

How Much Surface Habitat is Enough? Preserve Design and Application for Cave-Limited Species

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Abstract

Central Texas supports some of the world's most biologically rich and diverse cave ecosystems. The rapid pace of urban expansion threatens many of these ecosystems and has led to the federal listing of 16 cave-limited invertebrates as endangered. Due to their rarity and endemism, destroying even a very few caves means certain extinction for many cave species, as these environments cannot be recreated. To avoid this outcome and assist developers in complying with the Endangered Species Act, we have developed preserve design recommendations to promote the species' survival in perpetuity. Historically, conservation efforts have focused solely on protecting cave entrances and drainage basins. Here, we take a broader perspective and consider population viability requirements of the surface plants and animals that are intricately intertwined with the life support system of each cave. We conclude that long-term protection entails a minimum preserve size of 69 to 99 acres (0.27923 to 0.40064 square kilometers) around a given cave or cave cluster, as well as maintenance and adaptive management to ameliorate other insidious threats, such as infestations of red, imported fire ants (*Solenopsis invicta*). Problems associated with setting these preserve standards in rapidly developing areas include inflated land values, public response, limited data on the species of interest, and the improbability of re-populating a cave once the species is extirpated.