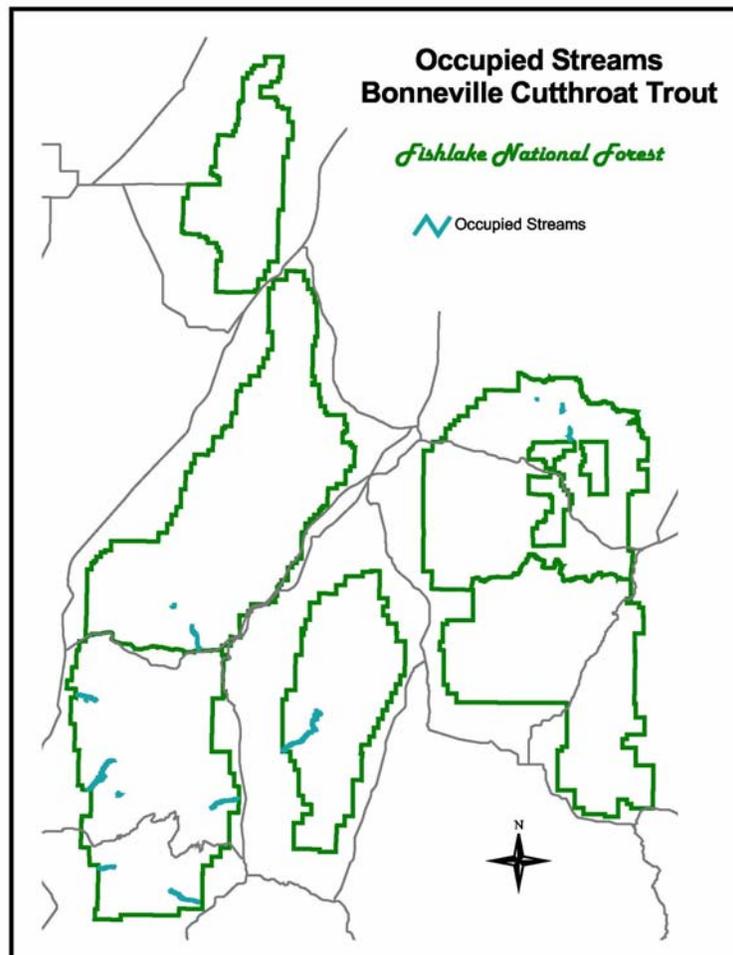


SENSITIVE FISH SPECIES

Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*)

Bonneville cutthroat trout is one of three cutthroat trout subspecies native to Utah. Bonneville cutthroat trout historically occurred in the Pleistocene Lake Bonneville basin, which included portions of Idaho, Nevada, Utah, and Wyoming (Kershner 1995). The desiccation of Lake Bonneville into the smaller Great Salt Lake and fragmentation of other stream and lake habitats may have led to three slightly differentiated groups of Bonneville cutthroat trout from the Bear River basin, the Bonneville basin proper, and the Snake Valley (Behnke 1992). There are five known populations of pure strain Bonneville cutthroat trout on the Fishlake National Forest inhabiting approximately 38 miles of stream habitat.

The map below displays 38 miles of occupied Bonneville cutthroat trout habitat on the Fishlake National Forest.



Habitat for the Bonneville cutthroat trout is widely distributed and variable. It ranges from high elevation (3,500 m mean sea level) streams with coniferous and deciduous riparian trees to low elevation (1,000 m mean sea level) streams in sage-steppe grasslands containing herbaceous riparian zones (Kershner 1995). As such, Bonneville cutthroat trout have adapted to a broad spectrum of habitat conditions throughout their range.

Sexual maturity is typically reached during the second year for males and the third year for females (May et al. 1978). Both the age at maturity and the annual timing of spawning vary geographically with elevation, temperature, and life history strategy. Lake resident trout may begin spawning at two years and usually continue throughout their lives, while adfluvial individuals may not spawn for several years. Annual spawning of Bonneville cutthroat trout usually occurs in the spring and early summer at higher elevations (Behnke 1980) at temperatures ranging from 4-10 degrees C (May et al. 1978). May et al. (1978) reported Bonneville cutthroat trout spawning in Birch Creek, Utah beginning in May and continuing into June. The wild brook stock at Manning Meadow Reservoir (9,500 ft. elevation) spawn from late June to early July (Hepworth and Ottenbacher 1995).

