# Fort Cavazos Integrated Natural Resources Management Plan

Directorate of Public Works
Environmental Division
Fort Cavazos, Texas

# FORT CAVAZOS INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

This Integrated Natural Resources Management Plan (INRMP) has been developed by III Corps and Fort Cavazos, Texas, in cooperation with the U.S. Department of the Interior, Fish and Wildlife Service, and the Texas Parks and Wildlife Department. The signatures below indicate the mutual agreement of the parties concerning the conservation, protection, and management of the installation's natural resources as presented in this plan.

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Note: *This document is updated annually for minor changes, and no less than every 5 years for operation and effect. U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department only sign this document during major revisions.*

# Executive Summary

This Integrated Natural Resources Management Plan (INRMP) is for Fort Cavazos and the U.S. Department of the Army in accordance with the Sikes Act Improvement Act, as amended; Department of Defense (DoD) Instruction 4715.03 (*Natural Resources Conservation Program*); Army Regulation (AR) 200-1, (*Environmental Protection and Enhancement*); and the most recent Department of the Army and DoD Sikes Act and INRMP guidance memoranda, to include DoDM 4715.03. The purpose of an INRMP is to provide guidance for the implementation and management of natural resources on Fort Cavazos during the 5-year period from 2024 through 2028. This INRMP uses an integrated, adaptive, ecosystem management approach for sustainability and consistency with the military missions on Fort Cavazos. The DoD with the assistance of the U.S. Fish and Wildlife Service (USFWS) and the Texas Parks and Wildlife Department (TPWD) are responsible under the Sikes Act (16 U.S.C. 670a-670f, as amended) for carrying out programs and implementing management strategies to conserve and protect biological resources on Fort Cavazos lands. INRMP implementation is imperative for increasing mission capabilities, minimizing military training constraints, and maintaining maximum flexibility.

Integrated natural resources management in an ecosystem framework promotes overall environmental quality and provides for recreational uses while protecting biological diversity and allowing military training access to the resources needed to maintain a high degree of combat readiness at Fort Cavazos. Effective sustainable use of natural resources accomplishes no net loss in the capability of the installation to support the military mission.

This INRMP provides a description of Fort Cavazos and its surrounding environments and presents various management practices designed to mitigate potential negative impacts and enhance the positive effects of the installation's mission on the regional ecosystem. These management practices complement the requirements of Fort Cavazos to accomplish mission requirements at the highest possible level of efficiency. To obtain an accurate assessment of Fort Cavazos's environmental impact, environmental analyses were completed to determine the physical and biotic nature of the installation and to determine the potential impacts of operational activities upon the natural environment.

This INRMP is a practical guide for the management, sustainment, and stewardship of all natural resources present on Fort Cavazos, thus helping to ensure no net loss in mission capabilities. This INRMP uses an interdisciplinary approach whereby scientific information is compiled from a variety of sources.

This INRMP represents a major revision of the 2019-2023 INRMP, reviews the natural resources activities undertaken at Fort Cavazos since implementation of the 2019 INRMP, and proposes new projects and initiatives for the years 2024 through 2028. This revised INRMP includes the procedural requirements of the National Environmental Policy Act (NEPA) and DoD Instruction 4715.03 and strives to fully integrate and coordinate the natural resources program with other Fort Cavazos plans and activities.

This INRMP establishes goals that represent a long-term vision for the health and quality of Fort

Cavazos's natural resources. From these goals, objectives and management actions have been identified that follow DoD and USFWS guidance. The INRMP goals and management actions are revised over time to reflect changing missions and environmental conditions. Actions proposed in this INRMP are subject to NEPA compliance.

This INRMP undergoes internal, NEPA, and interagency review on a regular basis to ensure compliance and integration with other installation management plans including Army guidance and regulations and State and Federal natural resources conservation plans. This INRMP was developed in cooperation with the USFWS and the TPWD. These agencies are partners with the U.S. Army and Fort Cavazos for the conservation of the natural resources that occur on Fort Cavazos. These agencies are stakeholders and signatories for this INRMP along with Installation Command and indicate their consent for the natural resources management program as outlined herein on Fort Cavazos.

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# Chapter 1 Management Overview

## 1.1 Purpose and Scope

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide the natural resources management program at Fort Cavazos, Texas, from fiscal year (FY) 2024 to 2028, in accordance with the Sikes Act Improvement Act (SAIA), as amended through 2003; Department of Defense (DoD) Instruction 4715.03 (*Natural Resources Conservation Program*, 1996); Army Regulation (AR) 200-1, (*Environmental Protection and Enhancement*, 2007); and the most recent Department of the Army and DoD Sikes Act and INRMP guidance memoranda. This INRMP is the principle guiding document for land management activities on Fort Cavazos, is a major revision of the 2019-2023 INRMP, and has been restructured based on the INRMP Template issued by the U.S. Army Environmental Command. This INRMP allows Fort Cavazos to achieve its goal of ensuring the sustainability of desired future conditions while maintaining ecosystem viability. In addition, this INRMP ensures that natural resources conservation measures and Army activities on Fort Cavazos lands are integrated and consistent with Federal stewardship requirements.

This INRMP addresses the geographic area associated with the contiguous properties of Fort Cavazos, with particular emphasis on the training areas. It provides management measures that were developed through consideration of various alternatives for meeting resource-specific goals and objectives at Fort Cavazos. This INRMP also provides rationale for why certain management measures have been selected for implementation and others have not, which are supported by analysis of resource-specific screening criteria. This INRMP is based on the philosophy of ecosystem management with the intent of demonstrating the interdependency between the military mission and natural resources management.

## 1.2 Management Philosophy

The management measures and strategies that will be implemented at Fort Cavazos have been developed with consideration for the interrelationships between the individual components of the ecosystem, the requirements of the military mission, and other land use activities. The focus is on maintaining the structure, diversity, and integrity of biological communities, while recognizing that the Soldiers and military mission are a vital component of the ecosystem. An adaptive management strategy has been incorporated into this INRMP to monitor the temporal and spatial dynamics of the ecosystem and to adjust the management measures and strategies based on improved knowledge and data. Monitoring programs will generate the data needed to determine whether the management measures and strategies are effective in achieving their intended goals and objectives. This management approach will preserve and enhance the natural resources while providing the optimum environmental conditions required to sustain the military mission and realistic training conditions at Fort Cavazos. Management measures in this INRMP were developed based on current conditions of the resources, the military mission, and activities as they are anticipated.

## 1.3 Mission and Natural Resources Management History

The Army recognizes that a healthy and viable natural resources base is required to support the military mission. Areas that are deemed unusable for training affect the military mission. This INRMP ensures that environmental considerations are an integral part of planning activities at Fort Cavazos and that natural resources are protected in accordance with Army regulations and policies.

Military operations performed at Fort Cavazos have the potential to alter the environmental setting and condition of the natural resources. The absence of long-term, collaborative management measures to properly conserve and restore natural resources could potentially impede Fort Cavazos's ability in continuing to adequately train Soldiers. Environmental damage can place other artificial constraints on training, such as the following:

- Loss of training acreage,
- Decreased tactical maneuverability,
- Increased land and natural resources maintenance costs,
- Increased safety hazards, and
- Civil or criminal liability.

The Soldiers who utilize Fort Cavazos are trained to be aware of the environmental effects of their operations and to recognize that their actions in the field directly affect the long-term sustainability of the training lands and their ability to continue training. Training the Soldiers to understand their environmental stewardship responsibilities assists in preventing environmental degradation during training activities.

The primary mission of Fort Cavazos is to conduct readiness training, promote survivability of Soldiers, and provide combat-ready forces for worldwide deployment. Environmental initiatives and plans are typically considered secondary and should not inhibit military mission requirements. In most instances, environmental initiatives and plans are in agreement with military requirements and are generally transparent to commanders in the field. For instances with apparent disagreement, discussion amongst trainers, commanders, and subject-matter-experts often resolves differences. It is important to consider limitations due to the presence of naturally occurring resources that cannot be altered, as well as limitations resulting from natural resources that have already been affected.

Existing natural resources on Fort Cavazos can influence the manner in which the military mission is executed. Not only is proper management of natural resources and their use by the military a sound environmental practice, but it also directly supports the Fort Cavazos mission to provide sustainable training opportunities. This INRMP considers the effects of such natural resources on the mission. Examples of training activities and their effects on the environment, as well as examples of how degradation to natural resources adversely affects the military mission, are provided in **Table 1-1**.

Fort Cavazos Regulation 200-1, *Environment and Natural Resources*, dated April 2014, prescribes policies, assigns responsibilities, and establishes procedures for protecting the environment while preserving natural and cultural resources. Commanders are responsible for

integrating environmental management principles and environmental protection activities and programs, to the fullest extent possible, into the planning and execution of the mission.

**Table 1-1. Mission Activities and Potential Effects**

| | Potential Effects on: | |
|---|---|---|
| **Activity/Use** | **Natural Resources** | **Training/Combat Readiness** |
| Vehicles operated off-road | Degradation of soil, water, and vegetation | Loss of training realism |
| | Erosion gullies | Safety hazards in eroded areas |
| | Soil compaction | Contamination of soils could limit availability of training areas |
| | Soil and water contamination from field maintenance | Increased maintenance costs |
| Foxholes<br>Defilades | Soil displacement | Loss of training realism |
| | Erosion; eroded soils unable to support vegetation | Safety hazards in eroded areas |
| Bivouac areas | Soil compaction and/or erosion | Loss of training realism |
| | Loss of vegetation understory and overstory | Loss of camouflaging for vehicles and troop locations |
| | | Limit usable training areas |
| Range firing | Soil compaction, erosion, and inversion | Immobilized vehicles mired in mud |
| | Loss of vegetation understory and overstory | Loss of training realism |
| | | Potential administrative restrictions as a result of disturbance to Federally protected species or habitat |
| | Wildfires from pyrotechnics, tracer ammunition, or shell detonation | Accidental fires result in loss of usable training areas |
| | Artillery training produces a heavy metals residue | May result in administrative restrictions |

## 1.4 Goals and Objectives

The strategic goals of this INRMP conform to the goal of the Conservation Program of the DoD, which is to support the military mission by:

- Providing for sustained use of its land and air resources,
- Protecting valuable natural and cultural resources for future generations,
- Meeting all legal requirements, and

- Promoting compatible multiple uses of those resources.

Fort Cavazos's Natural and Cultural Resources Management Branch (NCRMB) has identified a number of objectives necessary to achieve these goals. **Table 1-2** aligns Sikes Act requirements with Fort Cavazos's objectives and program elements.

The ability to achieve these goals depends directly on the health and condition of the natural resources. Protecting the ecological and biological integrity of the training lands ensures that those lands will continue to provide the vegetation, soil, and water resources necessary for sustainable military training. Such protection will also preserve popular outdoor recreational activities at Fort Cavazos, such as hunting, fishing, birding, boating, and hiking. Implementation of ecosystem management principles will provide the quantity and diversity of fish and game for enjoyable hunting and fishing experiences. Proper management of the ecosystem will maintain water quality at a level that can support quality fisheries and presents no potential risks to human health.

**Table 1-2. Goals and Objectives Aligned with Sikes Act Requirements**

| Goal | Objectives | INRMP |
|---|---|---|
| **1. No net loss in the capability of military installation lands to support the military mission of the installation.** | Manage all resources to support long-term sustainment of the installation's training mission. | **Chapters 1-6** |
| **2. Establishment of specific natural resources management goals and objectives and time frames for proposed action.** | Implement a natural resources management program that reflects the principles of ecosystem management. | **Chapters 1, 4, and 6** |
| **3. Integration of, and consistency among, the various activities conducted under the plan.** | Use adaptive techniques to provide flexibility of management strategies based on increased knowledge and data gained from monitoring programs and scientific literature. | **Chapter 3** |
| **4. Provide for fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation.** | a. Seek to maintain or increase the level of biodiversity of native species.<br><br>b. Protect sensitive and ecologically significant habitats located on Fort Cavazos.<br><br>c. Protect woodland resources from unacceptable damage and degradation resulting from insects and disease, animal damage, non-native invasive species, and wildfire; and manage the resources in a manner that supports the military mission.<br><br>d. Protect soil resources from erosion and destabilization through prevention and restoration efforts.<br><br>e. Protect and preserve cultural resources. | **Chapter 4** |
| **5. Provide for fish and wildlife habitat enhancement or modification.** | Manage wildlife and fisheries resources within the principles and guidelines of ecosystem management to maintain productive habitats and viable populations of native species. | **Section 4.9** |
| **6. Wetland protection, enhancement, and restoration where necessary for support of fish and** | Prevent the degradation of water quality, protect aquatic and riparian habitats, and identify and restore degraded habitats. | **Sections 4.6 & 4.9** |
| **7. Public access to the military installation that is necessary or appropriate subject to requirements necessary to ensure safety and military security.** | a. Provide quality consumptive and non-consumptive recreational opportunities while avoiding impacts on training and maintaining a balanced and diverse ecosystem.<br><br>b. Provide a positive contribution to the community by offering informative and educational instruction and opportunities. | **Section 4.9** |

| Goal | Objectives | INRMP |
|---|---|---|
| **8. Sustainable use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management.** | Monitor outdoor recreational opportunities to ensure they do not conflict with natural resources or the military mission on the installation. | **Section 4.9** |
| **9. Enforcement of applicable natural resources laws and regulations.** | Maintain an adequate number of Conservation Law Enforcement Officers to protect the natural resources of Fort Cavazos by enforcing laws and regulations. | **Section 4.2** |
| **10. Review of INRMP as to operation and effect by the parties on a regular basis, but not less often than every 5 years.** | a. Allocate funds for INRMP review and update.<br><br>b. Continue coordination with U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department. | **Section 1.5** |
| **11. Protect and provide a benefit to threatened and endangered species.** | a. Provide special protection and management that leads to the recovery of threatened and endangered species and conserves species of concern and their habitats so that new species are not listed.<br><br>b. Protect rare and unique plant species identified as state or locally rare, but without legal protection status, to the extent practical without restrictions on operations.<br><br>c. Exempt critical habitat designation by providing a benefit to the species. | **Section 4.7 & Appendix B** |

## 1.5 Review, Revision and Reporting

The Sikes Act specifies that a formal review by the stakeholders must be completed no less often than every five years; however, DoD policy (specifically DODI4715.05) requires installations to review INRMPs with regard to operation and effect annually. These reviews are intended to determine whether the existing INRMP is being implemented to meet the requirements of the Sikes Act and contributing to the conservation and rehabilitation of natural resources on Fort Cavazos. In accordance with these regulations and AR200-1, this INRMP will be reviewed and updated as appropriate in concert with installation needs to obtain mutual agreement in coordination with the U.S. Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), and other internal and external stakeholders. A 5-year update will not be required if circumstances have not changed.

**Interagency Coordination.** In June 2015, the USFWS published *Guidelines for Coordination on Integrated Natural Resources Management Plans*. In July 2015, the DoD released *Guidelines for Streamlined INRMP Review*. Additionally, *The INRMP Implementation Manual* (DOD Manual 4715.03) was published in December 2017. These documents clarify and describe a streamlined process for reviewing and updating existing INRMPs. The goal of using a streamlined approach for updating INRMPs is to reduce the workload for all parties, ensure INRMPs are current, and sustain mission flexibility. This guidance calls for all proposed changes be outlined in a text, table, or matrix format so that reviewing agencies may expedite review times. A table outlining the updates in this INRMP is included as **Appendix A3.**

Annual reviews will be conducted between Fort Cavazos, the USFWS field offices (Austin and Arlington, TX), and the TPWD. Annually, formal agency consultation letters are e-mailed to the USFWS and the TPWD. These letters officially notify USFWS and TPWD of Fort Cavazos's intent to prepare an INRMP and associated National Environmental Policy Act (NEPA) documentation (if needed). Fort Cavazos distributes the draft update to the USFWS and TPWD for review and comment. Once comments are incorporated, Fort Cavazos distributes the final update to the TPWD and to both the USFWS field offices (Austin and Arlington, TX) and the USFWS Regional Sikes Act Coordinator (Albuquerque, NM). Any additional comments are incorporated into the final version of the INRMP. Once signed by all parties, the updated INRMP is considered reviewed for operation and effect and will restart the 5-year window for compliance. Previous NEPA documentation is assessed to ensure that the effects of the natural resources management practices in future INRMP updates have been adequately addressed. A Draft Finding of No Significant Impact (FNSI) is prepared, if appropriate. Applicable notes and written records documenting consultations is maintained in the official Administrative Record.

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# Chapter 2 Installation Overview

## 2.1 Maps

**Figure 2-1** depicts the installation boundary with major landmarks and features, including the impact area, training areas, cantonment and recreation areas, and leased areas.

**Figure 2-2** depicts the impact and surface danger zone areas, restricted areas, parks and open spaces, and major wetlands/waters that are considered (or are likely considered) "waters of the U.S" by the U.S Army Corps of Engineers (USACE).

**Figure 2-3** depicts the Installation in relation to other land uses, Army Readiness and Environmental Protection Integraton (Army REPI) priority areas, parcels in easements, and other regional opportunities or constraints.

**Note:** All maps in this INRMP were prepared by NCRMB GIS staff utilizing 2018 data.

## 2.2 General Installation Information

### 2.2.1 Location

Fort Cavazos Military Reservation is located in central Texas within Bell and Coryell Counties adjacent to the City of Killeen. Fort Cavazos lies between the major cities of Waco, 39 miles to the northeast, and Austin, 60 miles to the south. Food Cavazos is bounded on the east by Belton Lake and on the south by the cities of Copperas Cove, Killeen, and Harker Heights. The City of Gatesville is located north of the installation.

The installation has three cantonment areas (designated the Main Cantonment Area, West Fort Cavazos, and North Fort Cavazos), two instrumented airfields, and maneuver and live-fire training areas (see **Figure 2-1**). The Main Cantonment Area is at the southern edge of the large, central portion of the installation and is adjacent to the City of Killeen. West Fort Cavazos cantonment area is between the Cities of Copperas Cove and Killeen, in the center of the southern extension of the installation (south of Highway 190 / Interstate 14). North Fort Cavazos (NFC) cantonment area is near the City of Gatesville, in the northernmost part of the installation.

Fort Cavazos is one of the Army's premier installations, providing training facilities for the full range of mission requirements, including maneuver exercises for units up to brigade level, firing of live weapons, and aviation training. Fort Cavazos's mission is to provide an efficient and effective power projection platform—training, mobilization, deployment, and sustainment support—to produce the world's best trained and most effective Soldiers. Fort Cavazos provides state-of-the-art facilities to support the full spectrum of training requirements of today's modern armed forces. Installation lands and ranges provide excellent training opportunities for mechanized maneuver and small unit exercises, combined arms training, and live-fire training. Many different types of military units conduct a variety of training on Fort Cavazos. Representative units and their subsequent missions are outlined in **Section 2.6**.

Figure 2-1. Installation Map

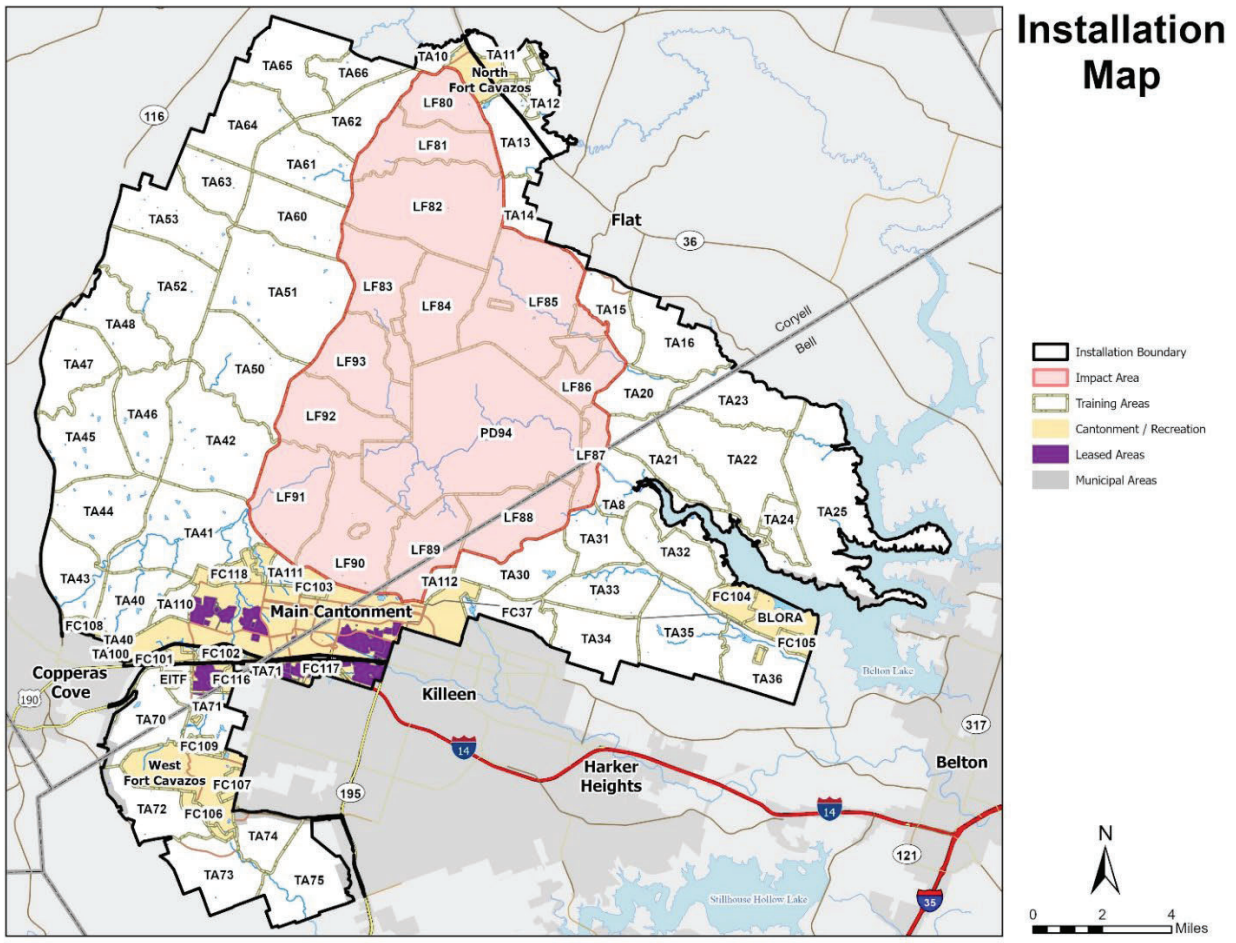


Figure 2-2. Constraints Map

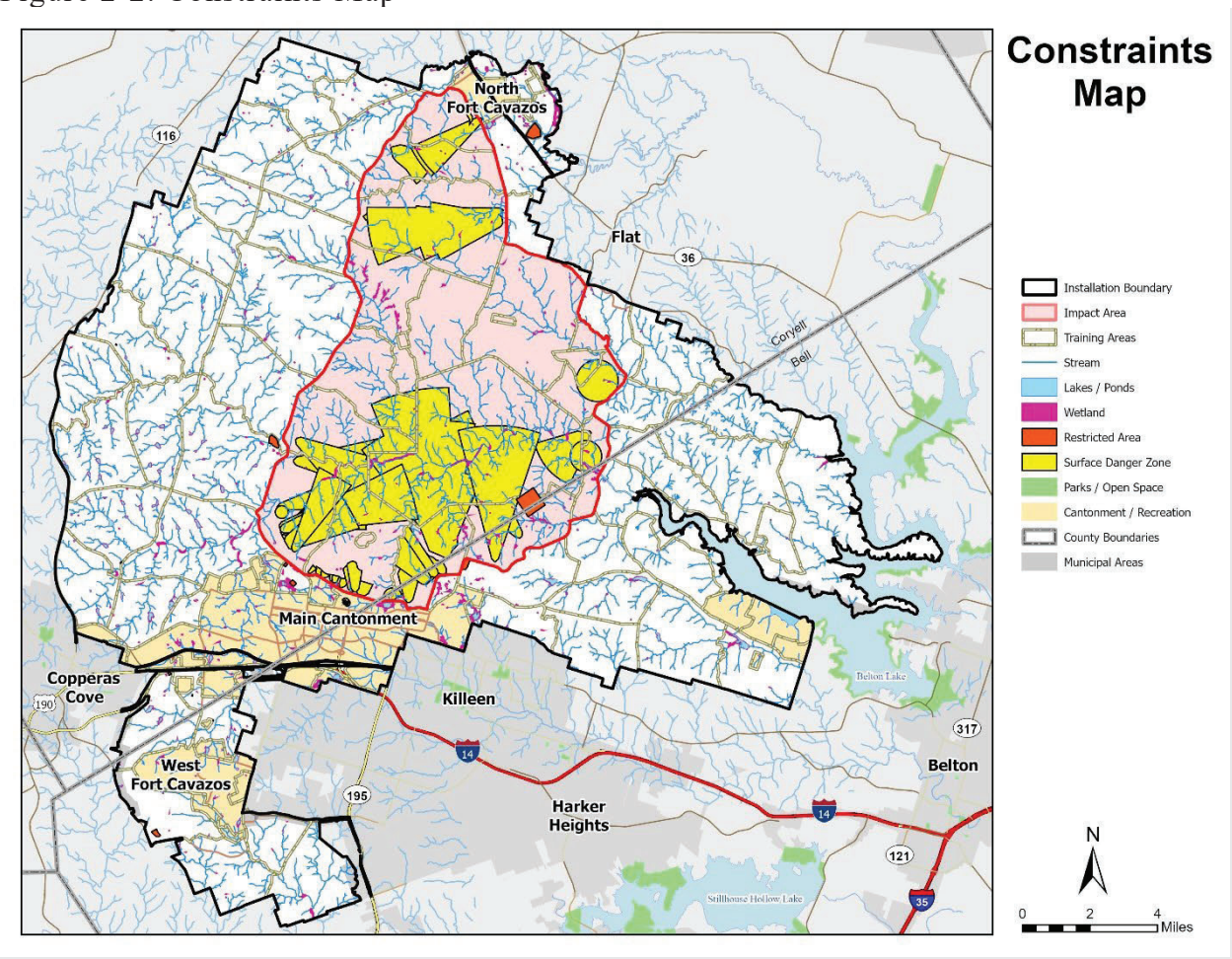
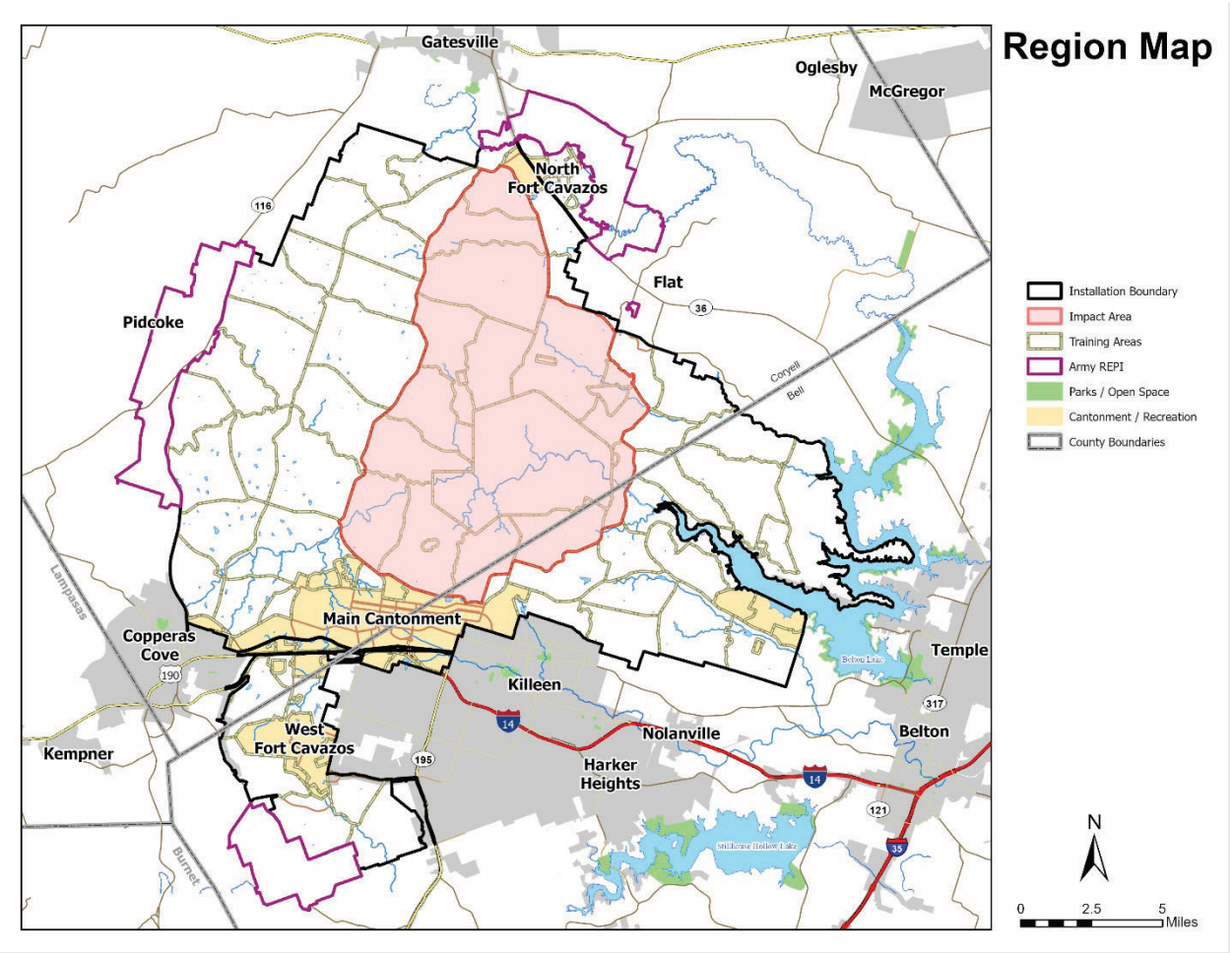


Figure 2-3. Local Area (Region) Map



## 2.2.2 Training Facilities and Ranges

Fort Cavazos encompasses just over 218,823 acres (342 square miles) of land, consisting of 132,525 acres of maneuver training area and 64,272 acres of range Live-Fire Training Area (LTA). Maneuver training land comprises roughly 61 percent of the installations total land acreage. **Table 2-1** lists the breakdown of current land use on Fort Cavazos.

**Table 2-1. Fort Cavazos Land Use**

| Primary Land Uses | Acreage | Percent |
|---|---|---|
| **Training and Live-Fire Areas** | **196,797** | **89.9** |
| Maneuver Land | 132,525 | 60.6 |
| Live-Fire Areas | 64,272 | 29.4 |
| **Cantonment Areas and Belton Lake Outdoor Recreation Area** | **22,026** | **10.1** |
| **Total Acreage** | **218,823** | **100.0** |

Source: USAG Fort Cavazos Fact Sheet (5 January 2018)

## 2.2.3 Regions

For ease of allocating resources (staff and funding) for this INRMP, Fort Cavazos's NCRMB has divided the installation into functional regions The regions are listed in **Table 2-2**, and a map of the regions is included as **Figure 2-4.**

**Table 2-2. Physical Characteristics of Regions**

| | | Land Cover | | | | Streams | Water Bodies | |
|---|---|---|---|---|---|---|---|---|
| Regions | | Bare Ground* | | Vegetation | | Stream Miles | Acres | Percent Area |
| | Acres | Acres | Percent | Acres | Percent | | | |
| Live-Fire Area | 62,882 | 3,210 | 5.1 | 58,841 | 93.6 | 307.9 | 9.1 | 0.01 |
| North Fort Cavazos | 5,885 | 156 | 2.7 | 4,645 | 78.9 | 38.8 | 22.9 | 0.39 |
| Northeast | 27,062 | 366 | 1.4 | 26,673 | 98.6 | 142.0 | 4.5 | 0.02 |
| Northwest | 36,298 | 1,621 | 4.5 | 34,593 | 95.3 | 184.9 | 52.6 | 0.14 |
| South | 17,528 | 467 | 2.7 | 15,117 | 86.2 | 76.2 | 61.4 | 0.35 |
| Southeast | 23,514 | 787 | 3.3 | 22,139 | 94.2 | 92.2 | 134.1 | 0.57 |
| Southwest | 31,697 | 1,754 | 5.5 | 29,511 | 93.1 | 198.9 | 220.6 | 0.70 |
| **ALL REGIONS** | **204,866** | **8,361** | **4.1** | **191,519** | **93.5** | **1040.9** | **505.2** | **0.25** |

*Bare Ground is defined as areas devoid of vegetation. Source: NCRMB GIS Data 2018

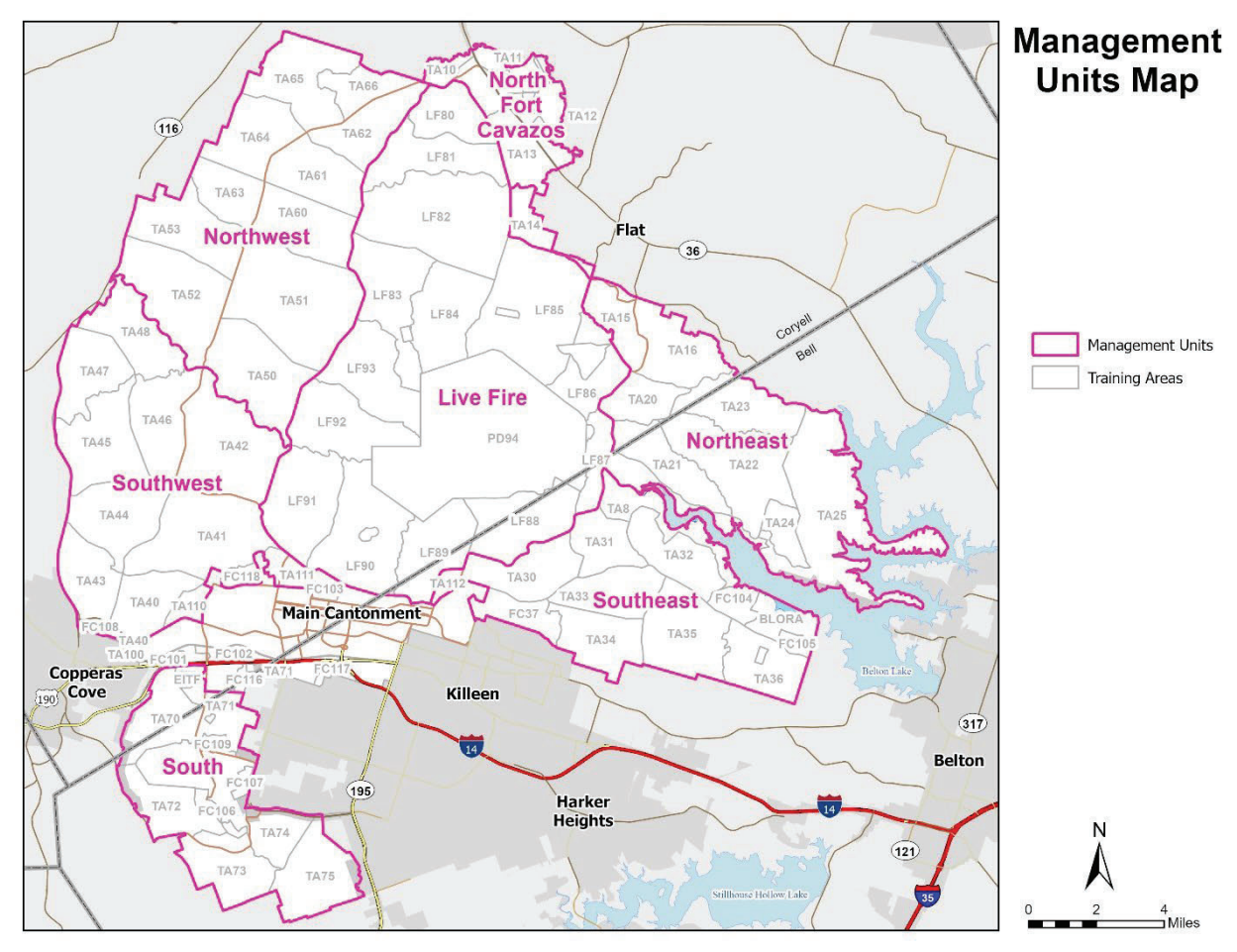
*Live-Fire Training Area*

The LTA and impact areas do not host much maneuver training and traffic is limited primarily to vehicles moving to and from the ranges. Access to the impact area is restricted due to danger from direct and indirect fire from active ranges and unexploded ordnances.

The LTA has the second-largest acreage of endangered species habitat of any region. In addition, the LTA region has 252 miles of streams, including Cowhouse Creek, which empties

into Belton Lake, the drinking water supply for Fort Cavazos and surrounding municipalities.

Figure 2-4. Regions/ Management Units Map




Because very little maneuvering occurs in the LTA, this region is not subjected to the same potential degradation as other areas, such as the Northwest and Southwest regions in the Western Maneuver Area (discussed below). Although the restricted nature of the area precludes access to a significant portion of the LTA region, most of the high-priority management activities are implemented to the highest practical extent.

## *South*

The South region includes the West Fort Cavazos cantonment. West Fort Cavazos consists of Robert Gray Army Airfield (AAF), the Ammunition Supply Point, research and administrative facilities for the Operation Testing Command, support facilities, and housing for military personnel, which accommodates both families and unaccompanied troops. The South region is used primarily by small, mechanized units, dismounted infantry training, and for logistical training.

The low-impact training that occurs in the South region results in minimal potential

degradation of the resources in the area. Habitat management is a key activity in this location due to the amount of endangered species habitat.

### *Southwest*

The Southwest region constitutes the southern portion of the Western Maneuver Area. Training in this region consists of battalion- and brigade-level training, which is conducted year-round. Of all the regions on the installation, the Southwest region has the greatest percentage of area receiving training disturbance. The level of training and associated disturbance causes the Southwest region to have the largest number of acres and percentage of bare ground of any of the regions.

Because of the large amount of bare ground, management activities focus on stabilizing the soils, increasing the vegetative cover, minimizing erosion, and improving the sustainability of the training area. The Southwest region contains many streams; therefore, aquatic habitat, fisheries, and water quality are at risk from sedimentation. The endangered species habitat in the Southwest REGION is minimal in comparison to other regions.

### *Northwest*

The Northwest region constitutes the northern portion of Fort Cavazos's Western Maneuver Area, and training in this area is similar to the training that occurs in the Southwest region. The Northwest REGION has the most extensive gully network of all the regions on the installation. Sediment from sheet and rill erosion in the Northwest region is transported into the various streams associated with Cowhouse Creek and eventually settle into Belton Lake.

The degradation of the vegetative cover in the Northwest region has resulted in an extensive gully network that requires significant resources for repair, as well as to prevent further erosion and sediment loading in streams. Gully plugs have significantly reduced gully erosion in these areas. A primary focus for the Northwest region is revegetation of bare areas and increasing the density of the vegetative cover.

Furthermore, the Northwest region contains the largest area of black-capped vireo habitat on the Installation. Management activities have and will continue to focus on maintaining the ecological integrity of the habitat to ensure that Fort Cavazos continues to monitor the species in accordance with the post-delisting monitoring plan. Habitat for the golden-cheeked warbler is also located in this area.

### *North Fort Cavazos*

Activities at NFC are similar to those of the main cantonment area. Nearly a third of the region is cantonment area; the remaining area consists of deciduous forest and woodlands. The Leon River forms the northern border, and there are potential jurisdictional wetlands within the floodplain.

The NFC region receives relatively little disturbance from training and therefore degradation is minimal. Endangered species habitat is found in this area and represents less than 1 percent of the total endangered species habitat on the installation. The primary focus for management on the NFC region is to maintain ecological integrity.

*Northeast*

The Northeast region is heavily vegetated and cross-compartmentalized by terrain features, providing limited value as a mechanized maneuver area. The area is used year-round primarily for vehicle maneuvering, dismount operations, and military police training. The Northeast region contains a significant amount of endangered species habitat. It has restrictive terrain and vegetation, and therefore training is normally conducted on roads and trails.

The Northeast region has the most contiguous and the greatest quantity of golden-cheeked warbler (*Setophaga chrysoparia*) habitat. In addition, the Northeast region has the highest known concentration of karst habitat and features compared to any other regions on Fort Cavazos. Significant effort is expended to protect these sensitive habitats and the species inhabiting them. In addition, surveys will continue for additional caves and the endemic karst/cavernicole species inhabiting them. Invasive species identification/control will continue in the Northeast region to minimize their impact on the sensitive habitats and species within the area.

A significant portion of this region is bordered by water, including Belton Lake. As a result, it is important to maintain vegetated watersheds and riparian buffers to protect water quality, aquatic habitat, and biological communities, including fisheries.

*Southeast*

The southeast region is used year-round for tracked-vehicle maneuver and dismounted training. This region is heavily vegetated and contains a significant amount of endangered species habitat. The northern border consists of Cowhouse Creek and Belton Lake. The Belton Lake Outdoor Recreation Area (BLORA), Fort Cavazos's premier outdoor recreation area, is within the Southeast region.

The majority of the habitat within the Southeast region is golden-cheeked warbler habitat. The Southeast region contains some karst habitat, which will continue to be monitored and protected. Surveys for additional caves and species will continue in this area.

Cowhouse Creek and Belton Lake compose the northern border of this region. As with the Northeast region, it is important to maintain vegetated watersheds and riparian buffers to protect water quality, aquatic habitat, and biological communities, including fisheries.

## 2.3 Local Area Land Use and Setting

Both urban and rural areas surround Fort Cavazos. Urban land uses are primarily residential, commercial, and industrial. The rural areas surrounding Fort Cavazos support agricultural land uses such as farming, ranching, and hunting. Nearby Belton and Stillhouse Hollow reservoirs provide excellent recreational opportunities for surrounding communities and Fort Cavazos residents. Fort Cavazos supports a population of 382,722 people (Fort Cavazos 2018), and seven surrounding cities are partnered with, and provide substantial quality of life

support, to Fort Cavazos.

## 2.4 Natural Environment

### *Climate*

Fort Cavazos's climate is characterized by long, hot summers and short, mild winters. The average annual temperature is 67 degrees Fahrenheit (°F). The temperature ranges from the mid-30s in the winter to the high 90s in July and August. Most of the summer days have temperatures over 84°F and are a combination of stiflingly high temperatures and humidity, which commonly occurs for extended periods of time. Winters are generally mild with occasional winds that bring ice and short periods of snow. Snow is infrequent and remains on the ground for very limited periods. Annual precipitation averages 33 inches and is heaviest in May and September and lighter during the winter months. (Fort Cavazos 2016)

### *Topography*

The topography of Fort Cavazos is defined by remnant mesas separated by wide valleys and rolling lowlands with steep canyon breaks, and it includes karst topographic features such as caves, sinkholes, rockshelters, and springs. Fort Cavazos is located northwest of the Balcones Fault Zone, a region of numerous geologically small faults. Over geologic time the area surrounding this fault zone, including Fort Cavazos, has elevated as much as 500 feet in certain areas. The subsequent erosion of these areas has created an irregular and steeply sloping terrain (USACE 2003).

Elevations range from 561 feet above sea level near the shores of Belton Lake in the northeastern portion of the installation, to 1,231feet above sea level in the Seven Mile Mountain area in the southern portion of the installation. Slopes generally range from level in the floodplains of Cowhouse Creek to as much as 33 percent on tributary valley walls. The average slope of the installation is between 5 and 8 percent. The area north of Highway 190 generally slopes east, while the area south of Highway 190 generally slopes south and east.

