

Borax Lake Chub

Interim Risk Assessment

The Borax Lake Chub SMU is comprised of one population that inhabits a single 4.1 hectare geothermally-heated alkaline lake in Harney County, Oregon. The Borax Lake chub (*Gila boraxobius*) is a small minnow endemic to Borax Lake and adjacent wetlands in Oregon's Alvord basin (Williams and Bond 1980). Borax Lake is a natural lake, perched ten meters above the desert floor on sinter deposits, which is fed almost exclusively by thermal groundwater. The Borax Lake chub was listed as endangered under the federal Endangered Species Act in 1982 (USFWS1982).

Population abundance estimates obtained in 1991-1996 indicated a fluctuating population ranging from a low of 8,144 fish to a high of 34,634 fish. The basis for its listed status is not population size, but the security of a very limited, unique, isolated, and vulnerable habitat. Because Borax Lake is situated above salt deposits on the desert floor, alteration of the salt crust shoreline could reduce lake levels and the habitat quantity and quality available to Borax Lake chub. At the time of the listing, Borax Lake was threatened by habitat alteration caused by geothermal energy development and alteration of the lake shore crust to provide irrigation to surrounding pasture lands. The Borax Lake chub federal recovery plan, completed in 1987, advocated protection of the lake ecosystem through the acquisition of key private lands, protection of groundwater and surface waters, controls on access, and the removal of livestock grazing (USFWS 1987).

Numerous recovery measures implemented since listing have improved the conservation status of Borax Lake chub and protection of its habitat (Williams and McDonald 2003). When the species was listed, critical habitat was designated on 259 hectares of land surrounding the lake, including 320 acres of public lands and two 160-acre parcels of private land. In 1983, the U.S. Bureau of Land Management designated the public land as an Area of Critical Environmental Concern. The Nature Conservancy began leasing the private lands in 1983 and purchased them in 1993, bringing all of the critical habitat into public or conservation ownership. The Nature Conservancy ended water diversion from the lake for irrigation and livestock grazing throughout the critical habitat. Passage of the Steens Mountain Cooperative Management and Protection Act of 2000 removed the public BLM lands from mineral and geothermal development within a majority of the basin. These actions, combined with detailed studies of the chub and their habitat have added substantially to our knowledge of the Borax Lake ecosystem (Scoppettone et al. 1995, Salzer 1996, Perkins et al. 1996). However, two primary threats remain. These include the threat to the fragile lake shoreline, wetlands, and soils from a recent increase in recreational use around the lake (particularly off-road vehicle usage) and impacts to the aquifer from geothermal groundwater withdrawal if groundwater pumping were to occur on private lands outside the protected areas (Williams and McDonald 2003).

The status of the Borax Lake Chub SMU was assessed by evaluating six interim criteria. For each interim criterion, a designation of "pass" or "fail" for the SMU was determined. The Borax Lake chub SMU is classified as "at risk" because only three of the six interim criteria were met.

Distribution

Borax Lake chub are endemic to the 4.1 hectare Borax Lake. Records are not available to evaluate whether Borax Lake chub existed historically at other locations. Because of its highly restricted distribution, dependence on a single water source, perched topographic position, and

existing threats to their fragile habitat, the Borax Lake chub are vulnerable to catastrophic loss and fail the distribution criterion.

Abundance

Data describing the abundance of the Borax Lake chub population (Borax Lake SMU) over the last seven years are not available. Abundance estimates were obtained from 1986-1997 by The Nature Conservancy (Salzer 1997) (Figure 46). Abundance estimates for 1986-1990 are not comparable with those obtained in 1991-1997. Prior to 1991, estimates were obtained only from traps set around the perimeter of the lake. In 1991, estimates were obtained from traps set on a regularly spaced grid throughout the lake. A study comparing the methods suggests that pre-1991 abundance was underestimated, perhaps by as much as 50 percent (Salzer 1992).

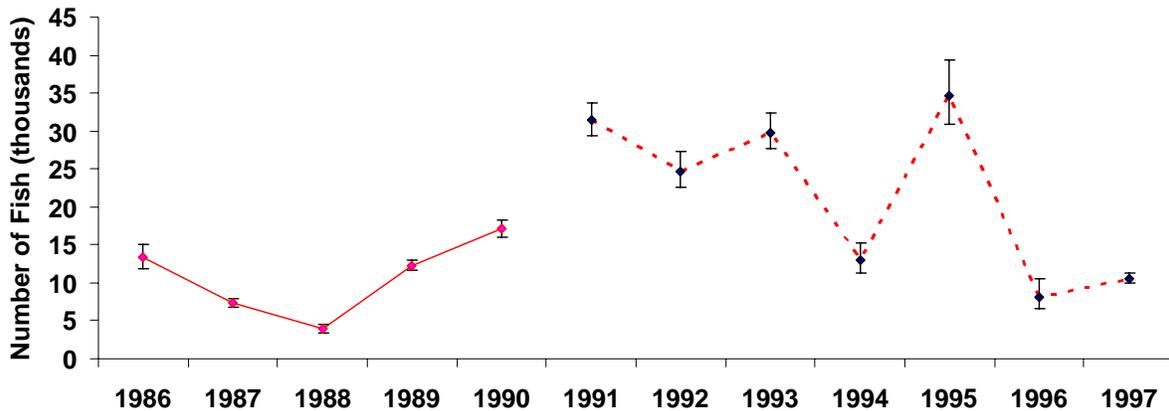


Figure 69. Borax Lake chub population abundance estimates from 1986 to 1997. Horizontal bars represent 95% confidence limits. In 1986-1990 (solid line), only the perimeter of the lake was trapped. From 1991 to 1997 (dashed line) the entire lake was trapped. Estimates are not directly comparable across these time periods.

A recent review of the conservation status of the Borax Lake chub by Williams and McDonald (2003) cited the lack of recent and ongoing population and ecosystem monitoring as one argument against downlisting or delisting the species at this time. The chub population has experienced substantial fluctuations in abundance over the time period (1986-1997) when abundance data is available. The most recent abundance estimates, obtained in 1996 and 1997, were some of the lowest estimates in recent years. For these reasons, the Borax Lake chub fail the abundance criterion.

Productivity

No data are available to assess productivity and the rate of population growth at the population level as called for in the Native Fish Conservation Policy interim criteria. This criterion was not evaluated. However, there are limited population age structure data that offers valuable insight into Borax Lake chub productivity. Williams and Bond (1983) examined length-frequency data and concluded that the Borax Lake chub population consisted primarily of age-1 fish, with few age-2 and age-3 fish present. Limited opercle bone aging of chub collected in 1992-1993 also indicated that most Borax Lake chub were less than one year of age (67-79%), yet a few individuals were aged at 10+ years (Scoppettone 1995). Because Borax Lake chub are only found in one location and the population is dominated by a single year-class of adults, the species has a high inherent risk of extinction.

Reproductive Independence

All Borax Lake chub are naturally-produced. No hatchery programs exist. Borax Lake chub pass this criterion.

Hybridization and other negative impacts of nonnative fishes

Interspecific hybridization and immediate threats from non-native fishes have not been identified as issues for Borax Lake chub. Borax Lake chub passed this criterion.