of Trout Unlimited. "And they're one of the most significant populations of native trout in the world. If we can't save them here, in our flagship national park, where can we save them?"

Lake trout collected from Yellowstone Lake with smaller cutthroat trout removed from their guts.