### *Hydrology*

As defined by the U.S. Geological Survey (USGS), Fort Cavazos lies within three major watersheds trending from northwest to southeast: Leon (#12070201), Cowhouse (#12070202), and Lampasas (#12070203) (USGS 2018). Cowhouse Creek and the Lampasas River are both tributaries of the Leon River. The Leon River begins approximately 60 miles northwest of Fort Cavazos and roughly parallels the installation's northern boundary. Tributaries of the Leon River, including Shoal and Henson Creeks, drain northern portions of NFC, the Western Maneuver Area, the LTA, and the Eastern Training Area. Owl Creek drains northern portions of the LTA and the Eastern Training Area and merges with the Leon River to form the northern arm of Belton Lake. Nolan Creek, which drains the southern portion of the Eastern Training Area and the main cantonment area, is also part of the Leon River Watershed and merges with this river downstream of Belton Lake. The western arm of Belton Lake is formed by Cowhouse Creek. The Cowhouse Creek watershed includes several tributaries within Fort Cavazos and drains most of the Western Maneuver Area and LTA along with the northern portion of West Fort Cavazos. A very small portion of the Lampasas River Watershed lies

within the southern portion of West Fort Cavazos.

*Ecoregions*

Fort Cavazos is situated in the northeastern reaches of the Edwards Plateau, the southernmost extension of the Cross Timbers and Prairies, and just west of the Blackland Prairie ecological regions. Woody and shrub-dominant communities, which typify much of the land area on Fort Cavazos, are most closely representative of Edwards Plateau vegetative associations. The grasslands are representative primarily of the mid-grass associations of the Cross Timbers and Prairies areas, with inclusions of species more commonly associated with tall-grass associations of the Blackland Prairie. Historically, frequent natural and man-made fires confined woody vegetation to riparian areas and rocky slopes and hills. As a result of human activities including grazing, reduction and suppression of fires, and training activities, the current vegetation structure and mix of species differ from those historically associated with the region.

## 2.5 Installation History

### 2.5.1 Pre-Military Land Use

Before pioneer settlement, Fort Cavazos was likely a mixture of grasslands, shrublands, oak-juniper forests, and riparian corridors. These vegetation communities reflect Fort Cavazos's location at the intersection of the Edwards Plateau and Cross Timbers and Prairies ecoregions. Oak-juniper forests occurred on mesa slopes and tops, canyons, rolling uplands, and lowland canyons. Deciduous shrublands nested in a grassland matrix were interspersed on mesas and rolling uplands; these shrublands were the result of wildland fire and storm disturbances. Grassland valleys and riparian corridors separated forested mesas and rolling lowlands. The historic extent of these vegetation communities is unknown. The landscape remained largely agricultural with extensive grasslands until Fort Cavazos was established in the 1950s (Fort Hood 1999).

### 2.5.2 Installation Military History

Fort Cavazos was named for the U.S. Army's first Hispanic 4-star general, Richard E. Cavazos. The installation was previously known as "Fort Hood". The original site was selected in 1941 in preparation for World War II, and construction of what was called South Camp Hood began in 1942. North Camp Hood was established shortly after the first land acquisition and the founding of the cantonment area. Camp Hood formally opened for troop training in September 1942 and, at peak population, provided training grounds for over 130,000 troops. Over the years, Camp Hood expanded in size through a series of land acquisitions to accommodate new equipment and training needs. In 1951, South Camp Hood was designated as a permanent installation and officially renamed Fort Hood. In 2023, it was again renamed Fort Cavazos.

North Camp Hood became the North Fort Cavazos MU and what is now West Fort Cavazos was formerly Gray Air Force Base. The U.S. Air Force ran both the airfield and the base from 1947 to 1952. From 1952 to 1969, the U.S. Army under the Defense Atomic Support

Agency managed the facilities which became part of Fort Hood in 1969.

## 2.6 Current Military Missions

Many different types of military units conduct a variety of training on Fort Cavazos. Representative units and their subsequent missions are outlined in the following table.

**Table 2-3. Installation Users and Primary Missions**

| Installation Users | Primary Mission | Garrison Resources Utilized |
|---|---|---|
| Headquarters III Corps | A major subordinate command of U.S. Armed Forces Command, provides command and staff oversight of all assigned units at five installations, including Fort Cavazos. | All resources including cantonment building space, maneuver lands, range |
| III Corps "The Phantom Corps" | Prepared to rapidly deploy and conduct the full range of military operations to seize, retain and exploit the initiative, in order to deter or defeat any adversary. | All resources |
| 1st Cavalry Division "America's First Team" | Prepares lethal, flexible, agile Division HQ and Brigades competent in Combined Arms Maneuver and Wide Area Security to execute missions to prevent, shape, win as directed. | All resources |
| 1st Army Division West | Conducts training readiness, oversight, and mobilization of designated active and reserve component forces in the western area of responsibility in order to provide trained and ready forces to regional combatant commanders. | All resources |
| 13th Expeditionary Sustainment Command "Phantom Support" | The logistical backbone of III Corps, providing supply, maintenance, transportation, field services, medical, engineering construction, smoke generation, and decontamination services. | All resources |
| 1st Medical Brigade "Silver | Provides command and control, administrative assistance, and technical supervision of assigned and attached medical units, while providing combat health support. | All resources |
| 36th Engineer Brigade | Rapidly deploys trained and ready engineer forces to seize, retain, and exploit the initiative across the range of military operations. | All resources |
| 89th Military Police Brigade | Supports the III Corps as a subordinate command in peace and war. | All resources |
| 504th Expeditionary Military Intelligence Brigade | Supports the III Corps and combatant commanders with multidisciplinary intelligence collection, analysis and dissemination. | All resources |
| 11th Signal Brigade | Integrates tactical, strategic and sustain base communications, information processing and management systems into a seamless global information network that supports knowledge dominance for the Army, joint and coalition operations. | All resources |
| 418th Contracting Support Brigade | Enhances installation and operational contracting support to Army commands. | All resources |
| Carl R. Darnall Army Medical Center | Provides service members, families and veterans quality, patient–centered care to promote a medically ready force and a healthy, resilient community. | Cantonment building space |

| Installation Users | Primary Mission | Garrison Resources Utilized |
|---|---|---|
| 15th Military Intelligence Battalion | Aerial intelligence, surveillance and reconnaissance fleet that provides aerial imagery and signals intelligence support to warfighters. | All resources |
| 1st Army Division West Headquarters | Conducts training readiness oversight and mobilization of designated active and reserve component forces in the western area of responsibility to provide trained and ready forces to regional combatant commanders. | All resources |
| Operational Test Command | Provides training, doctrine, and combat development of the products that Soldiers use daily and will use on the future battlefield. | Cantonment building space, maneuver lands |
| Fort Cavazos U. S. Army Garrison | Provides service with a proactive workforce to ensure combat ready Soldiers and provide comprehensive family support. | All resources |
| 48th Chemical Brigade | Deploys and conducts operations in support of combatant commanders or other governmental agencies to counter chemical, biological, radiological and nuclear threats. | All resources |
| 79th Ordnance Battalion | Provides 24-hour explosive ordinance disposal support to all military, local, State, and Federal agencies. | All resources |
| 69th Air Defense Artillery Brigade | Conducts air and missile defense operations in support of global strategic contingencies to deter, and then defeat Tactical Ballistic Missile and Air Breathing Threat attacks. | All resources |
| 7th Mobile Public Affairs Detachment | Gathers and distributes media to both internal and external audiences. | All resources |
| 85th Civil Affairs Brigade | Organizes, trains, equips and deploys forces worldwide, in any environment, to conduct Civil Affairs operations to mitigate civil vulnerabilities to advance U.S. goals and policies within relevant foreign populations, in support of combatant commanders and US ambassadors. | All resources |
| 13th Expeditionary Sustainment Command | Provides command and control of assigned, attached and operational control units, and plans and provides sustainment, distribution, and health service support for full spectrum operations. | All resources |
| 11th Military Police Battalion (CID) | Provides criminal investigative services to the U.S. Army within Texas, New Mexico, and Arizona. | All resources |
| 36th Infantry Division (Texas ARNG) | The ARNG has a partnership with Fort Cavazos that prioritizes their training during the summer months of June and July, plus the unit has training priority on weekends throughout the year, if scheduled. | All resources |
| Reserve Components | Numerous U.S. Army Reserve and Army National Guard Soldiers are mobilized, trained, equipped, and deployed from Fort Cavazos. | All resources |

Source: Fort Cavazos 2017.

## 2.7 Public and Affiliates Access

Fort Cavazos allows public recreation, provided those activities do not conflict with the military mission. The Directorate of Plans, Training, Mobilization, and Security (DPTMS) Range Operations Branch and Directorate of Public Works (DPW) control recreational access to all training areas and may close training areas to public recreation at any time for safety or training purposes. Recreation in the live-fire training area is prohibited. Training areas may be accessed only after obtaining appropriate permits on the Fort Cavazos iSportsman website and obtaining access to the installation at the Marvin Leath Visitor Access Center. Activities that are not allowed in the training areas are described in Fort Cavazos Regulation 210-25.

Except for special situations, road entrance points at installation perimeters are unmanned. The public is responsible for adhering to all Fort Cavazos regulations and restrictions placed on range access by DPTMS Range Operations Branch, Directorate of Emergency Services (DES) personnel, and the Army. Joint use of training areas is not authorized.

In accordance with Fort Cavazos Regulation 210-25, all persons desiring to conduct any recreational activity within the Fort Cavazos training areas must register with the iSportsman recreation program; minors ages 9 – 17 must have their own iSportsman account. Hunting permits are valid from the date of purchase through 31 August. Fishing and general recreation are valid for one year from the date of purchase. Access to the installation requires a person to provide picture identification, vehicle registration, and other personal information. All fees charged for recreational opportunities are charged IAW DoDI 4715.03, Enclosure 3(6)(c)(3). Fees are updated on 1 September annually and available at www.cavazos.isportsman.net.

Entry for recreational activities into contaminated impact areas, temporary or permanent, is strictly prohibited, without exception. Central Texas Cattlemen's Association (CTCA) provides a list of its members who use the Fort Cavazos training areas for their livestock to DPTMS Range Operations Branch. The list is validated annually and revised as necessary.

# Chapter 3 Integration Overview

This chapter describes how this INRMP is coordinated and integrated into the installation's real property master plan, range complex master plan, and any other strategic installations planning and outlines who is responsible as it relates to natural resources.

## 3.1 Authorities and Responsibilities

The roles of the organizations at Fort Cavazos that are directly responsible for, or are aiding in, the implementation of this INRMP are described in the following paragraphs. **Table 3-1** outlines the conservation laws and regulations that are applicable to natural resources management at Fort Cavazos and identifies the responsible Directorate and personnel for those laws/regulations.

**Commanding General.** The Commanding General has the overall responsibility for sustaining readiness training and complying with all laws and regulations associated with the protection of the installation's natural resources.

**Garrison Commander.** The Garrison Commander has the overall responsibility for implementation of the INRMP and conducts base operations in support of Fort Cavazos and tenant activities.

**Directorate of Public Works (DPW).** DPW develops coordinated master plans for future development and allied construction programs, coordinates utility and environmental programs, conducts high-visibility and command-interest studies to evaluate the effectiveness of current operations, and ensures that construction projects comply with the terms of the INRMP.

**Environmental Division (ENV).** ENV is responsible for the conservation, restoration, protection, and enhancement of the environment at Fort Cavazos. This includes the management and oversight of the natural resources (land, fish and wildlife), water pollution abatement, pest management, cultural resources, recycling, hazardous waste management, NEPA, and energy programs, as outlined in the INRMP.

**Environmental Management Branch (EMB).** The EMB manages, coordinates, and monitors a variety of environmental plans and programs, requests and maintains certain State and Federal operating permits or exemptions for solid waste, hazardous waste, air emissions, water use, and storm water and wastewater discharges. The EMB reviews the INRMP for correctness in the areas related to their functional areas of expertise and provides data on an annual basis.

**Natural and Cultural Resources Management Branch (NCRMB).** ENV's NCRMB is charged with managing all aspects of the INRMP, including the review of information, the addition of data as required, and the collection of comments from other agencies and directorates, both on and off post. NCRMB manages, coordinates, and monitors natural resources, fish and wildlife, land, and pest management. It also protects and improves fish and wildlife habitats; establishes and recommends protective measures

and practices in construction and maintenance activities to avoid pollution, burning, and unnecessary destruction of habitat; monitors, investigates, and recommends management and procedures related to game and non-game animals, birds, and fish; surveys and recommends improvements for food, cover, and water sources for wildlife; develops and monitors fish and wildlife inventories and population indices; maintains liaison with State land grant colleges and other local, State, and Federal wildlife management agencies; recommends, implements, and inspects fish and wildlife development and rehabilitation contracts; prepares reports, interagency agreements, and long-range plans related to program development and future planning; coordinates with other directorates to jointly allow recreational hunting and fishing activities; collects and analyzes biological data during annual deer and turkey harvests; manages the funds and budget for fish and wildlife activities; performs the function of staff agronomist and entomologist; develops, prepares, and monitors long-range plans for the use and improvement of natural resources programs; develops, manages, and coordinates pest management plans; prepares and reviews plans for service projects and in-house landscape, natural resources, and pest control projects; operates a geographic information system for the collection and analysis of automated natural resources databases; monitors projects and coordinates with proponent and regulatory agencies to ensure compliance with Section 404 of the Clean Water Act (CWA); coordinates and consults with the USFWS to ensure compliance with the Endangered Species Act; conducts endangered species monitoring and research and provides oversight and approval for all endangered species research conducted by university personnel, students or other researchers; and coordinates the clearance of excavation activities in unimproved grounds.

**Directorate of Plans, Training, Mobilization, and Security (DPTMS).** DPTMS is the approval authority for entry onto range and maneuver areas and the central point for control and coordination for all activities conducted within the installation live-fire and maneuver training land to ensure safety and unified operations. DPTMS is responsible for establishing procedures for the recreational use of Range and Training Land to support recreation activities. The DPTMS is responsible for the Range Complex Master Plan and the Integrated Training Area Management (ITAM) Workplan for training area repair and maintenance in close coordination with the NCRMB. The DPTMS also provides awareness training to the troops on the importance of protecting natural resources when in the field. The ITAM program provides the means to understand how the Army's training impacts land management practices and what the impact of training is on the land, how to minimize and/or mitigate and repair the impacts and communicate the ITAM message to Soldiers and the public.

**Directorate of Emergency Services (DES).** The DES provides natural resources law enforcement on the installation, including enforcement of hunting, fishing, archaeological, and environmental statutes and regulations. The DES has the responsibility to investigate animal neglect and animal cruelty reports. The DES documents endangered species habitat violations and works with NCRMB to ensure compliance with wildlife harvest quotas, disposes of dead wildlife resulting from motor vehicle operations, and provides a portion of the training for hunter safety briefings as requested. The DES also serves as fire marshal, providing fire prevention and protection for the installation.

## Table 3-1. Authorities and Responsibilities

| Law/Regulation/MOU # | Law/Regulation/MOU Title | Responsible/ Administering Agency(s) | Responsible Directorate & Personnel Position Title(s) |
|---|---|---|---|
| DoD Financial Management Regulation 7000.14-R, Vol. 11A, Ch.16 | Accounting for Production and Sale of Forest Products, August 2002. | Department of Defense | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C § 742j-l | Airborne Hunting Act | U.S. Fish & Wildlife Service | Directorate of Public Works, Wildlife Management Supervisor |
| 7 U.S.C.§ 426-426b | Animal Damage Control Act | U.S. Department of Agriculture | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C. §§668-668d | Bald & Golden Eagle Protection Act | U.S. Fish & Wildlife Service | Directorate of Public Works, Endangered Species Supervisor |
| 42 U.S.C. § 7401-7642 | Clean Air Act | Environmental Protection Agency | Directorate of Public Works, Air Program Supervisor |
| 16 U.S.C. 4301 *et. seq.* | Cave Resource Protection Act | Department of Defense | Directorate of Public Works, Endangered Species Supervisor |
| 33 U.S.C. §1251 *et. seq.* | Clean Water Act | Environmental Protection Agency | Directorate of Public Works, multiple |
| 40 C.F.R. Parts 1500-1508 | CEQ Regulations - Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA | All Federal Agencies (As Applicable) | Directorate of Public Works, NEPA Program |
| 42 U.S.C. §9601-9675 | Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) | Environmental Protection Agency | Directorate of Public Works, Waste Program Manager |
| DoDI 4715.03 | Conservation Program for Natural Resources, March 18, 2011 | Department of Defense | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| DoDI 5525.17 | Conservation Law Enforcement Program (CLEP), October 17, 2013 | Department of Defense | Directorate of Emergency Services, Chief Game Warden |
| DoD & USFWS MOU | Conservation of Migratory Birds MOU (Partners in Flight) | Department of Defense & U.S. Fish & Wildlife Service | Directorate of Public Works, Wildlife Management Supervisor |
| DoD & the Pollinator | Conservation of Pollinators MOU | Department of Defense & The Pollinator Partnership | Directorate of Public Works, Wildlife Management Supervisor |
| DoDI 6055.06 | DoD Fire and Emergency Services Program, December 21, 2006 | Department of Defense | Directorate of Emergency Services, multiple |
| DoD 5400.7-R | DoD Freedom of Information Act Program, September 4, 1998 | Department of Defense | Directorate of Public Works, multiple |
| DoDM 4715.03 | Department of Defense Manual: Integrated Natural Resources Management Plan (INRMP) Implementation Manual | Department of Defense | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C. §1531-1543 | Endangered Species Act of 1973, as amended | U.S. Fish & Wildlife Service | Directorate of Public Works, Endangered Species Supervisor |
| 32 C.F.R. § 651 | Environmental Impact Analysis | Department of Defense | Directorate of Public Works, NEPA Program |

| | | | |
|---|---|---|---|
| 16 U.S.C § 3901-3932 | Emergency Wetlands Resources Act of 1986 | Secretary of the Interior | Directorate of Public Works, Wildlife Management Supervisor |
| 40 C.F.R. 149 | EPA Sole Source Aquifers | Environmental Protection Agency | Directorate of Public Works, Water Program Supervisor |

| Law/Regulation/MOU # | Law/Regulation/MOU Title | Responsible/ Administering Agency(s) | Responsible Directorate & Personnel Position Title(s) |
|---|---|---|---|
| 7 U.S.C. §4201 *et. seq.* | Farmland Protection Act | Natural Resource Conservation Service | Directorate of Public Works, Wildlife Management Supervisor |
| 7 U.S.C. §136 *et. seq.* | Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended | Environmental Protection Agency | Directorate of Public Works, Wildlife Management Supervisor |
| 43 U.S.C. §1701 | Federal Land Policy and Management Act of 1976 | Department of Defense | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Executive Order 13514 | Federal Leadership in Environmental, Energy, and Economic Performance, October 5, 2009 | Department of Defense | Directorate of Public Works, Environmental Chief |
| 7 U.S.C. § 2801 | Federal Noxious Weed Act of 1974 | Secretary of Agriculture | Directorate of Public Works, Wildlife Management Supervisor |
| 33 U.S.C. § 1251-1376 | Federal Water Pollution Control Act of 1977 (Clean Water Act), as amended | Environmental Protection Agency | Directorate of Public Works, multiple |
| 16 U.S.C. §2901 – 2911 | Fish and Wildlife Conservation Act of 1980 | U.S. Fish & Wildlife Service | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Executive Order 11988 | Floodplain Management, May 24, 1977 | Department of Defense | Directorate of Public Works, multiple |
| 16 U.S.C. §1601 *et. seq.* | Forest and Rangeland Renewable Resources Planning Act of 1974 | Secretary of Agriculture | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Executive Order 13148 | Greening the Government through Leadership in Environmental Management, April 21, 2000 | Department of Defense | Directorate of Public Works, Environmental Chief |
| 10 U.S.C. §2671 | Hunting, Fishing and Trapping on Military Lands | Department of Defense | DFMWR Sportsmen's Center General |
| Executive Order 13112 | Invasive Species, February 3, 1999 | Department of Defense, State DNR, & other Federal Agencies (As Applicable) | Directorate of Public Works, multiple |
| 16 U.S.C. §701, 702 | Lacey Act of 1900 | Secretary of the Interior | Directorate of Public Works, Wildlife Management Supervisor |
| U.F.C. 3-210-10 | Low Impact Development | Department of Defense | Directorate of Public Works, Water Program Supervisor |
| P.L. 94-265, as amended at P.L. 109-479 | Magnuson-Stevens Fishery Conservation and Management Act | Regional Fishery Management Councils (both Federal and State Agencies) | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C. §718-718k | Migratory Bird Hunting Stamp Act | U.S. Fish & Wildlife Service | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C. §703 *et. seq.* | Migratory Bird Treaty Act, as amended | U.S. Fish & Wildlife Service | Directorate of Public Works, Wildlife Management Supervisor |
| Public Law 91-190, 42 U.S.C. §4321-4347 | National Environmental Policy Act (NEPA) of 1969, as amended | Department of Defense | Directorate of Public Works, NEPA Program |
| 32 C.F.R. 190 | Natural Resource Management Program for the Department of Defense | Department of Defense | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Executive Order 11989 | Off-Road Vehicles on Public Lands, May 24, 1977 | Department of Defense | Directorate of Emergency Services, multiple |
| 16 U.S.C. §4601 | Outdoor Recreation on Federal Lands | Department of Defense | DFMWR Outdoor Recreation Director & General Manager Sportsmen's |
| 10 U.S.C. §2667(d)(4) | Outleasing for Grazing and Agriculture on Military Lands | Department of Defense | Directorate of Public Works, Real Property Branch Chief |

| Law/Regulation/MOU # | Law/Regulation/MOU Title | Responsible/ Administering Agency(s) | Responsible Directorate & Personnel Position Title(s) |
|---|---|---|---|
| 50 C.F.R. 13 para 12-4 | Permit Procedures of the USFWS | U.S. Fish & Wildlife Service | Directorate of Public Works, multiple |
| Public Law 106-224, 7 U.S.C. §7702 | Plant Protection Act | U.S. Department of Agriculture | Directorate of Public Works, Wildlife Management Supervisor |
| 43 U.S.C. § 1701 et. Seq., 18 U.S.C. §641, and 18 U.S.C. §1361 | Protection of Fossils on Federal Lands | Department of Defense | Directorate of Public Works, Cultural Resources Team Lead |
| DoD & USFWS MOU | Promote the Conservation of Migratory Birds | Department of Defense | Directorate of Public Works, Wildlife Management Supervisor |
| Executive Order 11990 | Protection of Wetlands, May 24, 1977 | Department of Defense, U.S. Fish & Wildlife Service, & U.S. Army Corps of | Directorate of Public Works, Wildlife Management Supervisor |
| Executive Order 12962 | Recreational Fisheries, June 7, 1995 | Department of Defense & State DNR | Directorate of Public Works, Wildlife Management Supervisor |
| 42 U.S.C. 6901-6992 k | Resource Conservation and Recovery Act | Environmental Protection Agency | Directorate of Public Works, Waste Program Manager |
| Executive Order 13186 | Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001 | U.S. Fish & Wildlife Service | Directorate of Public Works, Wildlife Management Supervisor |
| 33 U.S.C. §401 *et. seq.* | Rivers and Harbors Act of 1899 | U.S. Army Corps of Engineers | Directorate of Public Works, Wildlife Management Supervisor |
| 16 U.S.C. §670a-f | Sikes Act | U.S. Fish & Wildlife Service, State DNR | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Sikes Act Tripartite MOU | Cooperative Integrated Natural Resource Management Program on Military Lands | Department of Defense, U.S. Fish & Wildlife Service, & Association of Fish & Wildlife Agencies | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| 16 U.S.C. §2001 | Soil and Water Conservation Act | Secretary of Agriculture | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Executive Order 13423 | Strengthening Federal Environmental, Energy, and Transportation Management, January 24, 2007 | Department of Defense | Directorate of Public Works, Energy Branch Chief |
| 50 C.F.R. 10-16 | Taking, Possession, Transportation, Sale, Purchase, & Barter, Exportation & Importation of Wildlife & Plants | U.S. Fish & Wildlife Service | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| Title I of P.L. 102-440, signed October 23, 1992 | Wild Bird Conservation Act | U.S. Fish & Wildlife Service | Directorate of Public Works, Natural and Cultural Resources Branch Chief |
| AR 200-1 | Environmental Protection and Enhancement | Department of Army | Directorate of Public Works, Environmental Chief |

## 3.2 External Stakeholders

Several Federal and State agencies, in addition to DoD and Fort Cavazos, have an interest or a role in the management of natural resources at Fort Cavazos. The involvement of these agencies is based on signatory responsibilities, cooperative agreements, regulatory authority, and technical assistance as required by Federal laws and regulations. In addition, several universities are active participants in projects at Fort Cavazos. The following table identifies the external relationships and a brief description of their responsibilities on the installation.

**Table 3-2. External Stakeholders**

| External Stakeholder | Type | Document/Agreement | Brief Description |
|---|---|---|---|
| USFWS (Austin and Arlington, TX) | **Required Partnership** | Species Recovery Plans, Endangered Species Management Component, Biological Opinion (2020) | Assists in INRMP development and updates to address recovery goals where mutually agreed. |
| TPWD | **Required Partnership** | 2023 State Wildlife Action Plan: Texas | Assists in INRMP development and updates to address Action Plan goals where mutually agreed. TPWD also plays an important role in installation fish and wildlife management. |
| Natural Resources Conservation Service (NRCS) | **Cooperative Agreement** | RTLA Program (2015) | ITAM funds NRCS to assess the impact of maneuver training on soil/vegetation and the ability of the western training areas to sustain continuous training. |
| USACE | **Regional Partner** | Fort Cavazos Forestry Market Study (2016) | Prepared a market analysis that addressed existing forest products currently found on the training areas. |
| Texas Commission on Environmental Quality (TCEQ) | **Regulator** | Stormwater Pollution Prevention Plan (2016); Stormwater Management Program (2017) | Partners with Fort Cavazos in several areas, such as water quality and waste, and issues permits. |
| Texas A&M AgriLife Research - Blackland Research Center (BREC) | **Cooperative Agreement** | RTLA Program (2015) | ITAM funds BREC to document off post, ongoing sediment monitoring, gully plug erosion monitoring, and the installation flood warning system. |
| Texas A&M University | **Cooperative Agreement** | Research and Studies | Conducts an annual forage inventory to provide information necessary for determining grazing allotments. |

| External Stakeholder | Type | Document/Agreement | Brief Description |
|---|---|---|---|
| University of Illinois (U of I) | **Cooperative Agreement** | Research and Studies | Provides support to the endangered species management program and Adaptive and Integrated Management (AIM) program. Provides support in the following areas: black-capped vireo annual and seasonal staff; golden-cheeked warbler annual and seasonal staff; brown-headed cowbird seasonal staff; migratory bird management, annual, and seasonal staff; pollinator seasonal staff; karst management and survey; and invasive species management. Also collaborates with USA-CERL on a number of projects. Past investigations include a radio telemetric study of the rat snake and research on a new species of Plethodontid salamander. |
| University of Texas | **Cooperative Agreement** | Research and Studies | Provides expertise for karst invertebrate taxonomy. |
| University of North Texas | **Cooperative Agreement** | Research and Studies | Assists with projects related to white-tail deer, including implementation of a deer population and migration study, which includes netting, collaring, and tagging. |
| Stephen F. Austin State University | **Cooperative Agreement** | Research and Studies | Assists NCRMB staff to study and better understand karst geology and hydrogeology. |
| Central Texas Cattlemen's Association | **Lessee** | Grazing Lease | Leases approximately 197,000 acres of the installation for cattle grazing purposes. |
| Inks Lake National Fish Hatchery (USFWS) | **Memorandum of Agreement & Interagency Agreement** | Fish Stocking | Provides fish for stocking several ponds throughout the year. |
| USFWS – Balcones Canyonlands NWR | **Memorandum of Agreement & Interagency Agreement** | Prescribed Burning | Provides resources for burning year-round. |
| Engineer Research and Development Center (ERDC) | **Memorandum of Agreement & Interagency Agreement** | Research and Studies | Assists with projects related to wild pigs and rodent density. |
| Compatible Lands Foundation (CLF) | **Regional Partner** | Conservation, restoration, and preservation activities | Monarch habitat restoration and partner in the ARMY REPI Program. |

## 3.3 Internal Integration

This INRMP is the planning document for the management of natural resources on the installation. Other documents, primarily included in **Appendix B** of this document, are required to be integrated and mutually supportive of one another, and each document reflects the objectives and planning outlined in the INRMP. Should conflict in management practices, management tools, objectives, planning tools, or in other areas arise, the notions outlined in this document supersedes other documents that identify natural resource practices.

### 3.3.1 Installation Plans

**Table 3-3** provides a comprehensive list of Fort Cavazos's plans that are utilized and integrated into this INRMP.

**Table 3-3. Installation Plan Integration**

| Responsible Directorate | Installation Plan (Date of Approval) | Personnel Position Title(s) |
|---|---|---|
| DES | Conservation Law Enforcement Plan | Lead Game Warden |
| DPW | Endangered Species Management Component | Endangered Species Supervisor |
| DPTMS | US Army Garrison Strategic Plan (2017, ongoing) | Plans Specialist, PAI |
| DPW | Installation Compatible Use Zone Study (2017) | Air PM |
| DPW | Installation Karst Management Plan (2012) | Natural Resource Specialist |
| DPW | Installation Master Plan (ongoing) | Master Planner |
| | Sustainability Component Plan (ongoing) | Master Planner |
| DPW | Integrated Cultural Resources Management Plan (2015-2020) | Cultural Resources Team Lead |
| DPW | Integrated Pest Management Plan (2016) | Entomologist |
| DPTMS | Integrated Training Area Management Work Plan (FY18-FY23) | ITAM Manager |
| DES | Integrated Wildland Fire Management Plan (2012) | Chief, Fire Department |
| DPTMS | Range Complex Master Plan (2017) | Range Planner |
| DPW | Real Property Master Plan (ongoing) | Master Planner |

### 3.3.2 Internal Coordinating Offices

**Table 3-4** describes the integration of regular or daily operations, not fully addressed in the above- listed plan integration. This table outlines the Division or Department that the natural resources team coordinates with on a regular basis to effectively implement the INRMP and ensure compliance with natural resources laws and regulations.

**Table 3-4. Additional Internal Coordination**

| Responsible Directorate | Personnel Position Title(s) | Contact |
|---|---|---|
| DPTMS | Range Officer | Brett Bair |
| DPTMS | Scheduler | Jeffrey Stamp |
| DPTMS | Range Planner | Rey Navarro |
| DPTMS | Range Safety Officer | Alvis Perry |
| DPTMS | ITAM Training Area Planner | Vacant |
| DPW | Master Planning | Mario Perez, Jill Martin |
| DPW | Environmental. | Tanicha Avila |
| DES | Fire Chief | Sergio Campos |
| DES | CLEO | CPT Marett |

# Chapter 4 Program Elements

## 4.1 Geospatial Information Systems

A Geographic Information System (GIS) is a particularly useful tool for evaluating the relationship between various natural resources management activities and the military mission. Global Positioning System (GPS) technology allows the field staff to accurately map features and to delineate various habitats in the field or to mark the exact location of a resource, such as a cave opening.

GIS databases and map feature classes serve as a powerful management tool for facilitating the integration and implementation of the resource-specific management measures presented in this INRMP. An overlay of the feature classes for the natural and cultural resources areas graphically illustrates the complexity of the environment and provides the means to readily identify and resolve potential conflicts between natural resources issues and mission requirements. Due to the sensitive nature of natural and cultural resources, these GIS datasets are shared by the NCRMB on a need-to-know basis. All requests of such datasets are directed to the NCRMB personnel using the "Terms of Use and Disclaimer of Fort Cavazos DPW GIS Data" form and further distribution of these datasets is prohibited without express written permission from NCRMB. This form may be obtained at the NCRMB office, or via email.

Fort Cavazos natural and cultural GIS feature classes are maintained in the Fort Cavazos Installation Geospatial Information & Services (IGI&S) Spatial Database Engine (SDE) by the NCRMB geographer. The SDE is the Database of Records for Installation GIS data. It is managed and maintained by the DPW IGI&S team. The IGI&S Manager for Fort Cavazos grants access permission and editing privileges to the database. The NCRMB geographer and a cultural resources specialist update the natural and cultural GIS feature classes as needed based on field conditions and SME input and review these datasets at a minimum quarterly for upload to the Office of Assistant Chief of Staff for Installation Management (OACSIM) IGI&S Headquarters geospatial data repository. All natural and cultural feature classes meet current Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) 3.1 Army Adaptation standards and Army IGI&S Standard Geospatial Data Layer Quality Assurance Plans (QAP), including metadata requirements.

### *Program Data Management*

The following table outlines NCRMB IGI&S data gathered under the GIS program to date.

**Table 4-1. GIS Data**

| Data Description/Program | Information | Frequency of Collection | Last Update |
|---|---|---|---|
| Polygon feature class of ARMY REPI priority areas.<br>ARMY REPI Program | ARMY REPI Priority Area (EncroachmentPriorityArea A) | One-time; modify as needed | 07/17 |
| Polygon feature class of ponds and lakes with fishing access.<br>Hunting and Fishing Program | Fishing Location A | One-time; modify as needed | 07/17 |

| Data Description/Program | Information | Frequency of Collection | Last Update |
|---|---|---|---|
| Polygon feature class of Training Areas and their corresponding hunting area designation. Hunting and Fishing Program | Recreation Area Hunting A(HuntingLocation_A) | Yearly update based on MWR/DPW directive | 04/20 |
| Polygon Feature class of ESA listed species habitat as delineated by SME in the field and using ancillary desktop data. Endangered Species Program | Fauna ERT A (SpecialStatusSpecies_Fauna_A) | As needed based on habitat take, and field surveys | 01/21 |
| Point feature class of ESA listed species observations for species other than the Golden-cheeked Warbler. Endangered Species Program | Fauna ERT P (SpecialStatusSpecies_Fauna_P) | As needed when sightings occur | 07/17 |
| Polygon feature class of fauna study site. Endangered Species Program | Fauna Study Site A (SpeciesStudySite_Fauna_A) | Yearly | 02/18 |
| Polygon feature class of land that is planted with vegetation and is maintained by NCRMB personnel. Outreach Program | Flora Planting A | As needed when new plantings occur | 02/18 |
| Polygon feature class of ponds and lakes. Waters Program | Water Feature A | As needed | 12/19 |
| Polygon feature class of vegetation communities, alliances, and associations. Flora Program | Vegetation Classification | As needed when surveys indicate vegetation changes | 07/17 |
| Line feature class of streams and rivers. Waters Program | Water Feature L | As needed | 12/20 |
| Polygon feature class of wetland areas. Wetlands Program. | Wetland A | As needed based on delineations and other field surveys | 06/19 |
| Polygon feature class of both wildfires and prescribed burns. Endangered Species Program | Wildland Fire A | As needed when new fires occur | 03/21 |
| Point feature class of recreational feature. NCRMB does not maintain this layer. Hunting and Fishing Program | Recreation Feature P | Yearly | 10/17 |
| Polygon feature class of lands held by non- DoD entities in which the DoD has interests. ARMY REPI program | External Property Interest (EncroachmentManagement_A) | As needed when new easements are acquired | 03/21 |
| Polygon feature class of each watershed located within the installation boundary. Waters Program | Watershed Area (WatershedFeature_A) | One-time; modify as needed | 07/17 |
| Polygon feature class of specific areas where fire is managed or excluded. | Fire Management Area (LandManagementZone_FireMgmt_A) | As needed when new prescribed fire plans are created | 02/18 |

## *Program History*

NCRMB began utilizing GIS technology in the mid-1990s primarily as a means of tracking prescribed burning acreages and locations as well as mapping endangered species habitat. Over the years the volume of managed natural resources related GIS data has increased considerably.

GIS data is obtained, created, edited, and maintained for the endangered species management program, the wildlife management program, the prescribed fire program, other natural resources programs, as well as for the karst resources management program. The geographer conducts routine as well as complex GIS analyses in support of NCRMB programs and produces quality mapping products for use by staff and partners.

## *Current Condition*

Fort Cavazos meets the Common Installation Picture (CIP) requirements for natural resources GIS datasets. Current condition of the GIS datasets listed in **Table 4-1** are up-to-date and meet current SDSFIE Army Adaptation Standards. Shells exist for a few other natural resources GIS datasets that have not yet been populated, not for lack of data, but for lack of time. These shells are Flora Species Site, Nuisance Species, and Tree Point. The geographer will work on these datasets as time allows.

## *Program Goals and Objectives*

Efficient data collection, storage, management, and analysis are essential for conducting a comprehensive natural resources management program, especially at Fort Cavazos given the size of the installation and the scope of activities. **Table 4-2** outlines the goals and objectives of the NCRMB's GIS program.

**Table 4-2. Goals and Objectives for the GIS Program**

| Goals | Objectives |
|---|---|
| Maintain installation natural resources GIS data, ensuring all information is current | Adhere to current Army OACSIM QAPs and SDSFIE Army Adaptation standards for official natural resources feature classes.<br><br>Continue data collection using aerial photography, GPS location, contracting of services, and field reconnaissance.<br><br>Continue to update layers as new data become available.<br><br>Manage and merge data from surveys and studies to support GIS users.<br><br>Ensure that all GIS information is available to biologists, planners, contractors, and others in a quick and timely manner.<br><br>Ensure accurate and usable GIS deliverables from NCRMB contracts. |
| Provide analytical and technical GIS products | Conduct complex and routine spatial data analyses in support of natural resources management objectives.<br><br>Leverage emerging GIS technologies to enhance field data collection and desktop analysis practices.<br><br>Interpret results and products as they relate to the NCRMB mission.<br><br>Produce high quality cartographic products for internal use and external distribution. |

| | |
|---|---|
| GIS coordination | Provide GIS expertise to NCRMB staff and its internal and external partners.<br><br>Provide GIS technical support and customer service to NCRMB staff.<br><br>Share and distribute GIS data as needed. |
| Maintain one or more operational GPS units to quickly and accurately map natural resources. | Ensure equipment (GPS, printers, and plotters) are ready to use. |

*Program Regions*

All Regions (refer to **Figure 2-4**).

*Monitoring*

GIS data layers are reviewed regularly, and pertinent or applicable changes are incorporated into the datasets. The NCRMB geographer continues to update the natural GIS feature classes as new information is received.

## 4.2 Conservation Law Enforcement

On Fort Cavazos the DES Conservation Law Enforcement Program (CLEP) is responsible for the law enforcement of all Federal and State laws including Fort Cavazos regulations pertaining to natural resources, archeological and historical resources, and other environmental statutes and regulations. DODI 5525.17 establishes policy, assigns responsibilities, and provides direction for the CLEP in accordance with the authority in DoD Directive (DoDD) 5124.02 (Reference (a)). Within the DES, Conservation Law Enforcement Officers (CLEOs) work with the NCRMB personnel on a regular basis to ensure that Federal, state, and installation regulations pertaining to fish, game, wildlife, natural resources and cultural resources are enforced. Fort Cavazos regulations that guide the enforcement of Conservation Law on the Installation include: Fort Cavazos Annual Hunting, Fishing and Natural Resource Use Guide, Texas Parks and Wildlife Laws in the Texas Parks & Wildlife Code, Fort Cavazos Regulation 210-25 (Installation Hunting, Fishing, and Natural Resources Conservation), and Fort Cavazos Circular 210-22 (Hunting & Fishing Bag Limits and Seasons). Close coordination between NCRMB Program Managers and the Fort Cavazos DES is essential in achieving INRMP goals.

CLEOs proactively enforce provisions of Federal/State laws to ensure compliance to reduce violations by all military personnel, DOD personnel and civilians in the recreational use of Fort Cavazos land. CLEOs actively patrol Fort Cavazos, including habitat areas, waterways, nesting sites, and culturally sensitive areas, as well as actively patrol recreation areas, training area, and ranges, in the enforcement of all Federal and State laws, Fort Cavazos Regulations including hunting, fishing, and area access regulations to prevent conflict and ensure safety. CLEOs conduct Federal and State license/permit compliance checks to ensure recreators on the installation are in compliance with all related laws and regulations.

Examples of specific duties for CLEOs include documenting violations of the Endangered Species

Act (ESA) and natural resources violations, and the Archaeological Resources Protection Act (ARPA) and other cultural resources violations. Looting of archeological sites is one of the most common offenses. Numerous and varied offenses can result in loss/damage of protected materials, exposure to UXO, and potential lawsuits. CLEOs work with DPW and NCRMB to ensure compliance with wildlife harvest quotas, disposing of dead wildlife resulting from motor vehicle/wildlife accidents, game and fish and other wildlife laws, and security for historical and archeological sites. CLEOs provide educational classes (as requested) to the public concerning natural resources, recreation on Fort Cavazos, wildlife encounters and environmental concerns. Finally, CLEOs are available to provide briefings to new arrivals.

## *Program Data Management*

Not applicable.

## *Program History*

All CLEO's must complete the Dept. of the Army/IMCOM basic Law Enforcement training academy and attend all required annual in-service training, including semiannual firearms. Newly hired CLEOs are trained using the Conservation Law Enforcement Field Training Program and complete the Department of the Army/IMCOM CLEO training academy (80-hours) within 1 year. CLEOs are required to receive a minimum of 40 hours of CLE focused refresher training annually IAW DoDI 5525.17. This training can be coordinated with federal, state or local agencies and completed throughout the year, other periodic training can include a host of law enforcement skills and techniques.

## *Current Condition*

The DES table of distribution and allowances provides for an authorization of seven CLEOs assigned to Fort Cavazos. At a minimum, maintaining the seven authorized CLEOs is critical to continued enforcement of all Federal and State laws, Army and Fort Cavazos regulations including natural and cultural resource laws, statutes and regulations. In late 2023 the Installation introduced the use of iSportman to replace the Hunt Trac system. All recreators are required to have an iSportsman account, a permit (specific to Fort Cavazos), and a Vehicle Range Pass before recreating on Fort Cavazos. With iSportsman's ease of use, demand for hunting and fishing permits will increase along with the number of recreators. More recreators will increase the responsibilities and workload for the current CLEOs. Fort Cavazos encompasses a very large patrol area of just over 218,823 acres (342 square miles) of land. Given the large patrol area, and general time constraints resulting from not having enough staff to cover areas, seven CLEOs are not sufficient to meet the Sikes Act and INRMP requirements. By helping to ensure the safety and security of the Installation's natural and cultural resources, professionally trained CLEOs are force multipliers.

## *Program Goals and Objectives*

The goal of the Conservation Law Enforcement Program is to help ensure the safety and security of the installation by enforcing all Federal and State laws, Army and Fort Cavazos regulations, to include fish, wildlife and game laws, natural resource laws, statutes and regulations. The objectives that have been implemented to ensure this goal is achieved are presented in **Table 4-3**. CLEOs support Fort Cavazos's mission by conducting proactive law enforcement

patrolling, providing for the safety of recreational and military users; maintaining a wildlife education program to deter violations; and assist the installation's requirement to meet natural resources goals and objectives as outlined in the INRMP.

