

Bonneville Cisco (*Prosopium gemmifer*)**Species Status Statement.**Distribution

Bonneville cisco is one of four fish species naturally found only in Bear Lake (Sigler and Sigler 1987), which straddles the Utah-Idaho border. Some years ago, Bonneville cisco introductions were attempted in one lake in South Dakota, one lake in Colorado, and Lake Tahoe which straddles the California-Nevada border. After inquiring about all three introductions approximately a decade ago, Utah managers remain uncertain of the success of the South Dakota and Colorado introductions. It was thought that due to water quality similarities, the Lake Tahoe introduction would have the best odds of success. However, managers there reported the effort ended in failure, despite having stocked tens of thousands of propagules annually, for several years in a row.

Contemporary fisheries management limits and regulates interstate fish introductions to a much greater extent than was formerly practiced. Disease and other aquatic invasive species concerns are better recognized, and due to many lessons learned, are more respected by fisheries professionals. Bonneville cisco probably live nowhere else in the world once again, and this is unlikely to change.

Table 1. Utah counties currently occupied by this species.

<b>Bonneville Cisco</b>
RICH

Abundance and Trends

The abundance of Bonneville cisco is monitored using hydroacoustic gear, which allows biologists to create lake-wide population estimates. From 1990-1999, the Bonneville cisco population was estimated to be approximately 2.5 million individuals, however from 2000-2017 the population increased and has averaged approximately 6-8 million fish (Tolentino 2007, Tolentino 2019 in press). This sharp increase was likely due to several factors. One likely factor includes high reproductive success in the late 1990s, when the water level of the lake was near full pool and abundant rocky, littoral spawning habitat was available. A second likely factor is a decrease in predators, due to a reduction in annual stocking of cutthroat trout and lake trout (Tolentino 2019 in press).

The average fish size of cisco in the spawning population increased somewhat in the mid-1990s possibly due to an increase in *Daphnia* populations, which was possibly caused by nutrients being released from shoreline areas due to wave action during the period of low water years in the late 1980s and early 1990s (Nielson and Tolentino 2002). An increased abundance of large

zooplankton in Bear Lake during the early 1990s suggested reduced foraging rates and possibly a reduced abundance of Bonneville cisco.

The increase in cisco abundance in 2000- 2017 initially was accompanied by an overall decrease in average fish size (Nielson and Tolentino 2002), but individual size (a determinant of egg-laying potential) has since stabilized (Tolentino 2019 in press).

## **Statement of Habitat Needs and Threats to the Species.**

### Habitat Needs

For the majority of its life, Bonneville cisco is a schooling, open water fish that roams the waters of Bear Lake at depths of 30-100 feet. Managers have also observed this species using depths of the lake that light does not penetrate (UDWR unpublished data). In mid to late January, Bonneville cisco move into the shallow rocky areas of the lake where they use this habitat to spawn (Sigler and Sigler 1987).

### Threats to the Species

Development of the Bear Lake valley is a prominent threat to this species (Sigler and Sigler 1987) due to water demands and pollution. Reduced lake levels or decreased water quality may negatively affect Bonneville cisco populations due to dewatering of littoral, rocky habitat that they require to spawn (Bouwes and Luecke 1997). Because they tend to form schools and often spawn very near to the shore, Bonneville cisco are also vulnerable to increased predation and reproductive failure due to lowered water levels (Bouwes and Luecke 1997, Tolentino 2019 in press).

Since their first stocking into the lake in 1911, managers have believed that lake trout are unable to maintain their population in Bear Lake through natural reproduction. This is likely due to several factors including predation by native fish, lake trout eggs suffocating from the unique water chemistry in Bear Lake, and limited spawning habitat (Martinez et. al. 2009). To ensure control of lake trout numbers, beginning in 2001 the UDWR and Idaho Department of Fish and Game (IDFG) began stocking only sterile (triploid) lake trout. A joint fisheries management plan that was first developed by both UDWR and IDFG (Tolentino et. al. 2015) identified a minimum Bonneville cisco population level of 2.5 million fish. If suppressed populations of Bonneville cisco are noted, both the UDWR and IDFG can reduce or eliminate the number of stocked cutthroat trout and lake trout. The plan also mandates the notification of water managers in such situations, in order that as much water as possible remain within Bear Lake.

Table 2. Summary of a Utah threat assessment and prioritization completed in 2014. This assessment applies to the species' entire distribution within Utah. For species that also occur elsewhere, this assessment applies only to the portion of their distribution within Utah. The full

threat assessment provides more information including lower-ranked threats, crucial data gaps, methods, and definitions (UDWR 2015; Salafsky et al. 2008).

<b>Bonneville Cisco</b>
<b>Very High</b>
Dam / Reservoir Operation
Hydro Power Facilities
Power Generation
Water Allocation Policies
<b>High</b>
Groundwater Pumping
Unauthorized Species Introductions
<b>Medium</b>
Invasive Wildlife Species - Non-native

### **Rationale for Designation.**

Bonneville cisco is one of the four species of fish found nowhere else in the world but the unique Bear Lake of northern Utah and southern Idaho. This fish community is a unique wildlife resource that could be vulnerable to loss or degradation of their habitat. Sensitive species designation will help state management of this resource and prevent the need for federal Endangered Species Act listing. Protection of Bonneville cisco and their habitat is also of economic and recreational value to the local Bear Lake community, and the state. Measures to conserve Bonneville cisco would also benefit Bear Lake whitefish, Bonneville whitefish, and Bear Lake sculpin.

### **Economic Impacts of Sensitive Species Designation.**

Sensitive species designation is intended to facilitate management of this species, which is required to prevent Endangered Species Act listing and lessen related economic impacts. The listing of Bonneville cisco as endangered would have impacts on water resource management at Bear Lake, including reservoir operation, power generation, and groundwater pumping in the surrounding areas. There would also be costs associated with preventing and mitigating unauthorized species introductions and increased costs of regulatory compliance for many land-use decisions and mitigation costs.

### **Literature Cited.**

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