Fecundity is typically between 1800-200 eggs per kilogram of bodyweight (Behnke 1992). Incubation times for wild Bonneville cutthroat trout have not been verified but probably average 30 days (Gresswell and Varley 1988). Fry emerge in mid July through mid August (depending on spawning time) and migrate to channel margin habitats associated with stream banks (Moore and Gregory 1988). Growth of resident fish is highly dependent on stream productivity. Growth rates of Bonneville cutthroat trout tend to be slower in headwater drainages than in lacustrine environments. Because Bonneville cutthroat trout may be adapted to the rigorous conditions of high elevation headwater streams, these fish may have a competitive edge over nonnative salmonids in those areas (Binns 1981).

Bonneville cutthroat trout require relatively cool, well oxygenated, water and the presence of clean, well-sorted gravels with minimal fine sediments for successful spawning.

Both terrestrial and aquatic invertebrates are important food items for stream-dwelling Bonneville cutthroat trout (May et al. 1978, Binns 1981). Their diet was diverse during the summer in Birch Creek (May et al. 1978). Dipterans and debris were the dominant food items for immature trout and terrestrial insects were the dominant prey for mature individuals.

There are numerous threats to Bonneville cutthroat trout. These include hybridization and/or competition with nonnative salmonids, degradation of habitat from diversions, livestock grazing, road building, fire, mining and timber harvest activities, as well as angling.

Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*)

Colorado River cutthroat trout is one of three cutthroat subspecies native to Utah. Historically, the subspecies occupied portions of the Colorado drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Behnke 1992). Though it is now restricted to headwater streams and lakes, its original distribution included portions of the Colorado and Green River drainages. Although reduced in range and numbers, pure populations of Colorado River cutthroat trout still exist in their native drainages. There are three known populations of pure strain Colorado River cutthroat trout on the Fishlake National Forest inhabiting approximately 8 miles of stream habitat.

Populations may be lake resident, fluvial or adfluvial, and life history characteristics vary somewhat between these strategies. Colorado River cutthroat trout appear to be slower growing than other subspecies with few fish over 200 mm, probably because of the short growing season. However, Colorado River cutthroat trout transplanted to lower elevation ponds grew to nearly 400 mm in two years and were commonly over 250 mm in tributaries to the Green river in Wyoming, especially where fish were associated with beaver ponds (Young 1995). Lacustrine populations of Colorado River cutthroat trout averaged 325 mm at age three.

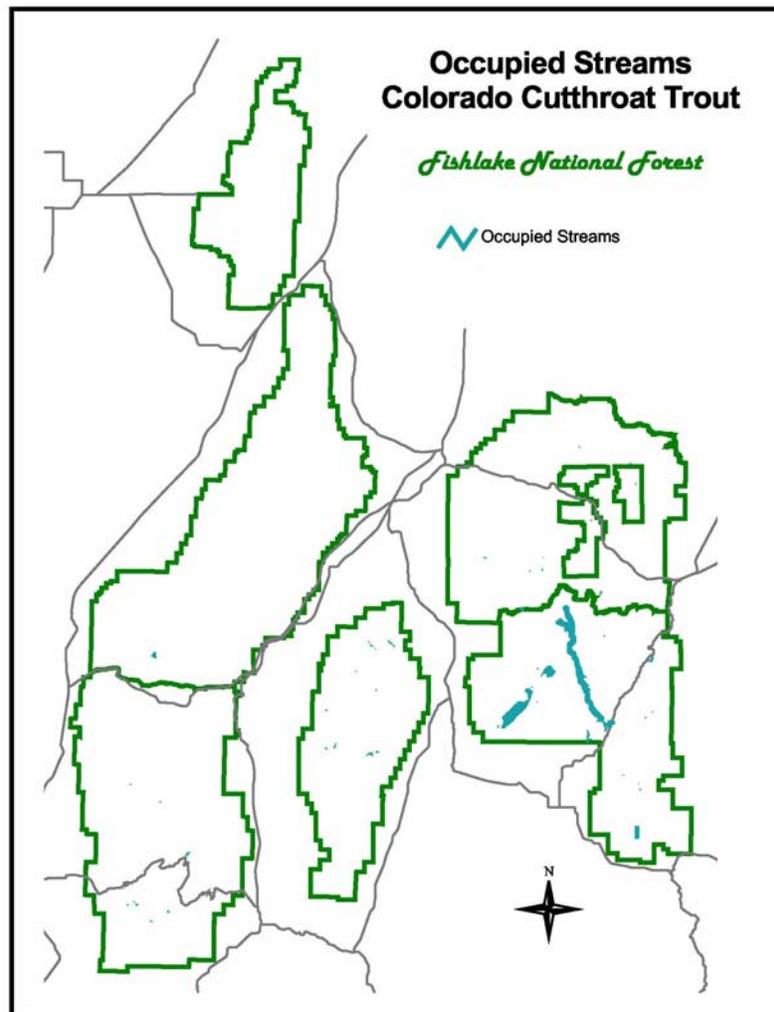
Spawning for Colorado River cutthroat trout usually begins when spring floods begin to recede in late spring and early summer possibly cued by changes in water temperature. Fecundity varies with individual size and location as well as life history. Water temperature, elevation and climatic variation determines fry emergence. Emergence usually occurs in late summer for known populations. Maturity is thought to be reached at approximately three years of age for lotic populations.