Effective enforcement of laws and regulations applicable to Fort Cavazos and natural resources enhances the overall natural resources program, protects the natural and cultural resources, and provides public safety by enforcing off-limit areas and providing protection from criminal destruction of natural resources (e.g., activities such as trespassing and poaching). By FY 2026, a minimum of 10 CLEOs will be required to safely and effectively meet the Sikes Act and INRMP requirements. In 2026, the number should be re-evaluated by stakeholders to ensure that 10 CLEOs are adequate to meet these requirements. Currently, the Military Manpower Model suggests 10 CLEOs for Fort Cavazos. Staffing should begin immediately to ensure 10 CLEOs are onboarded and trained by FY 2026.

**Table 4-3. Goals and Objectives for Conservation Law Enforcement**

| Goals | Objectives |
|---|---|
| Protect the natural and cultural resources of Fort Cavazos by enforcing laws and regulations. | Ensure that laws and regulations pertaining to natural and cultural resources at Fort Cavazos are in accord with the laws and regulations of the United States and the State of Texas.<br><br>Adopt additional laws and regulations that adequately protect the natural and cultural resources of Fort Cavazos.<br><br>Maintain staffing levels of trained and capable law enforcement personnel sufficient to effectively monitor and enforce natural and cultural resources laws and regulations. Ensure that law enforcement personnel meet the requirements for training and weapons qualification according to their experience and rank and receive appropriate continuing education to enhance understanding of natural and cultural resources and ecosystem management.<br><br>Enforce the natural and cultural resources laws and regulations of Fort Cavazos; prioritize and conduct an adequate number of patrols to cover the installation to ensure protection of sensitive resources; educate military personnel and the public about natural and cultural resources protection and how to report violations; file reports for all known violations and law enforcement actions.<br><br>Provide education and training to the installation populace, workforce, and general public to prevent inadvertent violation of natural resource and cultural resource laws.<br><br>Report non-compliance with laws and regulations in accordance with Military Service criminal data reporting procedures.<br><br>Report and track natural and cultural resources crimes and their disposition (both military and civil).<br><br>Coordinate with other federal and state agencies to address specific relevant conservation law enforcement issues |

*Program Regions*
All Regions (refer to **Figure 2-4**).

*Monitoring*
Federal and State natural resources laws should be reviewed regularly, and pertinent or applicable changes should be considered for incorporation into Fort Cavazos's regulations. In addition, incident reports should be reviewed to ensure that adequate actions have been taken in each instance and enforcement activities should be evaluated to determine their adequacy in protecting Fort Cavazos's natural resources. All law enforcement personnel should have their training and qualifications reviewed annually or semiannually to ensure that training and performance consistently meet current requirements.

## 4.3 Climate Resilience

Congress passed legislation requiring military installations to address environmental planning, sustainable design and development, sustainable range planning, real property master planning, military installation resilience, and transportation planning to address the growing threat of climate change. This legislation is codified in 10 U.S. Code (U.S.C) Section (§) 2864, subsection (c), items (1) through (8). The U.S.C. codifies that each military installation will develop an Integrated Climate Resilience Plan (ICRP) that provides a path to address the threats of climate change holistically in the Real Property Master Plan by identifying climate-related risks as well as corresponding mitigations and real property investments that can reduce those risks.

Fort Cavazos developed and completed an ICRP in June 2023 to address climate change in their Real Property Management Plan (RPMP). As a result, the Integrated Natural Resource Management Plan (INRMP) will integrate pertinent climate change risks and information into its natural resource management strategy.

Department of Defense Manual 4715.03 (March 2011) requires installations to address potential impacts of climate change on natural resources and the training mission in ENCLOSURE 3, Procedures, INRMP Preparation, Review, and Implementation. Item c. states, "All DoD Components shall, in a regionally consistent manner, and to the extent practicable and using the best science available, utilize existing tools to assess the potential impacts of climate change to natural resources on DoD installations…".

The *Climate Adaptation for DoD Natural Resource Managers* (Stein et al. 2019) provides additional tools for installations to assess their concerns, projections and vulnerabilities. The guide provides direction in updating INRMPs to account for climate change projections. A 6-step climate-smart conservation process can be used as an adaptation planning framework for natural resource management. **Figure 4.1** Climate Adaptation Planning for INRMPs describes the steps.

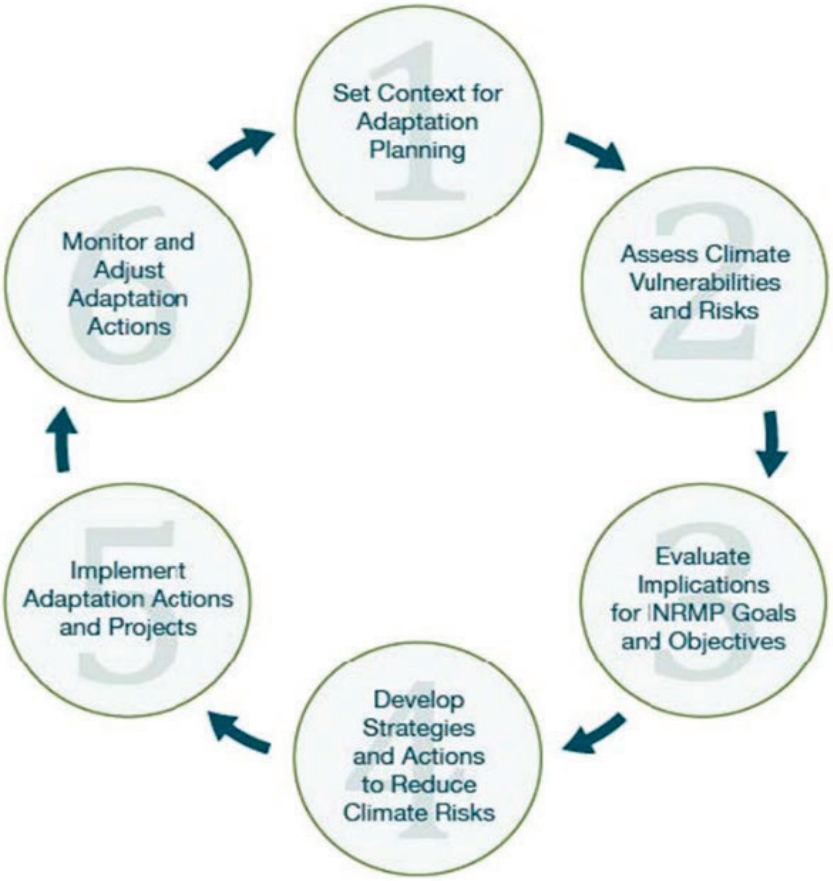



FIGURE 4-1. Climate Adaptation Planning Process

INRMPs should be based on the principles of ecosystem management. Their purpose is to describe natural resources management, allow for multipurpose uses of those resources, and define public access—all while ensuring no net loss in the capability of an installation to support its military testing and training mission.

As noted in Fort Cavazos' ICRP, mission sustainment ensures the military can continue to train and fight as needed and intended. Mission sustainment increasingly includes addressing climate change and the associated weather extremes and changes to the natural environment. Key benefits of climate resilience planning as it relates to mission sustainment are summarized in the following:

1. Maintain the mission(s).
2. Provide training in a unique and valuable environment.
3. Ensure mission readiness.
4. Conserve the natural environment.
5. Ensure that Fort Cavazos remains relevant, well-utilized, and mission capable.
6. Provide environmental stewardship in a changing world.
7. Provide uninterrupted training, working, and living environments for Soldiers and their

Families.

8. Avoid the long-term costs associated with failure to adapt and mitigate the effects of Climate Change.

Regional natural resource related risks to the mission at For Cavazos were identified as severe weather, drought, wildfire, heat, flooding, and land degradation. Climate models increasingly predict warming temperatures and changes in the timing and amount of precipitation in the southwestern U.S. These changes can permanently alter ecosystems which ultimately result in impacts to the mission. At the ecosystem level, effects will likely be gradual and challenging to assess.

## *Program Data Management*

Fort Cavazos identified and assessed each climate hazard using the Standardized Army Risk Matrix. Inputs to the assessment included authoritative climate projections, virtual meetings with stakeholders, the workshop results, and subsequent research and evaluation, and other related management plans. Table 4.4 provides a summary of climate hazard risk events that could affect natural resources at Fort Cavazos. These include severe weather, drought and water supply issues, wildfire, heat, flooding, and land degradation.

**TABLE 4.4** Summary Risk Assessment for Fort Cavazos

| EVENT | RISK | IMPACT | LIKEHOOD |
|---|---|---|---|
| | | | |
| Severe Weather | Extremely High | Catastrophic | Likely/Frequent |
| Drought & Water Supply | Moderate/High | Moderate/Critical | Likely |
| Wildfire | Extremely High | Critical | Frequent |
| Heat | Low/Moderate | Negligible/Moderate | Likely |
| Flooding | Moderate/High | Moderate/Critical | Likely/Occasional |
| Land Degradation | Moderate/Extremely High | Moderate/Critical | Likely/Frequent |

Other information used in the ICRP includes an overview of climate hazards screened in the DoD Climate Assessment Tool (DCAT). Information in the DCAT identifies projected climate exposures at the installation-level. As the authoritative data source of climate exposure assessment for the Department of Defense (DoD), the DCAT served as a primary data source for the ICRP. The DCAT incorporates data from nationally recognized sources, including:

- National Oceanic and Atmospheric Administration's (NOAA's) ***Storm Events Database***: this documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce.

- The U.S. Global Change Research Program's ***4th National Climate Assessment:*** fulfills a mandate for the U.S. Global Change Research Program to deliver a report to Congress and the President no less than every four years.

Codified military installation resilience plan requirements in 10 U.S.C. § 2864(c) that provided additional guidance to the ICRP include:

- National Defense Authorization Act for Fiscal Years (FYs) 2020 and 2022.
- DoD Installation Exposure to Climate Change at Home and Abroad, April 2021.
- Unified Facilities, Criteria, (UFC) 2-100-01, Installation Master Planning, September 2020.
- Army Directive 2020-08, U.S. Army Installation Policy to Address Threats Caused by Changing Climate and Extreme Weather, September 2020.
- Army Climate Resilience Handbook, August 2020
- Army Climate Strategy, February 2022.

## *Climate Projections Overview*

The following provides a general overview of climate risk projections at Fort Cavazos. The *4th National Climate Assessment* provides an overview of climate risks in the Southern Great Plains *regional* level of the U.S. and the *DCAT* identifies projected climate exposures at the *installation* level. It should be noted that climate related hazards can be linked. For example, severe weather can lead to drought, flooding, and land degradation, and heat with drought can exacerbate wildfires.

### 1. Severe Weather

The ICRP notes that Fort Cavazos is located in the Southern Great Plains. The Southern Great Plains includes significant and consequential weather events such as hurricanes, flooding, severe storms, large hail, tornadoes, blizzards, ice storms, heat waves, and drought. Over the past 50 years the region has sustained increasingly "rapid swings" between extreme drought and flooding. Changes in precipitation and drought are projected. Warming temperatures introduce atmospheric instability that can facilitate volatile weather, such as more frequent and intense severe thunderstorms. A summary of the following precipitation changes can also occur:

- Increase in frequency and intensity of precipitation.
- More precipitation in winter, drier summers.
- Longer periods between rains so drier conditions overall.

### 2. Drought and Water Supply

Drought is an acute or long-lasting shift to a drier climate condition than is typical for a given location and time of year due to lack of precipitation and/or temperature- driven increases in evapotranspiration. Indicators of drought in the *DCAT* include aridity, mean annual runoff, flash

drought frequency, drought year frequency, and consecutive dry days. Climate studies suggest that the increased time between intense rains will lead to a decrease in soil moisture.

Belton Lake serves to provide flood risk management, supply water and offer recreational opportunities to the Fort Cavazos/Temple/ Belton areas, and to offer some of the best fishing, camping and boating in Central Texas. The Brazos River Authority publishes two- month reservoir projections to track reservoir capacity and drawdown potential. As of June 8, 2023, Belton Lake was only 50-75 percent full, indicating abnormally dry conditions.

Climate change is projected to exacerbate aridity largely due to drying soils and overall temperature increases. This hazard is linked closely to severe weather and land degradation because they impact one another's severity.

### 3. Wildfires

Wildfires are uncontrolled human or naturally ignited fires that originate on or cross over to undeveloped areas. Wildfires are a significant hazard and can threaten structures and communities near or immediately adjacent to vegetated areas or "wildlands." Wildlands encompass all undeveloped areas such as military ranges, grasslands, shrublands, barren lands, woodlands, and forests. Three key components of wildfire are climatological conditions favorable for ignition and spread; the presence of wildland vegetation such as dense and multi-canopied vegetation; and a source of ignition (natural or human). All three components are related to other climate hazards. Wildfires are more likely to ignite and burn in dry conditions caused by drought. Severe weather conditions that dry fuels and make them prone to ignition and wildfire spread are the most important factor in determining exposure to wildfire risk.

The *DCAT* identified the following indicators for wildfire at Fort Cavazos: fire season length, flash drought frequency, fuel abundance, and ignition rate. Periods of abundant precipitation followed by drought and high temperatures are linked to increased wildfire activity. Other model simulations indicate that wildfire risk will increase throughout the Southern Great Plains Region as temperatures rise, particularly in the summer, and the duration of the fire season will increase. As a result of these changes, the Installation may experience more severe fire behavior.

Fort Cavazos's Integrated Wildland Fire Management Plan (IWFMP) details how training-related wildfires are inherent to the Installation because there is high demand for year-round, live fire munitions training. Live fire training activities cause 99% of all wildfire ignitions at Fort Cavazos and result in lost training time each year. Fort Cavazos relies on interagency and mutual aid agreements to support wildfire suppression for very large fires. These agreements are updated annually and provide critical additional resources for wildfire management at the Installation.

### 4. Heat

The Southern Great Plains is projected to experience an increase in temperatures and the number of days above 100°F in climate change projections scenarios (ICRP 2023). The frequency and severity of heat events is projected for an additional 30-60 days per year above 100°F, and nearly all climate projections indicate that the Southern Great Plains will experience a continued increase

in high-heat days, 5-day maximums, and days above 95˚F.

- An increase in average temperature of 3.6-5.1°F is expected by the mid 21st century.
- An increase of 4.4-8.4°F is projected by the late 21st century.

### 5. Floods

Warmer temperatures can increase precipitation and flooding. Flooding occurs when precipitation is so heavy that it overwhelms existing drainage and flood runoff systems or causes rivers to overflow their banks. The *DCAT* identified the following indicators for flooding at Fort Cavazos: extreme precipitation days, maximum 1-day precipitation, maximum 5-day precipitation, and flooding extent in the event of extreme precipitation.

Both the frequency and intensity of heavy precipitation are projected to increase in the Southern Great Plains region by the second half of the century. While annual average precipitation rates are expected to slightly increase, the winter months will experience heavier rains, and the summer months will experience more frequent drought conditions. In the last 50 years the frequency of swings between drought and flooding in the region has increased. Fort Cavazos and its surrounding community experience regular flooding events. April to September is the "flash flood season" in the region.

Floodwaters cause a significant life-safety and public health risk, damage buildings and infrastructure, and can stress and damage natural resources. Flooding negatively impacts ranges, training areas, and the roads, tank trails, and the bridges that provide access to the ranges and training areas. Flood events can damage existing vegetation and transport invasive plant species. Floods can also re-route streams, create headcuts and destabilize streambanks, move large amounts of sediments, and cause significant erosion leading to further land degradation.

### 6. Land Degradation

Land degradation refers to long-term changes in land use, land cover, soil moisture, and other processes that result in soil loss, reduced soil fertility, land subsidence, and a reduced ability of the land to support native plants and animals. Major factors in land degradation are soil or water erosion, wind erosion, loss of nutrients, and physical deterioration. The *DCAT* identified the following indicators for land degradation at Fort Cavazos: soil loss, fire season length, and aridity. When wildfire destroys vegetation cover, surface soils are weakened and can result in direct heating and drying by the sun. Soil type and topography also contribute to degradation. Vulnerabilities to degradation can occur when soil is disturbed by rainfall, wind, and evaporation rates.

Fort Cavazos is expected to see an increase in severe weather activity, including thunderstorms. Weather conditions conducive to fire activity that produce more severe fire behavior is also expected to occur more frequently, and the Installation also expects to see an increase in heat in the future. Climate change indicators together with the characteristics of Fort Cavazos's training mission (e.g., maneuver training, live-fire training ranges, etc), point to an increase in future land degradation.

## *Program History*

Many of the potential factors of climate change driving habitat conversion cannot be manipulated on an installation scale (e.g., decreased precipitation, increased annual mean temperatures). However, human-imposed stressors on habitats can be managed. Some of the actions Fort Cavazos is already taking to manage natural resources is likely helping ecological systems adapt to changing conditions, even though climate change was not a specific consideration in developing those actions. These actions include prescribed burning, planting native species, thinning of unwanted vegetation, promoting habitat connectivity, and controlling invasive species.

Threatened, endangered, and sensitive plant and animal species populations are continuously monitored by Fort Cavazos. The survey data from monitoring reports is used to inform and support the installation leaders in planning locations and timing of training events to help protect and sustain these species.

Road degradation and erosion from repeated vehicular use is mitigated by improving roads with crowning, paving or gravel. Control structures are minimizing erosion. The Fort Cavazos ITAM program along with the DPW, monitor and maintain roads throughout the installation, which is instrumental in decreasing impacts from erosion and dust.

The prescribed burning program at Fort Cavazos ensures that training lands are sustained. Firebreaks are a protective measure for cultural and natural resources. Prescribed burning is a useful management tool for controlling shrub encroachments and reducing fuel loads, and thereby reducing the potential for large, destructive wildfires.

Changes in the temperature and moisture regimes of central Texas could alter ecosystem composition. More drought-tolerant species and growth forms may be favored in the long-term, with shrublands likely replacing grasslands and mature woodlands, which are important resources on Fort Cavazos. Both add to training land diversity; mature woodlands provide nesting habitat for the golden-cheeked warbler, and grasslands provide grazing opportunities for livestock and wildlife.

The golden-cheeked warbler is a climax community species and is overwhelmingly reliant upon that special Hill Country habitat association of mature juniper-hardwood forests, with high levels of canopy cover, a diverse deciduous component, and occurring along moderate to steep slopes. Hotter, drier weather could increase wildfires and the susceptibility of oaks to oak wilt and other pests, which would reduce mature woodlands and expand arid shrublands. These disturbances can impact birds directly by destroying nest sites and altering habitats. For example, in the Texas Hill Country, the effects of drought on fire regimes are compounded by the invasion of broomweed (*Xanthocephalum texanum*), Ashe juniper (*Juniperus ashei*), and mesquite (*Prosopis glandulosa* and *Prosopis juniflora*). These species are highly flammable, and as drought conditions increase, fire frequency and severity increase. Native plant species are ultimately replaced by these highly flammable species, which further increases extreme fire behavior.

In general, plant and animal species with small distributions such as karst species are more susceptible to changes in climate. Although long-term models predict increasing drought

conditions, they also predict an increase in intense, single-day, precipitation events. These events could increase soil erosion rates into Fort Cavazos's caves, which could alter the food chain, change habitat conditions, or eliminate habitat by completely or near completely filling caves. If these species lose habitat and decrease in numbers due to factors predicted with climate change, their status designations may change. If they become listed as threatened or endangered (with possible designation of critical habitat), consultation with the USFWS would be necessary for federal actions at Fort Cavazos that may affect those species and their critical habitats..

Drought can negatively affect the installation mission. A reduction in precipitation may increase bare ground, which can lead to greater dust production and soil erosion. Down-wind vegetation becomes covered by dust. Dust can cause mechanical damage to military vehicles, clogging filters, and can also become a safety hazard as convoys become unable to see the vehicle in front of them or helicopters are unable to land. A significant loss of topsoil would alter the type of vegetation that an area can support.

Increased drought frequency and severity can also negatively affect riparian habitats, which are scarce on Fort Cavazos, relative to other habitat types. Prolonged drought that results in reduced water availability for both plant and animal communities would likely be detrimental to some species.

Flash flooding poses a risk for vehicle traffic and has caused several deaths on Fort Cavazos. The installation has installed stream and depth gauges at critical locations on the west side to better monitor and predict flash flooding and focused on clear signage and training.

With a loss of vegetative ground cover comes an increased amount of overland water flow. Water flowing along bare tire tracks and roads picks up sediment and carries it away, eroding the soil and affecting the nutrient properties of the remaining soil. Road pathways can become rutted or pockmarked with holes to the extent that they become impassable, thus affecting the training mission. Soil particles carried by runoff can contribute to sedimentation of ponds, lakes, and other water catchments, filling them gradually and reducing their storage capacity as well as their value to wildlife and recreation.

The CTCA manages livestock grazing and stocking rates on Fort Cavazos through a lease agreement. If drought effects persist, stocking rates may need to be reduced and pastures may need to be rested to help sustain the soils and grasslands.

## *Program Goals and Objectives*

Natural resource managers at Fort Cavozos will continue to monitor climate related changes at the installation. Incorporating information about the vulnerabilities and risks associated with a changing climate is an important first step. From there, emphasizing actions that maintain flexibility and address the greatest risks may preserve the most choices for future managers, even as they help meet current management goals.

To address climate change issues that occur as predicted, the installation will use adaptive management. Adaptation strategies should be defined and implemented to support the resilience of the installation's natural resources and to ensure that limited funds are directed towards effective

management practices. By focusing on resiliency adaptation strategies, the installation will promote natural resources sustainability. Climate change adaptation strategies for consideration can include:

- **Decrease Stressors:** Continue to decrease stressors that negatively affect at-risk and T&E species and priority habitats, full implementing INRMP projects.
- **Restore Habitat:** Continue to restore priority habitats and ecosystems for at-risk and T&E species. Actions can include: Undertaking restoration and enhancement of natural habitats that are most threatened by the changing climate.
- **Practice Adaptive Management:** Continue ongoing monitoring and assessment of key natural resources to provide the information needed for adaptive management decisions
- **Education and Outreach:** Educate personnel, visitors, and surrounding communities on the threat climate change can have on natural resources, property, structures, and infrastructure.

Incorporating information about the vulnerabilities and risks associated with a changing climate is an important first step. From there, emphasizing actions that maintain flexibility and address the greatest risks may preserve the most choices for future managers, even as they help meet current management goals. Specific goals and objectives to protect against climate changes that can impact natural resources are listed in **Table 4-5**.

**Table 4-5. Goals and Objectives for Climate Change**

| Goals | Objectives |
|---|---|
| Determine the installation's sensitivity and ability to adapt to climate change. | Develop Climate Change Vulnerabilities Assessments for priority natural resources (e.g., golden-cheeked warbler, karst species).<br><br>Determine thresholds where climate change actions will be required. |
| Manage resiliency efforts to lessen effects of severe weather. | Program funds to manage for resiliency efforts for natural resources to effects from potential storm damages and/or wildfire events.<br><br>Use iSportsman to notify and educate Soldiers and hunters in range and training areas during inclement weather. |
| Conserve, manage, and efficiently use available water resources. Develop artificial sources as needed. | Increase water sources (e.g. water storage tanks, plan for ponds, etc.) in range and training areas to support wildlife in times of drought and firefighting when needed. |
| Remove fuels where possible through prescribed burns in areas that are at risk for wildfires.<br><br>Re-assess and maintain firebreaks on a | Increase use of shaded fuel breaks (plan/scope) to prevent surface fires from escalating to crown fires.<br><br>Maintain mutual aid agreements for emergency wildland fire response. |

| | |
|---|---|
| consistent basis.<br><br>Increase resources allocated to firefighting and fire prevention.<br><br>_____ | Confirm availability for dedicated (2-hour response) aviation assets during high-risk seasons.<br><br>Use the ARMY REPI Program, via Compatible Lands Foundation to encourage adjacent landowners, to complete prescribed burns (e.g., free training through Texas Certified Prescribed Burn Program).<br><br>_____ |
| Reduce land degradation and increase military capabilities by conserving native vegetation to provide tactical cover, and to prevent erosion with naturally adapted plant species. | Continue maintaining riparian buffers to reduce erosion.<br><br>Continue implementing the Integrated Natural Resources Management Plan (INRMP) to manage invasive species.<br><br>Re-instate the Erosion Control Program.<br><br>Advocate to temporarlily limit training in re-seeded areas for a few months following re-seeding.<br><br>Use native plants to revegetate disturbed or eroded areas. |

Fort Cavazos will continue to consult and collaborate with many entities to mitigate anticipated effects of climate change. These partners could include, but are not limited to, the USFWS, U.S. Forest Service, U.S. Environmental Protection Agency (USEPA) Region 6, TPWD, Texas Commission on Environmental Quality (TCEQ), local Native American Tribes, Texas A&M University, and the University of Texas.

### *Program Regions*

All Fort Cavazos lands.

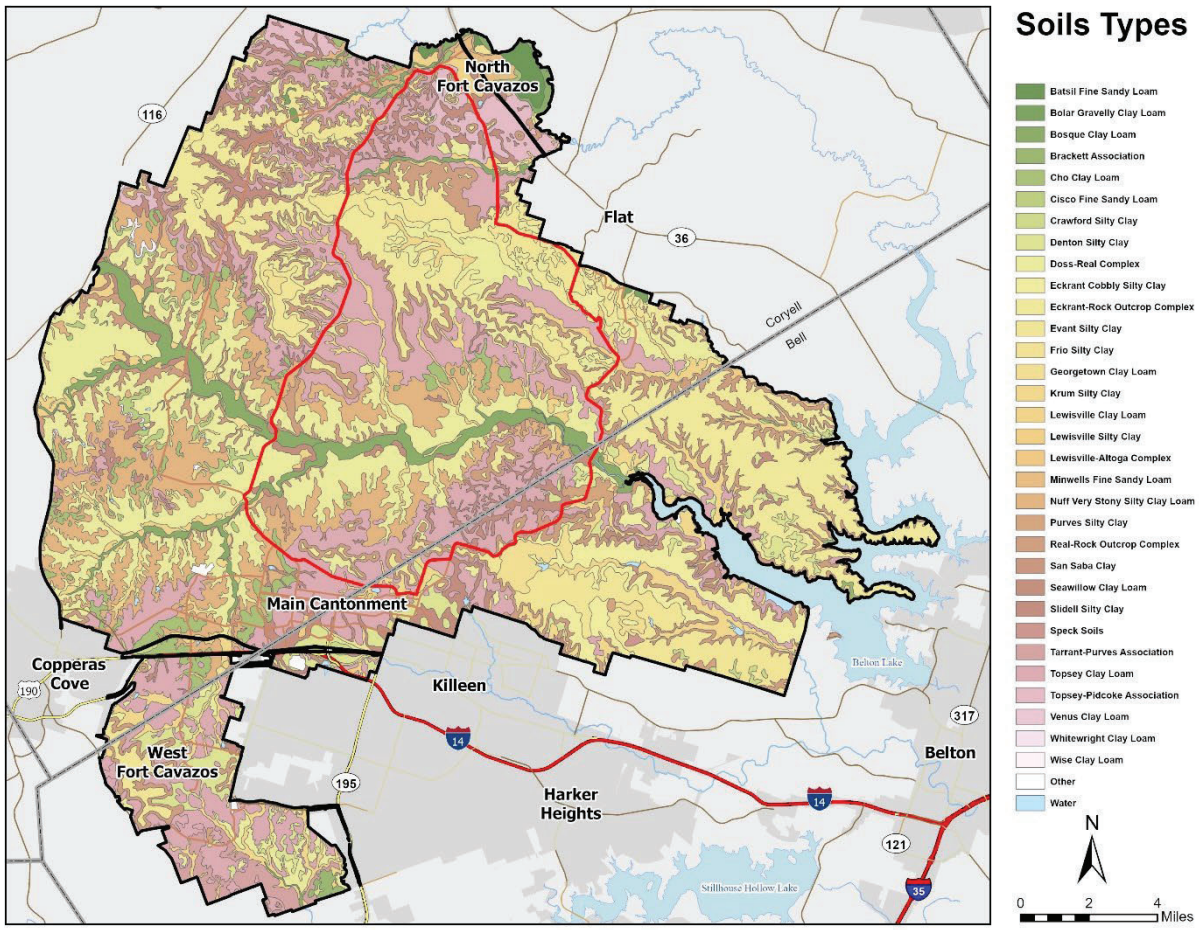
### *Monitoring*

Monitoring for climate change should be included in the Climate Change Vulnerability Assessments (see **Table 4-5**).

## 4.4 Soil, Erosion, and Sedimentation

There are over 30 unique soil series on Fort Cavazos (**Figure 4-2**). In general, these soil series are well drained and moderately permeable, but they can vary widely in other characteristics such as depth, parent material, and slope. Five soils that occur on Fort Cavazos are partially hydric soils, covering approximately 2.5% of the installation and are generally located along the stream banks of Cowhouse Creek, Nolan Creek, and Leon Creek and their tributaries (Natural Resources Conservation Service [NRCS] 2017). However, other soils can become hydric, exhibiting anaerobic conditions, as a result of periodic or permanent saturation or inundation. Seventeen soils that occur on Fort Cavazos are prime farmland soils, covering approximately 19% of the installation and are generally located near the main cantonment area, West Fort Cavazos, NFC, and on floodplains (NRCS 2017).

## Figure 4-2. Soil Types



Many of the soils on Fort Cavazos are naturally susceptible to water erosion (**Figure 4-2**). Five soils are categorized as having very high-water erosion potential, covering approximately 68,128 acres, or 31% of the installation. Nine soils are categorized as having a high to moderate water erosion potential, covering approximately 82,504 acres, or 38% of the installation. The remainder of the installation has a low to very low water erosion potential (NRCS 2017).

Severe erosion areas are defined as areas with erosion rates exceeding tolerance limits established by the NRCS for each soil type according to its capability to maintain vegetative cover. Soil tolerance levels on Fort Cavazos range from 1 to 5 tons per acre (USACE 2003). Soils with higher tolerance values can hold soil or withstand erosion better than those with lower values. Soil loss exceeding the tolerance levels results in sheet, rill, and gully erosion, potentially limiting land availability for military training maneuvers. Erosion in areas already bare from previous activities, lack of ground cover, lack of woody vegetation, or overgrazing is exacerbated by continued effects from military vehicle tracks or wheels. Several areas of the installation, particularly training areas, have extremely high soil erosion rates due to high use by tracked vehicles and cattle grazing, resulting in high sheet, rill, and gully erosion. Loss of perennial vegetative cover (herbaceous and woody vegetation) has resulted in these high erosion rates and increased bare soil and annual plants in some areas.

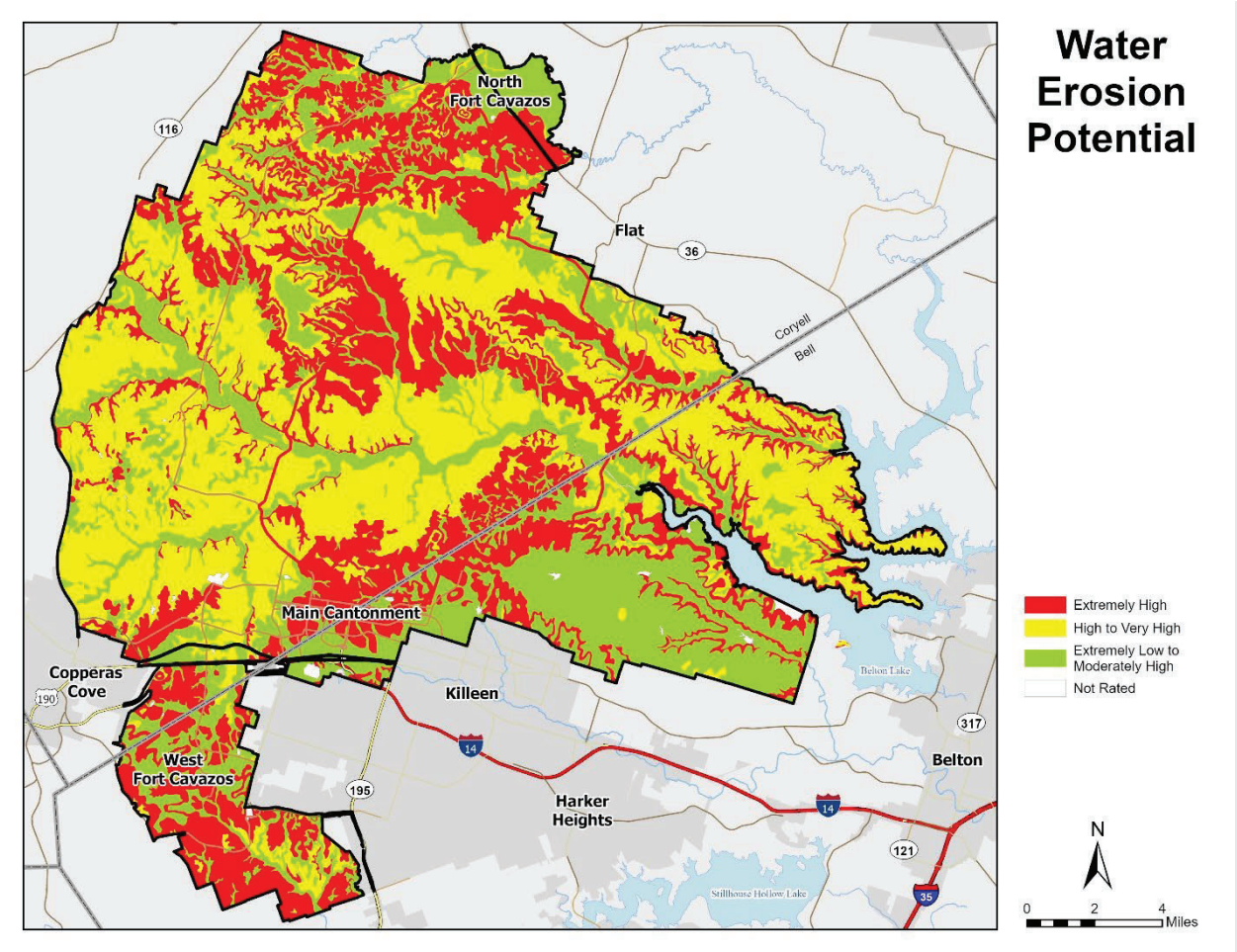
Sedimentation is the most prevalent water quality threat at Fort Cavazos. Training exercises and land practices (e.g., cattle grazing) have resulted in erosion and sediment deposition in water bodies across the installation. To combat this erosion, Fort Cavazos has created 33 sediment retention structures to limit soil loss into Belton Lake, the installation's supply for drinking water. Construction and maintenance activities can also contribute to erosion and sedimentation. Storm water runoff transports eroded soils into nearby water bodies. Erosion and sedimentation adversely affect the water quality of streams and lakes and reduce the capacity of lakes and ponds.

## *Program Data Management*

Inventories have been conducted for forage levels, soil erosion rates, and sedimentation rates to identify priority areas for restoration, including the following:

- Annual ITAM Range and Training Land Assessment (RTLA) report, ongoing
- Fort Cavazos Erosion and Sedimentation Reduction Project (in cooperation with the NRCS), September 1993
- Fort Cavazos Vegetative Resource Inventory (in cooperation with the NRCS), May 1998
- Fort Cavazos Vegetation Survey Project (in cooperation with the NRCS), May 2002
- Fort Cavazos Rangeland Health Study (in cooperation with the NRCS) as part of the 2004 Land Condition Report to Fort Cavazos ITAM
- Soil migration/herbicide study (2015-2017)

**Figure 4-3. Highly Erodible Soils – Water Erosion Potential**




## *Program History*

Fort Cavazos employs various erosion and sedimentation mitigation practices including, but not limited to, the following:

- Maneuver Access Structures (MAS): Also known as "gully plugs", this is the construction of a series of rock check dams in gullies to reduce erosion, contain sediment, and provide maneuver access across gullies. It has been shown that MAS not only slows erosion but has a positive impact by allowing soil deposition and vegetation re-growth within the gully. To date, over 5,000 MAS have been installed across the Western training areas.
- Riparian Buffers: Maintain riparian vegetative zones to reduce erosion along drainages as well as filter and/or catch sediment before it enters the drainage system.
- Tank Trail Improvement: Over the last five years, about 150 miles of tank trails have been repaired or improved. This reduces concentrated erosion by hardening surfaces and channeling water to established runoff areas.
- Critical Area Treatment (CAT): CAT is a combination of best management practices (BMPs) and any or all may be required to ensure serviceability of the landscape. This combination of conservation practices is required on severely degraded areas and

includes MAS, mulch on bare ground, vegetation establishment, maneuver trail maintenance, hillside access trails, pipeline crossing repair, and stream crossing repair.

- Seeding: Seeding of areas where adequate vegetative cover is lacking. This is not currently ongoing in training areas but may be used in future projects. It is used on cantonment projects and smaller construction projects. Seed mixes must be a native seed mix and approved by the NCRMB.
- Maneuver Damage Program: Program under which training units file a maneuver damage report following training activities and repair damage incurred within their responsibility and capability.
- Sediment retention: Construction and maintenance of more than 30 sediment catchment basins to reduce sediment loads into Belton Lake.
- Training Restricted Area Program (TRAP): Supports maintenance of training land and specifies work areas for training avoidance and safety. As a component of ITAM, Training Requirements Integration (TRI) utilizes the TRAP as an operational program that provides locations for DPW and ITAM work areas and timeframes of work for unit planning and avoidance. (see **Section 4.15.1** for further information).

Fort Cavazos has an active Construction Site Storm Water Compliance Inspection Program that inspects construction sites for compliance with TCEQ Construction General Permit TXR150000. The areas of inspection include the main cantonment, NFC, West Fort Cavazos, and all training/live- fire areas.

Training area storm water management BMPs include the aforementioned MAS structures, silt fencing, ripping and seeding, check dams, and right-of-way clearing to ensure tracked vehicles remain in established lanes.

## *Current Condition*

Since 1989, ITAM personnel have refined their annual RTLA survey to the current 100 reference plots located in the Western Training Area (which is approximately 67,000 acres) in order to provide a means of ongoing land condition assessment. In 2012, the focus began to shift from erosion monitoring to vegetation cover and type monitoring in response to Woody Species Management (WSM) projects. Previously, soil erosion had been the single biggest detriment to military training. However, due to a lack of regularly occurring fires and the spread of woody vegetation due to cattle grazing, the major detriment to training is now vegetation encroachment. Therefore, the monitoring emphasis has shifted to vegetation type and cover to assess current WSM practices that are occurring as well as identifying problem areas that impede heavy and light maneuver and non-live fire training. It is anticipated that erosion monitoring will occur periodically (approximately every 5 years) to ensure BMPs remain effective.

The results of the 2017 RTLA report indicate that training activity has increased slightly from 2016 to 2017, visual signs of training activity (amber and red) have increased from 22% to 33% indicating that training is increasing overall. In 2017, training disturbance increased from 19% to 24% of plots with at least 25% of the plot showing ground disturbance (amber or red status) from military training. Training activity and training disturbance are expected to continue to increase in the future. The metric categories (training and vegetation) are presented

by year as the percent of training area affected (**Table 4-5**).

**Table 4-5. Summary of Measured Variables in Western Training Areas**

| Metric | Percent of training area affected | | | |
|---|---|---|---|---|
| **Training** | **Action level (criteria)** | **2015** | **2016** | **2017** |
| Activity | Red (> 50% of plot affected) | 0 | 7 | 6 |
| | Amber (25-50% of plot affected) | 4 | 15 | 27 |
| | Green (< 25% of plot affected) | 20 | 39 | 37 |
| | No Activity | 76 | 39 | 30 |
| Disturbance | Red (> 50% of plot affected) | 0 | 9 | 3 |
| | Amber (25-50% of plot affected) | 4 | 10 | 21 |
| | Green (< 25% of plot affected) | 20 | 23 | 34 |
| | No Activity | 76 | 58 | 42 |
| **Vegetation** | | | | |
| Bare ground (cover) | Red (> 50% of plot bare) | 2 | 2 | 2 |
| | Amber (25-50% of plot bare) | 38 | 12 | 13 |
| | Green (< 25% of plot bare) | 60 | 86 | 85 |

Historically, an expansive network of gullies has developed across the Western Maneuver Area. Heavy mechanized maneuver across the land produces bare soil, void of vegetative cover, which increases water and wind erosion. Much of the gully network is cumulative damage that has occurred over the past 60 years. The damage has accelerated during the past 20 years because the vehicles used for military training have become greater in number, heavier, and faster, causing increased damage to soils. Decades of continuous training with minimal land repair efforts resulted in compacted soils in some areas that did not permit rainfall infiltration needed to sustain perennial vegetative growth. In addition, cattle grazing and inadequate land repair funding have contributed to the problem. However, over the past 20 years, gully damage has been minimized by MAS structures to support readiness training and reduce sediment movement.

Efforts are ongoing to reduce sedimentation by installing MAS structures across the training landscape. This effort has significantly decreased erosion rates on the installation. As part of the 2015 RTLA report, the Texas A&M AgriLife Research – Blackland Research Center (BREC) measured 38 storm runoff events in 2013-2014. Sediment yield ranged from 0.002 to 0.046 ton/acre/year. Mean sediment yield for all stations combined was 0.018 ton/acre/year. Although very low, sediment yields were higher at the Cowhouse Creek outflow (0.016 ton/acre/year) than the Cowhouse Creek inflow (0.002 ton/acre/year). Further monitoring efforts will need to occur to determine the cause (e.g., maneuver training erosion vs. natural stream bank erosion).

Soil erosion and sedimentation is a problem at Fort Cavazos and has resulted in impaired training and degradation of the water resources. It also represents a threat to the long-term sustainability of the training lands. Impacts from training, cattle grazing, and vegetation removal have reduced, and in some cases, eliminated vegetative cover. However, BMPs such as the use of MAS and the improvement of stream crossings are beginning to slow the sedimentation rate across the installation. DPTMS implements both gully plugs and stream crossing repairs to the ITAM Workplan annually, significantly decreasing the soil loss on the installation.

In addition, soil erosion appears to have historically affected several caves and sinks on Fort Cavazos. Many caves containing species of concern are blocked by black topsoil. Many additional sinkholes currently filled with sediment are likely habitat for troglobitic species. It is likely that thick black sediment deposits in many caves are a result of soil erosion related to livestock grazing, construction projects (tank trails, borrow pits), and military activities. Thick soil deposits in some caves appear to reflect continued soil erosion in their drainage areas (Fort Cavazos 2012).

## *Program Goals and Objectives*

The primary goals of soil conservation and erosion control management on Fort Cavazos are to identify eroded soils, protect soil resources, and prevent soil erosion and its potential impacts on water quality, habitat, and mission objectives. Approximately 87 percent of the soil series that occur on the installation are considered highly or potentially highly erodible. Most of the problems associated with soil erosion on the installation occur in areas where vegetation has been removed or disturbed on steep slopes or on long, moderately steep slopes.

The objective of soil conservation and management on Fort Cavazos is to avoid disturbance of soils that are considered moderately or severely susceptible to erosion. Where these areas are disturbed by anthropogenic activities or natural causes, they will be stabilized and repaired in a timely manner to avoid the development of excessively eroded sites. Installation sources of erosion and sedimentation, runoff, and dust will also be controlled to prevent damage to land, water resources, equipment, and facilities on the installation and adjacent properties.

Specific goals and objectives to protect soil resources are listed and discussed in **Table 4-6**.

