

## **Cave and Karst Resource Management on Joint Base San Antonio-Camp Bullis**

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This paper will focus on the history and management practices of the cave and karst resources by the Department of Defense (DoD) on Joint Base San Antonio-Camp Bullis (JBSA-CB) as defined by the Biological Opinions (BO) and Integrated Natural Resource Management Plan (INRMP). This will include management of 112 known caves. 29 of these caves contain known endangered karst invertebrate species including in cave biological monitoring, cave cricket exit counts and Red Imported Fire Ant (RIFA) monitoring and treatment. An additional 42 caves and karst features are managed for endemic and state threatened species and require RIFA inspections and treatments. Three karst features are used as control sites for the RIFA program. This paper will present the history and details of the cave resource management program at JBSA. We have over 20 years of one of the most intensive programs in the Federal Government and an extensive database of resources that is unparalleled.

JBSA-CB is an approximately 28,000 acre military training facility located in Bexar and Comal Counties outside of San Antonio, Texas. JBSA-CB has worked with the United States Fish and Wildlife Service (USFWS) for over 20 years to protect and conserve three federally listed endangered karst invertebrate species twelve endemic karst invertebrate species and one state threatened, cave adapted vertebrate species. The cave and karst management program is among the most thorough and detailed program of its' kind to study and manage these cave and karst related species. The amount of data collected is enormous and will take years to analyze. Analysis of this data

allows JBSA-CB to work with the USFWS to take proactive, adaptive management strategies in research and management of these species and their habitat while optimizing the military training mission. Sykes Act (1960) requires military installations to assess property for natural resources. When significant natural resources are determined an Integrated Natural Resource Management Plan (INRMP) must be undertaken to manage all natural resources identified.

JBSA-CB has been a military reservation for over 100 years. It lies in the rolling hills of south-central Texas in a mostly scrub oak and juniper forest. Several significant natural resources have been identified in the INRMP. The significant natural resources identified on JBSA-CB related to cave resources include groundwater significance and endangered species.

JBSA-CB lies within the Edwards Aquifer Recharge and Contributing zones. JBSA-CB has 112 known caves and approximately 1500 karst features identified. The southeast corner of the installation is part of the Edwards Aquifer Recharge zone along with Cibolo Creek in that runs across the installation from west to east in the extreme north of the base. The rest is the Contributing Zone that runs toward the recharge zone but with an abundance of caves and karst features this area also contributes water to the Glen Rose-Trinity Aquifer. JBSA-CB is one of the ideal places to study the relationship between these two aquifers.

JBSA-CB is home to three federally listed endangered karst invertebrate species. Management of these species is based upon the Bexar

County Karst Invertebrate Recovery Plan. JBSA-CB has adopted some adaptive management strategies implementing some variance from the recovery plan. The INRMP is a document that requires signature from installation command, the USFWS and the state natural resource agency, Texas Parks and Wildlife Department (TPWD).

JBSA has identified two areas of potential impact to federally listed endangered species, both of which are related to the cave and karst management program at JBSA-CB. The oldest of these Biological Opinions (BO)s entitled “Military Mission and Associated Land Management Practices and Endangered Species Management Plan (ESMP) for the U.S. Army’s Camp Bullis in Bexar County, Texas.” This document essentially defines the management strategies for the three endangered karst invertebrate species as well as two endangered bird species.

JBSA has also completed a BO on Edwards Aquifer Groundwater Use. The Edwards Aquifer is a sole source aquifer for the City of San Antonio and surrounding region. It also is the source of most of the springs in Central Texas, including San Marcos, Hueco, and Comal Springs. These springs are the source or provide significant water to some of the most significant rivers in the State of Texas. These springs also provide habitat to several listed endangered species. The “Groundwater BO” determines the amount of water that JBSA is allowed to pump from the Edwards Aquifer and has resulted in the “Critical Period Management Plan for Edwards Aquifer Water Use at JBSA”.

Both of these BOs are a result of section 7 consultations with the USFWS as required under the Endangered Species Act (ESA)

