

DEVIL'S HOLE PUPFISH AND HOWELL'S SPINEFLOWER



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An inch-long, iridescent blue fish, the Devil's Hole pupfish is found only in a single cavern on the Ash Meadows National Wildlife Refuge in Nye County, Nevada, near California's Death Valley. It lives a precarious existence in waters generally warmed to about 90 degrees F. The cavern is more than 400 feet deep and is a maze of chambers that the fish shares with a snail species and a beetle species. At the mouth of the cavern, just below the water's surface, is a rock shelf that is the only spawning ground for the pupfish.

Listed as endangered in 1967, the pupfish has never numbered more than 553 individuals since population surveys began in 1972. Stable into the mid-1990s, the population began to decline in 1997. A survey in April 2006 indicated an adult population of 38, the lowest on record.

Management measures include regulating water use in Ash Meadows and nearby valleys to maintain water levels in the cavern, as exposing the spawning shelf could doom the pupfish. A Supreme Court ruling in 1976 required the protection of the water level.

Funding from all government sources for Desert Hole pupfish recovery ranks the species at 267 out of 1,311 species, according to the U.S. Fish and Wildlife Service fiscal year 2004 report (the most recent available) to Congress, *Federal and State Endangered and Threatened Species Expenditures*. Total recovery funding for the fish from all government sources that year was about \$138,000, with \$42,000 coming through the Service.

Listed as endangered in 1992, this flowering annual, which grows up to 4 inches tall and 20 inches across, is native to coastal dunes north of Fort Bragg in Mendocino County, California, where it occurs sporadically in an area of about 125 acres. The largest occurrence is in Mackarricher State Beach Park, which likely harbors more than a million individual plants.

Growing on coastal dunes and adjacent sandy soils of coastal prairies up to 120 feet above sea level, the plant is threatened by many of the activities that jeopardize the Smith's blue butterfly and shore-nesting birds such as the western snowy plover—beach recreational activities and encroachment by invasive, nonnative plant species.

U.S. Fish and Wildlife Service biologists know little about the plant, including overall population size and trends or details about the species' response to disturbance. Limited resources are not being focused on the plant because it does not appear to be in immediate danger. Controlling hikers and other beach recreationists and removing invasive plants are key to recovery for the species. Dunes restoration for the listed Menzies wallflower and the western snowy plover are likely to help this species, too.

Funding from all government sources for Howell's spineflower recovery ranks the species at 784 out of 1,311 species, according to the U.S. Fish and Wildlife Service fiscal year 2004 report (the most recent available) to Congress, *Federal and State Endangered and Threatened Species Expenditures*. Total recovery funding for the plant from all government sources that year was less than \$9,400, with less than \$2,400 coming from the Service.



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