**Table 4-6. Goals and Objectives for Soil, Erosion, and Sedimentation**

| Goals | Objectives |
|---|---|
| Protect soil resources and prevent soil erosion and its potential impacts on water quality, habitat, and the military mission. | Minimize erosion, reduce the sediment load to streams and other water bodies, protect fertile soils, and revegetate bare ground, including plowing and seeding. |
| Continue reduction of sheet, rill, and gully erosion to acceptable limits. | Continue to use of the Revised Universal Soil Loss Equation (RUSLE) model or other Army-approved erosion model to estimate soil erosion and use of soil tolerance levels and other factors to determine acceptable limits.<br><br>Continue to develop a standardized, coordinated system for recording and mapping significant erosion damage and gully sites.<br><br>Investigate the use of pavers to reduce runoff in improved areas, such as parking lots, staging areas, firing points and range travel lanes, and other areas subject to heavy traffic. |
| Continue to minimize, where possible, impacts from vehicle training maneuvers that increase soil erosion. | Maximize vehicle flow traffic on established trails.<br><br>Limit cross-country non-tactical traffic.<br><br>Conduct maintenance activities following training exercises to the maximum extent possible. |

| Goals | Objectives |
|---|---|
| | Harden high-use staging areas.<br><br>Design criteria and specifications for wet- and low-maintenance conditions.<br><br>Repair trails with significant erosion problems. |
| Conduct erosion and sedimentation inventory and monitoring. | Continue ITAM RTLA monitoring.<br><br>Evaluate and prioritize a list of active erosion sites.<br><br>Conduct new soil loss inventory via IMCOM-funded project. |
| Minimize erosion and degradation of training lands resulting from cattle grazing | Manage cattle grazing on training lands.<br><br>Reduce stocking rates as necessary or recommended by vegetation inventories. |
| Maintain, and where possible, increase native vegetative cover on training lands to reduce soil erosion and facilitate maintenance, restoration, and revegetation in training areas. | Use NCRMB-approved seed mixes for stabilization of bare areas.<br><br>Supply installation-generated organic matter and nutrients through the addition of mulch or other organic biodegradable material to enhance soil quality and promote vegetative growth to reduce soil erosion where practical and in keeping with overall NCRMB land management goals.<br><br>Use installation-generated organic matter (e.g., grass clippings, landscape trimmings, leaves, mulch, wood chips) for application to training lands to enhance soil quality and promote native vegetative growth. Caution should be taken to ensure organic matter depth does not exceed 2 inches.<br><br>Continue to maintain riparian vegetation buffers along streams.<br>Continue forage inventory monitoring at transects to estimate changes in biomass, ground cover, and erosion rates.<br>Continue RTLA site monitoring for changes in BMP effectiveness, erosion, and maneuver damage<br><br>Continue prescribed burning to help restore and maintain the ecological health of the soils. |
| Continue to implement designation free excavation sites and restrictions for military training. | Continue to restrict excavation sites within 50 meters of trails, streams, and karst features, and within 10 meters of trees. |
| Develop and implement a comprehensive plan on the management of borrow sites. | Prohibit the use of non-permitted and unregulated borrow sites and develop a program for rehabilitating / reclaiming borrow areas.<br><br>Encourage the reuse of construction “spoil” material.<br><br>Eliminate illegal dumping sites to include construction/deconstruction materials. |
| Continue to implement existing BMPs, assess their effectiveness, and continue to search for new BMPs applicable to Fort Cavazos. | Continue to implement the following BMPs to minimize erosion, conserve soil resources and protect vegetation.<br><br>• Critical Area Planting (NRCS Code 342)<br>• Early Successional Habitat Development/Management (NRCS Code 647)<br>• Fences (NRCS Code 382) |

| Goals | Objectives |
|---|---|
| | • Grazing Land Mechanical Treatment (NRCS Code 548)<br>• Heavy Use Area Protection (NRCS Code 561)<br>• Land Reconstruction, Currently Mined Land (NRCS Code 544)<br>• Mulching (NRCS Code 484)<br>• Prescribed Burning (NRCS Code 338)<br>• Prescribed Grazing (NRCS Code 528 and 528A)<br>• Prescribed Grazing: Acceptable Grazing Use on Rangeland, Native Pasture, Grazed Forestland, Grazed Wildlifeland and Pastureland (NRCS Code 528)<br>• Prescribed Grazing: Resting or Deferring Grazing Land for a Prescribed Period (NRCS Code 528)<br>• Restoration and Management of Declining Habitats (NRCS Wetland Code 643)<br>• Rock Barriers (NRCS Code 555)<br>• Sediment Basins (NRCS Code 350)<br>• Stream Crossings (NRCS Code 578)<br>• Use Exclusion (NRCS Code 472)<br>• Water and Sediment Control Basins (NRCS Code 638)<br>• Wildlife Habitat Management (NRCS Code 644)<br>• Wetland Wildlife Habitat Management, Texas Supplement (NRCS Code 644)<br>• Gully Plugs<br><br>Monitor effectiveness of hardened stream crossings and continue to construct new ones as appropriate.<br><br>Monitor effectiveness of diversion terraces and grassed waterways and continue to construct new ones as necessary.<br><br>Monitor effectiveness of hardened hillside access points and continue to construct new ones as appropriate. Use existing roads and openings to the maximum extent possible. |

## *Program Regions*

All Regions (refer to **Figure 2-4**).

## *Monitoring*

Most of the current or planned projects are designed to address problems resulting from erosion on training areas and concerns with realistic maneuver training. Because of the erosion potential of disturbed areas on Fort Cavazos, it is necessary that a comprehensive soil resource management approach be followed. The current policy of addressing problem erosion areas as they occur through the Integrated Training Land Management (ITLM) program will be continued (see **Section 4.15.2**). In addition, a management approach designed to avoid the disturbance of potential problem erosion areas will be implemented, when possible, in a manner consistent with mission objectives.

A comprehensive monitoring program involving both the NCRMB and the ITAM program has been incorporated into the objectives to ensure the effectiveness of the soil conservation

and erosion control measures that will be implemented as part of this INRMP.

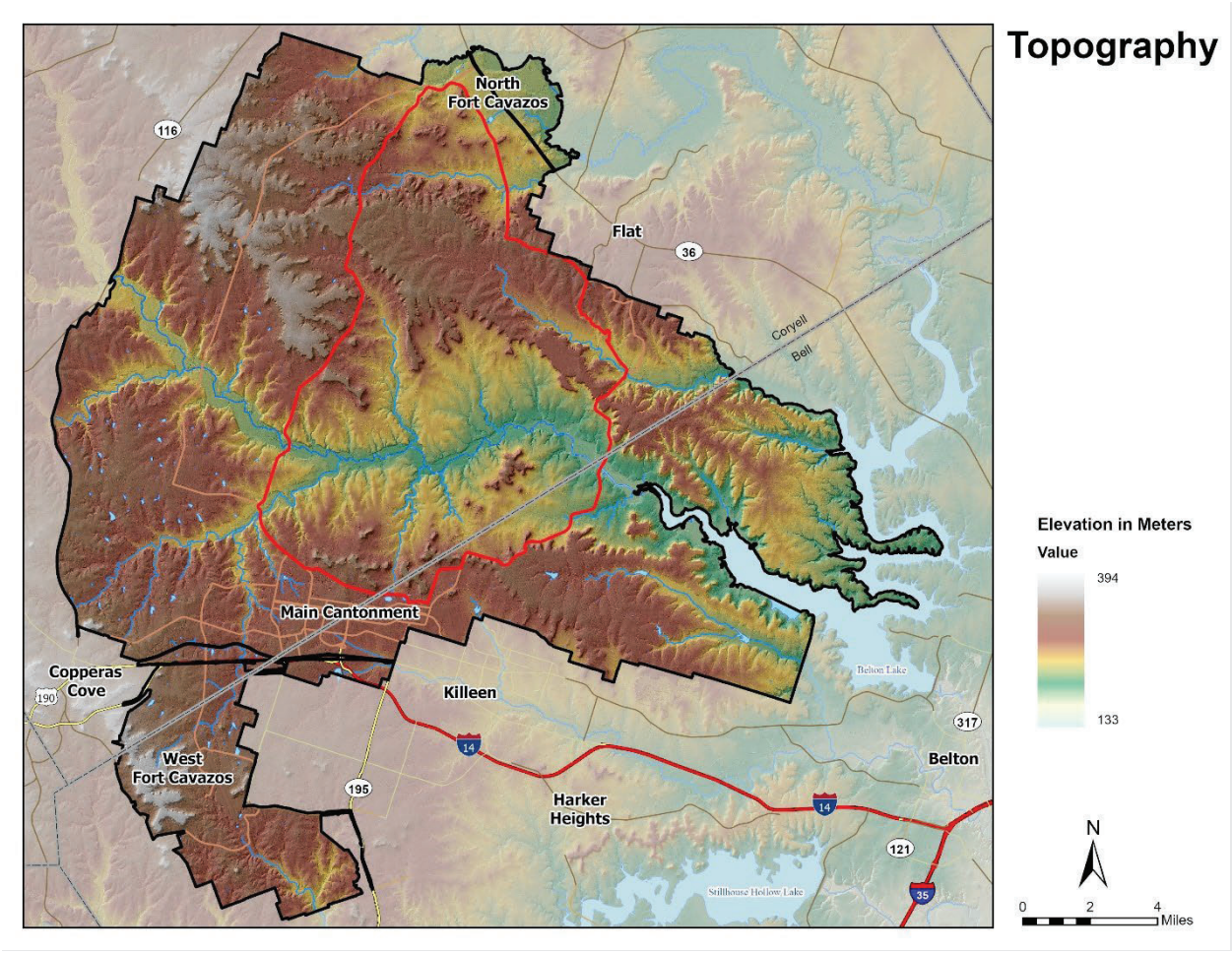
## 4.5 Geology

The topography of Fort Cavazos is defined by remnant mesas which are separated by wide valleys, rolling lowlands, and steep canyon breaks, and it includes karst topographic features such as caves, sinkholes, rockshelters, and springs. Fort Cavazos is located northwest of the Balcones Fault Zone, a region of many faults. Over geologic time, the area surrounding this fault zone, including Fort Cavazos, became elevated as much as 500 feet. The subsequent erosion and weathering of those elevated areas created an irregular, steeply sloping terrain (USACE 2003).

Elevations range from 561 feet above sea level near the shores of Belton Lake in the northeastern portion of the installation, to 1,231feet above sea level in the Seven Mile Mountain area in the southern portion of the installation. Slopes generally range from level in the floodplains of Cowhouse Creek to as much as 33 percent on valley and canyon walls. The average slope of the installation is between 5 and 8 percent. The area north of Highway 190 generally slopes east, while the area south of Highway 190 generally slopes south and east. **Figure 4-4** shows the topographic relief on Fort Cavazos.

Several geologic formations from the Cretaceous and Quaternary Periods are exposed on Fort Cavazos. These formations are, from oldest to youngest: Glen Rose, Paluxy Sand, Walnut Clay, Comanche Peak Limestone, Edwards Group Limestone, Kiamichi Clay, Duck Creek Limestone, Fort Worth Limestone, and Denton Clay formations.

**Figure 4-4. Topography**




In general, these formations and groups are composed of limestone, sandstone, calcareous clay, shale, sand, and/or sandy marl (USACE 2003). Cretaceous strata exposed on Fort Cavazos strike generally in a north-northeasterly direction, and dip in an east, southeasterly direction. Due to the composition and differential erosion of the formations, terraced or 'stair step' configuration is expressed on the surface when traveling from mesa top down to creek benthic. Formations from the Quaternary Period can be found near Leon River, Cowhouse Creek, and their tributaries. These formations are Pleistocene terrace remnants and Holocene flood plain sediments, composed of gravel, sand, silt and clay size sediment eroded from upstream uplands (USACE 2003).

Fort Cavazos lies within the Lampasas Cut-Plains region, which includes the Edwards Plateau and Cross Timbers and Prairies regions. The southern and eastern boundary of the Edwards Plateau is defined by the Balcones Escarpment, which is an area of normal faults that rises abruptly from the Gulf Coast Plains. Erosion of the escarpment by east, south, and southeast-flowing streams has created areas of high relief along the southeast margin of the plateau commonly referred to as the Texas Hill Country. The bedrock of the Edwards Plateau consists primarily of Cretaceous Period limestone. The dissolution of fractured limestone and

fossiliferous reefs has formed the karst topographic features (caves, sinkholes, rockshelters, and springs) that are found throughout Fort Cavazos (Reddell and Veni 2012).

The NCRMB's primary goal for geologic resources on Fort Cavazos is to provide adequate and sufficient protective measures to karst features, karst fauna habitat, and cave cricket foraging areas, thus protecting karst-adapted species of concern. Because of this overlap, details regarding karst management, past surveys, program history, current conditions, and a list of goals and objectives can be found in **Section 4.7.2**, Species of Concern.

## 4.6 Water Resources

The water resources of Fort Cavazos can be classified into two main categories—groundwater and surface water. Each of these water resources has its own physical and chemical characteristics, uses, and potential issues. Fort Cavazos's major uses of water resources primarily involve surface water and include municipal water supply, training, recreation, vehicle maintenance, and aquatic habitat.

*Groundwater* – The major aquifer that underlies Fort Cavazos is the Trinity Aquifer. Parts of both the outcrop and the downdip are deeply buried below Fort Cavazos. The Trinity Aquifer extends through parts of 55 counties of central Texas. The stratigraphic column units from oldest to youngest includes the Glen Rose, Paluxy, Walnut Clay, Comanche Peak, Edwards, and Georgetown limestones. The Paluxy and Walnut Clay units are exposed in wide valleys separating mesa ridges and on the rolling lowlands and associated canyons above major creeks, and the Glen Rose unit is exposed in the benthic along major creeks (USACHPPM 2001; Charles Pekins, personal communication 2014). The Comanche Peak, Edwards, and Georgetown units are exposed on mesa tops, slopes, and canyons.

The Travis Peak formation, which does not outcrop at the surface in Fort Cavazos, is the deepest and hydrologically the most important stratigraphic unit in the Fort Cavazos Region. No major groundwater resources outside the installation are affected by recharge from within Fort Cavazos, and recharge that occurs within the installation affects only the small, shallow groundwater supplies that mostly remain on the installation (USACHPPM 2001, Charles Pekins, personal communication 2014).

Potentially sensitive groundwater areas of the Fort Cavazos region are the outcrop areas of the Paluxy formation and recent alluvial materials within and adjacent to Cowhouse Creek, Henson Creek, and the Leon River, as well as the karst systems developed over thousands of years in the Edwards Group on mesas throughout the installation. The aquifers recharged by these areas are relatively shallow, and therefore they could be affected by hazardous material spills and seepage. However, these waters are not used for municipal purposes (USACHPPM 2001). Surface water, not groundwater, is the primary water supply for Fort Cavazos. Groundwater resurges from many springs and seeps and generally flows along short runs into surface creeks or ponds. These springs and runs are critically important sources of water for Fort Cavazos's flora and fauna, including stygobitic and troglobitic invertebrates. Pollutants which enter groundwater are passed through karst conduits unfiltered, which could negatively affect wildlife, as well as municipal supply because some groundwater eventually discharges into

Belton Lake via creeks.

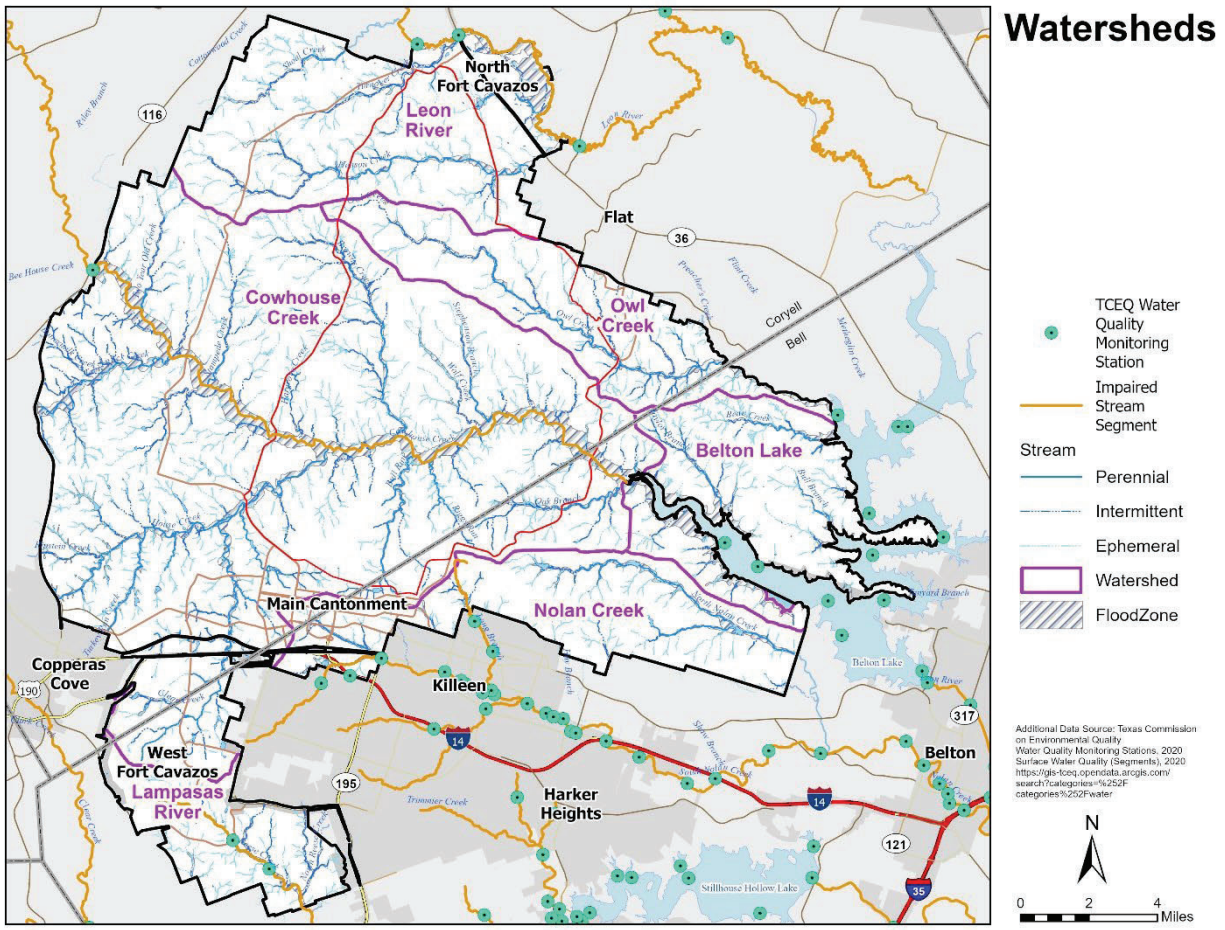
*Surface Water* – Fort Cavazos is in the Brazos River Basin. Surface water resources consist of numerous small to moderate sized streams, which generally flow in a southeasterly direction. Fort Cavazos has approximately 200 miles of named intermittent and perennial streams with numerous additional tributaries associated with these features. Fort Cavazos contains more than 200 water impoundments constituting approximately 692 surface-acres. Most of these are used for flood control, sediment retention, wildlife and livestock water, and fish habitat.

The installation is located directly upstream of two man-made reservoirs—Belton Lake (a sole source water supply for approximately 200,000 people in Fort Cavazos and the surrounding communities) and Stillhouse Hollow Lake (a water supply for several surrounding communities). Both reservoirs function as fish and wildlife habitat and provide flood control and recreation opportunities for the public.

Fort Cavazos can be divided into portions of six watersheds and several smaller sub-watersheds. The six main watersheds are Belton Lake, Cowhouse Creek, Lampasas River, Leon River, Nolan Creek, and Owl Creek (**Figure 4-5**). These watersheds can be further divided into minor sub- watersheds, which include portions of the main stems and tributaries of the major water bodies listed above. The Leon River and Cowhouse Creek form the two arms of Belton Lake, while Owl Creek flows directly into the Leon River arm. Reese Creek and its tributaries flow south toward the Lampasas River which feeds Stillhouse Hollow Lake. Overviews of the main watersheds on Fort Cavazos are described in the following paragraphs.

Belton Lake is a man-made reservoir that is owned and operated by the USACE for flood control, conservation, storage, and recreation. Most of Fort Cavazos drains to this water body, and it is the primary water supply for Fort Cavazos and surrounding areas. The area classified as the Belton Lake watershed comprises the eastern portion of the installation, just below the point where the Leon River drains into Belton Lake. It includes those areas with shoreline along Belton Lake where all waters drain directly into the lake. This watershed includes tributaries such as Taylor Branch, Bear Creek, Bull Branch, and several unnamed tributaries. BLORA is located in this watershed.

**Figure 4-5. Watersheds**




Belton Lake was impounded in 1954 and has a surface area of 12,300 acres. In addition to serving as a municipal water supply, the lake is a major site for recreation. It is estimated that nearly three million people visit the lake annually for recreational purposes. Designated uses for the lake include contact recreation, high aquatic life support, and use as a public water supply. In 2013, zebra mussel (*Dreissena polymorpha*) populations were discovered in Belton Lake.

The Cowhouse Creek watershed is the largest at Fort Cavazos, draining more than 50 percent of the surface runoff of the installation. The watershed is close to the center of Fort Cavazos and extends from the western to the eastern installation boundaries. Cowhouse Creek and its tributaries flow in an easterly direction and drain into Belton Lake. Tributaries to Cowhouse Creek include Beehouse Creek, Browns Creek, Bull Run, Buttermilk Creek, Clear Creek, Cottonwood Creek, House Creek, Oak Branch, Riggs Run, Ripstein Creek, Stampede Creek, Stephenson Creek, Table Rock Creek, Two Year Old Creek, Wolf Creek, and several other unnamed tributaries. Upstream portions of the Cowhouse Creek watershed extend far to the northwest outside Fort Cavazos's boundaries.

The Cowhouse Creek watershed contains combat training areas where maneuver and live-fire operations occur. This area is heavily affected by these operations in terms of soil disturbance and

destruction of vegetation, which results in surfaces prone to erosion and surface water runoff. In turn, sedimentation affects surrounding water resources. There is also a possibility of influence on water resources due to the receipt of surface water runoff that might contain residue from explosives and artillery use in high-explosive-impact areas in the Cowhouse Creek drainage basin.

A very small portion of the Lampasas River watershed lies within the southern portion of the Fort Cavazos installation. This watershed contains tributaries to the Lampasas River, including Reese Creek, North Reese Creek, and Clear Creek. These waters drain to Stillhouse Hollow Lake just outside Fort Cavazos.

Portions of the Leon River watershed are in NFC. The tributaries in this watershed include Henson Creek, Shoal Creek, Turnover Creek, and Cottonwood Creek. At various points, the Leon River coincides with the boundaries of the installation. Several tributaries feed directly into the Leon River, which drains to Belton Lake. The Leon River watershed includes urban areas, as well as training areas where maneuver and live-fire occur. The Leon River's designated uses include contact recreation, high aquatic life use support, and use as a public water supply. Segment ID 1221, Leon River (below Proctor Lake), was first listed as impaired for bacteria in 1996, and portions remain on the approved 2014 Texas 303(d) list. The portions affected are described as "from confluence with Stillhouse Creek, upstream to confluence with Plum Creek" and "from confluence with South Leon Creek upstream to confluence with Walnut Creek". The affected segment portions are upstream of Gatesville and do not receive runoff from Fort Cavazos.

Upstream portions of the Nolan Creek watershed lie in the southeastern portion of Fort Cavazos. Most of the headwaters of Nolan Creek originate within the installation and flow in a southeasterly direction into the creek. Eventually, Nolan Creek flows into the Leon River below Belton Lake. The portion of the Nolan Creek watershed that is within Fort Cavazos contains several tributaries, including North Nolan Creek, South Nolan Creek, Shaw Branch, Hay Branch, and several unnamed tributaries. In addition to training areas, this watershed contains most of the urban areas on Fort Cavazos. Segment ID 1218, Nolan Creek/South Nolan Creek was first listed as impaired for bacteria in 1996 and remains on the approved 2014 Texas 303(d) list. The portion affected is described as the "portion of South Nolan Creek from the confluence with North Nolan/Nolan Creek fork upstream to confluence with Liberty Ditch in the city of Killeen in Bell County". Water quality monitoring, data inventory, public participation activities, and watershed analyses are currently ongoing. This segment receives runoff from a small portion of Fort Cavazos's southeastern training areas, Airfield Lake and its tributaries, and a portion of Robert Gray AAF.

The Owl Creek watershed is almost entirely within Fort Cavazos. The watershed is just south of NFC, and the creek drains directly into Belton Lake. The Owl Creek main stem, as well as numerous unnamed tributaries, flows through Fort Cavazos before its confluence with Preachers Creek and Belton Lake.

*Floodplains* – Although precipitation varies from year to year at Fort Cavazos, most precipitation occurs during May through June and October. January is the driest month of the

year. Installation- wide flooding is usually of short duration, occurring only after heavy downpours. However, flooding can be a safety concern to Soldiers and equipment. Flood zone areas are shown on **Figure 4-5**.

*Wetlands* – Wetlands exist across the installation and range from small emergent wetlands associated with ephemeral streams to large, forested wetland complexes adjacent to perennial channels. Wetlands in central Texas and at Fort Cavazos are most common on floodplains along rivers and streams (riparian wetlands), along the margins of lakes and ponds, and in other low- lying areas where the groundwater intercepts the soil (springs). There are numerous natural springs on Fort Cavazos, but many of their locations have not been mapped.

Most of the surface water features located on the installation are classified as waters of the U.S. as defined by the USACE under Section 404 of the CWA. Approximately 30% of the installation has been delineated, primarily in areas associated with range and cantonment area construction projects. During the planning phase of construction projects, these delineations are utilized to assist in the avoidance and minimization of impacts to waters of the U.S, as required by Section 404. The delineations are also used to calculate the amount of unavoidable impacts, which is used to determine permitting requirements and any appropriate compensatory mitigation.

It has been the practice of Fort Cavazos, in accordance with Executive Order 11990, to avoid or minimize impacts to wetland areas from construction; however, these areas might be indirectly affected by ongoing installation activities such as military training activities, livestock grazing, hydrologic alterations, and urban and training area storm water runoff.

## *Program Data Management*

Various water quality studies have been conducted to monitor the condition of the water resources across the installation. Through these studies, water quality sampling has taken place at several locations throughout the Fort Cavazos area. These locations are shown on **Figure 4-4**.

Water quality studies at Fort Cavazos include sedimentation and erosion studies; storm water data collection (conducted quarterly by Fort Cavazos); Texas Pollutant Discharge Elimination System (TPDES) permit monitoring (conducted weekly and quarterly by Fort Cavazos); studies of metals, explosives, and perchlorates in the groundwater, surface water, and sediment in the Cowhouse Creek drainage basin (conducted by USCHPPM in 2001 and 2004); and a limited focus investigation of the potential overall impact of munitions constituents resulting from live-fire training operations that occurred at select ranges on the installation (conducted by USCHPPM in 2007).

In addition, Fort Cavazos monitors industrial sites identified in the Fort Cavazos Industrial Stormwater Pollution Prevention Plan (SWPPP) in accordance with the Multi-Sector General Permit TXR050000. Sites are monitored annually and/or semi-annually. Typical pollutants sampled are heavy metals, total suspended solids, and chemical oxygen demand. Site specific pollutants are determined by the type of operation. Most sites meet regulatory requirements; however, the following sites have a history of exceeding permit benchmark parameters: DPW Classification Unit, Defense Logistics Agency Disposition Services, Landfill, and the

Recycle Center.

## *Program History*

Currently, Fort Cavazos operates industrial, construction, and municipal storm water programs. Specific industrial activities are managed under an industrial storm water permit (TPDES Permit No. TXR05P855) that comes from the general permit, TXR050000. These industrial activities include aircraft maintenance, bulk fuel storage, watercraft maintenance, landfill operation, and recycling activities. These activities are inspected on at least a quarterly basis. Depending on the specific industrial activity, annual or semi-annual storm water sampling is also conducted.

Fort Cavazos also operates various sites under the TCEQ Construction General Permit TXR150000 for construction activities that occur on the installation. Such sites with land disturbance greater than one acre or within a Common Plan of Development that exceeds the one-acre limit are required to obtain coverage under this permit. At some time in the future, the USEPA may require sites with greater than 10 or 20 acres of disturbance to monitor storm water discharges for turbidity.

Fort Cavazos's Storm Water Management Program ensures the installation complies with all Federal, State, and local storm water regulations. Fort Cavazos is required to comply with the rules and regulations established in Section 402 of the CWA and Chapter 26 of the Texas Water Code. Fort Cavazos has been granted permission by the TCEQ to discharge storm water to surface waters in the State under TPDES General Permit No. TXR040000 for small Municipal Separate Storm Sewer Systems (MS4). Fort Cavazos developed a Storm Water Management Plan (SWMP) that outlines all requirements of the permit and summarizes the work plan that will be conducted. Fort Cavazos has been approved by TCEQ for their SWMP, which includes the following five minimum control measures:

- Public Outreach Education and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Storm Water Runoff
- Post Construction Storm Water Management in New Development and Redevelopment
- Pollution prevention/good housekeeping for municipal operations.

Fort Cavazos has a TPDES wastewater permit (Permit No. TX0002313). This permit covers industrial wastewater discharges from various vehicle washing and maintenance activities located in the main cantonment. Various BMPs and innovations are employed to limit the potential for pollutants to enter water resources. These include the use of wastewater and storm water detention ponds and four tactical vehicle wash facilities which treat and re-circulate wash water so that no discharges occur. Water quality samples are collected weekly at TPDES permit outfall locations, when discharging, to ensure compliance with permit requirements.

## *Current Condition*

Groundwater studies conducted at Fort Cavazos do not show any critical issues attributable to the installation; however, there are there are a host of hazards to nearby waterbodies that require monitoring. These include:

- Storm water runoff from training areas
- Storm water runoff from agricultural operations in the agriculture outlease areas
- Sanitary sewer overflows
- Fats, oils, and grease in the waste water collection system
- Portable latrines, mobile kitchens and showers, and hand-washers
- Zebra mussel populations in Belton Lake
- Elevated MCOC concentrations from munitions impacts

## *Program Goals and Objectives*

The primary goal of water resources management at Fort Cavazos is to identify and restore degraded aquatic habitats, protect aquatic and riparian habitats, and prevent degradation of water quality. Fort Cavazos's goals and objectives for water resources are presented in **Table 4-7** and described below.

**Table 4-7. Goals and Objectives for Water Resource**

| Goals | Objectives |
|---|---|
| ***Groundwater*** | |
| Protect groundwater resources and prevent degradation of water quality. | Continue to develop an inventory and characterization of karst features and groundwater hydrologic flow characteristics on Fort Cavazos.<br><br>Locate refueling activities and other training activities with the potential for generating pollutants away from karst features.<br><br>Disseminate information on proper spill prevention and control techniques to be implemented in karst areas.<br><br>Develop adequate understanding of hydrologic environment sufficient to determine wells or springs to be quarantined if spills occur in karst areas.<br><br>Continue to maintain protective zones around spring resurgences and spring runs. |
| ***Surface Water*** | |
| Identify and restore degraded aquatic habitats, protect aquatic and riparian habitats, and prevent degradation of water quality. | Design and implement a comprehensive sampling and assessment plan.<br><br>Identify areas of high erosion and sediment input through stream and watershed assessments.<br><br>Develop a database to assess status and trends in water quality and habitat suitability.<br><br>Repair and maintain aquatic resource infrastructure such as dams and spillways to maintain safety and established aquatic habitat. |

| Goals | Objectives |
|---|---|
| Reduce erosion and sedimentation in water resources. | Continue evaluation of effectiveness of existing BMPs to reduce sedimentation and erosion of streams and assess possibilities of new ones.<br><br>Establish and maintain sufficient vegetative buffers (stream bank and shoreline vegetation) around water bodies to minimize the flow of nonpoint source pollution, particularly sediment, into the streams.<br><br>Limit activities within the buffer zone to those causing little or no impact on water quality and aquatic habitats.<br><br>Continue revegetation of disturbed lands. |
| Protect, maintain, and enhance waters of the U.S., and ensure no net loss of wetland habitats. | Identify, delineate, and characterize the waters of the U.S. on Fort Cavazos.<br><br>Develop an installation-wide wetlands delineation, increase wetlands management activities and use GIS to track wetlands and other environmentally sensitive areas.<br><br>Continue evaluating potential impacts of current mission activities on waters of the U.S. and determining need for permits.<br><br>Establish a database to monitor habitat quality and ecological integrity. |
| Continue environmental awareness and outreach programs. | Develop Sustainable Range Awareness (SRA) materials to disseminate information to Soldiers and commanders. |

## *Program Regions*

All Regions (refer to **Figure 2-4**).

## *Monitoring*

To gain a thorough understanding of the current state of water resources at Fort Cavazos and identify water quality issues, it is necessary to maintain a comprehensive water monitoring program. Ideally, the program should include routine water and sediment sampling across the installation, in addition to assessments of the stream habitat and biological communities.

It is also necessary to monitor the integrity of waters of the U.S., including wetlands, following their identification, delineation, and characterization. The development of a database to monitor their status and trends not only will enable NCRMB staff to determine future management efforts but also will facilitate the decision-making process on future training and range activities. Activities occurring in or adjacent to wetlands, karst features, and spring runs that would result in impacts will be avoided, when possible, in a manner consistent with mission objectives. Where impacts on waters of the U.S, including wetlands are not avoidable, mitigation of the impacts will be implemented.

# 4.7 Sensitive Species

## 4.7.1 Threatened and Endangered Species

The Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1531 et seq.) requires all Federal agencies to conserve listed species. Conservation, as defined by the ESA, means the use of all methods and procedures necessary to bring any listed species to the point where protections pursuant to the ESA are no longer necessary. The ESA specifically requires agencies not to "take" or "jeopardize" the continued existence of any endangered or threatened species, or to destroy or adversely modify habitat critical to any endangered or threatened species. Under Section 9 of the Act, take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect"; under Section 7, jeopardize means to engage in any action that would be expected to "reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

On 28 September 1994 the Acting Assistant Secretary of the Army (Civil Works) signed a multi-agency Memorandum of Understanding (MOU) on implementing the ESA. The purpose of the MOU was to establish a general framework for greater cooperation and participation among the agencies exercising their responsibilities under the ESA. The MOU states that the departments will work together to achieve the common goals of (1) conserving listed species, (2) using existing Federal authorities and programs to further the purposes of the ESA, and (3) improving the efficiency and effectiveness of interagency consultations conducted pursuant to Section 7(a) of the ESA. Each signatory agreed to (1) use its authorities to further the purposes of the ESA by carrying out programs for the conservation of Federally listed species, including implementing appropriate recovery actions that are identified in recovery plans; (2) identify opportunities to conserve Federally listed species and the ecosystems on which they depend within existing programs and authorities; (3) determine whether its respective planning processes effectively help conserve threatened or endangered species; and (4) use existing programs, or establish a program, to evaluate and reward the performance of personnel who are responsible for planning or implementing programs to conserve or recover listed species or the ecosystems on which they depend.

Army policy on listed species includes the following elements: balancing mission requirements with endangered species protection, cooperating with regulatory agencies, and conserving biological diversity within the context of the military mission. As required by AR 200-1, the Army must ensure that it carries out mission requirements in harmony with the requirements of the ESA. All Army land uses, including military training and testing, recreation, and grazing, are subject to ESA requirements for the protection of listed species and critical habitat. In fulfilling its conservation responsibilities, the Army is required to work closely and cooperatively with the USFWS and National Marine Fisheries Service, the two Federal agencies responsible forenforcing the act. Installations are encouraged to engage in informal consultation with the USFWS and National Marine Fisheries Service during the planning of projects or activities to ensure ESA compliance. In conserving biological diversity, installation commanders and Army natural resources managers are required to develop and implement policies and strategies to maintain viable populations of native plants and animals, maintain natural genetic variability within and among populations, maintain functioning representations of the full spectrum of ecosystems and biological communities, and integrate human activities with the conservation of biological diversity.

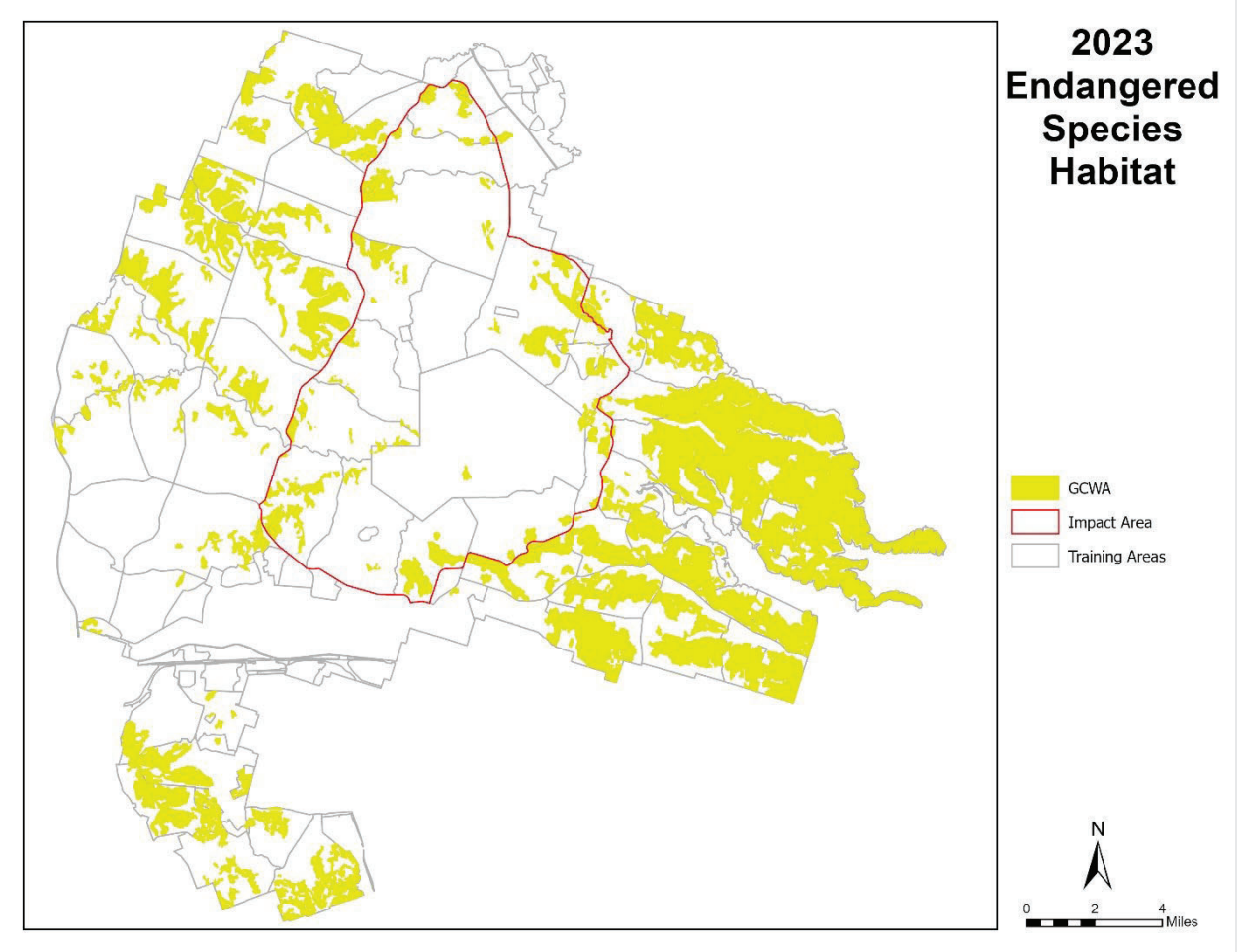
The following table lists the Federally-listed threatened and endangered species that occur or may occur on Fort Cavazos. **Figure 4-6** shows the extent of endangered species habitat on Fort Cavazos.

**Table 4-8. Federally Listed Threatened and Endangered Species**

| Scientific Name | Common Name | Federal Status | State Status | Installation Status* | Existing USFWS Consultation |
|---|---|---|---|---|---|
| *Setophaga chrysoparia* | Golden-cheeked warbler | E | E | A | USFWS BO for Fort Cavazos (31 Aug 2020) |
| *Grus americana* | Whooping crane | E | E | B | Endangered Species Management Component |
| *Danaus plexippus* | Monarch Butterfly | C | | A | |

Legend: E – Endangered; T – Threatened; C – Candidate for listing; DL – Delisted
*Status refers to population status on Fort Cavazos according to these definitions: (A) Population established on Fort Cavazos. Recent information documents an established breeding population or regular occurrence on the installation. (B) Recently recorded on Fort Cavazos, but there is no evidence of an established population. This includes species considered to be transient, accidental, or migratory (e.g., some migrating birds may use the installation as a stopover site during migration to and from their wintering grounds). For some species in this category, further inventory may reveal breeding populations. (C) Known small population immediately adjacent

**Figure 4-6. Endangered Species Habitat**




## *Program Data Management*

In accordance with the ESA, the Army must assist in the recovery of all Federally listed threatened and endangered species and their habitats under the installation's management authority. The Army requires installations to prepare an Endangered Species Management Component of the INRMP addressing each species, each species proposed for listing, and the critical habitat present on the installation, including areas used by tenant organizations. The ESMC is used as a tool to achieve conservation objectives for populations of listed and proposed species while minimizing impacts on the training mission. The ESMC must prescribe area-specific measures necessary to meet the installation's conservation goals for the subject species and critical habitats. This INRMP's conservation measures provides a benefit to the species to prevent critical habitat designation (ESA Section 4(a)(3)(b)(ii), 50 CFR 424.12(h), and DoDI 4715.03, enclosure 3(1)(f)(1)).

The ESMC for Fort Cavazos is under revision and provides management and monitoring guidelines for the next 5 years (see **Appendix B1)**. The 2020 programmatic Biological Opinion (BO) for Fort Cavazos (see **Appendix B2**) provides requirements and guidance for endangered species management. The ESMC is written specifically for use by natural resources managers and leaders of training operations on Fort Cavazos to accomplish military training

objectives while meeting conservation objectives for these species.

Data gathered on the primary endangered species and a recently delisted species known to occur on the installation is as follows:

- *Golden-cheeked Warbler* – Research and conservation efforts for this species on Fort Cavazos have been numerous. Research projects have included fledgling radio telemetry study, source-sink population dynamics, range-wide breeding population study, nest survival rates, forest cover and its impacts on density, and nest predation to name a few. Current ongoing research includes a breeding range wide geolocator study to determine male migration corridors, overwintering locations, and migratory connectivity; impacts of geolocators on reproductive success and survival; female geolocator study; meta barcoding for foraging consumption, and the use of nano and life tags on male warblers to examine migration timing. Monitoring and research activities for the warbler on Fort Cavazos were initiated in 1991 and continue through the present.

  Past monitoring (1991-2015) efforts include point count surveys to determine detection rate and trends, while current monitoring efforts (since 2016) employ point-transect distance sampling to determine male population density, estimates, and trends. Current and past research includes demographic monitoring in selected study sites, research in habitat selection, studies to determine the effects of habitat fragmentation and wildfire on warbler demographics, and population viability analyses.

- *Black-capped Vireo* – Research and conservation efforts for this species on Fort Cavazos have been numerous. Recent research projects have included studies of nest depredation, conspecific attraction, the relation between nest success and snake activity, nest parasitism and cowbird management, selection of nest sites, demography in relation to habitat, survival, age and sex determination, adrenocortical responses, habitat selection by juveniles, longevity, habitat suitability models, habitat restoration, source-sink population dynamics, and juvenile behavior. Monitoring activities include distance sampling to determine population estimates and demographic monitoring in selected study sites.