Habitat requirements for Colorado River cutthroat trout are poorly understood, and results of studies are frequently conflicting. Typical of most cutthroat species, Colorado River cutthroat trout spawn over gravel substrates with good water through-flow. Coarse woody debris, greater depth and lower velocities have been found to be positively associated with Colorado River cutthroat trout presence; however, these conditions were not readily available within many streams containing Colorado River cutthroat trout. Most conclusions on habitat requirements are confounded by small population size and restricted habitat areas.

Colorado River cutthroat trout do not appear to compete well with introduced salmonids. This is possibly due to having evolved with mottled sculpin and several endemic Colorado River minnows and suckers, not with other salmonids.

Diets of subadult Colorado River cutthroat trout comprise mainly of macroinvertebrates and plankton, whereas adults can be piscivorous with a larger proportion of large macroinvertebrates and terrestrial insects in their diets than that of subadults.

The Colorado River cutthroat trout only occurs on the Loa Ranger District of the Fishlake National Forest.



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Lake trout, (*Salvelinus namaycush*)

Lake trout are a medium to dark gray or olive color with white worm-like wavy marks on their backs and on top of the head. Occasionally, they have bars or spots along the side mainly tinged with red.

This species is native to the Great Lakes and prefer deep, coldwater lakes throughout North America. They are usually found offshore in deep, well oxygenated water. In Lake Erie, lake trout are usually not found in Ohio waters, but can be found in low numbers in the East Central and Eastern basins. These populations are maintained by annual stockings in Pennsylvania and New York.

On the Fishlake National Forest, they spawn on reefs in the fall. Eggs hatch in the spring and young lake trout usually move to deeper water after a short time. Adult fish are opportunistic feeders their diet consisting of aquatic insects, crustaceans, and a range of fish species, including small lake trout and other trout species. The lake trout is a slow growing, long-lived species that does not become sexually mature until age seven or eight. Lake trout populations in Fishlake have been present since the early 1940's

Lake trout average between 20 and 24 inches and 3 to 6 pounds, but are capable of reaching in excess of 50 pounds.

Trend

The following information is from Chamberlain (Utah Division of Wildlife Resources fisheries biologist, personal communication 2002), which will be released in a UDWR publication in the near future. Lake trout were first stocked into Fish Lake shortly after the turn of the century. Lake trout numbers were maintained by periodic stocking until about 1991. The original prey species for lake trout in Fish Lake was the Utah chub. Two changes have occurred since lake trout were introduced which has changed the ecology of this species. The first was the accidental introduction of Eurasian milfoil, which has choked out the native bottom growing weed bed that occurred around the lake. The second was the illegal introduction of yellow perch to Fish Lake in the early 1970s. Towards the end of the 20th century yellow perch began to out compete and displace the Utah chub, reducing forage biomass for lake trout (which do not eat the spiny fish). This was likely exacerbated by the thick, non-native weed growth that protects perch from other fish predators in the lake.

Stocking was ceased in about 1991. Data to that date indicated stocking was unnecessary to maintain lake trout numbers. Due to concern about the reported decline of large lake trout and to ensure a viable lake trout fishery, trend netting (fall gill netting over spawning reefs) by the Utah Division of Wildlife Resources has continued every other year since then. Some food analysis work has also occurred. This work has shown that there are still high numbers of smaller lake trout below 22 inches that primarily feed on aquatic insects and crustaceans. There are few lake trout from 22-26 inches, which is a critical size where lake trout switch to feeding on fish. Suitable sized Utah chub needed for prey are now limited. The fewer number of lake trout which are able find sufficient smaller fish prey to grow to 26 inches then do quite well, as lake trout over 26 inches are large enough to prey on the stocked rainbow trout.

In summary, lake trout numbers have remained relatively stable, but a reduced number make it through the 22-26 inch bottleneck to become trophy lake trout. The Utah Division of Wildlife is analyzing the data to determine if management changes, such as increased harvest of smaller lake trout, could increase numbers of larger trophy lake trout in Fish Lake.

Occupied Habitat Lake Trout

Fishlake National Forest

■ Lake Trout Habitat

