

## Threatened fishes of the world: *Cyprinodon tularosa* Miller & Echelle, 1975 (Cyprinodontidae)

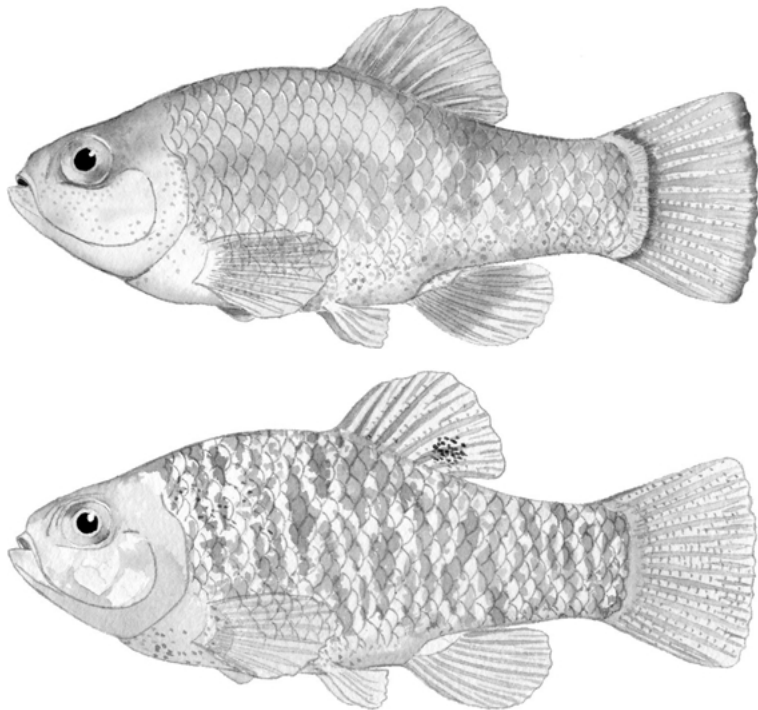
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**Common names:** White Sands pupfish. **Conservation status:** Threatened, New Mexico. **Identification:** The White Sands pupfish, *Cyprinodon tularosa*, is part of the *Cyprinodon variegatus* species complex (Echelle & Echelle 1992). White Sands pupfish are deep bodied and laterally compressed. Large adults may exceed 50 mm SL. D 8–11, A 9–11, P 14–17, C 13–18, LL 26–28; Karyotype 2N = 48 (Miller & Echelle 1975). *C. tularosa* exhibit low genetic variability (Echelle et al. 1987, Stockwell et al. 1998).

White Sands pupfish is sexually dimorphic. Adult males have a black terminal band on the caudal fin and display bright yellow-orange coloration on paired fins and outer margins of anal and dorsal fins. The side is grayish blue and the back and upper parts metallic blue (Miller & Echelle 1975). Females are whitish to silvery with vertical side bars which are grayish to golden and have an ocellus on posterior base of dorsal fin. Upper parts and back are olivaceous. Illustration by Bill Cray. **Distribution:** White Sands pupfish occupy four habitats in the Tularosa Basin, New Mexico. Native populations of *C. tularosa* occur at Salt Creek and Malpais Spring on White Sands Missile Range (WSMR) (Pittenger & Springer 1999). Because of fixed genetic differences, Stockwell et al. (1998) recognized the Salt Creek and Malpais Spring populations as two evolutionarily significant units (ESU) of *C. tularosa*. Two non-native populations were established by translocation of fish from Salt Creek to Mound Spring, WSMR between 1967 and 1973 and to Lost River, Holloman Air Force Base in 1970 (Stockwell et al. 1998, Pittenger & Springer 1999).

**Habitat and ecology:** White Sands pupfish habitats vary in environmental salinity (3–100 ppt) and parasite communities, providing conditions for local adaptation (Stockwell & Mulvey 1998, Stockwell et al. 1998). For instance, physid snails (*Physa* sp.) and an associated parasite (white grub, family Diplostomatidae) only occur at Malpais Spring and Mound Springs. This parasite can induce mortality in *C. tularosa* (Collyer 2000). An additional parasite species (Heterophyidae) is associated with a springsnail, *Jutumia tularosae*, endemic to Salt Creek (Hershler, Liu & Stockwell unpublished). **Reproduction:** White Sands pupfish lay eggs singly, but may have up to 6000 eggs (Jester & Suminski 1982). **Threats:** White Sands pupfish are threatened due to their limited distribution. Current threats to these habitats and their populations include the introduction of non-native fishes, de-watering and chemical contamination (Pittenger & Springer 1999). **Conservation action:** The White Sands pupfish conservation plan was developed by a multi-agency team in 1995. A revised plan will focus on increasing the security of the two ESU of White Sands pupfish (Stockwell et al. 1998, Pittenger & Springer 1999). These conservation efforts should preclude the listing of White Sands pupfish under the Endangered Species Act.



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