As a part of the endangered species population monitoring program, Fort Cavazos employs the use of helicopter over-flights to map wildfires in endangered species habitat and control wild pigs. Fort Cavazos's use of helicopter surveillance is an effective means of monitoring available habitat.

## *Program History*

Fort Cavazos's past actions of prescribed burning, juniper removal, and cowbird control continues to the present. The prescribed burn policy emphasizes reduction of fuel loads in grasslands surrounding endangered species habitats which reduces the threat of wildfire damage. Prescribed burn policies emphasize use of preventative prescribed fire to maintain blacklines near habitat areas annually. Fort Cavazos also employs firebreaks in association with endangered species habitats to reduce fire risk. Prescribed burns are managed through the

Fort Cavazos NCRMB (see **Section 4.10.3**).

From 2005 to 2010, juniper was removed from approximately 22,598 acres on the Installation. Of this acreage, approximately 5,700 acres was black-capped vireo habitat and 372 acres was golden-cheeked warbler habitat. The USFWS has determined that juniper removal in vireo habitat typically does not adversely affect the species. In many instances juniper removal improves vireo habitat by thinning out the density of the shrubland, providing more sunlight for other species of woody shrubs, and maintaining the openness of the habitat preferred by vireos. Juniper removal within warbler habitat does adversely affect the warbler, therefore incidental take must be authorized by the USFWS for this activity.

Fort Cavazos conducts extensive operations to reduce numbers of brown-headed cowbirds (*Molothrus ater*) on the installation. The program consists of trapping and shooting activities that target feeding concentrations of cowbirds throughout the installation and cowbird individuals in endangered species nesting habitat. The objective of the control program is to maintain the incidence of cowbird parasitism of vireo nests below 10 percent annually in managed study sites.

## *Current Condition*

*Golden-cheeked Warbler* – The golden-cheeked warbler, which was federally listed as endangered in December 1990, occurs on Fort Cavazos from March through late July and early August. Warbler habitat includes mature Ashe juniper with peeling bark and a variety of oak species. Known distribution of potential warbler habitat on Fort Cavazos is based on vegetation mapping, visual interpretation of aerial photography, and ground surveys. Currently, it is estimated that approximately 49,468 acres of suitable warbler habitat occur on Fort Cavazos (see **Figure 4-6**). Warbler occurrence is widespread and has been documented in all training areas with suitable habitat on the installation.

The 2023 estimated abundance surveying point-transects was 4,119 (95% CI, 3,484-4,875) males and the average estimated abundance from 2017 to 2023 resulted in an average male population estimate of 4,678 (95% CI, 3,972-5,530). The male density for the entire installation for 2023 was 0.22 males/ha (95% CI, 0.19-0.26), while the averaged for 2017 to 2023 was 0.23 males/ha (95% CI, 0.19-0.27). These estimates were calculated by surveying >1,000 point-transects annually on a 300m x 300m grid system (Macey and Collins 2023).

Prior to the 2015, BO, approximately 9,541 acres of golden-cheeked warbler habitat was categorized as "core habitat" on the eastern portion of the installation. This core habitat was subject to training restrictions year-round, with additional restrictions applicable to the breeding season. The implementation of restrictions in core habitat was previously included as a Conservation Measure in past consultations with the USFWS. However, due in large part to successful endangered species management at Fort Cavazos, the 2015 BO eliminated all golden-cheeked warbler core habitat designation on Fort Cavazos.

*Black-capped Vireo* – The black-capped vireo was listed as endangered in November 1987 and was delisted in 2018. It nests on Fort Cavazos from March through July each year. Vireo

habitat at Fort Cavazos typically is shrubby with a "clumped" vegetation structure. Known distribution of potential vireo habitat on Fort Cavazos is based on ground surveys (see **Figure 4-6**). Most habitat patches were caused by accidental fires or mechanical clearing related to military training and operations. The current estimate of suitable vireo habitat on Fort Cavazos is 19,634 acres. Distance sampling based on surveys at 300–850 points has been used to estimate the abundance of vireos at Fort Cavazos. The estimate for 2023 was 7,104 male vireos with a 95% confidence interval of 6,051-8,341. An increasing trend in vireo abundance was evident from 2007 to 2023. The delisted black-capped vireo is subject to a 12-year, post-delisting monitoring plan. Despite delisting, the black-capped vireo is included in this section because the post-delisting monitoring requirements are a consequence of its prior status as an endangered species.

*Whooping Crane* – The whooping crane is a rare migrant. Three whooping cranes were sighted in 2017, and this species was previously documented on Fort Cavazos. They may fly over or near Fort Cavazos during spring and fall migration. They may stop at Belton Lake during migration and have been observed at other wetland areas on Fort Cavazos.

Management actions and minimization measures for endangered species are outlined in the 2020 BO (see **Appendix B2**). Currently, construction and range improvement projects on Fort Cavazos, as well as habitat loss due to wildfire, have been authorized under the BO. Currently, there are no restrictions on training in designated threatened and endangered species habitat areas, and there is no habitat on Fort Cavazos designated as critical habitat by the USFWS (per ESA (4)(a)(3)(B)(i) and DoDM 4715.03, Enclosure 4(2)).

## *Program Goals and Objectives*

The management goals for threatened and endangered species on Fort Cavazos are to preserve these species on the installation in accordance with the ESA, Endangered Species Recovery Plans, U.S. Army regulations and guidance, and BO. **Table 4-9** lists the goals and objectives for the management of threatened and endangered species.

**Table 4-9. Goals and Objectives for Threatened and Endangered Species**

| Goals | Objectives |
|---|---|
| Manage all identified rare, threatened, and endangered species in accordance with the ESA, U.S. Army regulations and guidance, State wildlife regulations/laws, and approved site-specific management plans. | Continued ongoing monitoring of intensive study areas to assess critical demographic parameters of golden-cheeked warblers. Provide approval and oversight for research conducted by universities, graduate students, and other researchers.<br><br>Actively manage black-capped vireo habitat in accordance with the provisions of the ESMC. |
| Protect and enhance the habitat and populations of those plant and animal species listed as threatened, and endangered or those with the potential to be listed in the future. | Continue to monitor land use impacts in endangered species habitat. |
| Continue cowbird control through an active trapping and shooting program based on recovery/research needs. | Maintain parasitism levels in black-capped vireo nests below 20% within intensive study sites. |

| | |
|---|---|
| Continue support and encouragement of research programs with potential to improve knowledge concerning the status and management of endangered bird populations. | Continued monitoring to determine population trends, demographic parameters, and effectiveness of management initiatives. |
| Continue support for range-wide population and habitat conservation and protection measures. | Assess the feasibility and desirability of participating in regional surveys of selected species and habitat types to contribute to the understanding of the ecology of the black-capped vireo and golden-cheeked warbler, or other sensitive species.<br><br>Continue to collaborate and cooperate with agencies and organizations conducting monitoring and conservation of listed species on the wintering grounds, including collaborative training and data-sharing. |
| Ensure that scientifically sound and commonly accepted data collection methods and sampling techniques are used. | Continue to develop and assess new and innovative survey techniques for endangered species. Provide recommendations that might improve or enhance research projects conducted by universities, graduate students, or other researchers and provide oversight for the implementation of these projects. |

*Program Regions*

All Regions (refer to **Figure 2-4**). Golden-cheeked warbler habitat is shown on **Figure 4-6**.

*Monitoring*

The BO includes provisions for monitoring. The reasonable and prudent measures outlined in the BO include (1) continuing to implement monitoring and research programs for the golden-cheeked warbler; (2) managing vegetation- clearing projects to minimize fire hazard from slash and to avoid impacts on residual stands; (3) emphasizing the use of prescribed burning to support protection and maintenance of endangered species habitat and to support ecosystem management principles; (4) implement management options to reduce nest losses and habitat degradation; (5) monitoring the quality and quantity of available endangered species habitat; (6) incorporating preventive measures to avoid future uncontrolled burns similar to the February 1996 fires; (7) develop management options through the adaptive management process for actions located within endangered species habitat.

Additional recommended conservation practices are outlined in the BO (see **Appendix B2**).

## 4.7.2 Species of Concern

**Table 4-10** includes species, not identified in the previous section, that are declining and appear to need conservation in order to sustain Fort Cavazos's military mission in the near-term or foreseeable future. Species of Concern is an informal term used to refer to species that need proactive protection, but for which insufficient information is available to indicate a need to list the species as endangered. The term is not defined in the ESA.

For the purposes of this INRMP, Species of Concern include Texas state-listed species. DoD and Department of the Army policy requires Fort Cavazos to provide for the protection and conservation of state-listed species when practicable. Fort Cavazos will provide similar conservation measures for state-listed species as are provided to species listed under the ESA, as

long as such measures are not in direct conflict with the military mission. When conflicts do occur, consultations will be conducted with TPWD to determine if any conservation measures can be feasibly implemented to mitigate impacts.

**Table 4-10. Species of Concern**

| Scientific Name | Common Name | Federal Status** | State Status | Status on Fort Cavazos* |
|---|---|---|---|---|
| Various species | Cave invertebrates | -- | -- | A |
| *Plethodon albagula* | Slimy salamander | -- | -- | A |
| *Perimyotis subflavus* | Tricolored bat | Proposed E | -- | A |
| *Myotis velifer* | Cave myotis | -- | -- | A |
| *Croton alabamensis* var. *texensis* | Texabama croton | -- | -- | A |
| *Phrynosoma cornutum* | Texas horned lizard | -- | Threatened | A |
| *Vireo atricapilla* | Black-capped vireo | DL 16 May 2018 | -- | A |
| *Colinus virginianus* | Northern Bobwhite | -- | -- | A |
| *Haliaeetus leucocephalus* | Bald eagle | DL 28 June 2007 | -- | B |
| *Falco peregrinus anatum* | American peregrine falcon | DL 1999 | Threatened | B |

*Status refers to population status on Fort Cavazos according to these definitions: (A) Population established on Fort Cavazos. Recent information documents an established breeding population (even if small) or regular occurrence on the Installation. This includes those species for which research and management is ongoing and several endemic cave invertebrates. (B) Recently recorded on Fort Cavazos, but there is no evidence of an established population. This includes species considered to be transient, accidental, or migratory (e.g., some migrating birds may use the installation as a stopover site during migration to and from their wintering grounds). For some species in this category, further inventory may reveal breeding populations. ** DL is delisted. EP NE is expirmental population, non-essential.

One of the objectives of the ESMC is to provide adequate and sufficient protective measures to avoid listing karst-adapted species found on Fort Cavazos under the ESA. Karst-adapted species are identified as Species of Concern at Fort Cavazos. Such listings would add restrictions to military training. Therefore, the primary focus of much of this section of the INRMP is on karst and karst-dependent species management.

## *Karst Program Data Management*

Studies of caves on Fort Cavazos were conducted in the 1960's; however, no other studies were conducted on Fort Cavazos until 1991 when the U.S. Army Construction Engineering Research Laboratory (USACERL) contracted a biological study. All previously known caves and karst features on Fort Cavazos were examined. The studies entailed surveys of the caves' layout from which all other research could be overlain for meaningful analysis. Biological collections were conducted, and specimens sent to taxonomists specializing in those animals for authoritative identification.

Between 1991 and 1998 many new features were found. Although no transect surveys have been conducted on Fort Cavazos, areas already known to contain caves were covered fairly completely as incidental efforts in collecting, mapping, and locating those caves.

The 1998-1999 field season was largely devoted to conducting searches for new features in areas not yet visited or poorly known. A total of 58 new karst features were documented. From 2000 to the present, additional karst surveys have resulted in the discovery of many new karst

features and caves, including several containing endemic species. Continued excavation has also resulted in the opening of new caves containing endemic species. At present 329 caves, 862 sinks, 192 springs, and 639 rockshelters are documented and recorded. Important parts of the study for the last few years have been searching for unknown karst features and the taxonomic description of the new species discovered on Fort Cavazos.

Fort Cavazos prepared a Karst Management Plan (June 2012) designed to eliminate, mitigate, and prevent harm to the species of concern. A copy of this plan can be found in **Appendix B3**. By proposing a plan for all species of concern, not just those proposed for endangered listing, Fort Cavazos can take a broader and more effective ecosystem-based approach to species management, similar to habitat conservation plans. Standard Operating Procedures have been developed between Cultural Resources and Natural Resources Branches to coordinate research at karst features that may contain cultural remains, significant resources, or have spiritual significance.

## *Karst Program History*

Fort Cavazos covers several karst fauna regions. Karst landscape identifies the caves, sinks, and the network of dendritic fissures and cracks that supply nutrients to the features. The regions are defined based on geologic and hydrologic continuity and the distribution of karst adapted and dependent species. Sub-regions are zones within karst fauna regions that have different faunal assemblages.

Karst fauna regions and sub-regions can be further divided into "karst fauna areas." USFWS (1994) described the karst fauna area as "known to support one or more locations of the listed species [species of concern at Fort Cavazos] and is distinct in that it acts as a system that is separated from other karst fauna areas by geologic and hydrologic features and/or processes that create barriers to the movement of water, contaminants, and troglobitic fauna." The purpose of the karst fauna areas in managing the species of concern is to establish areas such that if a catastrophic event that might kill species or destroy habitat occurs in one area, it will not affect species or habitat in other areas.

There are several threats to karst species on Fort Cavazos. These include:

- Vegetation removal around and within 164 feet (50 meters) of karst entrances and cave footprints is a threat to the integrity of the ecosystem because important microclimate variables are altered.
- Disturbances related to vegetation removal promote the colonization of red imported fire ants, an important predator of cavernicoles and cave crickets.
- Military vehicle maneuvers and bivouacs around entrances and over footprints promote soil disturbances around karst features and constitute a safety hazard because Soldiers may unintentionally fall into a feature and/or damage equipment.
- Loose soil, which is easily washed into karst features and plugs passages, alters critical hydrologic recharge and nutrient exchange between the karst feature and the surface.
- Anthropogenic disturbances such as vandalism, trash dumping, and unauthorized visits degrade and destroy karst ecosystems and the ecosystem processes.
- Urban growth into the karst regions and the subsequent loss of habitat, as well as

direct impact on the species.

## *Karst Current Condition*

*Cave Adapted Fauna* – Troglobitic faunal communities (karst-adapted and dependent organisms) are often represented by rare endemics due to the narrow ecological niche and natural isolation of the caves and cave systems they inhabit. Several endemic and currently undescribed cave invertebrate species and one probable new subspecies of slimy salamander occur on Fort Cavazos.

Karst investigations at Fort Cavazos have found at least 16 species of troglobites endemic to Fort Cavazos. These species include five spiders, two pseudoscorpions, one millipede, one ground beetle and seven ant-like litter beetles. A full listing of species can be found in the Karst Management Plan (see **Appendix B3**). None of these species are known to occur outside of Fort Cavazos. Population estimates for the invertebrate species of concern are not available due to their inaccessibility, rarity, and sometimes secretive habits.

Additional species, presently under study, may also prove endemic to Fort Cavazos and will need to be added to the list. Population of a silverfish species found on Fort Cavazos is worthy of conservation because of its rarity or because it represents a peripheral, isolated population. Without pro-active monitoring and management, these species could be proposed for listing in the future. Additional, non-endemic troglomorphic and non-troglomorphic species have been observed utilizing Fort Cavazos caves, resulting in a minimum of 286 invertebrate and 32 vertebrate species, including two bat species of concern (cave myotis and tri-colored bat).

*Slimy Salamander* – Specimens of the slimy salamander have been collected from caves and springs in the east/northeast training areas of Fort Cavazos. This species is not cave-restricted; however, it is troglophilic (depends upon karst features) and has a very limited geographical range (Training Areas 20-25 & possibly LTA 85). The species is unique because two color morphs exist on Fort Cavazos: one is all black (atypical) and the other is mottled black-and-white (typical).

*Cave Myotis* – Four known roosts occur on Fort Cavazos: 1) an active maternity roost, with an estimated 20,000 - 25,000 bats during the warm season, 2) two abandoned, but restored roosts, and 3) an unmonitored roost in an underground river. Additionally, cave myotis can be found in small groups (10 – 150 individuals) and single bats in other karst features (caves and rockshelters) and in four underground training facilities (MOUT tunnels) on Fort Cavazos during the spring-autumn seasons. The bats migrate during late-autumn, meaning they are mostly absent from the installation during the winter; however, small groups typically remain to hibernate in a small number of caves.

*Tri-colored Bat* — This species diffusely roosts in Fort Cavazos's forests and shrublands during the warm season (spring and summer), typically as single bats, and diffusely roosts in caves and rockshelters during the cold season (autumn and winter), typically ranging in groups from 1-30 bats. Because the species has a wide, tolerable temperature range for hibernacula, the bats frequently move between roosts during the cold season. Additionally, because of this

tolerance, they will hibernate in a greater number of hibernacula, meaning they are widely scattered amongst many karst roosts across the landscape; however, they have been regularly observed in at least six hibernacula.

## *Other Species of Concern Current Condition*

*Monarch Butterfly* – Monarch butterfly and milkweed surveys were conducted from 2016 to 2018 to gather baseline data and are planned to continue. In 2017 the NCRMB developed an extensive monarch tagging project which has been continued annually using tags from Monarch Watch. Resources and background information on the Monarch Watch program is available at https://www.monarchwatch.org/tagmig/index.htm. Detailed information on this Fort Cavazos project can be found under the Non-Game Management section (see **Section 4.9.4**).

*Plains Spotted Skunk* – During camera-trap grid surveys, these skunks were detected in Fort Cavazos's forests (most observations), shrublands, riparian forests, and semi-open forests on the eastern, western, and southern (West Fort Cavazos) regions. Most of the surveyed areas co-occur with endangered songbird habitat, resulting in "umbrella" protection. Their density, territory size, landscape usage, survival, productivity, and population trend on Fort Cavazos are unknown.

*Texabama Croton* – In 1989, a distinct population of this species was discovered on Fort Cavazos. Other Texas populations have subsequently been discovered in Travis and Coryell counties. After taxonomic review, the Texas population of this species was designated a new variety. Both significant populations on Fort Cavazos occur in protected canyons along the Owl Creek river drainage. Several scattered plants and a small population have been found near tributaries of Owl Creek. The total population on Fort Cavazos is estimated to be around 20,000 individuals.

*Texas Horned Lizard* – Four separate lizard surveys have been conducted on Fort Cavazos (1994- 1996, 1998-1999, 2001, and 2009). A total of 16 horned lizards were observed, widely scattered across a broad geographic range. Texas horned lizards appear to be widely scattered at low overall densities. Further data collection on the species will be initiated in 2018.

*False Spike* – A survey of archeology sites revealed the false spike was historically present in the streams near the present-day Belton Lake. False spike was observed in the Leon River just upstream of Fort Cavazos in the 1920s but has not been observed since. Recent eDNA samples from the Leon River were negative for this species futher supporting the assumption that it has been extirpated from this stream reach.

## *Program Goals and Objectives*

The management goals for species of concern (primarily karst species) on Fort Cavazos constitutes a proactive role that could preclude listing of the species as threatened and/or endangered. Should listing occur, Fort Cavazos's proactive role will no doubt result in less intense restrictions (i.e., should not increase above current protection and management levels found in the Karst Management Plan). Additionally, most of Fort Cavazos's karst areas co-occur with endangered species habitat. As a result, many karst features receive "umbrella" protection and management via endangered species habitat management, protection, and threshold

reviews. **Table 4-11** lists the goals and objectives for the management of species of concern.

**Table 4-11. Goals and Objectives for Species of Concern**

| Goals | Objectives |
|---|---|
| Protect and enhance the habitat and populations of species of concern. | Continue to survey and monitor for the presence of Species of Concern and collaborate with researchers who are studying declining species.<br><br>Delineate and manage habitat (occupied and unoccupied). |
| Conserve rare and endemic invertebrates and salamanders and their habitat throughout the karst landscape of Fort Cavazos. | Continue to search, identify, document, survey, map, study, and protect karst features and areas with significant faunal assemblages.<br><br>Continue to study, monitor, and protect the Rocket River Cave System in LTA, and Bear Springs on the east side.<br><br>Continue to study the hydrology/water flow of the Rocket River Cave System, the System springs, and the surrounding aquifer, and continue to delineate, protect, and manage the upstream and downstream watersheds. Determine and monitor sedimentation rates in the Rocket River Cave system.<br><br>Study the hydrology/water flow, movement of spring resurgence and flow path through time at Bear Springs. If funding is available, investigate if the massive tufa mound age can be determined.<br><br>Continue to assess, investigate, and excavate sinkholes for their potential to become caves and/or significant locations for cavernicoles.<br><br>Continue to monitor salamander cave and spring habitats for degradation and/or human and non-invasive species damage.<br><br>Continue to manage, update, and the limit the distribution of karst location and species composition databases and GIS data.<br><br>Continue to determine the appropriate number, size, and shape of karst fauna areas targeted for management. |
| Provide protection to targeted karst fauna areas. Specific protective measures include installing rock (physical) barriers, protecting the areas from vegetation clearing, implementing erosion control practices, and protecting cave watersheds. | Identify and monitor training effects on karst areas and disseminate educational information to Soldiers and trainers to raise awareness, when appropriate.<br><br>Restrict the use of pesticides, fertilizers, herbicides, or other chemicals at and near karst preserve locations, and within 50 meters of karst feature entrances and footprints.<br><br>Limit vegetation removal within karst fauna areas.<br><br>Implement conservation measures and management of targeted karst fauna areas in accordance with the Karst Management Plan.<br><br>Continue ongoing research and conduct additional research about the life history of rare and endemic invertebrates and salamanders. Determine troglobitic invertebrate detection rates in biodiverse karst features.<br><br>Study, delineate, map, and characterize the karst bearing geologic formations on Fort Cavazos |

| Goals | Objectives |
|---|---|
| | Sample springs and water caves for groundwater fauna and develop species lists.<br><br>Conduct geochemical and anion/cation analyses of spring and cave water.<br><br>Continue to survey, map, and sample the biota in known and newly discovered karst features in conjunction with the Karst Management Plan.<br><br>Protect the karst surface and subsurface watershed. The subsurface watershed is the dendritic network of cracks and fissure around a feature that direct nutrients and water underground.<br><br>Protect surface area and vegetation within 50 meters of karst feature entrances and footprints to conserve cave cricket populations, limit surface erosion, and prevent sedimentation/filling of karst features.<br><br>Continue to study and monitor the cave microclimate of selected karst features.<br>Continue to limit human visitation to researchers with appropriate karst competency skills.<br><br>Maintain Level 1 & 2 cave and cliff rescue proficiency and competency, and rescue equipment cache in accordance with National Cave Rescue Commission standards, training, and qualifications.<br><br>Investigate feasibility of assembling cave rescue team with DES-Fire Department personnel.<br><br>Continue to conduct semi-annual checks of cave gates for operations, lubing, debris blockage, and vandalism. Repair when necessary.<br>Continue to collaborate with Cultural Resources Management Branch staff to ensure conservation and protection of cultural sites and traditional cultural properties, along with researcher access to such sites<br><br>Continue to coordinate with Cultural Resources Management Branch staff for excavation activities at karst sites<br><br>Continue to update karst feature list, descriptions, and species occurrence. |
| Continue bat cave conservation activities. | Continue to monitor, study, and protect the maternal colony of cave myotis in the western maneuver area.<br><br>Continue to monitor, study, and manage bat caves in the LTA and maneuver areas.<br><br>Continue to search for and document bats utilizing karst features as hibernacula and transient, migratory roosts. Investigate and document rockshelters and caves for bat occupation and signs of use.<br><br>Continue to search, study, and document cave bat use at rockshelters and other non-cave habitats. |

| Goals | Objectives |
|---|---|
| | Continue to monitor known and newly discovered bat cave roosts for signs of White-nose Syndrome. Report and collect samples in accordance with USFWS and TPWD protocol.<br><br>Continue consultation and collaboration with governmental and non-governmental cave and cave biota management organizations. |
| Control or eradicate fire ants near karst systems. | If necessary, evaluate and prioritize a list of karst systems that require non-pesticidal or least-toxic control strategies (e.g., hot water or steam) fire ant control. |
| Monitor status and distribution of Texabama croton populations. | Visit known locations to visually assess condition of known populations.<br><br>Develop and implement an annual monitoring plan. |
| Survey, manage, and protect Texas horned lizard populations. | Develop a monitoring plan. |

### *Program Regions*

Karst habitat and features are managed in the LTA, Northeast, Northwest, South (West Fort Cavazos), and Southeast Regions. All other species of concern are managed in all Regionss. (refer to **Figure 2-4**).

### *Karst Monitoring*

The Karst Management Plan provides detailed descriptions of the actions necessary to monitor the karst features of Fort Cavazos (see **Appendix B3**).

All karst fauna areas targeted for conservation should be monitored to determine the success or failure of the management actions implemented and to guard against irreversible declines in the species' status. The status of the species of concern and existing or potential threats to either should be monitored on a basis recommended by the USFWS. Monitoring criteria that are as quantitative as possible should be developed to minimize sampling or interpretational bias and to facilitate comparison between monitoring periods and other observations. The results of the monitoring should be assessed periodically to determine whether changes, additions, or deletions to the conservation program are needed.

Any monitoring program should take care not to adversely affect cave fauna. It is both impractical and probably harmful to do intensive, regular detailed monitoring of many of the small caves. Larger caves, where only selected areas are monitored, can be safely monitored two to four times a year. Any cave in a potentially affected karst fauna area should be studied immediately after the event. Additional surveys should be conducted if there is evidence of an adverse impact on the karst ecosystem or, especially in the event of a spill of hazardous materials. Caves and karst features should also be monitored if heavily affected by vegetation clearing activities, flooding, or fires.

## 4.8 Migratory Birds

The Migratory Bird Treaty Act (MBTA, 16 USC 703-712; 50 CFR Part 10) states that, "Unless and except as permitted by regulations…it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill…any migratory

bird, any part, nest, or eggs of any such bird…concluded November 19, 1976." Further, Executive Order 13186 provides guidance to Federal agencies with the purpose to, "minimize the potential adverse effects of migratory bird take, with the goal of striving to eliminate take, while implementing the mission."

In accordance with Executive Order 13186 and the associated MOU between the DoD and the USFWS to Promote the Conservation of Migratory Birds, Fort Cavazos will, to the extent feasible and practical, conduct non-military readiness activities in a manner that will minimize or avoid their impacts on migratory birds, with special emphasis on migratory bird species of concern.

DoD installations must ensure that INRMPs and NEPA analyses adequately address migratory bird management and the potential impacts of proposed military activities – readiness and non- readiness related alike – on migratory birds. Section 315 of the 2003 National Defense Authorization Act and the Military Readiness Rule (50 CFR Part 21) authorizes, with certain limitations, the incidental take of migratory birds during "military readiness activities". Nonetheless, the Armed Forces must give appropriate consideration to protecting migratory birds when planning and executing military readiness activities; however, implementing protections must not diminish the effectiveness of those activities. Moreover, this requirement pertains to all military readiness activities, not just those that may result in a significant adverse effect on a population of a migratory bird species. Under the provisions of that rule (NEPA and ESA considerations), Fort Cavazos units, civilians, and contractors conducting a Military Readiness Activity may unintentionally take migratory birds.

"Military Readiness Activities" includes all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. It does not include (a) routine operation of installation operating support functions, such as administrative offices; military exchanges; commissaries; water treatment facilities; storage facilities; schools; housing; motor pools; laundries; morale, welfare, and recreation activities; shops; and mess halls, (b) operation of industrial activities, or (c) construction or demolition of facilities listed above.

The NCRMB is the review authority for migratory bird consideration in NEPA analyses and has developed BMPs for avoidance and minimization of potential incidental take of migratory birds. These BMPs ensure the installation is meeting its compliance obligations under the MBTA for both Military Readiness Activities and non-Military Readiness Activities.

### *Program Data Management*

The NCRMB manages USFWS Birds of Conservation Concern and DoD Mission-Sensitive Species through the Adaptive and Integrative Management (AIM) Program. Priority species are identified by utilizing lists of species of concern (SOC) provided by reputable avian conservation communities. These include the USFWS Birds of Conservation Concern (2008), comprehensive bird conservation plans (North American Waterbird Conservation Plan, U.S. Shorebird Conservation Plan, Partners in Flight Bird Conservation Plans, North American Waterfowl Management Plan), and Game Birds Below Desired Condition. These lists are useful tools for installation managers to identify species that may be on their lands and most in

need of conservation attention. These lists also provide a starting point for DoD natural resources managers interested in addressing concerns over potential impacts of readiness and non-readiness activities on SOC. A complete list of SOC by Bird Conservation Region (BCR), and the location of each installation by BCR, can be found on the DoD PIF website.

*Inventory and Monitoring*

Currently, data is being collected in grassland habitats, as grassland birds are declining faster than any other group of bird species across North America due to habitat loss and fragmentation. The data collection will provide a better understanding of the current distribution and abundance of declining avian grassland species, enabling the NCRMB staff to provide BMPs for all stakeholders and streamline the NEPA process. Future research goals and timeframes are outlined in **Table 4-12**. Target research species selections are subject to change and will be aligned with the most current SOC research recommendations from DoD PIF.

Incidental data is also collected across all habitats. The data is managed using eBird, an online database of bird observations providing scientists and researchers with real-time data about bird distribution and abundance. The database is supported by The Cornell Lab of Ornithology.

Avian grassland data has been collected from 2016-2018 using the point count method. Much of the research conducted is a replication of work done by The Nature Conservancy in 2008-2010. Much of the landscape has changed due to vegetation encroachment, training activities, construction, and vegetation clearing. Results from this data are very similar to the archived data and resulted in more targeted research toward mission sensitive species.

*Northern Bobwhite*- Northern Bobwhite have been steadily declining throughout their range for several decades. Anecdotal data along with previous hunting data, indicates this species is also in decline on Fort Cavazos and the surrounding area. In 2020, point counts specific to Northern Bobwhite were initiated to gain a baseline understanding of the overall population on the installation. Bobwhite utilize early succession habitat consisting of grasslands comprised of native warm-season grasses, and interspersed srubby cover providing protection from predators. Whistle count surveys were conducted in the spring in suitable habitat across the installation as an index for breeding males. Standardized fixed-radius 100-meter point counts were utilized with observers completing 5-7 surveys per day between sunrise and up to two hours after sunrise, which is the most active calling period. Since most bobwhite are detected outside of the 100-meter range, an adapted method was used to estimate bobwhite in distance bins. Estimates from these surveys resulted in a naïve occupancy rate of .27 and 2.1 singing bobwhite per occupied point. May is the peak month for spring bobwhite detections.

In the fall, bobwhite assemble into groups called “coveys” that will remain together until the next breeding season. Unlike the spring, they only call for a few minutes before sunrise to communicate with other covey nearby to establish territories. Observers are limited to one survey per day to ensure that any calling bobwhite present are detected. To account for this restriction, covey count surveys were completed at a subset of the same locations as the

spring surveys. Estimates from these surveys resulted in a naïve occupancy rate of .45 and an average of 3.2 coveys per point. October is the peak month for fall bobwhite detections.

Research on Northern Bobwhite will continue for the foreseeable future as DoD PIF has launched an initiative focused on bobwhite on military lands. Fort Cavazos will be an important conservation partner for other installations with this species moving forward.

*Monitoring of Owls and Nightjars*
Nocturnal avian species are cryptic and difficult to detect on traditional avian surveys. Furthermore, some of these species are declining due to food and habitat shortages and are anticipated to become mission sensitive species in the future. In order to develop a more complete understanding of these species and where they occur, NCRMB staff developed nocturnal surveys in 2020 to census these species. Monitoring of Owls and Nightjars (MOON) surveys are completed annually between April and June along six routes across the installation. Each route has between eight to ten survey points where an observer records any avian species detected. Playback for specific target species is also used. Through 2023, Chuck-will's Widow were the most abundant species accounting for 80% of total detections and were recorded on 100% of the routes surveyed. Eastern-screech Owls were the second most abundant species accounting for 12% of total detections,and were also recorded on 100% of the routes surveyed. This research is planned to continue in order to track any long-term changes overtime and may result in more targeted research if a species of concern is identified.

*Burrowing Owls-* Burrowing Owls were only recorded a few times on MOON surveys despite use of playback recordings of that species. To gather more adequate data on the distribution of Burrowing Owls, specialized surveys were conducted during the Winter of 2022. These surveys targeted Burrowing Owls in appropriate habitat using playback recordings to try and illicit a response. Surveys were done between one hour before sunrise and up to two hours after sunrise. No Burrowing Owls were detected during these surveys.

*Sprague's Pipits-* Surveys conducted by the Nature Conservancy during the winters of 2008-2010 were reconfigured and carried out during the winter seasons in 2021 and 2022. Results of these surveys yielded similar results to the previous project. Between 2021 and 2023 there has been an average of 1.7 birds per grassland plot, and a Naive occupancy probability of .14.

**Table 4-12. Installation Migratory Bird Future Research Goals and Timeframes**

| Target Species Common Name | Scientific Name | Anticipated Research Timeframe |
|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | 2024-2028 |
| Sprague's Pipit | *Anthus spragueii* | 2024-2026 |
| | | |
| Burrowing Owl | *Athene cunicularia* | 2024-2026 |
| Grasshopper Sparrow | *Ammodramus savannarum* | 2026-2028 |

| | | |
|---|---|---|
| Loggerhead Shrike | *Lanius ludocivianus* | 2026-2028 |
| Chestnut-collared Longspur | *Calcarius ornatus* | 2026-2028 |

Research priority for mission-sensitive species will be determined using the most current DoD Partners in Flight (PIF) ranking (See **Table 4-13**). In addition to mission-sensitive species, DoD PIF also classified certain species as Tier 2 species that have experienced long-term declines and may have future impacts to mission readiness but are not designated as high priority based on DoD PIF's review criteria.

**Table 4-13. DoD Species Ranking and Occurrence on Fort Cavazos**

| Common Name | Scientific Name | DoD PIF Ranking | Occurrence on Fort C |
|---|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | Mission-sensitive | Year Round |
| Mountain Plover | *Charadrius montanus* | Mission-sensitive | Migration/Winter (Non-breeding)** |
| Burrowing Owl | *Athene cunicularia* | Mission-sensitive | Winter * |
| Golden-winged Warbler | *Vermivora chrysoptera* | Mission-sensitive | Migration** |
| Cerulean Warbler | *Setophaga cerulea* | Mission-sensitive | Migration** |
| Rusty Blackbird | *Euphagus carolinus* | Mission-sensitive | Migration/Winter (Non-breeding)** |
| Golden Eagle | *Aquila chrysaetos* | Tier 2 | ** |
| King Rail | *Rallus elegans* | Tier 2 | ** |
| Long-billed Curlew | *Numenius americanus* | Tier 2 | Migration* |
| Eastern Whip-poor-will | *Caprimulgus vociferus* | Tier 2 | Migration* |
| Red-headed Woodpecker | *Melanerpes erythrocephalus* | Tier 2 | Winter (Non-breeding)** |
| Loggerhead Shrike | *Lanius ludovicianus* | Tier 2 | Year Round |
| Prairie Warbler | *Setophaga discolor* | Tier 2 | Migration** |
| Wood Thrush | *Hylocichla mustelina* | Tier 2 | Migration** |
| Chestnut-collared Longspur | *Calcarius ornatus* | Tier 2 | Winter (Non-breeding) |
| Canada Warbler | *Cardellina canadensis* | Tier 2 | Migration** |
| Swallow-tailed Kite | *Elanoides forficatus* | Tier 2 | Migration** |
| Olive-sided Flycatcher | *Contopus cooperi* | Tier 2 | Migration* |
| Sprague's Pipit | *Anthus spragueii* | Tier 2 | Winter (Non-breeding) |
| Blue-winged Warbler | *Vermivora cyanoptera* | Tier 2 | Migration** |
| Kentucky Warbler | *Geothlypis Formosa* | Tier 2 | Migration** |
| Grasshopper Sparrow | *Ammodramus savannarum* | Tier 2 | Year Round |
| Black-billed Cuckoo | *Coccyzus erythropthalmus* | Tier 2 | Migration** |
| Prothonotary Warbler | *Protonotaria citrea* | Tier 2 | Migration/Summer |
| Greater Yellowlegs | *Tringa melanoleuca* | Tier 2 | Migration/Winter (Non-breeding) |

Legend: *Uncommon, **Rare (Reassessment: DoD PIF will collaborate with avian conservation communities to reevaluate mission sensitive status every 5 years utilizing most current data available.)

The NCRMB also manages all avian nests that are discovered in motor pools and on construction sites. A monthly Environmental Compliance Officer course is offered at Fort Cavazos during which Soldiers and contractors who are in attendance are briefed on the MBTA law, ethical management of avian nests, and proper reporting protocols. Detailed information pertaining to this topic is provided in the following section.

## *Program History*

The greatest risk of incidental take occurs during the migratory bird nesting season, which at Fort Cavazos is 15 March to 15 August (runs concurrently with endangered species nesting season).

Given the intense and dynamic training requirements and construction, and security activities at Fort Cavazos, and the need to occasionally conduct these activities during the nesting season, the installation has developed comprehensive BMPs to minimize impacts to migratory birds.

- **NEPA Requirements:** NEPA analyses are performed on a programmatic level to address the potential comprehensive and cumulative impacts associated with all Military Readiness and non-Military Readiness Activities on Fort Cavazos. These NEPA analyses are completed, and then coordinated with all stakeholders before a decision document is signed by the appropriate Army leadership. Additional tiered NEPA analyses is completed prior to project implementation, as necessary. The level of these analyses (e.g., Record of Environmental Consideration [REC], Environmental Assessment [EA], or Environmental Impact Statement [EIS]) is dependent on the scope of the effort and the potential for environmental impacts through implementation of the proposed action and alternatives. All environmental media is evaluated in the analysis, including migratory birds as well as threatened and endangered species.

- **Disturbance:** Birds and/or bird nests protected under the MBTA are not removed from building exteriors and interiors without coordinating with the NCRMB. Any nests found in inactive vehicles or equipment are assessed to determine if a depredation permit is required prior to disturbance. If the nest is determined to be active, a depredation permit is obtained from USFWS prior to any activities that could result in a take. When nests are found on a vehicle during a field mission readiness activity and no other viable alternative is available, the nest may be taken by NCRMB personnel. Nest stage (eggs vs. nestlings) determines whether the nest is destroyed or delivered to a licensed rehabilitator. Nests may be removed under military readiness activities as described in 50 CFR 21.42

- **Contracts:** All contracting documents associated with the training, construction, and security activities includes comprehensive BMPs and measures for protection of migratory bird populations for each project.

- **Briefings:** Prior to commencement of work activities, appropriate stakeholders (e.g., contractors and contract inspectors) working on a project site receive a NCRMB MBTA briefing. The brief discusses the MBTA, Federal agencies responsibility under the MBTA, Fort Cavazos's BMPs and methods of minimizing the effects of project implementation to migratory birds. The presentation includes color handouts for field referencing of examples and pictures of the different types of nests that are likely to be encountered and discusses behavioral clues that may indicate a nearby nest (e.g., flushing, scolding). This interactive discussion also includes the procedures to be taken in the event a nest is located. The briefing occurs prior to onset of each project implementation. A list of MBTA briefing attendees is provided to the contracting

officer or NCRMB office, as appropriate. Spot checks to ensure compliance occur during projects.

- **Funding:** Although subject to Federal funding cycles and congressional approvals, projects are scheduled to occur outside MBTA nesting season wherever feasible and practical.

- **Surveying:** Vegetation including trees, shrubs, and grassland areas in the entire project area are surveyed and assessed by qualified biologists with experience in surveying and locating bird nests. Primary surveying responsibility is with NCRMB MBTA biologists. Although NCRMB makes every effort to supply a MBTA biologist for every project, shortfalls may occur due to funding constraints. Non-availability of a NCRMB biologist does not preclude adherence to the MBTA. All organizations (military and civilian) and contractors conducting business on Fort Cavazos are required to abide by the terms and conditions of the MBTA.

  The surveying biologist's qualifications are reviewed and approved by NCRMB prior to approval of the biologist working on a project. The position is solely dedicated to migratory bird survey work and is not tasked to several positions on the project site or sites. If it is determined the biologist lacks appropriate experience or qualifications, the contract biologist is not allowed to make migratory bird/nest decisions on project sites.

  The systematic surveying occurs within 72 hours prior to commencement of work activities in the immediate project area. For large parcels, the biologist surveys the smaller parcels where the work will begin first and phases the surveying to immediately precede (within 72 hours) project disturbance. The biologists mark the nesting areas with flags at a safe distance to avoid the potential take of the birds. GPS coordinate data is taken at all nests locations. Prior to removing a tree or shrub, crews (staff or contractor) are also instructed to inspect the tree/shrub as thoroughly as possible to determine if a nest is present.

- **Identifying and Marking:**
  *Range and non-cantonment project sites:* A progressive distance-buffer system has been developed to minimize and/or eliminate potential impacts to nesting birds on Fort Cavazos, based on the affected species sensitivity to disturbance. Doves, mockingbirds, corvids, swallows, and hummingbirds should receive a 30-meter radius buffer surrounding active nests. Killdeer, nightjars, and ducks should receive a 100-meter radius buffer surrounding active nests. Hawks, kites, accipiters, owls, eagles, falcons and herons should receive a buffer between at least 200-meter radius and up to 800-meter radius surrounding active nests, dependent on species, location, and recommendation of Fort Cavazos biologists. Woodpeckers, and all other passerines should receive a 50-meter buffer radius surrounding active nests. If multiple nests are observed on a site, buffering will likely increase.

*Cantonment area project sites:* Cantonment projects vary substantially in scope, and disturbances to bird species (traffic noises, frequent human interaction, etc.) are common. Urban birds, therefore, are much less likely to abandon a nest due to nearby disturbances than birds in open range conditions. Buffering is determined based on project scope, duration, and species impacted. NCRMB biologists perform initial site evaluations to determine appropriate buffers. This initial site visit is conducted either 1) prior to MBTA nesting season (15 March) or 2) no fewer than 14 working days before the start of construction activities. If a qualified biologist is hired by the contractor, the biologist follows the buffering and management recommendations of the NCRMB biologist. Buffering distances start at the same level as range and non-cantonment project sites above, but may be reduced based on both the initial, and follow-up, site visits.

*Motor pools:* Motor pool actions are not considered a military readiness activity, as such active nests that occur within motor pools are not eligible for take authorization under the existing MOU with the USFWS. All active nests in motor pools must be reported to the NCRMB for species identification, nesting stage determination, and conservation management implementation. Buffering is determined on a case by case basis. Military readiness activities are described in 50 CFR 21.42.

- **Notification:** Project survey biologists notify all appropriate stakeholders (i.e., DPW NCRMB staff, all the active field crews, and DPTMS/Range staff) that the pre-project survey has been completed, and provide details on number, location, and species of nests found. All marked nests are treated as active, unless NCRMB staff determines a nest to be inactive. NCRMB informs stakeholders of nests that they determine to be inactive within one week of notification of nest location.

- **Tracking and Data Collection:** NCRMB maintains records on nest data and locations for the duration of the nesting season. All nests located during nesting season are tracked through GIS so that nesting habits, populations, and even species can be observed and monitored during the nesting season in which it is discovered, as well as tracked over time for better understanding of population trends. Fort Cavazos NCRMB staff has implemented a robust monitoring, data collection, and tracking system. Data collected from the MBTA program is managed with this established data management program.

