



Conserving Integral Units of Chihuahuan Desert Biodiversity

Project # 05-112

Background:

Within most desert environments, aquatic habitats play an integral role in the preservation of biodiversity. Rareness of aquatic habitats is associated with high levels of regional endemism in the desert Southwest. Desert fishes are important components of these habitats and thus studies of fish across desert landscapes provide an excellent means to conserve these unique habitats. For instance, in the Tularosa Basin a series of aquatic habitats support a New Mexico State threatened fish species, the White Sands pupfish (*Cyprinodon tularosa*). This species is an important component of the aquatic community, and is endemic to Department of Defense (DoD) lands (Holloman Air Force Base [HAFB] and White Sands Missile Range [WSMR]).

Objective:

Because of their rarity, management plans call for the establishment of “refuge” populations of the pupfish to serve as “genetic replicates”. This Legacy funded research has focused on the biological implications of such translocations. This project sought to determine the genetic diversity of the experimental population (which would relate to its parasitic resistance genes (if experimental populations lack variation diversity, managers may need to supplement translocations to effectively increase parasitic resistance diversity. A second objective was to convene a scientific panel to evaluate management options for White Sands Pupfish habitat and other factors necessary for the subsequent development of best management practices from this species.

Summary of Approach:

Fifteen ponds were established with 9 and 6 ponds, each pond hosting fish from Salt Creek and Lost River, respectively. For each of the experimental ponds, project scientists conducted mark-recapture on a bi-annual basis. Recapture sessions were conducted between 2 and 6 days after the marking session.

Benefit:

Efforts to conserve biodiversity are an important responsibility of the DoD. The Nature Conservancy, the World Wildlife Fund and other international organizations identified the Tularosa Basin as a priority site for conservation of aquatic species. An integral component of these systems is the White Sands

pupfish, which occurs only on DoD land. This species can serve as a “conservation target” to draw attention to these important aquatic habitats. By protecting pupfish, we also protect other aquatic biodiversity such as a recently discovered species of springsnail that is also endemic to aquatic habitats on DoD land. This research has also provided evidence that exotic species pose a significant threat to White Sands pupfish. The proposed research will help fill in the gaps in our understanding of how to manage this threatened species.

Accomplishments:

This project resulted in demographic data for 7 experimental populations of the White Sands pupfish (*Cyprinodon tularosa*). Of the seven ponds that were continuously monitored, 3 underwent population declines and two of the seven (ponds 16 & 17) declined to under 50 fish. A separate data genetic data set is consistent with this observation and shows that ponds 16 and 17 also experienced severe genetic bottlenecks as reflected in loss of alleles and a change in gene frequencies. Project Authors produced multiple publications of the findings and implications of their study. All materials have been posted on DENIX (www.denix.osd.mil).



(New Mexico Game and Fish)

Contact Information:

Lonnie Britton
Natural Resources Planner
Holloman Air Force Base
49 CES/CEV, 550 Tabosa Avenue
Holloman AFB, NM, 88330
(575)572-3931
lonnie.britton@us.af.mil