- **Assessment and Determination:** The DPTMS/Range Project Manager assesses the vegetation conditions (e.g., type and density) and limitations (e.g., nest density and locations) and determines the best vegetation removal methods that pose the least risk to the surrounding environment. Product and methodology is reviewed through the Project Review Board and approved by NCRMB prior to implementation of the project.

- **Project Execution and Verification:** Once the assessment of conditions and determination is made, the Project Manager removes the targeted vegetation only. NCRMB staff confirms and verifies the evaluation, assessment, and project execution

process. Any project delays require Garrison Commander approval.

- **Burning:** DES-FES, DPW, and USFWS personnel are the only personnel currently allowed burning privileges on Fort Cavazos. No contractors can conduct prescribed burning. Should the Prescribed Burn program be transferred to another directorate, this organization will also be allowed burning privileges. Brush piles are monitored for avian species and other wildlife. If nests or dens are discovered in a brush pile, the brush pile is not burned until 1) the den or nest is able to be relocated or 2) the den or nest cycle is complete.

Unintentional take of migratory birds is avoided and/or minimized by following the above BMPs.

On October 4, 2021, the USFWS published a final rule redefining the scope of the MBTA to the destruction and relocation of migratory bird nests. The Service revoked its January 7 2021 MBTA ruling. The new ruling returned the MBTA to its original purpose and once again prohibits incidental take and applies enforcement discretion, in accordance with judicial precedent and agency practice prior to 2017 (50 C.F.R. § 10.12). For recurring projects, including, but not limited to, vegetation thinning and clearing projects, Fort Cavazos will continue to work outside of the migratory bird nesting season when feasible. In addition, NCRMB MBTA biologists will be available to check the area for active nests or contracted biologists will be required to apply for a permit. Collection of eggs or chicks in project areas must be immediately coordinated with, and reported to, NCRMB biologists. Those involved with recurring or large-scale projects may not collect eggs and chicks in lieu of obtaining proper permitting.

## *Current Condition*

Several hundred species of non-game birds protected by the MBTA use Fort Cavazos. A comprehensive list of birds known to occur on Fort Cavazos and their abundance is provided in **Appendix C1**. These species use the installation for breeding, overwintering, or migratory stopover.

## *Program Goals and Objectives*

The primary goals and objectives are to provide conservation efforts and management actions that lessen impacts and provide benefits to migratory birds. They improve existing habitat, create new habitat, enhance degraded habitat, and improve conditions for migratory birds. Fort Cavazos's goals and objectives for migratory birds are presented in **Table 4-14** and described below.

**Table 4-14. Goals and Objectives for Migratory Birds**

| Goals | Objectives |
|---|---|

| | |
|---|---|
| Protect and enhance the habitat and populations of migratory birds. | Establish baseline population data for monitored species.<br><br>Continue brown-headed cowbird control to minimize nest parasitism.<br><br>Control erosion to minimize damage to the landscape. Revegetate areas affected by excessive erosion with native species to improve soil stability.<br>Continue wetland, lake, and pond management. Monitor the presence and spread of oak wilt disease.<br>Continue the prescribed burning program. Construct and maintain fire breaks to minimize wildfire risk.<br><br>Increase habitat for ground-nesting grassland birds by maintaining areas of grassland habitat.<br><br>Identify and map important habitat and manage habitat when possible.<br><br>Work with local and national organizations to formulate conservation and management plans |

*Program Regions*
All Regions (refer to **Figure 2-4**).

### 4.8.1 Bald and Golden Eagle Protection Act Species

Bald eagles were previously listed as Federally-threatened but were delisted on 28 June 2007; however, they are still protected by the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA. The golden eagle (*Aquila chrysaetos*) is also protected under the BGEPA and the MBTA. The bald eagle is a Texas Threatened Species while the golden eagle is not listed in the State of Texas.

Among many provisions, the BGEPA prohibits take of eagles. "Take" is defined to include disturbing eagles to the extent that they are harmed; "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in its productivity by substantially interfering with normal breeding, feeding, or shelter behavior. The bald eagle has been recorded year-round on the installation near Belton Lake. The bald eagle nests in some areas of the Installation, as well as in along the Lampasas and Leon Rivers. Fort Cavazos may implement a Bald Eagle Restricted Aviation Zone (1 October – 31 March) which is intended to minimize disturbances from low-level helicopter flights. Flight restrictions are lifted when no bald eagles have been observed for a period of 2 weeks.

Golden eagles are rare migrants, and there are only two to three recorded sightings on the installation annually.

No goals and objectives for bald or golden eagles have been established at this time.

## 4.9 Fish and Wildlife

There are approximately 196,356 acres of land available for fish and wildlife management at Fort Cavazos. Several projects are ongoing and planned to maintain or improve fish and wildlife habitat. Although not intended primarily for their benefit, most of the planned elements being implemented for other purposes will benefit fish and wildlife.

Fort Cavazos's wildlife species include fish, mammals, herpetofauna, avifauna, and invertebrates [troglobitic (sub-surface) and surface] typical to central Texas. Some Fort Cavazos species are widespread in Texas and the southwestern/southeastern United States. Some species are endemic to the Edward's Plateau ecoregion, while others are endemic to the Cross Timbers and Prairies ecoregion. Such wildlife diversity is attributed to Fort Cavazos's location on the boundary between the two ecoregions. In turn, the ecoregions influence ecosystem diversity on Fort Cavazos where grasslands, wetlands, mature juniper-oak forests, deciduous forests, riparian forests, shrublands, and karst features provide food, water, cover, and shelter for various populations of wildlife. For a complete list of fish and wildlife species found on Fort Cavazos, refer to **Appendix C** of this document.

The fish and wildlife habitat management program at Fort Cavazos is targeted toward maintaining the ecological health of the installation to support the long-term viability of diverse wildlife populations, while maintaining mission readiness. This is accomplished through wildlife surveys, habitat delineation and inventory (forests, grasslands, shrublands), management/monitoring of habitat extent and diversity, protection of water resources, maintenance of databases and geospatial data, and appropriate representation during construction and stakeholder project planning. Where appropriate, certain ecosystems are restored via passive methods (e.g. natural succession) or active methods (e.g. wild pig management).

### 4.9.1 Recreation

Fort Cavazos supports one of the largest active-duty armored posts in the United States. The quality of life is enhanced by access to numerous recreation opportunities and services. The Garrison offers a wide variety of recreational opportunities accessed through both the DFMWR and the DPW Natural and Cultural Resources Management Branch (NCRMB).

Recreation program components of the DFMWR include the Sportsmen's Center and snack bar, a skeet, trap, and archery range, the Recreation Equipment Checkout (REC), and the West Fort Cavazos Travel Camp (WFHTC). The Sportsmen's Center also has a pro shop to support hunting and fishing equipment. Other recreational opportunities include recreating at BLORA, which offers opportunities for horseback riding, swimming, camping, fishing, mountain biking, etc.

The DPW Natural and Cultural Resources Management Branch (NCRMB) supervises, directs, and coordinates fish, wildlife and natural resources conservation activities on Fort Cavazos. They maintain and improve fish and wildlife habitat according to:

- The Integrated Natural Resources Management Plan (INRMP)
- Army Regulation (AR) 200-1 (Environmental Protection and Enhancement)
- Fort Cavazos (FC) Regulation (REG) 200-1 (Environment and Natural Resources)

- The Sikes Act

In 2023, the Hunting, Fishing, and General Recreation program for Fort Cavazos transitioned from HuntTrac to iSportsman and now resides under the NCRMB. The NCRMB manages the Fort Cavazos program and issues permits and vehicle range passes through iSportsman. All permit fees sold through iSportman are utilized to support administration, habitat improvement, fish and wildlife management, fish stockings, and other related expenses in accordance with the Sikes Act. All recreational users are responsible for the knowledge and understanding of:

- The Fort Cavazos Annual Hunting, Fishing and Natural Resource Use Guide
- Texas Hunting and Fishing Regulations in the Texas Parks & Wildlife Outdoor Annual
- Fort Cavazos Regulation 210-25 (Installation Hunting, Fishing, and Natural Resources Conservation)
- Fort Cavazos Circular 210- 22 (Hunting & Fishing Bag Limits and Seasons)

## *Program Data Management*

All persons, 9 years of age or older, desiring to conduct any recreational activity within the Fort Cavazos training areas must register in iSportsman. All recreational users must sign in daily using iSportsman before entering any area for recreational purposes and must sign out after departing the area. Recreation hours are 0400 to 2200. Instructions for use of the iSportsman system can be found in Fort Cavazos Annual Hunting, Fishing, and Natural Resource Guide. Individuals fishing in "No Check In/Out" fishing ponds and lakes are not required to check in or out, but must still possess valid state licenses, installation permits, and vehicle access passes. Persons using Fort Cavazos's facilities are responsible for knowledge and understading of the applicable statutes, regulations, and procedures for hunting safety, water safety, range entry, and proper conservation practices. Individuals must know and uderstamd the above regulations PRIOR to recreating on the installation.

Further information on regulations, area access, and permits can be found at: https://cavazos.iSportsman.net.

## *Program History*

The Outdoor Recreation Program provides basic recreation opportunities (e.g., hunting, recreation lodging, swimming, camping, boating, fishing, hiking) and occasional opportunities that meet more specialized interests. All recreational activities are coordinated with the NCRMB to ensure compliance with natural and cultural resource regulations.

## *Current Condition*

*Belton Lake Outdoor Recreation Area* – The BLORA is a 2,032-acre major recreational and leisure area that offers a wide variety of facilities and activities to military members and their eligible dependents, as well as the general public. Recreational activities available include RV camping, cottages, tent camping, swimming, boating, fishing, and sunbathing. BLORA is equipped with party pavilions, a paddleboat dock, a boat dock, a fishing marina, nature/hiking trails, horseback riding trails, mountain bike trails, waterslides, and a paintball course. Unit parties, family picnics,

and similar functions can be held there. Most BLORA facilities are open to the public. Only facilities that require contracts, including watercraft rentals, camping sites, pavilion sites, and cottage rentals, are restricted to authorized users only. There is a daily privately-owned vehicle gate fee to enter BLORA.

The BLORA has three nature/hiking trails, totaling approximately five miles in length. These trails are well marked with signs and have rest areas located at set intervals along the paths. The trails wind through the beautiful rolling terrain at BLORA. Deer, wild turkey, and other wildlife, including the endangered golden-cheeked warbler, are frequently seen.

Horseback and pony riding opportunities are available at BLORA Ranch, and riding lessons are available upon request. Facilities are subject to inspection by the post veterinary services to ensure proper care of the animals and clean stables.

The BLORA Trailblazers Mountain Biking Program was implemented in 1998 to promote mountain bike riding at Fort Cavazos. A trail system offers approximately 14 miles of riding trails and accommodates riders of all skill and endurance levels. Riding trails at BLORA are located and designed in close coordination with NCRMB to ensure that environmental concerns and sensitive areas are fully considered. A five-year study was conducted by NCRMB and USFWS to evaluate the potential impacts of recreational mountain biking on golden-cheeked warbler populations in the area (Pekins 2002). The study concluded that mountain biking at current intensity levels did not have an apparent adverse impact on the species.

The BLORA Paintball Program was implemented in May 2000 to provide a safe, controlled environment where participants can enjoy recreational paintball. Several playing fields have been designed and established to accommodate players of all skill levels.

*Sportsman's Center* – The Sportsmen's Center supports archery, recreational skeet and trap shooting. The facility is open to the public.

The Sportsmen's Center operates three skeet ranges, two trap ranges, and an archery range to promote shooting sports. These range facilities are open to the public.

*West Fort Cavazos Travel Camp* – The WFHTC provides 80 temporary RV camping sites, 3 large group picnic areas, and dry boat storage facilities for incoming and outgoing patrons. This facility is open year-round for authorized users.

*Recreation Equipment Checkout* – The REC facility provides a wide variety of outdoor recreational equipment to promote camping and outdoor activities. Recreational items available include tents, campers, utility and travel trailers, vans, recreational games, sports equipment, camping equipment, and more. This facility is for authorized users only and is open year-round.

## *Program Goals and Objectives*

Fort Cavazos's NCRMB provides oversight support to the outdoor recreational program by protecting and enhancing the natural resources on which these recreational activities rely.

NCRMB's primary goal for supporting recreational opportunities is to ensure that the natural resources maintain their ecological integrity and that the recreational pursuits do not adversely affect native species populations (**Table 4-15**).

**Table 4-15. Goals and Objectives for Recreation**

| Goals | Objectives |
|---|---|
| Provide quality consumptive and non-consumptive recreational opportunities while avoiding impacts on training and maintaining a balanced and diverse ecosystem. | Ensure through monitoring that recreational activities and designated recreational areas do not cause adverse impacts to sensitive species or habitats. |

### *Program Regions*

All Fort Cavazos property designated for recreational use. A map of the designated recreation areas is available on the iSportman website at https://cavazos.isportsman.net/

### *Monitoring*

Most of the monitoring done to support recreational opportunities is discussed under **Sections 4.9.2** (*Fisheries Management*) and **4.9.3** (*Game Management*). Fort Cavazos will continue to monitor recreational activities in BLORA to ensure that endangered species populations continue to remain unaffected.

## 4.9.2 Fisheries Management

Per AR 200-1, the fisheries management program on Army installations must provide for the management of fish populations and their habitats consistent with accepted scientific principles, in compliance with the ESA and other applicable laws and regulations. The program is to emphasize maintaining and restoring habitat favorable to the production of indigenous fish, particularly Federally listed species protected under the ESA. In addition, fisheries stocks are to be managed to conserve both game and non-game species.

### *Program Data Management*

Most ponds and lakes on the installation are considered free access to anglers if they go directly to and from the waterbody, and possess a valid Fort Cavazos fishing permit and and valid state fishing license. A list of these ponds and lakes can be obtained on the iSportman website. Funds generated by selling fishing permits are used to procure catfish (*Ictalurus punctatus*) to seasonally stock ponds and small lakes. All Fort Cavazos permits/cards are valid for one year from the date of purchase. If the person or guests plan to conduct any activity, the user must follow the check in/out procedures through the iSportsman website.

### *Program History*

Fishing opportunities abound in Belton Lake and the small lakes, stock ponds, streams, and rivers on the installation. Boating is allowed on Fort Cavazos lakes and ponds, but gasoline-powered motors are prohibited. This restriction does not apply to Belton Lake.

### *Current Condition*

Fort Cavazos has approximately 193 miles of named intermittent and perennial streams, as well

as numerous additional tributaries associated with these features. Fort Cavazos contains more than 222 water impoundments constituting approximately 584 surface-acres and shares 43 miles of shoreline with Lake Belton. A list of native fish species is provided in **Appendix C2**. Current fish habitat management includes, pond and lake renovation, shoreline improvement, aquatic weed management, and dam and spillway repair.

Fish are stocked seasonally (through the Put and Take Program) to provide quality fishing opportunities at some lakes and ponds. Stocking locations and quantities change annually as needed, and stocking details are updated on the iSportsman website. "Put and Take" refers to stocking (Put) legal size fish in installation waters that permitted fishers can immediately fish for and keep (Take) as a part of their creel. Largemouth bass (*Micropterus salmoides*) are occasionally stocked to maintain or establish balanced populations within a pond, particularly in newly built or renovated ponds. Supplemental stockings can be of any size, depending on the need identified, while new stockings are primarily fingerlings. Channel catfish are stocked annually in many of the installation ponds, and particularly in some of the more popular fishing ponds and lakes, to provide greater angler opportunities and to facilitate fish management by concentrating fishing pressure into specific areas. Forage fish, such as bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), and fathead minnows (*Pimephales promelas*), are stocked to supplement forage deficiencies in established ponds or to provide forage in newly constructed or renovated ponds. Stocking by anyone other than the NCRMB prohibited.

Habitat protection and the availability of suitable habitat are essential for productive fisheries and the successful management of the fisheries (USEPA 1993). The condition of the surrounding watershed plays a significant role in determining the quality of the water and the physical habitat. The implementation of watershed management practices improves and protects the quality of the water resource and therefore must be incorporated into the fisheries management program.

Fort Cavazos's approach to fisheries management places a high priority on habitat restoration aimed at creating ecosystems capable of producing self-sustainable populations of fish. Long-term increases in fishing quality at relatively low costs are achieved by implementing habitat improvement and protection measures. Costs for enhancing or rehabilitating fish stocks are controlled by implementing self-sustaining habitat and water quality protection measures.

## *Program Goals and Objectives*

The goal of fisheries management at Fort Cavazos is to provide quality recreational fishing opportunities while maintaining a balanced and diverse aquatic ecosystem. The best long-term approach, as well as the most efficient use of resources for achieving this goal, is to establish and maintain the biological integrity of the water bodies. The inability of water bodies to provide sustainable populations is often the result of habitat degradation, poor water quality, introduction of undesirable species, and overfishing. **Table 4-17** lists the goals and objectives for fisheries management.

**Table 4-17. Goals and Objectives for Fisheries Management**

| Goals | Objectives |
|---|---|
| Provide quality recreational fishing opportunities while maintaining a balanced and diverse aquatic ecosystem. | Evaluate current fisheries, develop a database to evaluate the future condition of fish populations, and enhance fishing opportunities on Fort Cavazos.<br><br>Continue to develop and expand recreational fishing opportunities. |
| Protect, restore, and enhance aquatic ecosystems to protect water quality and support an adequate fisheries resource. | Protect the biological integrity of streams.<br><br>Control/eradicate exotic and undesirable species in lakes and ponds. |
| Maintain, protect, and enhance riparian areas to protect water quality, aquatic habitat, and fisheries and to enhance native biodiversity. | Maintain riparian buffer zones along streams, lakes, and ponds. |
| Enhance fish habitat. | Where necessary, shoreline diversification, dam and spillway renovation, and riparian habitat management.<br><br>Monitor aquatic weeds and implement necessary controls. |
| Manage fish harvests to maintain fish populations within the capacity of available habitat. | Continue to obtain adequate data to support the development of sustainable fish harvests. |
| Continue the reduction of sheet, rill, and gully erosion to acceptable limits. | Evaluate and prioritize a list of active erosion sites. |
| Assess existing best management practices. | Continue to improve the program through research and implementation of new management practices. |

*Program Regions*

All Regions (refer to **Figure 2-4**).

*Monitoring*

Fish populations in installation ponds and lakes are monitored individually, and data indicate that there is considerable variation in game fish populations throughout the year. The monitoring methods used are consistent among water body types (e.g., lakes/ponds and streams) and from year to year. Such consistency allows the comparison of data between water bodies of a similar type, as well as the evaluation of temporal status and trends occurring for each water body. Management measures that produce the desired results will be continued for as long as they successfully meet their objectives.

### 4.9.3 Game Management

Several projects are ongoing and planned to maintain or improve wildlife habitat. Although not intended primarily for their benefit, most of the planned elements being installed for other purposes benefit wildlife.

Hunting and fishing are common outdoor recreational activities conducted at Fort Cavazos. Deer and turkey hunting are the most popular, however, quail, small game, duck, goose, dove, wild pig, and unprotected wildlife hunting are also available.

*Program Data Management*

Deer and turkey are the installation's primary game species. An annual deer census is conducted,

using spotlight and incidental survey techniques. The NCRMB collaborates with TPWD to establish a sustainable harvest quota based on the survey data. Harvest quotas for Rio Grande turkeys are also established by NCRMB. Seasons and bag limits for all game animals conform to State and Federal laws and regulations and in some cases are more restrictive. All harvested big game animals must be checked at the game check station. Deer and turkey harvest data are collected at the game check station and are forwarded to the TPWD.

Quail populations vary from year to year depending on numerous environmental factors. Overutilization of bobwhite food sources and escape cover by cattle, and fire ant predation play major roles in quail population dynamics. Depending on yearly weather conditions and predator population size, small game populations also experience large population fluctuations.

### *Program History*

A valid Fort Cavazos hunting permit and a valid state hunting license are required when hunting on Fort Cavazos. Fort Cavazos hunting permits are available for purchase on the iSportsman website. October is the typical archery season for deer and turkey. Firearms hunting occurs from November to early January. The spring turkey season typically lasts from early April to mid-May. All large game (deer and turkey) hunting is controlled by DPW Natural Resources.

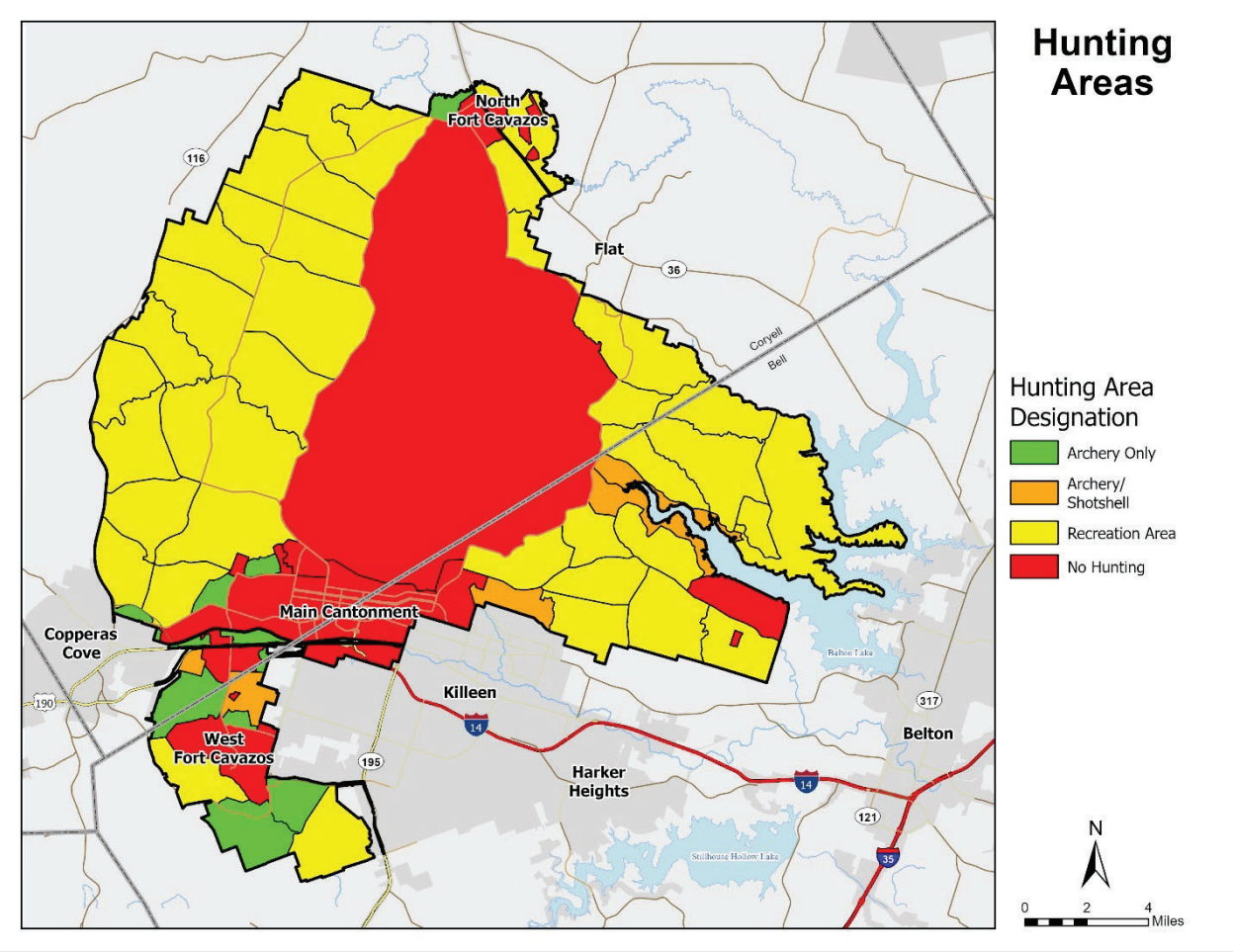
Live trapping is authorized on the installation, but participation has historically been low. Growth of this activity will depend on market pressures and user demands based on prices for common pelts. Only live traps are authorized, and the traps must be marked with the name and address of the trapper. Traps must be checked every 36 hours, and hunters/trappers of furbearing animals must possess a valid Texas Trappers License and a Fort Cavazos Hunting Permit. Trapping of wild pigs by the public is prohibited, and trapping of any kind in the cantonment areas is prohibited unless approved, in writing, by DES Game Wardens and NCRMB. Required information for trapping and the most recent guidance and regulations may be found in the Fort Cavazos Integrated Pest Management Plan (IPMP). Fort Cavazos's hunting areas and their restrictions (e.g., archery only) are provided in **Figure 4-7**.

Per Texas law, any hunter whose birth date is on or after 2 September 1971 must attend a hunter safety course, however since September 1, 1999 per AR 210-21, any person hunting on a military installation must have attended an approved State hunting education class regardless of date of birth.

The following installation regulations and instructions are related to the management of hunting and fishing programs on Fort Cavazos. They contain all information regarding hunting and fishing on the installation, including the types of weapons that can be used, information on guided and unguided hunting, and the type of game that can be hunted.

- III Corps and Fort Cavazos Regulation 210-25 establishes the policy for hunting, fishing, and natural resources conservation on the Fort Cavazos military reservation. Proof of completion of a state-sponsored hunter education safety course is required in accordance with AR 350-19. A Fort Cavazos fishing permit is required to fish on Fort Cavazos and a Fort Cavazos hunting permit is required to hunt.

**Figure 4-7. Hunting Areas**




- III Corps and Fort Cavazos Circular 210-22, the Installation's Hunting and Fishing Bag Limits and Seasons regulation, is issued each September and sets hunting and fishing bag limits, possession limits, size limitations, fishing and hunting seasons, and other restrictions for sport species at Fort Cavazos. It establishes equipment restrictions which comply with Federal and State regulations; in some instances, they are more restrictive than the Federal and State regulations.
- III Corps and Fort Cavazos Regulation 210-3, Installation's Recreational Use of Maneuver Training Areas regulation, covers access to and use of Fort Cavazos maneuver areas for recreational purposes. It establishes III Corps and Fort Cavazos policy, procedures, responsibilities, and user liability related to the recreational, non- military use of all Fort Cavazos maneuver training areas. All entry into numbered training areas for recreational purposes is controlled in iSportsman.
- III Corps and Fort Cavazos Regulation 200-1, Facilities Engineering Environment and Natural Resources regulation, prescribes policies, assigns responsibilities, and establishes procedures for protection of the environment, preservation of natural resources, and hazardous material/hazardous waste management.
- Fort Cavazos Annual Hunting, Fishing, and Natural Resource Guide is a guidebook for

hunters and anglers that contains basic information on hunting and fishing at Fort Cavazos and a list of prohibited activities.

All persons, 17 years of age or older, desiring to hunt within the Fort Cavazos training areas must register with iSportsman. Hunting permits are valid from 1 September to 31 August. All hunters must sign in daily using the online system before entering any area and must sign out after departing the area. Instructions for use of the online system are provided in the Fort Cavazos Annual Hunting, Fishing, and Natural Resource Guide.

Persons using Fort Cavazos's facilities are responsible for familiarity with the applicable statutes, regulations, and procedures for hunting safety, water safety, range entry, and proper conservation practices. Area clearances are not issued to anyone suspected of alcohol or drug consumption.

## *Current Condition*

The deer population has remained stable in some regions on the installation. Annual deer censuses and recommended annual harvest totals reflect a well-managed herd. Average deer harvest weight has continued to increase, and more mature bucks with quality racks are being harvested. The current doe-to-buck ratio is approximately 2:1. Close coordination is maintained with DPTMS Range Operations Branch in maximizing utilization of available training areas to support hunt program requirements.

NCRMB restricts the turkey harvest to only bearded birds and one less than the State permitted bag limit for the county to ensure that populations remain healthy. Turkey harvest numbers continue to remain about the same and reflect a stable population of birds. As new/better census techniques are developed for estimating turkey numbers, they will be utilized to more accurately assess the Fort Cavazos population.

Opportunities to hunt waterfowl on Fort Cavazos are numerous. There are many small lakes, stock ponds, and rivers that offer ducks a temporary refuge during their migratory flight south during the winter season and provide exceptional duck hunting opportunities. Ponds that were constructed to minimize erosion and collect runoff during heavy rains provide additional habitat for ducks. With approximately 175,000 acres for small game hunting at Fort Cavazos, there is great potential for continued growth of small game hunting for squirrel, rabbit, and doves.

## *Program Goals and Objectives*

The goals of the game management program (**Table 4-18**) are to sustain diverse, indigenous populations and their habitats using integrated ecosystem management principles while accommodating military training needs. Furthermore, wildlife resources and habitats for consumptive and non-consumptive uses are managed in compliance with Federal and State laws (Sikes Act, ESA, CWA, State laws), and U.S. Army regulations (e.g., AR 200-1) and guidance.

**Table 4-18. Goals and Objectives for Game Management**

| Goals | Objectives |
|---|---|

| | |
|---|---|
| Sustain game populations and habitats for consumptive and non-consumptive uses that are managed in compliance with Federal and State laws (Sikes Act, ESA, CWA, State laws) and U.S. Army regulations (e.g., AR 200-1) and guidance. | Improve and sustain habitat quality for game species, maintain quality of existing habitat, maintain existing habitat diversity, and ensure healthy wildlife populations in a manner consistent with land use.<br><br>Manage native vegetation to promote plant communities at different levels of succession. Ensure an appropriate mix of grasslands, forests, and shrublands occur at the landscape scale.<br><br>Maintain existing water availability and quality.<br><br>Enhance the value of ecosystems by eradicating exotic animal and plant species, promoting native plant communities, preventing the introduction of new exotic species, and restoring areas disturbed by training. |
| Develop a standardized, coordinated system for recording and mapping resource observations (e.g., plants, wildlife, erosion, damage). | Ensure that scientifically sound and commonly accepted data collection methods and sampling techniques are used to create and update wildlife inventories.<br><br>Evaluate and research factors influencing deer populations.<br><br>Continue RTLA monitoring as a component of ecosystem management. |
| Manage wildlife harvests to maintain game populations within the capacity of available habitat. | Continue to obtain adequate data to support the development of sustainable game harvests.<br><br>Continue to provide aerial support for wildlife surveys. |
| Continue environmental awareness and outreach programs. | Continue support and development of the Fort Cavazos Outdoor Recreation Program. |

*Program Regions*

All Regions (refer to **Figure 2-4**).

## 4.9.4 Non-Game Management

Fort Cavazos has many ecosystems which are managed and maintained to support military training in addition to the long-term survival, productivity, and biodiversity of invertebrates, fish, reptiles and amphibians, birds, mammals, and vegetation. Fort Cavazos's approach for non-game management is baseline surveys and ecosystem management which may include: maintain status quo, prevent excessive fragmentation, provide connecting corridors, prevent succession, restoration, and mitigate harmful land management/use. In some instances, specific management techniques may be employed to benefit a target species or guild, resulting in "umbrella" benefits and conservation for many taxa (e.g., maintaining intact riparian corridors or utilizing prescribed fire in grasslands and shrublands).

*Program Data Management*

Planning level surveys (installation – wide inventories to characterize essential components of the installation natural resources), inventory surveys, species-specific targeted surveys, and incidental observations/surveys are conducted for non-game and non-Federally/State listed wildlife in many ecosystems so that Fort Cavazos's baseline can be identified and better understood. With such data, the baseline can be monitored for changes across time, species presence or absence determined, and certain secretive species can be discovered, and more observations recorded (e.g., spotted skunks). It also allows for adaptive management and conservation techniques to be employed to detect and halt declines. Additionally, Fort Cavazos can demonstrate

responsible monitoring, conservation, and management, thus possibly reducing regulatory-driven, training restrictions.

*Monarch Management* – Every spring and fall, Fort Cavazos serves as a backdrop for the monarch butterfly migration. Fort Cavazos is in the southern core monarch conservation unit as defined by Monarch Joint Venture. The highest density of monarch detections occurs during fall migration, when monarchs return to their wintering grounds and funnel through the Texas central flyway. In the last decade, overall monarch populations have experienced a dramatic decline and have been designated an ESA candidate species as of December 2020.

To gain a deeper understanding of how monarchs use Fort Cavazos' natural resources during their fall migration, monarchs were captured and tagged in the fall of between 2017 and 2023. A total of 11,178 monarchs were captured and tagged using Monarch Watch tags. Each year thousands of monarchs are marked using adhesive tags provided by Monarch Watch, a nonprofit education, conservation, and research program based at the University of Kansas that focuses on the monarch butterfly, habitat, and fall migration. The purpose of tagging is to associate the location of capture with the point of recovery for each butterfly. The data from these recaptures are used to determine the pathways taken by migrating monarchs, the influence of weather on the migration, the survival rate of the monarchs, etc.

Additional data collected by Fort Cavazos is used to monitor overall health of monarchs migrating through the installation. Physical and behavioral measurement taken include body condition, wing length, weight, sex, and nectar source use. Comparing this data over the course of several years has provided valuable insight into species trends. Between 2017 and 2023, the peak migration period on Fort Cavazos occurs between early and late October. Of monarchs that were caught, 57% were male and 43% female. The most preferred nectar source was Liatris species (Table 4-19). An average of 75 monarchs were caught daily, however, there was a significant decrease in daily captures to 47 monarchs in 2022 and 31 monarchs in 2023. The decline may be due to severe drought conditions experienced by the region during this time and correlates with the decreased population estimates of overwintering monarchs in Mexico.

*Ophryocystis elektroscirrha* (OE) samples were also collected from 2017 through 2023. OE is an obligate, protozoan parasite that infects monarch and queen butterflies. In October of 2017, the first detection of OE on Fort Cavazos was documented. Of the 1,000 monarchs sampled, three percent were infected with the protozoan parasite. Subsequent years have revealed OE infection rates fluctuating between six and nine percent.

A partnership with Monarch Joint Venture, initiated in 2019, has resulted in research expansion to include spring migration data collection utilizing the protocols within Monarch Joint Venture's Integrated Monarch Monitoring Program (IMMP). Monarch Joint Venture has further developed an initiative within the DoD to connect other natural resource managers to incorporate the IMMP at installations within critical monarch flyways. If the monarch is listed as endangered, the DoD and Monarch Joint Venture are planning accordingly, sharing information to other installations, identifying habitat, and limiting training restrictions.

Data collected from this project has provided insight on preferred monarch nectar sources and what areas of the installation are utilized by monarchs during their fall migration. This information enables NCRMB to apply proactive conservation actions by better coordinating the maintenance and use of these sensitive areas during peak migration times.

*Monarch Habitat Restoration* – Through a partnership with Compatible Lands Foundation (CLF), NCRMB staff-initiated work on 120-acre grassland restoration project in 2017 (**Figure 4-8**). The CLF is a nonprofit organization whose mission is to promote the conservation, restoration, and preservation of land and natural resources and to foster compatible land uses among both public and private landowners. In 2017, CLF was awarded a grant through the Monarch Butterfly Conservation Fund, administered by the National Fish and Wildlife Foundation (NFWF). The funds were used to enhance monarch breeding and migratory habitat on or adjacent to four U.S. military bases. The project included the planting of native milkweed and nectar plants, and removed invasive species, to improve 325 acres of habitat across multiple installations. Fort Cavazos restored heavily encroached grasslands on the installation and conducting pre- and post-restoration pollinator activity surveys. The project's total cost with matching funds totaled over $600,000.

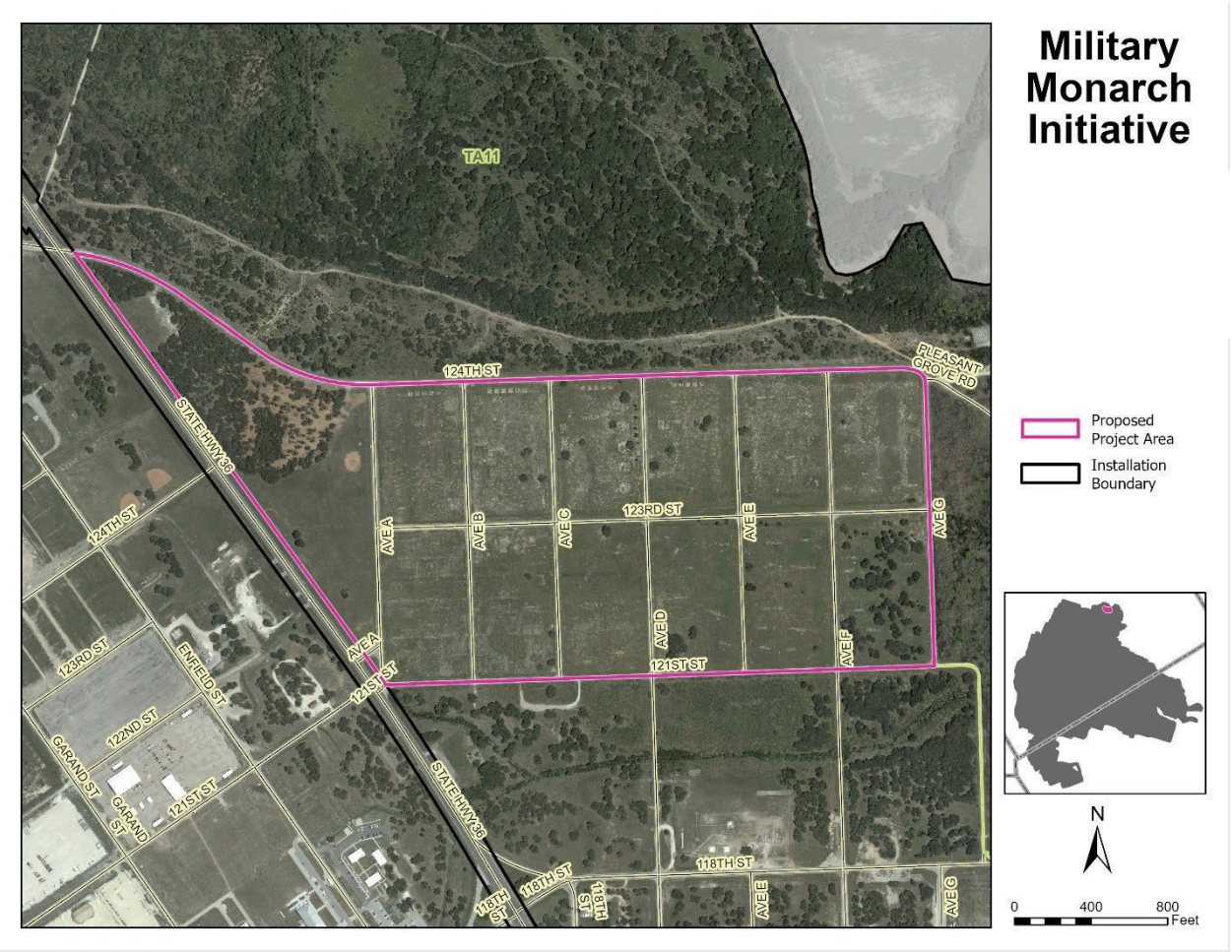
*Monarch Habitat Conservation* – Monarchs cannot survive without milkweed (*Asclepias* spp.). These plants play an important role throughout the monarch life cycle. Monarchs lay eggs on milkweed, monarch caterpillars almost exclusively eat milkweed, and adults use milkweed flowers as a nectar source. To provide all stakeholders with BMPs for milkweed populations on Fort Cavazos, data has been collected on species diversity, abundance, and flowering and seed dispersal times from 2016 and is ongoing.

In the spring and summer of 2016 and 2017, over 450 milkweed stem count surveys in grasslands were conducted. The 2017 field season yielded a more comprehensive data set. Seven species were detected with spider milkweed (*Asclepias asperula*) being the most abundant species as expected, totaling 51,264 stems. The second most common species being green milkweed (*Asclepias viridis*) totaling 12,960 stems During these counts, a milkweed species new to Coryell County was discovered: Narrow Leaf Milkweed (*Asclepias fascicularis*).

**Table 4-19. Monarch Butterfly Fall Migration Nectar Source Usage**

| Common Name | Scientific Name | Overall Percentage |
|---|---|---|
| Blazing Star | *Liatris spp.* | 49% |
| Curlytop Gumweed | *Grindelia nuda* | 18% |
| Frostweed | *Verbesina virginica* | 13% |
| Cowpen Daisy | *Verbesina enceliodies* | 5% |
| Fall Aster | *Symphyotrichum* | 5% |
| Plateau Goldeneye | *Viguiera dentata* | 5% |
| Maximilian Sunflower | *Helianthus maximiliani* | 2% |
| Other species | | 2% |

**Figure 4-8. Military Monarch Initiative NFC Restoration Area**




On the installation, large areas are cleared of vegetation for a variety of reasons, one of them being maintenance of ROWs. By working collaboratively with contractors and DPW Maintenance Division damage is minimized to nectar sources used by monarchs and other pollinators, especially during peak migration times. To mitigate the impact that vegetation clearing might have, NCRMB provides BMPs and works with contractors to ensure that disturbed areas are revegetated using eco-region specific pollinator friendly seed. Untimely mowing of sensitive areas during monarch migration will also be monitored.

## *Program History*

Because baseline knowledge of ecosystems and species/guilds present are required for land management and/or policy decisions, several surveys and inventories have been conducted on Fort Cavazos. These surveys and inventories varied in their effort and focus. However, the unifying concept for all is presence/absence and species' ecosystem/region assignment.

The first documented baseline survey occurred during 1978-1979. The following were inventoried during this survey: Plants, reptiles and amphibians, avian species, mammals, fish, aquatic macroinvertebrates, zooplankton, diatoms, and algae. Additionally, coarse-scale vegetation structure, water quality parameters, and species' ecosystem assignments were determined (Severinghaus *et al.* 1980).

In addition to these early studies, more recent works include:

**Invertebrates**

- Karst invertebrates (James Reddell and Charles Pekins unpublished report 1999-current)
- Mussels (Cowan and Krejca 2011; Virginia Sanders unpublished data 2012-current)
- Butterflies (summaries of annual butterfly counts pre-2010; Jackelyn Ferrer-Perez, Chelsea Blauvelt, Charlie Plimpton, unpublished data 2015-current)

**Fish**

- Stream fish (Johnson 1992 & 1994)
- Pond and stream fish (Kevin Cagle, Virginia Sanders, and Charles Pekins, 1995-current, observations during field work and pond and stream surveys)

**Reptiles and Amphibians**

- General survey (Johnson 1997)
- Unpublished incidental observations and recordings (Charles Pekins 2000-current)
- Texas horned lizard (Webb and Henke 2008)
- *Plethodon albagula* (Taylor *et al.* 2005; Charles Pekins unpublished surveys 2016-2017)

**Birds**

Biologists have used point counts to survey birds on the installation. Although the objective of each project was to determine the abundance of a single species, field workers also recorded detections of all species. For example, from 1995 to 1997, 25 points were surveyed several times each spring and summer for brown-headed cowbirds. From 1998 to 2005, 135 points were surveyed annually to determine the abundance of black-capped vireos. Seventy-six additional points were surveyed for this species in 1999 and 2001 to 2005. These surveys concentrated on the area of an extensive fire that occurred in 1996. The Institute for Bird Populations ran Monitoring Avian Productivity and Survivorship (MAPS) stations on Fort Cavazos from 1997 to 2011.

Avian grassland species were monitored using the point count method from 2008 to 2010 and again from 2016 to 2018. Over 240 points were monitored during these breeding seasons. In the wintering months the same areas are revisited using the Project Prairie Bird method.

**Mammals**

- Medium-sized mammals (Edwards *et al.* 1998; Carroll *et al.* 1999)
- Small mammals (Sperry and Weatherhead 2009; CERL, Champaign, IL 2017-current)
- Chiropteran mist-net and acoustic survey, 5-year study 2006-2010 (Pekins unpublished data)
- Medium-large sized mammals, 6-year camera trap grid 2011-2016 (Pekins unpublished data)

See **Appendix C** for non-game wildlife lists generated via surveys and inventories.

## *Current Condition*

There are many invertebrate taxa, especially aquatic and terrestrial insects and arthropods, with unknown presence/absence and ecosystem assignment status. Moreover, with the exception of karst invertebrates and pest species, no species list for these taxa exist. Similarly, except for White-Nose Syndrome studies in bat caves and oak wilt surveys, no surveys have been conducted for Fungi nor have any species lists been generated.

Baseline data regarding non-game wildlife and the ecosystems they occupy have been recorded for Fort Cavazos. Some of these taxa have continual, follow-on surveys (e.g., fish). However, others have not been re-examined for several years (e.g., reptiles and amphibians). Still others are currently undergoing survey (e.g., small mammals) or will soon need follow-on surveys (e.g., bats). Additionally, increased surveys may be needed to detect rare or difficult to detect species. Moreover, many of Fort Cavazos's ecosystems occupied by non-game wildlife undergo continual change. Some of the changes are natural, such as wildfire and floods, while others are anthropomorphic, such as: forest clearing/thinning, construction of tank trails, and intense military training. Such changes in ecosystems and habitats may result in wildlife population changes and/or habitat shifts. Therefore, continual and/or interval (every 5-10 years) surveys should be conducted for most non-game wildlife taxa, and ecosystem changes should be tracked and determined. It may be impossible to conduct interval surveys for some groups due to the population sizes, diversity, and expertise needed (e.g., insects and arthropods); however, baseline surveys should be conducted.

## *Program Goals and Objectives*

The goals and objective for non-game species management at Fort Cavazos are provided in **Table 4- 20**.

**Table 4-20. Goals and Objectives for Non-Game Management**

| Goals | Objectives |
|---|---|
| Continue to collect, add to, and update non-game baseline presence/absence data and assign ecosystem/habitat designation to surveys; re-survey for taxa that has not been examined in 10+ years. | Ensure that scientifically sound and commonly accepted data collection methods and sampling techniques are used to create and update inventories.<br><br>Partner with universities, research laboratories, (non-) Government agencies, consultants, etc. to conduct specialized research to better understand non-game wildlife distribution, density, behavior, life history.<br><br>Mammals<br>Continue to monitor and protect medium-large carnivore (fox, coyote, bobcat, and mountain lion) distribution and composition, and ensure supporting prey base and habitat are available.<br><br>Continue to use camera traps to document terrestrial mammal species presence, activity times, and distribution. Where appropriate, determine density.<br><br>Continue to trap, identify, and release non-volant small mammals. Investigate feasibility of utilizing baited camera traps. |

| Goals | Objectives |
|---|---|
| | Utilize acoustic detectors to re-survey bat distribution and identification.<br>Re-survey for eastern spotted skunks if the species continues to decline and/or if species is Federally-listed<br>Utilize camera traps to investigate medium-sized mammal use at karst features<br><br><u>Fish</u><br>Continue to survey creeks, rivers, and spring runs for fish. Continue to measure physical and water quality parameters.<br><br>Begin utilizing boats to survey fish in ponds and lakes and measure water quality parameters.<br><br>Establish permanent survey points in major creeks and rivers to bi-annually survey fish and measure water quality parameters<br><br><u>Invertebrates</u><br>Continue Monarch tagging program.<br><br><u>Reptiles and Amphibians</u><br>Re-survey, identify, and determine distribution at terrestrial and aquatic sample sites.<br><br><u>Birds</u><br>Continue surveys for mission-sensitive species.<br><br>Track changes over time to monitor populations trends. |
| Conduct baseline survey to collect presence/absence data and assign ecosystem/habitat designation to surveys for taxa that have not been examined | Survey, identify, and determine distribution of arthropod groups at terrestrial and aquatic sites.<br><br>Establish transects across the installation in native grassland habitats to survey for Texas Horned Lizard to determine presence, distribution, and abundance.<br><br>Survey for Northern Bobwhite Quail to determine distribution, population densities and habitat availability and quality.<br><br>Survey, identify, and determine distribution of fungi. |
| Conduct public outreach activities and assistance | Continue to educate the public about the benefits of carnivore communities to ecosystems.<br><br>Continue to work with Pest Management staff, contractors, and Family Housing staff to resolve and understand mammal/wildlife presence in urban areas and insure nuisance and non-native wildlife is removed and released or handled IAW proper procedures (IPMP).<br><br>Conduct public outreach and provide guidance to building occupants, cantonment residents, and Family Housing staff about safety around mammals and their occurrence in developed areas.<br><br>Continue educating civilians, Soldiers, contractors, and youth about the |

| Goals | Objectives |
|---|---|
| | MBTA and avian conservation by participating in events (Earth Fest, GIS day, Christmas Bird Count, etc.)<br><br>Continue providing personnel with MBTA training to enhance avian conservation during the breeding season. Training is conducted as requested and monthly during the Environmental Compliance Officer (ECO) course.<br><br>Continue enhancing natural resources native garden by partnering with the community during Make a Difference Day.<br><br>Increase public involvement and create internships with local universities to aid with Monarch tagging efforts and native garden/ grassland restoration projects. |

*Program Regions*

All Regions (refer to **Figure 2-4**).

*Monitoring*

Inventory and monitoring data is evaluated at regular intervals to ensure the continued successful management of non-game species at the ecosystem level. Management measures that do not produce the desired objective will be reevaluated to determine the corrective action needed to ensure success.

# 4.10 Vegetation

## 4.10.1 Flora and Habitat

There are four dominant vegetation communities at Fort Cavazos: Grasslands, Forests, Woodlands, and Shrubs (**Figure 4-9**). Grassland Communities are found throughout the installation. Wildfires and training activities, especially in the LTA/impact area and Western Maneuver Area, likely reduce the woody vegetation and allow grasses to dominate. The grasslands are composed primarily of perennial herbaceous species characteristic of mid-grass prairie. Common grasses include native species such as little bluestem (*Schizachyrium scoparium*), hairy grama (*Bouteloua hirsuta*), and sideoats grama (*Bouteloua curtipendula*) and the invasive King Ranch bluestem (*Bothriochloa ischaemum*). Common native forbs are broomweeds (*Amphiachyris* sp.), ragweed (*Ambrosia artemisiifolia*), and snow-on-the-prairie (*Euphorbia bicolor*). Remnant patches of tallgrass prairie vegetation are dominated by native yellow Indiangrass (*Sorghastrum nutans*) and big bluestem *(Andropogon gerardii*) (USACE 1999).

Forest, Woodland, and Shrub Communities are a major component of the installation. Most of these habitats are found on the slopes, canyons, mesas, rolling uplands, and on rolling lowlands and associated canyons; woodlands also occur along and adjacent to riparian zones. Three distinct Forest, Woodland, and Shrub Communities have been classified: Coniferous Forest and Shrub, Deciduous Forest and Shrub, and Mixed Forest and Shrub. Coniferous Forest and Shrub Communities are found throughout the installation and are primarily composed of Ashe

juniper (*Juniperus ashei*), the only coniferous species in the area.

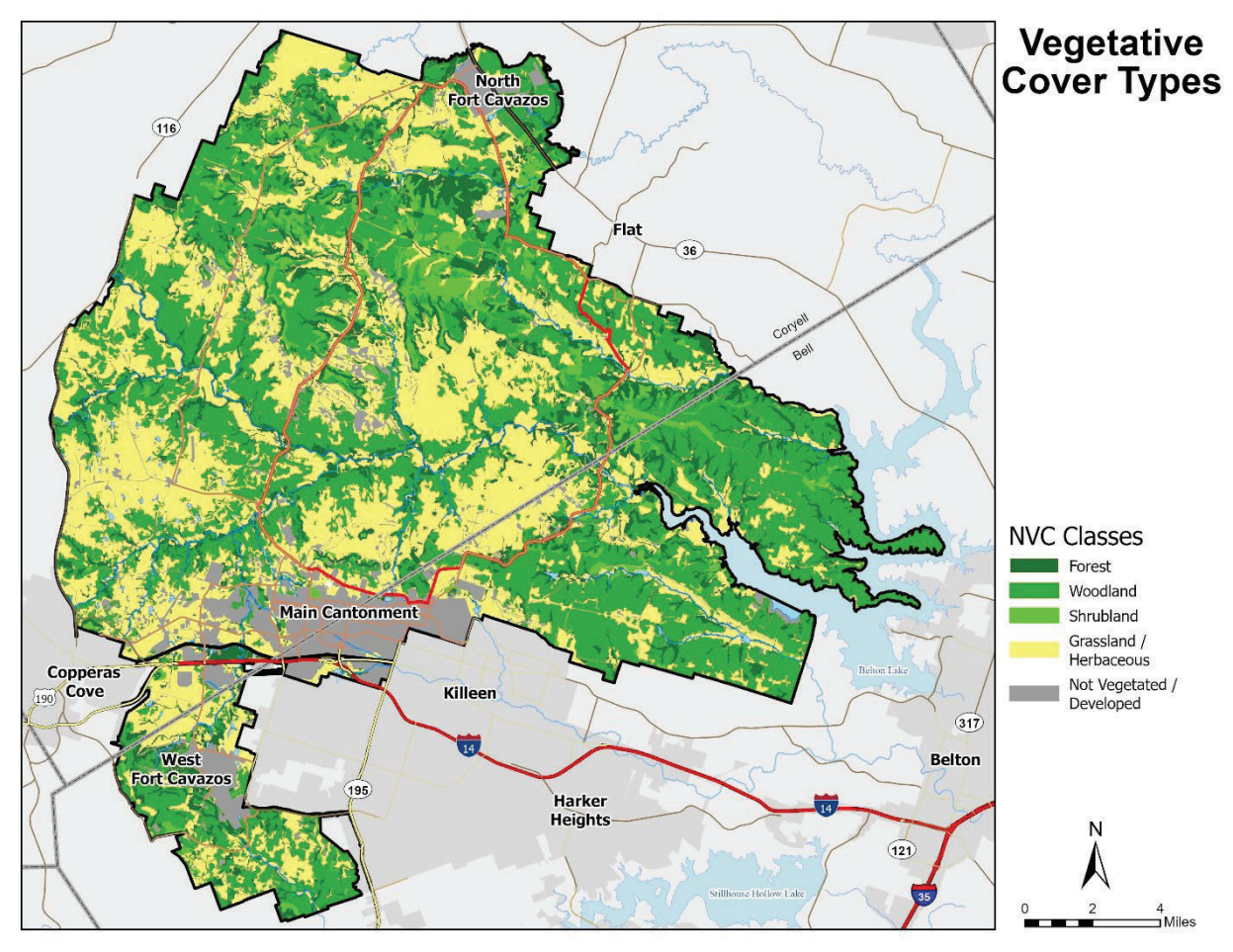
Deciduous Forest and Shrub Communities are composed of broad-leaf trees and shrubs and are found near streams in lowlands and on protected slopes. Tree species representative of this community include plateau live oak (*Quercus fusiformis*), post oak (*Quercus stellata*), pecan (*Carya illinoinensis*), and sycamore (*Platanus occidentalis*).

The most common vegetation community on the installation is the Mixed Forest and Shrub Community. In some areas Ashe juniper dominates over either plateau live oak or Texas oak (*Quercus buckleyi*), and in others the oaks dominate over the Ashe juniper (USACE 1999).

## *Program Data Management*

The NRCS conducted a vegetative resource inventory in 1997 to determine the ecological health of training lands and to recommend livestock carrying capacities for various vegetation communities on Ft. Cavazos (NRCS 1998). The findings of the vegetative resource inventory indicated that stocking rates were too high on most of the installation and that grazing and training deferments were necessary on all areas void of dense vegetative cover (USACE 2003). An additional finding of the inventory was that rest from military activities and grazing did not necessarily improve site condition. Areas having a lack of military activity and a lack of grazing for 20 years had similarity indices of approximately 25 percent, nearly identical to the indices of areas currently grazed by cattle and used for training. This provides evidence that in the absence of restoration, permanent deferment from military training and livestock grazing is not a solution for improving ecological health (USACE 2003).

**Figure 4-9. Vegetative Cover Types**




In 2001, the NRCS conducted an inventory in the Western Maneuver Area, the Eastern Training Area, and West Fort Cavazos to estimate soil erosion rates and determine rangeland health and trend. Sampling was conducted at permanent vegetation monitoring points that had been established for the data gathered in 1997. In the Western Maneuver Areas, both the short- and long-term rangeland trends were found to be declining on most of the sites. In the Eastern Training Area, approximately half of the sites showed downward trends (NRCS 2002). At West Fort Cavazos, most of the sites exhibited upward trends.

The primary conclusion of the 2001 rangeland health inventory was that declining rangeland health and trends on portions of the installation were the result of increased military training, continuous grazing of livestock without deferment, and the effects of multiyear droughts. The NRCS recommended that livestock and training deferments were needed in much of the Western Maneuver Area and portions of the Eastern Training Area to allow perennial vegetation to increase root biomass and recover (NRCS 2002).

In May 2002, the installation performed a vegetation resource inventory like the one conducted in 1997 (USACE 2003). The primary objective of this inventory was to determine the amount of grazeable forage on the installation and to document the species composition and recommend stocking rates (USACE 2003). Results of this inventory indicated that the amount

of perennial forage that could be grazed by cattle was low (< 750 lb/ac) relative to site potential in most of the ecological sites in the Eastern Training Area and in the southern portion of the Western Maneuver Area. In the Eastern Training area, sites that had moderate to high productivity (1,000 to 3,000 lb/ac) were generally dominated by King Ranch bluestem. In the NFC MU, Texas wintergrass (*Stipa leucotricha*) and Virginia wildrye (*Elymus virginicus*), both native cool season species, constituted approximately 60 percent of the grazeable forage, making this area a candidate for seasonal (winter) grazing. In the West Fort Cavazos MU, the amount of grazeable forage was generally greater than that of other MUs and the sites were dominated by little bluestem.

In 2004, Fort Cavazos carried out another vegetation survey to assess forage resources (Texas A&M 2004). The methods used were the same as those used in the 2002 inventory, and vegetation data was collected at 114 study points that had been previously established during the 2002 inventory. Several additional points were added in the LTA to collect additional data in areas underrepresented in the 2002 survey. The sampling technique identified plants within survey transects and categorized them according to forage suitability. These data were extrapolated to develop a prediction of the amount of consumable perennial vegetation in each of MUs. The amount of consumable perennial vegetation was then used to calculate recommended grazing levels in animal units per year under four different management options. Recommended installation-wide grazing levels (in animal units) for management options based on a 25 percent harvest efficiency were two to three times higher than management options based on a 750- or 1000-pound-per-acre or greater threshold for residue that considered only grazeable acreage within training areas. Training-related reductions in forage availability were factored into the results. The survey also found that the reduction in training and grazing in the Western Maneuver Area appeared to have resulted in increased biomass production and litter accumulation. Also, two good growing seasons in the previous two years had increased plant litter in all management areas.

## *Program History*

AR 200-1 requires that Army habitat management efforts be accomplished in a manner that conserves and enhances existing flora and fauna consistent with the Army's goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission. To meet this requirement, activities are directed toward the balanced maintenance of grassland, juniper-oak forest, deciduous forest, riparian forest, shrubland, and wetland ecosystems and restoration of ecosystems determined by NCRMB to be degraded.

The Woody Species Management (WSM) Program, performed through the ITAM Program, removes undesirable, high-density areas of Ashe juniper, mesquite, other hardwoods, and brush throughout the training lands. This allows for maneuvers to occur where it was difficult or impossible before and facilitates more desirable vegetation to grow. However, these actions have the potential to change forest composition, increase erosion, remove resources for wildlife, and remove cover for maneuver and dismount units. WSM also has benefits, such as reducing grassland encroachment and improving areas for black-capped vireo habitat.

Use of herbicides on training areas to control mesquite trees has become a common practice. Fort Cavazos has approved the basal application of Remedy Ultra on approved vegetation

management projects. The approved method includes cutting the trunk and spraying herbicide on the remaining stump. Foliar application is approved on regrowth/new sprouts less than 36 inches tall. Grubbing of vegetation may also be used. No other methods are approved, as foliar (on vegetation greater than 36 inches tall) and aerial methods are believed to allow more drift and affect other species and protected features on the installation. Products and methodology for all projects must be approved by the NCRMB prior to application.

## *Current Condition*

The land that makes up Fort Cavazos was purchased from the original landowners over a period of time. The former landowners have been allowed to graze the lands through outlease programs arranged first directly with the former owners and later through the CTCA. Since the inception of the original lease, grazing has been concurrent with military training activities on the installation (USACE 2003). Military training has led to disruption of the soil surface, as well as soil compaction, especially when the activities have occurred during wet periods. The lack of grazing deferral after soil disturbance has subsequently led to a decline in the abundance of perennial grass species and has promoted the invasion of short-lived annual plants that have less extensive root systems, thus making the soil less resistant to erosion (USACE 2003).

In addition, military activities in combination with livestock grazing have reduced the presence of the fire fuels required to carry range fires. Wildfires, which are a natural component of grasslands, were suppressed to prevent impacts on structures and to minimize the risk to human life. Lack of fire and overuse by livestock have been found to be primary factors leading to increases in Ashe juniper and other woody plants in the Edwards Plateau (Smeins et al. 1997).

Based on the 2008 vegetation map, as well as current field data (2013 and later) conducted by Fort Cavazos NRCMB personnel, and supporting NRCS documentation, Fort Cavazos is 15% forest, 33% woodland, 7% shrubland, and 34% grassland, leaving 11% not vegetated (see **Figure 4-9**). An annotated checklist of the vascular plants of Fort Cavazos is included in **Appendix C4**.

Since 2000, there have been questions as to whether forested lands are increasing across the installation. This debate has led to the abovementioned WSM Program. Global Forest Watch is a dynamic online forest monitoring tool that uses satellite imagery and other data to monitor both forest growth and loss. The site is a world-renowned resource, and has partners such as Google, ESRI, NASA, and many others. At Fort Cavazos, the program has allowed personnel to record forest growth and loss across the installation. As depicted in **Figure 4-10**, Fort Cavazos has lost substantially more forest than was gained. From 2000 to 2016, Fort Cavazos saw a net loss of 3,506 acres of forest cover (3,610 acres lost, 105 acres gained). Possible causes of loss include WSM, fire, juniper die- off, and flooding/droughts.

## *Program Goals and Objectives*

The primary goals of vegetation management at Fort Cavazos are to restore and maintain native plant communities (grassland, juniper-oak forest, deciduous forest, riparian forest, shrubland, and wetlands) using integrated ecosystem management principles while accommodating military training needs.

**Table 4-21. Goals and Objectives for Vegetation Management**

| Goals | Objectives |
|---|---|
| Restore and maintain native plant communities using integrated ecosystem management principles while accommodating military training needs. | Maintain a balance of vegetation communities so that they reflect configurations and types naturally found on the landscape. Use previous NCRMB studies to examine extent and configuration of existing communities so that training needs can be met while ensuring an appropriate representation of vegetation communities on the landscape. NCRMB will determine which ecosystems require restoration.<br><br>Use NCRMB Agronomist-approved seed mixes for stabilization of bare areas. Improve habitat quality for native species as determined by NCRMB. |
| Control damage to vegetation from overuse by cattle. | Manage cattle grazing on training lands.<br><br>Implement cattle grazing deferments on a rotational basis to allow re- vegetation of degraded training areas and riparian buffer zones, and to minimize future erosion.<br><br>Maintain grazing deferment for a time sufficient to allow re-vegetation of deep-rooted species and improve long-term sustainability of training lands. |
| Reduce damage to vegetation from training. | NCRMB Objectives<br>Continue to limit all excavation within 50 meters of riparian areas through the Dig Permit process.<br><br>ITAM Objectives<br>Monitor and evaluate plant responses to maneuver training.<br><br>Continue to improve and maintain 238 miles of maneuver access trails, thereby allowing military units access to training lands in a manner that reduces erosion and is less damaging to military equipment and to natural resources.<br><br>Harden HATs to enable safe access to hilltops and reduce soil erosion gullies. Use existing roads and openings to the maximum extent possible and use appropriate widths for existing trails (e.g., existing secondary two track trail should have improved secondary trail width).<br><br>Establish authorized and improved stream crossings so existing riparian corridors will be maintained, improved, and allowed to naturally re-establish and develop. These constructed crossings direct vehicular traffic to appropriate sites and deter the establishment of volunteer crossings, which cause significant damage to riparian areas.<br>Conduct annual survey to identify eroded areas on training lands.<br>Conduct annual vegetation surveys in training areas. |
| Establish and maintain perennial vegetation on critical and potentially eroding areas. | NCRMB Objectives<br>Continue to coordinate with universities and State, Federal, and non-governmental agencies on ongoing and new research projects to broaden informational database of perennial vegetation on Fort Cavazos.<br><br>ITAM Objectives<br>Attempt to restore training areas by seeding up to 500 acres annually with |

| Goals | Objectives |
|---|---|
| | native grass seed to cover bare ground and highly disturbed areas. |
| Work with universities, State agencies, Federal agencies, and non-governmental organizations to gather basic data on native and non- native plant communities. | Update existing floristic inventory document as additional plant species are found.<br><br>Maintain a GIS database to facilitate planning, implementation, and post-implementation evaluation of projects. |

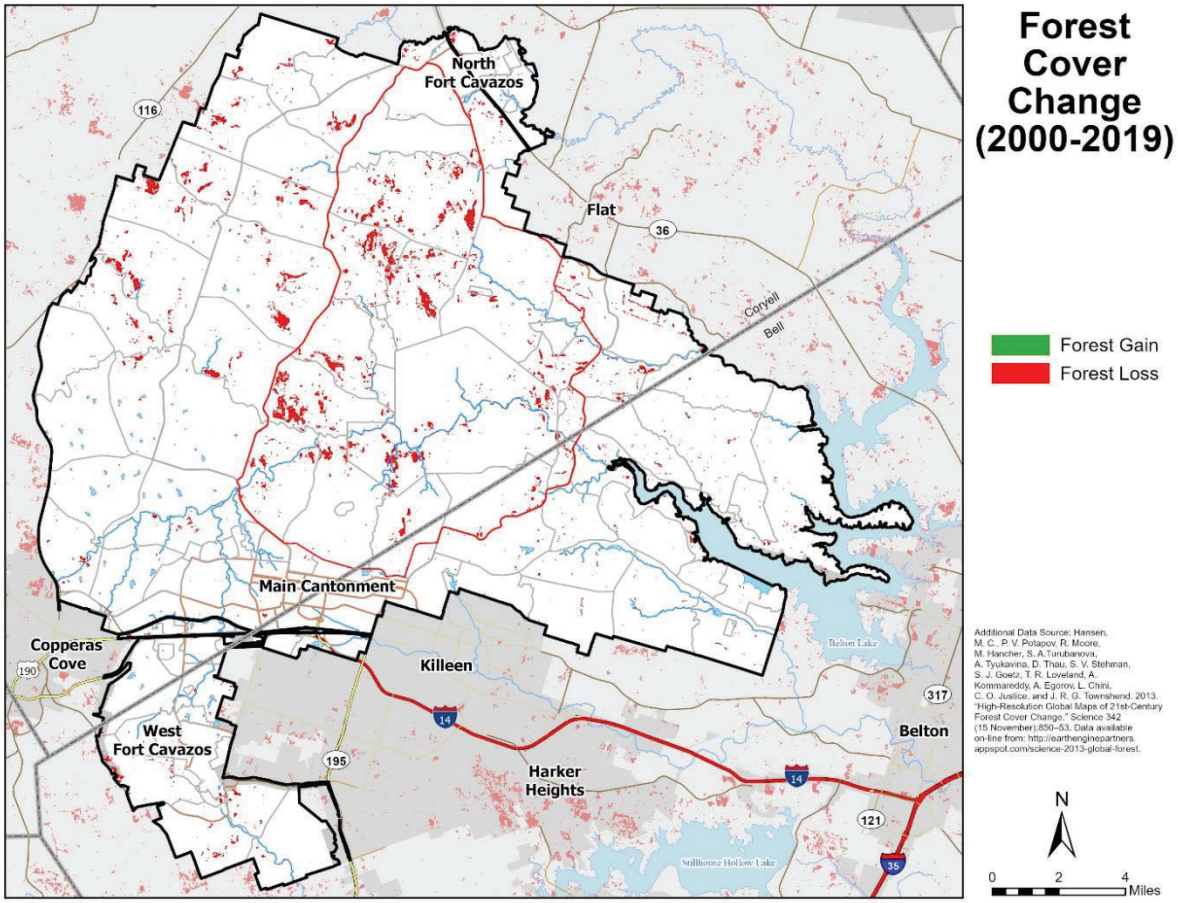
## *Program Regions*

All Regions (refer to **Figure 2-4**).

## *Monitoring*

The Grazing Management Plan currently under development should include monitoring measures for rangeland vegetation. The ITAM RTLA program will continue to monitor training land conditions.

**Figure 4-10. Forest Cover Change (2000-2019)**




## 4.10.2 Forest/Woodland

The Army forest management program is required to support and enhance the immediate and long-term military mission and to meet natural resources stewardship requirements set forth in AR 200-1. Army policy further stipulates that forest resources must be managed for multiple uses, using an ecosystem management approach to optimize the benefits to the installation's natural resources. Technical guidance indicates that installations should implement ecosystem management to support the military mission, while protecting endangered species and their habitat (FORSCOM 1997). Ecosystem management provides a framework for holistic management of the resource rather than focusing emphasis on a single aspect or activity such as commercial timber production or game species management. Fort Cavazos does not have a commercial timber harvest program.

### *Program Data Management*

The primary focus of forest/woodland management at Fort Cavazos is to protect and enhance forest/woodland composition and structure to support a healthy ecosystem, protect endangered species habitat, and improve wildlife habitat. The NCRMB geographer manages and maintains GIS data for the program to include vegetation mapping and vegetation

changes as a result of ITAM management projects. In addition, NCRMB maintains a database of prescribed burns which affect forest/woodland vegetation for the purposes of protection of golden-cheeked warbler habitat and maintenance of black-capped vireo habitat.

## *Program History*

Oak wilt, a disease caused by the fungus *Ceratocystis fagacearum*, has been identified in the past as a concern on Fort Cavazos. The fungus is systemic, inhibiting the ability of the vascular system to move water and nutrients upward resulting in wilting of leaves, and ultimately causing the death of the tree. Oak wilt surveys were conducted in 2007 and 2008 on approximately 2,826 acres in Training Area 32, the BLORA, and Training Area 115. A total of 323 oaks were identified as definitely having oak wilt, 94 of which were Texas red oaks and 229 were Plateau live oaks. An additional 214 trees were identified as possibly having oak wilt. There are currently no active oak wilt treatment projects occurring on Fort Cavazos. Further oak wilt projects will occur as conditions dictate, as determined by NCRMB staff.

In 1997, Fort Cavazos's ITAM program implemented a Woody Species Management (WSM) program to support heavy maneuver training. In 2009, WSM was expanded to include a dismount thinning plan. In 2017, WSM now consists of thinning and removing Ashe juniper, mesquite, and selected hardwoods and dead vegetation. WSM opens the area to heavy and infantry maneuvers. Areas should be reseeded with a native seed mix, where determined appropriate by NCRMB, and when approved by NCRMB. Work is normally done through the Training Restricted Area Program (TRAP).

## *Current Condition*

To determine if a sustainable forestry program could be established at Fort Cavazos, the USACE, Fort Worth District, conducted a market feasibility study in 2016 that addressed existing forest products currently found on the training areas. This included stockpiled mulch, tree trimmings, and wood products. The study concluded that there is no realized potential for a financially sustainable forestry program at Fort Cavazos. The research indicated there are two main forestry resources available at Fort Cavazos to include Ashe juniper trees used to produce juniper oil and fence post/staves, as well as a stockpile of juniper/hardwood mulch. However, the current economic environment coupled with local market restrictions creates a situation in which competition among prospective buyers is difficult to achieve (USACE 2016).

It is unlikely that oak wilt disease will ever be eliminated from the ecosystem. Painting of wounds is a method recommended in urban landscapes to prevent insect infestation; however, this is not a practical treatment in the training areas. Another practice is trenching, which involves digging a 4 to 5 feet deep trench about 100 feet outside of infected areas. The objective of trenching is to sever the root masses; therefore, the trench can be immediately refilled. This practice controls the spread of wilt to healthy trees but is only a temporary solution and often proves extremely costly. Because of the size of the training lands, implementing this management approach on a large scale is expensive and impractical.

Although WSM concentrates on creating open spaces at the expense of forest land, it is important to note that Fort Cavazos must be committed to maintaining the diversity of all plant communities (e.g., forests, grasslands, shrublands) to maintain a sustainable ecosystem.

The NCRMB has conducted studies that identify the boundaries of forest land, and where forests should be maintained. Coordination between NCRMB staff and ITAM staff should remain open so that vegetation clearing activities meet both NCRMB and ITAM goals. Examples include clearing juniper from post oak forests rather than red oak forests, and mulching shrubland back to early stages rather than clearing mature forests.

An oak recruitment study on the installation concluded that piling and burning slash was more effective at promoting oak recruitment than the practice of mulching slash. The ITAM program switched from mulching to piling slash in 2019.

All construction, training land enhancement, and maintenance projects have no disturbance vegetation buffers in the riparian corridors. This functions to both stabilize stream banks and improve water quality and to discourage off road vehicle traffic from driving off precarious and potentially dangerous drops into streams. These buffers begin in the stream center, and extend laterally towards the banks and into the riparian vegetation in each direction. For example, a 50 m buffer will extend 50 m in two opposing directions from the stream centerline, covering a total of 100 m from buffer edge across the stream to the other buffer edge. Perennial streams must have a minimum 50 m wide buffer (100 m total width), intermittent streams a 25 m wide buffer (50 m total width), and ephemeral streams a 15 m wide buffer (30 m total width).

## *Program Goals and Objectives*

The goal and objective for forest/woodland management at Fort Cavazos are provided in **Table 4-22**.

**Table 4-22. Goals and Objectives for Forest/Woodland Management**

| Goals | Objectives |
|---|---|
| Protect and enhance forest/woodland composition and structure to support a health ecosystem, protect endangered species habitat, and improve wildlife habitat. | Implement a monitoring program to determine large-scale changes. Initiate control measures where and when necessary as determined by NCRMB staff. |
| Maintain intact riparian stream bank woody vegetation | Stabilize stream banks, protect streams from nonpoint source pollutants, improving the water quality and channels water movement. |
| Promote continued oak recruitment and diverse forest species. | Wild pig control, fire management and vegetation management should promote healthy and diverse forests and ecoystems. |

## *Program Regions*

All Regions (refer to **Figure 2-4**).

*Monitoring*

Any future control measures implemented to control oak wilt will be monitored to evaluate their effectiveness in minimizing the impacts on surrounding trees, as well as the cost-effectiveness of implementing these measures installation-wide. Efforts will be to monitor locations of currently known oak wilt centers and identification of new oak wilt centers on a large scale.

### 4.10.3 Wildland Fire

Wildfire prevention and suppression is a matter of concern for military training and natural resources management at Fort Cavazos. Wildfires have several undesirable aspects: they interfere with ongoing training activities, they can make training areas unsuitable for training over the short term, and they have direct and indirect impacts on habitats and species. Past wildfires have caused substantial damage to the habitat of the golden-cheeked warbler, as well as damage to training facilities. From an ecological standpoint, there are positive aspects to wildfires provided the fuel loads are not excessive, such as returning nutrients to the soil, releasing the seeds of fire-dependent plant species, increasing diversity, and causing an overall revitalization of habitat. Prior to European settlement, wildfires were common in this region and helped to maintain the ecological balance between grasslands and forest and shrub communities. Prescribed fire can be a useful tool for maintaining healthy vegetation communities, and it also benefits birds of early successional habitats such as the black-capped vireo.

For many years, Army guidance has focused strictly on the suppression of wildfires. Wildfire prevention and suppression involve minimizing fire occurrence by educating personnel and residents of Fort Cavazos on fire prevention techniques, reducing natural fire fuels, restricting the types of ammunition and pyrotechnics that can be used based on the level of fire danger, being well prepared for fires, and, when necessary, rapidly suppressing and containing the spread of wildfires that do occur.

*Program Data Management*

Fort Cavazos has an approved Integrated Wildland Fire Management Plan. In addition, NCRMB maintains a database of prescribed burns which affect forest/woodland vegetation for the purposes of protection of golden-cheeked warbler habitat and maintenance of black-capped vireo habitat.

*Program History*

Prescribed burns have been used as a land management tool on Fort Cavazos since the 1970's. Over the past nine years, National Wildfire Coordinating Group (NWCG) certified staff members have assisted the NCRMB in conducting from 7,500 to 37,000 hectares of prescribed burns per year. The Fort Cavazos prescribed burning program was implemented to help accomplish several objectives. Prescribed burns are used to reduce fuel loads that would otherwise create a potential for wildfires that might destroy golden-cheeked warbler habitat. Such wildfires also create a significant risk for loss of training time for the Army because affected military ranges are placed in cease-fire status. In 2006, ranges had to be shut down for a total of nearly 2,800 hours solely due to wildfires. Other objectives of the prescribed burning program are the

management of black-capped vireo habitat, prevention of Ashe juniper encroachment into grasslands, and the maintenance of post oak woodlands' open character. All karst features are protected and excluded from prescribed burns.

Prescribed fires were originally planned and led by NCRMB staff and conducted with the assistance of contracted personnel and equipment. In addition, DES-FES assisted during the fire season to stand by with additional equipment in case of escapes and to help with mop-up.

## *Current Condition*

Prescribed burning is an appropriate management tool that is used year-round at Fort Cavazos in grasslands (when weather and fuel conditions allow) to keep natural succession in early-seral stages, burn dead debris, increase herbage yields, increase the availability of forage, and improve wildlife habitat. Prescribed burning is also used to manipulate habitat for the black-capped vireo, improve open space for military training, and reduce fuel loads to prevent wildfires.

Prescribed burning is overseen by DES-FES. NCRMB sets burning objectives and plans. Prescribed burning is conducted by qualified personnel from both NCRMB and the USFWS. The number of acres treated each season depends on weather conditions and the availability of areas not occupied for training. Areas are treated based on desired fire return residuals, which vary based on vegetation community types and management objectives. Areas overgrazed by cattle and heavily used for training require a longer cycle because of the reduced fuel load necessary to achieve positive results.

Most wildfires begin in the LTA. Uncontrolled wildfires are not only potentially detrimental to natural resources and to military training, but they can also threaten areas outside the installation if they cross the boundary. Wildfires occurring during dry periods seriously damage herbaceous plant species and can have a major negative impact on mammals, reptiles, and avian species.

Fort Cavazos uses a fire danger rating system to alert trainers when pyrotechnic operation should be limited or halted. The system is based on current (daily) weather and the estimated moisture content of vegetation and soil. Details of this rating system can be found in OPLAN 8-93, "Operation Brush Fire" and Fort Cavazos Regulation 350-40. The fire ratings are as follows:

- Condition Green – No restrictions on training. Troops may use pyrotechnics and incendiary munitions for training.
- Condition Amber – Caution must be taken in the use of pyrotechnics. Aerial flares are not to be used outside the impact area. Other pyrotechnics are to be used only in roadways, on tank trails, in areas clear of vegetation, or in containers.
- Condition Red – No pyrotechnics or incendiary munitions are authorized for training purposes.
- Condition Red with Waiver – Once a risk assessment is conducted by Range Operations Branch and the recommendation for training with waiver is approved by the Director, Range Operations Branch, specific restrictions are imposed on

training units.

Under all fire condition ratings, fires are reported to Range Operations Branch by military units or installation personnel. If the fires are within range fans where live-fire training is being conducted, units must cease firing until a fire risk assessment is conducted or control measures are implemented. Range Operations Branch determines the location of the fire and risk to facilities, personnel, or sensitive resources such as endangered species habitat. If Range Operations Branch determines there is no risk to facilities or habitats, the fire is allowed to burn. Typical examples are fires occurring in the permanently dudded impact area 94, where fires are extremely frequent and fuel loads are low.

As part of the ESMC, Fort Cavazos established a "let burn" policy for range fires that occur during periods when Fire Danger Rating is Green or Amber. Under Green and Amber ratings, fires will be allowed to burn in all habitat areas within the LTA unless there is obvious threat to personnel or facilities or until changing environmental conditions warrant implementing increased fire control procedures. The purpose of this modification is to reduce interruption of ongoing live-fire training exercises.

Under this modified procedure, Fort Cavazos will emphasize the use of annual preventive prescribed fire to maintain buffers near habitat areas in the LTA to enhance training capabilities. Fort Cavazos will employ firebreaks in association with endangered species habitat to reduce fire risk.

Prescribed fire was applied to 76,968 acres between November 1, 2017 and March 20, 2022. Prescribed fire in support of golden-cheeked warbler management is primarily for hazard reduction, hardwood recruitment, juniper reduction and is usually conducted in areas adjacent to or near habitat.

All prescribed burning occurring during the MBTA nesting season will be reviewed by the NCRMB and will be approved on a case-by-case basis. Brush pile burning during or mulching during the MBTA season will require nests checks.

## *Program Goals and Objectives*

DES-FES and NCRMB staff plan to increase prescribed burning to improve the ecological condition of the training areas. The goals and objectives (**Table 4-23**) reflect a let-burn policy designed to reduce fuel loads and minimize interruptions of live-fire training exercises, while preserving endangered species habitat and protecting human health and facilities on and off the installation.

**Table 4-23. Goals and Objectives for Wildland Fire Management**

| Goals | Objectives |
|---|---|
| Protect human life and prevent damage to land and natural resources caused by fire. | Continue the let-burn policy to minimize fuel loads; however, prevent unacceptable damage to natural resources and interference with training, and protect health and safety of personnel.<br><br>Purchase fire suppression equipment and train personnel, on an as-needed basis.<br><br>Support DES-FES in suppressing wildfires as the mission requires. |
| Maintain firebreaks and construct new ones as needed to contain fires originating in the LTA and reduce the risk of fire damage to critical facilities, training activities, and endangered species habitat. | Construct and maintain firebreaks inside of and adjacent to endangered species habitat as required by the ESMC.<br><br>DPW Maintenance/DPTMS Objectives<br>Maintain the road network in the LTA to provide some fire containment function.<br><br>Maintain a 25-foot-wide bladed earth firebreak around the Fort Cavazos boundary, within constraints of erosion control BMP's.<br><br>Minimize erosion on firebreaks.<br><br>Maintain a firebreak around critical facilities such as fuel storage areas by controlling the vegetation by mechanical means and herbicides where necessary. |
| Implement prescribed burning activities to control shrubs and trees, increase availability of forage and improve wildlife habitat, manipulate habitat for the delisted black-capped vireo, improve open space for military training, and reduce fuel loads to reduce the risk of wildfire. | Conduct prescribed burning year-round, as conditions allow, to minimize potential harm to endangered species habitat from training-related fires. The number of acres burned each season will depend on weather conditions and training schedules.<br><br>Conduct fires in black-capped vireo habitat to maintain patchy habitat structure and to limit the encroachment of juniper and other large trees.<br><br>Investigate the use of prescribed fires in ecotone boundaries to protect golden-cheeked warbler habitat from catastrophic fires.<br><br>Conduct prescribed fires (as training schedules and weather conditions allow) to treat grasslands, depending on conditions, burning approximately one fifth of appropriate grasslands on the installation per year. Burning the grasslands will limit woody encroachment on endangered species habitat.<br><br>Train personnel with S-130 and S-190 basic fire suppression classes, as well as intermediate and advanced fire-fighting techniques as necessary.<br><br>All personnel serving on the prescribed fire crew must maintain fitness conditions appropriate to their assigned roles, up to and including Red Card certification, and be tested at least annually. |

| Goals | Objectives |
|---|---|
| Maintain strategically located installation ponds and create new ones as water sources to support aerial firefighting. | Remove vegetation from dam structures to ensure integrity and provide clear flight path for aircraft. |
| Document wildland fire occurrences. | Map prescribed fires and wildfires promptly using aerial and ground survey methods.<br><br>Analyze historical occurrences to optimize prescribed fire planning and operations.<br><br>Continue using the GIS-based prescribed fire prioritization model to aid in prescribed fire planning. |

### *Program Regions*

All Regions (refer to **Figure 2-4**).

### *Monitoring*

To minimize the potential impacts of fires on endangered species habitat, and in accordance with provisions listed in the 2020 BO, Fort Cavazos will assess the effects of fire on endangered species habitat and will report habitat loss due to wildfire to the USFWS. Fort Cavazos will also implement minimization measures as outlined in the 2020 BO which will reduce the potential incidence and effect of wildfires to Federally-listed species and their habitat.

## 4.10.4 Grounds Maintenance and Landscaping

Grounds maintenance and landscaping includes considerations for weed control and urban forestry. It is Army policy that environmentally and economically beneficial landscaping practices be used. These practices are outlined in a Presidential Memorandum dated 26 April 1994. The Presidential Memorandum directs Federal agencies to use landscaping techniques that enhance the local environment and minimize the adverse effects on the environment. The Presidential Memorandum stresses use of regionally native plants and practices that conserve water and prevent pollution. Integrated measures include reducing the use of fertilizers, pesticides, and water use for both economic and environmental benefits.

### *Program Data Management*

Grounds Maintenance is the responsibility of several entities at Fort Cavazos. DPW – Engineering is responsible for overall landscape planning and development. DPW – Maintenance (Roads & Grounds) is responsible for general grounds improvement and landscaping maintenance. Grounds maintenance services are normally contracted to a commercial enterprise that provides services such as mowing, trimming, edging, irrigation, weed removal, and fertilization. The primarily role of the ENV is to provide technical advice when requested.

## *Program History*

Fort Cavazos issued a Memorandum of Instruction (MOI) in June 2012 titled "Landscaping on Fort Cavazos" which established procedures which would allow areas to be landscaped with vegetation native to the Fort Cavazos region. In addition, Fort Cavazos also has a Tree Care Ordinance which established a Tree Board (see next section for more information). Copies of these documents are included in **Appendix B4** and **B5**.

## *Current Condition*

As of January 2018, there were approximately 4,274 acres of maintained lands (*i.e.* mowed, landscaped) and that acreage will increase as construction continues and natural areas are converted into buildings, parking lots, yards, etc.

Natural vegetation is retained whenever possible and incorporated into landscaping designs. When landscaping or re-vegetation is required, native vegetation should always be selected if possible. These are plants already adapted to the area and should require the least amount of maintenance. Fort Cavazos's MOI "Landscaping on Fort Cavazos" includes a complete list of plants that can be used. Those identified as native species are included in **Table 4-24**. Any species not listed in **Table 4-24** must be approved by the Fort Cavazos Agronomist prior to planting.

**Table 4-24. Native Plant List for Landscaping on Fort Cavazos**

| Common Name | Scientific Name |
|---|---|
| **Large Trees** | |
| anacua | *Ehretia anacua* |
| bald cypress | *Taxodium distichum* |
| big-tooth maple | *Acer grandidentatum* |
| black walnut | *Juglans nigra* |
| bur oak | *Quercus macrocarpa* |
| cedar elm | *Ulmus crassifolia* |
| Chinquapin oak | *Quercus muehlenbergii* |
| escarpment black cherry | *Prunus serotine var. eximia* |
| lacey oak | *Quercus laceyi* |
| Monterrey oak | *Quercus polymorpha* |
| pecan | *Carya illinoenensis* |
| plateau live oak | *Quercus fusiform* |
| Shumard oak | *Quercus shumardii* |
| Texas red oak | *Quercus buckleyi* |
| Texas white ash | *Fraxinus texensis* |
| **Small Trees** | |
| Anacacho orchid tree | *Bauhinia lunaroides* |
| Blanco crabapple | *Pyrus ioensis var. texana* |
| Carolina buckthorn | *Rhamnus caroliniana* |
| Desert willow | *Chilopsis linearis* |
| Eve's necklace | *Styphnolobium affine* |
| little walnut | *Juglans microcarpa* |
| Mexican plum | *Prunus Mexicana* |
| Prairie flame-leaf sumac | *Rhus lanceolate* |
| rusty blackhaw viburnum | *Viburnum rufidulum* |
| Smoketree | *Cotinus obovatus* |

| Common Name | Scientific Name |
|---|---|
| Texas persimmon | *Diospyrus texana* |
| Texas redbud | *Cercis canadensis var. texensis* |
| **Tall Shrubs** | |
| Bee-brush | *Aloysia gratissima* |
| Cenizo | *Leucophyllum frutescens* |
| deciduous holly | *Ilex decidua* |
| dwarf wax myrtle | *Myrica pusilla* |
| evergreen sumac | *Rhus virens* |
| goldenball leadtree | *Leucaena retusa* |
| false indigo | *Amorpha fruticose* |
| Mexican buckeye | *Ungnadia speciose* |
| prickly ash | *Zanthoxylum hirsutum* |
| roughleaf dogwood | *Comus drummondii* |
| silktassel | *Gava ovata var. lindheimeri* |
| Texas kidneywood | *Eysenhardtia texana* |
| Texas mock orange | *Philadelphus texensis* |
| Texas mountain laurel | *Sophora secundiflora* |
| Texas pistache | *Pistacia texana* |
| wafer-ash | *Ptelea trifoliate* |
| wax myrtle | *Myrica cerifera* |
| witch hazel | *Hamamelis virginiana* |
| yaupon holly | *Ilex vomitoria* |
| **Low Shrubs** | |
| American beautyberry | *Calicarpa americana* |
| Agarita | *Berberis trifoliate* |
| black dalea | *Daleo frutescens* |
| butterfly bush | *Buddleia marrubilifolia* |
| buttonbush | *Cephalanthus occidentalis* |
| chili pequin | *Capsicum annuum* |
| elbowbush | *Forestiera pubescens* |
| flame acanthus | *Anisicanthus quadrifidus* |
| fragrant mimosa | *Mimosa borealis* |
| Gregg dalea | *Dalea greggii* |
| Gregg sage | *Salvia greggii* |
| Mexican oregano | *Poliomentha longiflora* |
| mountain sage | *Salvia regla* |
| shrubby blue sage | *Salvia ballotiflora* |
| shrubby boneset | *Ageratina havanensis* |
| skeleton-leaf goldeney | *Viguiera stenoloba* |
| skunkbush | *Rhus trilobata* |
| Texas lantana | *Lantana urticoides* |
| turk's cap | *Malvaviscus arboreus var. drummondii* |
| yaupon holly | *Ilex vomitoria* |
| Zexmenia | *Wedelia texana* |
| **Vines** | |
| Carolina jessamine | *Gelsemium sempervirens* |
| coral honeysuckle | *Lonicera sempervirens* |
| crossvine | *Bignonia capreolata* |
| Lindheimer's morning glory | *Ipomoea lindheimeri* |
| purple leather flower | *Clematis pitcheri* |
| trumpet creeper | *Campsis radicans* |
| Virginia creeper | *Parthenocissus quinquefolia* |

| Common Name | Scientific Name |
|---|---|
| white bush honeysuckle | *Lonicera albiflora* |
| **Xerophytes** | |
| devil's shoestring | *Nolina lindheimeriana* |
| Lechuguilla | *Agave lechuguilla* |
| pale-leaf yucca | *Yucca pallida* |
| red yucca | *Hesparaloe parvilfora* |
| Spanish dagger | *Yucca treculeana* |
| spice lily | *Manfreda maculosa* |
| Texas sacahuista | *Nolina texana* |
| Texas sotol | *Dasylirion texanum* |
| twist-leaf yucca | *Yucca rupicola* |
| **Perennial Flowers** | |
| aromatic aster | *Aster oblongifolius* |
| big red sage | *Salvia penstemonoides* |
| blackfoot daisy | *Melampodium leucanthum* |
| bushy skullcap | *Scutellaria wrightii* |
| butterflyweed | *Asclepias tuberosa* |
| canyon sage | *Salvia lycoides* |
| cedar sage | *Salvia roemariana* |
| chocolate daisy | *Berlandiera lyrata* |
| crimson-eyed rosemallow | *Hibiscus moschuetos* |
| Damianita | *Chrysactinia mexicana* |
| Engelmann daisy | *Engelmannia pinnatifida* |
| fall obedient plant | *Physostegia virginiana* |
| fluttermill | *Oenothera missouriensis* |
| frogfruit | *Phyla nodiflora* |
| gaura | *Gaura lindheimeri* |
| gayfeather | *Liatris mucronata* |
| giant blue sage | *Salvia azurea* |
| goldenrod | *Solidago canadensis* |
| heath aster | *Aster ericoides* |
| mealy sage | *Salvia farinacea* |
| Missouri violet | *Viola missouriensis* |
| pigeonberry | *Rivina humilis* |
| pink skullcap | *Scutellaria suffretescens* |
| ponyfoot | *Dichondra carolinensis* |
| prairie larkspur | *Delphinium carolinianum* |
| prostrate lawnflower | *Calyptocarpus vialis* |
| purple cone-flower | *Echinacea angustifolia* |
| rain lily | *Cooperia pedunculata* |
| red columbine | *Aquilegia canadensis* |
| rock penstemon | *Penstemon baccharifolius* |
| scarlet penstemon | *Penstemon triflorus* |
| silver ponyfoot | *Dichondra argentea* |
| snakeherb | *Dyschoriste linearis* |
| standing cypress | *Ipomopsis rubra* |
| sword leaf blue-eyed grass | *Sisyrinchium chilense* |
| Texas betony | *Stachys coccinea* |
| Texas rock rose | *Pavonia lasiopetala* |
| Texas star hibiscus | *Hibiscus coccineus* |
| tropical sage | *Salvia coccinea* |
| white avens | *Geum canadense* |

| Common Name | Scientific Name |
|---|---|
| wild fox-glove | *Pentemon cobaea* |
| winecup | *Callirhoe involucrate* |
| wood-fern | *Thylpteris kunthii* |
| woolly ironweed | *Vernonia lindheimeri* |
| woolly stemodia | *Stemodia lanata* |
| **Ornamental Grasses** | |
| big bluestem | *Andropogon gerardii* |
| big muhly | *Muhlenbergia capilaris* |
| bull muhly | *Muhlenbergia emersleyi* |
| bushy bluestem | *Andropogon glomeratus* |
| Indian grass | *Sorghastrum nutans* |
| inland sea oats | *Chasmanthium latifolium* |
| Lindheimer's muhly | *Muhlenbergia lindheimeri* |
| little bluestem | *Schizachyrium scoparium* |
| Mexican feathergrass | *Stipa tenuissima* |
| pine muhly | *Muhlenbergia dubia* |
| sideoats grama | *Bouteloua curtipendula* |
| switchgrass | *Panicum virgatum* |
| **Turf Grasses** | |
| blue grama | *Boutelous gracilis* |
| buffalograss | *Buchloe dactyloides* |
| Curly mesquite | *Hilaria belangeri* |

If non-native species must be planted for some reason, they must be non-invasive. Likewise, when any kind of ground disturbance occurs on the installation, the bare ground should be reseeded with certified weed-free native vegetation. AR 200-1, Section 4.3.10.d.(10)(d) states that invasive species are not to be used in installation landscaping in accordance with Executive Order 13112 Invasive Species.

Fort Cavazos's Tree Care Ordinance established a Tree Board which is composed of representatives from NCRMB, DPW – Maintenance Division (Roads and Grounds), DPW – Engineering and Services Division, III Corps and the Fort Cavazos Environmental Law Attorney, Fort Cavazos Family Housing, the Courses of Clear Creek, BLORA, the Sportsmen's Center, Killeen independent School District, and Central Texas College. The purpose of the Tree Board is to provide the preservation, protection, replacement, proper planting, and proper maintenance of trees located within the cantonment areas of Fort Cavazos.

The Tree Care Ordinance established a tree removal and replacement policy. All native hardwood trees should be preserved and protected, which is preferred over replacement. If removal of a tree becomes necessary, each tree that is removed must be replaced at required ratios. A 10:1 ratio is required for heritage trees and native hardwood trees with a diameter breast height (DBH) greater than 3 inches, and a 1:1 ratio is required for a landscaping tree planted by or for Fort Cavazos with a DBH less than 3 inches. Dead or diseased trees not under contract that are a hazard to life or property should be removed and replaced at a ratio of 1:1. Replacement trees must also be maintained (including watering) for one year after planting. Any replacement tree that dies within one year of the planting date must be replaced and maintained for another year. Species of trees for new plantings and replacements must be selected from the species listed in the Installation Design Guide or in the MOI "Landscaping

Unit Areas". Any species not found in the approved plant list cannot be planted on Fort Cavazos without the expressed permission of the Fort Cavazos Tree Board.

The Tree Care Ordinance also outlines specific exemptions to the replacement policy. These include:

- Trees can be removed within 10 feet of existing Fort Cavazos utility easements/corridors and replaced at a 1:1 ratio with small landscaping trees/shrubs where applicable as determined by DPW.
- Trees may be removed within the 30-foot clear zone of the cantonment outer perimeter fence as a force protection measure, except for trees which must be retained "for erosion control, passive defense, or for legal reasons". Trees removed in this clear zone are not subject to the tree replacement policy.
- Tree removal as required by Federal Aviation Administration regulations are exempt from the tree replacement policy.

The endangered golden-cheeked warbler does not tend to occur in the immediate vicinity of developed areas. However, persons should coordinate with the NRCMB staff prior to tree/brush trimming and removal during the breeding season of all birds to ensure that they do not remove limbs/trees that support active bird nests. Pesticide application must be coordinated with the DPW Installation Pest Management Coordinator (IPMC). Mowing the tall grasses around the runways tends to attract birds that can become a Wildlife Air Strike Hazard (WASH). This circumstance requires that special planning be done so that WASH hazards are kept at a minimum.

## *Program Goals and Objectives*

The following are grounds maintenance and landscaping goals and objectives.

**Table 4-25. Goals and Objectives for Grounds Maintenance**

| Goals | Objectives |
|---|---|
| Maintain an aesthetically pleasing cantonment landscape that conserves natural ecosystem functions as feasible. | Ensure that grounds maintenance and landscaping operations are consistent with natural resources goals and objectives.<br><br>Support DPW in making the best use of existing native trees; conserving floodplains, drainages, and topography; and enhancing aesthetic and structural standards fitting to the area.<br><br>Provide professional advice to assist the grounds landscaping and maintenance program toward the use of native species.<br><br>Always discourage the use of invasive, exotic plants. |

## *Program Regions*

Maintained grounds of Fort Cavazos.

## *Monitoring*

NCRMB will work closely with DPW on maintenance and landscaping operations throughout

the installation and will continue to occupy a position on the Tree Board.

### 4.10.5 Agricultural Leases

One of the most significant natural resources management issues at Fort Cavazos is the leasing of training land for livestock (cattle) grazing.

*Program Data Management*

As part of the planning process for the original INRMP, the NRCS conducted a detailed inventory and evaluation of the training areas (NRCS 2002). The purpose of the study was to determine the general ecological health of the training areas, as well as the stocking rates of individual training areas and management areas, and to recommend changes to protect and restore the ecological health of the training areas.

The stocking rate for each lease period is the number of animal units (AU) that are allowed to graze on a particular Grazing Management Unit (GMU). Animal unit equivalents were developed to standardize AUs among the various kinds and class of bovines. **Table 4-26** presents the AU equivalents used by Fort Cavazos.

**Table 4-26. Animal Unit Equivalents**

| Kinds/Classes of Bovine | Animal Unit Equivalent |
|---|---|
| Cow, dry | 0.92 |
| Cow, with calf | 1.00 |
| Bull, mature | 1.35 |
| Cattle, 1 year old | 0.60 |
| Cattle, 2 years old | 0.80 |

Stocking rates are based on a stocking rate calculation methodology for each GMU based on the ecological health and trend of the unit, and the potential for soil erosion. Forage will be made available for grazing to the extent practicable, while maintaining the ecological health and hydrological condition of the sites and providing the flexibility to modify stocking rates should the ecological health, trend, or erosion at a GMU improve or decline. The stocking rate calculations methodologies are listed below:

- Conservation Threshold – This approach sets a management objective of maintaining 1,000 lbs/acre of forage residue after grazing.
- Maintenance Threshold – This approach sets a management objective of maintaining 750 lbs/acre of forage residue after grazing.
- 25 Percent Harvest Efficiency – This approach is based on the premise that 50 percent of the forage on a site should be left un-grazed to provide cover for the soils and keep the vegetation healthy. The other 50 percent is made available to the grazing animal, but only half of that (25 percent of the total) is consumed by the animal. The other 25 percent is lost during the act of grazing by the animal and is returned to the soil as litter, trampled, or consumed by insects. Thus, only 25 percent of the forage will be consumed by livestock.

The lease area is inventoried each year in spring to determine the allowable stocking rate for

the next year to keep grazing animals in balance with available forage. The forage inventory contractor reports estimated forage production in each GMU to NCRMB; NCRMB incorporates land management requirements such as prescribed burning and the need for grazing deferments to support land rehabilitation efforts and determines appropriate stocking rates by GMU. The current stocking rates for each GMU are listed in **Table 4-27**.

**Table 4-27. Stocking Rates and Calculations for each Fort Cavazos GMU**

| GMU | Grazeable Acres | Animal Units |
|---|---|---|
| Eastern Training Area – North | 30,850 | 297 |
| Eastern Training Area – South | 22,439 | 147 |
| Live-Fire and Impact Area | 60,501 | 750 |
| North Fort Cavazos | 2,174 | (see note below) |
| West Fort Cavazos - North | 4,134 | 85 |
| West Fort Cavazos – South | 9,314 | 109 |
| Western Maneuver Area – North | 36,772 | 375 |
| Western Maneuver Area – South | 31,253 | 237 |
| **TOTAL** | | **2,000** |

**NOTE: North Fort Cavazos (NFC) GMU shall not be grazed in years 1, 3, 5, 7, and 9. NFC GMU may be used as swing space in years 2, 4, 6, 8, and 10. Swing space is defined as an area not routinely stocked, but available for grazing if temporary deferrals are required in other GMU's.**

In March 2020, the Department of the Army executed a new lease agreement with the CTCA (**Appendix B6**) for the purposes of grazing cattle on the training lands at Fort Cavazos. As part of the lease agreement, the cattlemen must abide by the provisions in the Land Use Regulations (LUR), included as Exhibit B in the Lease Agreement. The purpose of the LUR is to ensure that all grazing activities are conducted in a manner consistent with national policy intended to do the following:

- Provide for multiple uses of the premises (Fort Cavazos) for military purposes, wildlife habitat, public recreation, water conservation, and domestic livestock grazing
- Preserve, sustain, and enhance the natural resources of the premises (Fort Cavazos)

## *Program History*

The installation has one outlease for cattle grazing. When Fort Cavazos was established by condemning private lands, the Federal government granted landowners fair market value for the land and a 5-year lease for grazing. The affected landowners formed the CTCA, and the lease to the CTCA has been renewed continuously since its first issuance. The CTCA administers the leasing of the land by the cattlemen, and the leases run for a period of 5 years. Prior to the renewal of a lease, Fort Cavazos evaluates the conditions of the training lands to determine the level of grazing that can occur without degrading the training lands, impeding the military mission, and endangering the long-term sustainability of Fort Cavazos's resources.

Fort Cavazos allows grazing on approximately 197,439 acres of its 218,823 acres. Excluded from the leased acreage are the cantonment areas (NFC, West Fort Cavazos, and main) and the LRC area west of the main cantonment area. **Figure 4-11** shows the locations of the GMUs on Fort Cavazos.

**Figure 4-11. Grazing Management Units**

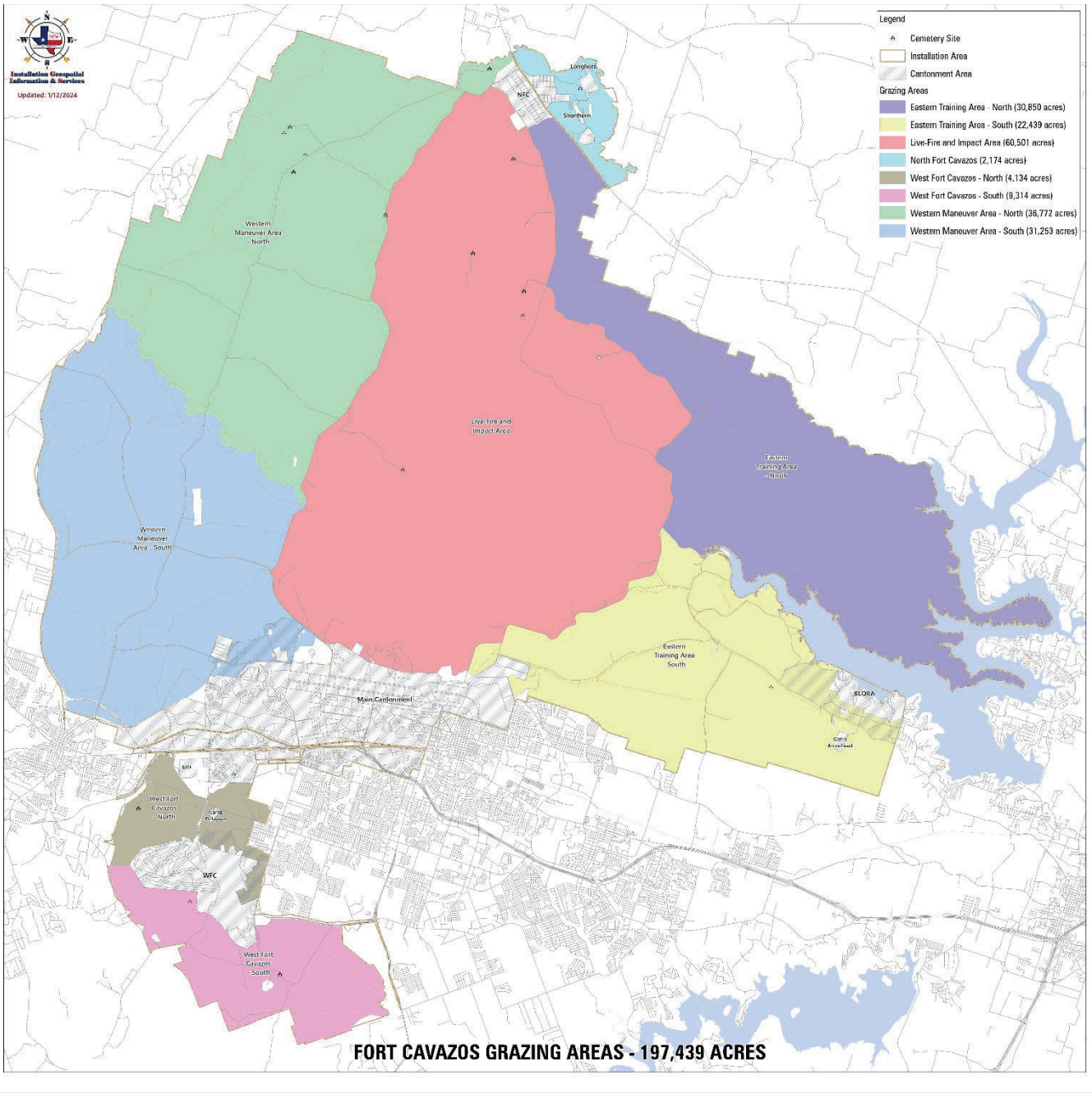


**Table 4-28** lists the major grazing management areas, the training areas each management area comprises, and the number of acres in each management unit.

**Table 4-28. Grazing Management Units by Training Areas and Acreage**

| Grazing Management Unit | Training Areas | Acreage |
|---|---|---|
| Eastern Training Area – North | 8 (partial), 14, 15, 16, 20, 21, 22, 23, 24, 25, BLORA | 30,850 |
| Eastern Training Area – South | 8 (partial), 30, 31, 32, 33, 34, 35, 36, 112 | 22,439 |
| Live-Fire and Impact Area | 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93 | 60,501 |
| North Fort Cavazos | 10, 11, 12, 13 | 2,174 |
| West Fort Cavazos – North | 70, 71 | 4,134 |
| West Fort Cavazos – South | 72, 73, 74, 75 | 9,314 |
| Western Maneuver Area – North | 50, 51, 52, 53, 60, 61, 62, 63, 64, 65, 66 | 36,772 |
| Western Maneuver Area – South | 40, 41, 42, 43, 44, 45, 46, 47, 48 | 31,253 |
| **TOTAL LEASED ACRES** | | **197,439** |

## *Current Condition*

Large portions of the training areas have been subject to excessive sheet and gully erosion in the past. The resulting sediment is detrimental to receiving streams. However, efforts to minimize sedimentation by DPTMS have shown considerable progress. The implementation of MAS has contributed to slowing erosion across the landscape.

An EA of the renewal of the grazing lease noted that ecological conditions at Fort Cavazos have worsened since the inception of the original grazing lease, and that cattle grazing has the potential to contribute to poor ecological conditions. A Supplemental EA addressed these potential environmental impacts and evaluated several new alternative management actions. A plan to address the erosion problem includes establishing a livestock rotation grazing program.

## *Program Goals and Objectives*

The primary goal of the grazing program at Fort Cavazos is to permit cattle grazing while ensuring the long-term sustainability of the training lands and unimpeded military training. The goals and objectives of the program are provided in **Table 4-29**.

**Table 4-29. Goals and Objectives for Agricultural Leases (Grazing)**

| Goals | Objectives |
|---|---|
| Allow cattle grazing to the extent that impacts on training, training lands, and natural resources can be maintained at acceptable levels. | Implement the stocking rate formulas defined in the Supplemental Grazing Environmental Assessment and the approved grazing management plan. |
| Develop a long-term plan for grazing management. | Develop and implement a Grazing Management Plan. |

| Goals | Objectives |
|---|---|
| Evaluate new methodologies for calculating cattle stocking rates. | A predictive forage response model is currently in development by Texas A&M University's Ranching Systems Group that shows promise to assess and predict forage response and fire risk to emerging conditions. Use of this model, if validated and approved by the Department of the Army, is proposed by Texas A&M to be integrated with a multiple model system for assessing and predicting Fire behavior, erosion and forage to assist Fort Cavazos with land management decisions where cattle grazing coincides with the military training mission. While the model(s) shows merit, a key component of its validated accuracy will be the system's capability to assess and predict forage loss throughout the year due to Fort Cavazos's military training mission and fluctuating military traffic |
| Monitor lessee performance. | Develop a lease surveillance plan to monitor the lessee's performance of work requirements.<br><br>Design and implement enforceable provisions to ensure that the lessees comply with the stocking rates authorized by the lease. |

## *Program Regions*

The GMUs of Fort Cavazos are shown on **Figure 4-10**.

## *Monitoring*

Fort Cavazos is in the process of preparing a Grazing Management Plan (which will be incorporated into **Appendix B** once completed) that will integrate the management of cattle grazing with Fort Cavazos's mission and environmental stewardship responsibilities. Monitoring measures are being built into the Grazing Management Plan to ensure that grazing at current levels is not jeopardizing the long-term sustainability of the training lands, resulting in irreparable harm to the natural resources, including increased erosion rates, sedimentation in the water bodies, and changes in the character of the rangeland vegetation.

Previous monitoring efforts to evaluate compliance with lease provisions have had limited success. Containment of cattle to designated grazing/training areas is naturally difficult without fencing. A more robust monitoring program must be implemented to ensure compliance and to avoid degradation of the training lands. A lease surveillance plan detailing compliance and monitoring measures could be developed for incorporation into future lease agreements and land use regulations. The lease surveillance plan would identify the lease provisions to be monitored and the way compliance or noncompliance will be determined, documented, and reported.

Measures that could be incorporated into the lease surveillance plan could include the following:

- Identification, counting, and reporting of cattle that interfere with or interrupt training exercises.
- Penalties for repeat offenders should be implemented and enforced.
- Random aerial surveys to monitor cattle locations and numbers. Surveys would be conducted concurrent with other aerial support operations.

The implementation of compliance monitoring would help ensure the protection of Fort Cavazos's natural resources, minimize environmental damage and degradation, and protect

endangered species habitat. Monitoring and compliance provisions could be incorporated into future grazing leases and land use regulations. Penalties for noncompliance could be established and incorporated into the LUR.

## 4.11 Integrated Pest Management

The definition of Integrated Pest Management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. IPM is an effective and environmentally sensitive approach to pest management that relies on education and the implementation of safe and effective practices that minimize risks from pesticides to human health and the environment. IPM programs provide education and use current comprehensive information on the life cycles of pests and their interaction with the environment. IPM takes advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides.

### *Program Data Management*

In accordance with the AR 200-1 and DoD Instruction 4150.7, DoD Pest Management Program (May 23, 2013), the Army must prepare an Integrated Pest Management Plan (IPMP), which is the framework through which pest management is defined and accomplished by Fort Cavazos. The IPMP defines and describes essential elements of the pest management program, such as health and environmental safety, installation pests (both arthropods and vertebrates), control procedures, and pesticide storage, transportation, use, and disposal. The Plan is used as a tool to maximize the use of integrated pest management by reducing unnecessary pesticide use, enhancing environmental protection, and maximizing the use of effective target specific reduced risks pesticides and non- chemical techniques. In addition, the Plan provides guidance for the judicious use of both chemical and nonchemical control techniques to achieve effective pest management with minimal environmental contamination. Adherence to the Plan ensures effective, economical, and environmentally acceptable pest management and compliance with pertinent laws and regulations. Fort Cavazos's IPMP was approved and signed in April 2021. A copy of the IPMP can be found in **Appendix B7** of this document.

### *Program History*

Most pest-related control activities are the responsibility of the DPW. Pest-related activities include: control of potential disease vectors and public health pests (mosquitoes; rodents; ticks; black widow spiders; fire ants; honeybees, hornets, yellow jackets, and wasps; scorpions; snakes; skunks, raccoons, foxes, coyotes, and bats; birds; bed bugs, swallow bugs, and bird mite; and poison ivy, poison oak, and poison sumac); quarantine pests (fire ants, tawny crazy ants and zebra mussels); real property pests (termites, birds, bats, squirrel and rodents), stored food product pests; noxious and invasive plants; ornamental plants and turf pests; undesirable vegetation; animal pests (squirrels, rodents, armadillos, stray dogs and cats, beaver, nutria, coyotes, deer, wild pigs, and undesirable fish); and household and nuisance pests (rodents, ants, cockroaches, and spiders). The DPW Installation Pest Management Coordinator (IPMC) oversees the installation pest management program and updates the IPMP, monitors all pesticide usage on the installation (including aerial validation plans), and conducts pest control management activities.

Pest management personnel must follow the IPMP and all applicable Federal and State laws and DoD regulations. Before any pesticides are applied, the presence of pest must be determined, and the most effective, safe, and least chemical control procedures be implemented. Non-chemical control efforts will be used to the maximum extent possible. All chemicals used on Fort Cavazos must be current USEPA approved and registered for use in the State of Texas. Fort Cavazos employees who apply or oversee the application of pesticides are DoD-certified, and contract personnel should be State certified applicators in the category of work being performed. At no time will pest management operations be done in a manner that may cause harm to personnel or the environment.

## *Current Condition*

DPW – ENV assists in development of the IPMP; ensures consistency of all pest management activities with this INRMP; and compliance with all appropriate environmental regulatory requirements.

The NCRMB has staff that are involved in the performance of numerous pest related control activities. NCRMB personnel perform wildlife control operations throughout the installation. Most of these activities are in areas outside of the main cantonment. Examples of pests they are responsible to control include wild pigs and brown-headed cowbirds. Deer, coyotes, and beaver may also need control on a case-by-case basis. Staff includes one pig trapper, one seasonal cowbird trapper, two wildlife biologists with DoD pesticide applicator training and certification (work mainly in aquatic management outside of cantonment), and one entomologist (appointed IMPC and is IPMC/QAE trained and certified.). The entomlogist provides oversight of pest control practices; editorial review of installation plans, projects, and contracts; performs pest assessments, surveys, and special projects; and provides education and guidance, for implementation of self-help control procedures. Most of the entomology activities and responsibilities are connected to pest management functions in the main cantonment.

## *Program Goals and Objectives*

Pest management practices are accomplished with the coordination of other programs to follow environmental regulations and BMPs. The goal of the pest management program is to protect human health and suppress or prevent damage to real estate and natural resources caused by pests. The objective of the pest management program is to use integrated pest management techniques to eliminate, suppress, or control pests using the judicious use of both chemical and nonchemical control techniques. **Table 4-30** provides a list of the goals and objectives.

**Table 4-30. Goals and Objectives for Pest Management**

| Goals | Objectives |
|---|---|
| Protect human health and suppress or prevent damage to real estate and natural resources caused by | Use integrated pest management techniques to eliminate, suppress, or control pests with the judicious use of both chemical and nonchemical control techniques. |
| Provide oversight of installation pest management in accordance with AR-200-1 and DODI 4150.07 | Assure compliance with Federal laws, applicable DoD regulations, and Fort Cavazos's IPMP. |

| Goals | Objectives |
|---|---|
| Implement Integrated Pest Management practices. | Continue to provide pest surveillance and monitoring.<br><br>Provide outreach education in nonchemical and reduced chemical control methods.<br><br>Encourage the creation of favorable landscape habitats, provide education, and implement control practices in all facilities, to include Fort Cavazos family housing, that preserve beneficial insects and other wildlife. |
| Reduce the quantity of pesticides used on the installation and promote more effective pest control practices. | Evaluate the effectiveness of control programs.<br><br>Implement new pesticide reduction methodologies and equipment initiatives. |
| Implement pest preventive building construction and maintenance requirements. | Investigate the safety and practicality of providing alternative housing for bats displaced from buildings by bat exclusion projects. Implement the placement of bat houses.<br><br>Ensure plans for building and renovation procedures contain pest preventive requirements.<br><br>Perform new construction and renovation projects inspections for pest preventive requirements. |
| Insure that effective control and management procedures are implemented for urban wildlife that pose a risk to public health or damage to property. | Provide oversight of the trapping and removal of vertebrate animals that are inside or under buildings, near the public, or in environmentally sensitive locations.<br><br>Provide education to enhance tolerance of and safety around vertebrate animals that reside in urban and residential areas.<br><br>Assess the need for installation-wide surveys and mapping of pest or invasive species. |
| Implement effective control and management procedures for invasive vertebrate pests in the cantonment and surrounding natural areas. | Perform studies to evaluate the effects of the invasion of non-native birds (starlings, house sparrows, and pigeons) on the population of the migratory song birds in the cantonment and surrounding areas.<br><br>Perform assessments of the effects of invasion of the roof rat *(Ratus ratus*) on property damage and native bird population in the surrounding areas. |
| Implement conservation and safe control of honey bees and other pollinators. | Perform live removal of honey bee swarms and hives in buildings or publics areas that are accessible for safe removal. |

## *Program Regions*

All Regions (refer to **Figure 2-4**).

## *Monitoring*

The monitoring program for the pest management program is detailed in the Fort Cavazos IPMP.

## 4.12 Noxious Weeds and Invasive Species

Noxious weeds are plant species known to be detrimental to agricultural crops and are regulated by State and Federal government agencies. Invasive species are non-native plants and animals whose introduction to the ecosystem causes, or is likely to cause, economic or environmental harm, or harm to human health. Some native plants may also become invasive due to negative environmental conditions or practices (e.g., mesquite due to continuous cattle grazing, and broomweed and Ashe Juniper due to over grazing and other negative environmental conditions).

AR 200-1, Section 4-3.d (10) identifies the Director of DPW as the proponent for invasive species management. Executive Order 13112 Invasive Species (1999) directs Federal agencies to prevent the introduction of invasive species; detect, respond rapidly to, and control populations of invasive species; monitor invasive species; provide for restoration of native species and habitat conditions in ecosystems that have been invaded; conduct research and develop sound control of invasive species; and promote public education on invasive species.

The control of invasive species is a priority for the entomology, agronomy, and wildlife staff in the NCRMB.

### *Program Data Management*

As outlined in **Section 4.11**, Integrated Pest Management, Fort Cavazos's IPMP was approved and signed in May 2016. A copy of the IPMP can be found in **Appendix B7** of this document.

### *Program History*

The installation supports the National Strategy for Invasive Plant Management and its three goals–prevention, control, and restoration. If any noxious weeds are found on the installation, a high priority for control will be established and control efforts will be maximized. A list of plants introduced to Texas is provided in the IPMP. Weeds on firing ranges, around targets, along fence lines, on road shoulders, on paved surfaces (including runways), and so forth require mechanical and chemical control using appropriate herbicides that are approved by the IPMC. Unwanted plants are controlled mechanically (e.g., mowing, string trimmers) or using mulch materials around ornamental plants. Turf weeds such as dallisgrass (*Paspalum dilatatum*) and crabgrass (*Digitaria ciliaris*) might also require control in improved grounds. Aquatic vegetation control is also occasionally necessary at managed fisheries ponds. Unwanted fish species are also removed from managed fisheries ponds by qualified personnel. Wild pig populations are removed by NCRMB staff primarily with the use of traps and aerial gunning by trained personnel.

Prescribed fire on training lands is used to control Ashe juniper and young mesquite, as well as other plant species. Mechanical and chemical controls are also used. Nuisance plant control on most of the installation cantonment except the golf course is performed by the application of herbicides as chemical edging and trimming in the mowing process by the DPW Work Services Branch's Grounds Maintenance (Mowing) Contractor. Work requests for vegetation control in the cantonment area are handled by the DPW applicators or contracted applicators as needed. The privatized Fort Cavazos Family Housing Maintenance/Landscape

contractor does a small amount of vegetation control, and the DPW mowing contractor uses an herbicide in the mowing process for chemical edging and trimming. Vegetation control projects in areas outside the cantonment area may also be done by contracts administered by DPW Work Services Branch, ITAM, or DPW ENV-NCRMB.

## *Current Condition*

Two noxious weeds are known to occur on Fort Cavazos: dodder (*Cuscuta sp.*) and cattail grass (*Setaria pumila*). Invasive plant species of concern to the Fort Cavazos ecosystem include giant reed (*Arundo donax*), salt cedar (*Tamarix ramosissima*), Chinese tallow tree (*Triadica sebifera*), kudzu (*Pueraria montana* var. *lobata*), mimosa (*Albizia julibrissin*), white mulberry (*Morus alba*), Chinese privet (*Ligustrum sinense*), glossy privet (*Ligustrum lucidum*), Japanese honeysuckle (*Lonicera japonica*), King Ranch bluestem (*Bothriochloa ischaemum*), tree of Heaven (*Ailanthus altissima*), China-berry (*Melia azedarach*), sacred-bamboo (*Nandina domestica*), Johnson grass (*Sorghum halepense*), Chinese pistache (*Pistacia chinensis*), red-tipped photinia (*Photinia serratifolia*), Jerusalem-thorn (*Parkinsonia aculeate*), fire-thorn (*Pyracantha koidzumii*), Japanese rose (*Rosa multiflora*), periwinkle (*Vinca major and V. minor*), common chaste-tree (*Vitex agnus- castus*), jujube (*Ziziphus zizyphus*), field brome (*Bromus arvensis*), rescuegrass (*Bromus catharticus*), cheat grass (*Bromus tectorum*), pampas grass (*Cortaderia selloana*), West India lantana (*Lantana camara*), dallisgrass (*Paspalum dilatatum*), Asian jasmine (*Trachelospermum asiaticum*), elephant ear (*Alocasia spp.*), English ivy (*Hedera helix*), Malta star thistle (*Centaurea melitensis*), nandina (*Nandina domestica*), wisteria (*Wisteria sinensis*), slender-flowered thistle (*Carduus tenuiflorus*), woolly distaff thistle (*Carthamus lanatus*), field bindweed (*Convolvulus arvensis*), bermudagrass (*Cynodon dactylon*), Horehound (*Marrubium vulgare*), yellow sweet clover (*Melilotus officinalis*), Scotch thistle (*Onopordum acanthium*), Callery pear (*Pyrus calleryana*), bastard cabbage (*Rapistrum rugosum*), multiflora rose (*Rosa multiflora*), blessed milk thistle (*Silybum marianaum*), common chickweed (*Stellaria media*), dandelion (*Taraxacum officinale*), spreading hedgeparsley (*Torilis arvensis*), and flannel mullein (*Verbascum thapsus*).

Invasive animals of concern to the Fort Cavazos ecosystem include wild pigs (*Sus scrofa*), zebra mussels (*Dreissena polymorpha*), fire ants (*Solenopsis invicta*), rasberry crazy ants (*Nylanderia fulva*), and other insect pests addressed in the Fort Cavazos IPMP. Specific rules for zebra mussels, which apply statewide, can be found on the TPWD website, and at www.texasinvasives.org/zebramussels. All organizations to include military units are required to follow the TPWD clean, drain and dry procedures for zebra mussel decontamination. This requirement is communicated to units requesting water use permits and to attendees of the Fort Cavazos Environmental Compliance Officer Course. Control measures for all nuisance animals and plants are detailed in the Fort Cavazos IPMP.

Wild pigs, present within most of the training areas, are a serious ecological problem because they trample vegetation, disturb soils while rooting, degrade aquatic habitats by wallowing, and compete with and prey on native species. There is increased interest by hunters to pursue wild pigs and an increase in those that participate in hunting them outside the deer and turkey seasons. Recreational hunting pressure has been shown elsewhere to be very ineffective at controlling wild pig populations. Fort Cavazos's goal is to carry out intensive efforts to eradicate and prevent re- establishment of current populations. As such, the installation's

trapping program has been implemented and will continue to expand to minimize the impacts of wild pigs to natural resources.
Besides invasives, there are other species which require monitoring and management for Soldier safety. These plants can impact Soldiers by causing minor to major injuries and are capable of inflicting damage to wheeled vehicles and military equipment. Native plants that are often a problem in the range areas due to their invasive qualities include broomweed, Ashe juniper, and mesquite.

## *Program Goals and Objectives*

The goals and objectives for the prevention of new infestations and the control of existing infestations of invasive species are provided in **Table 4-31**.

**Table 4-31. Goals and Objectives for Invasive Species Management**

| Goals | Objectives |
|---|---|
| Prevent new infestations of invasive species. | Report new infestations of invasive species to natural resources personnel.<br><br>Use all practical means to control and prevent the spread of zebra mussels from Belton Lake to the ponds and streams on the installation.<br><br>Require specific procedures for cleaning, draining, and drying of any equipment or vehicle encountering the waters of Belton Lake before entering other waters or training areas.<br><br>Regular monitoring of installation waters for the spread of zebra mussels. |
| Prevent the introduction of invasive species. | Prohibit the planting of invasive species in ornamental landscaping, in wildlife supplemental food plots, and in re-vegetation projects per MOI – *Landscaping on Fort Cavazos*. |
| Control invasive plant, insect, and mammal species to prevent degradation of training areas with respect to safety, training, and wildlife management. | Control invasive species on improved grounds using mechanical and biological control methods and approved chemical control methods when necessary.<br><br>Control unwanted aquatic plants in managed fisheries ponds with mechanical (shoreline shaping), physical (water level fluctuations), and biological and chemical methods.<br><br>Use all practical means to control and prevent spread of wild pigs on the installation.<br><br>Conduct research to evaluate new ways to control wild pig species. Continue to provide aerial support for wild pig control.<br><br>Continue to document and map occurrences of exotic/invasive species that are observed during survey efforts or incidentally encountered; use this information to schedule and prioritize management actions for such species. |
| Conduct restoration activities after invasive species control to repair areas vulnerable to erosion, and to prevent other invasive plants from establishment | Reseed native vegetation in bare soil resulting from mechanical control of invasive plants. |

## *Program Regions*

All Regions (refer to **Figure 2-4**).

### *Monitoring*

Monitoring for invasive species is integrated into the monitoring programs for other resources, such as terrestrial, aquatic, karst, and endangered species habitat; fish; and wildlife, as well as pest management.

## 4.13 Wildlife Aircraft Strike Hazard

Air operations, aviation safety personnel, and natural resources personnel must work together to reduce the risk of bird and wildlife strikes to aircraft on Fort Food. DoD continually implements and improves aviation safety programs to provide the safest flying conditions possible. One of these programs is the WASH prevention program.

### *Program Data Management*

The Robert Gray AAF WASH Plan is a vital component of the airfield safety and accident prevention program and is administered by the Airfield Manager with the input and guidance of the Airfield Safety Officer. The WASH Plan is applicable to both Robert Gray AAF and Killeen- Fort Cavazos Regional Airport. A copy of the Plan can be found in **Appendix B8**.

The WASH Plan is designed to: (1) prescribe the development of a Wildlife Hazard Working Group (WHWG) and designate member responsibilities; (2) prescribe procedures for reporting hazardous wildlife activity and altering or discontinuing aircraft operations; (3) develop procedures to identify hazardous wildlife situations and to aid Airfield Management and Air Traffic Control in disseminating information, issuing alerts and limiting or discontinuing aircraft operations when required; (4) prescribe active/passive techniques to disperse wildlife from Robert Gray AAF and decrease the attractiveness of the airfield to wildlife; (5) develop procedures to identify, provide information and eliminate or reduce environmental conditions that attract wildlife to Robert Gray AAF; and (6) identify agencies authorized to initiate or terminate Wildlife Watch Conditions (WWC).

### *Program History*

A WASH program exists at Robert Gray AAF and its vicinity primarily due to resident and migratory bird species. Due to the large expanses of open areas, birds are attracted to the airfield and the vicinity. Daily and seasonal bird movements create various hazardous conditions. In addition to birds, several mammalian and reptilian species pose threats to flight operations. In particular, the grounds surrounding the airfield are covered with Bahia grass that attracts white- tailed deer, wild hogs, coyotes and other wildlife. The WASH program monitors, reports and attempts to eliminate potential WASH problems.

The administration and execution of the Robert Gray AAF WASH Plan requires a collaborative effort from several Fort Cavazos agencies to minimize wildlife attractants not only on Robert Gray AAF but in the vicinity of the airfield. The WHWG is organized to implement and monitor the WASH Plan. The Garrison Commander/Deputy Garrison Commander is the WHWG chairperson, responsible for the WASH Plan and is the approval authority for all WHWG recommendations. Because the WASH Plan is a part of the Airfield Safety and Accident Prevention Program, the Airfield Safety Officer monitors the effectiveness of the Plan. The

WHWG also consists of the Director of Aviation Operations, Airfield Manager, Airfield Operations Officer, Air Traffic Control Chief, and representatives from DPW, NCRMB, 3rd Weather Squadron, and Killeen-Fort Cavazos Regional Airport. WHWG meetings occur quarterly unless more meetings are required.

The NCRMB representative on the WHWG is responsible for advising the WHWG on wildlife biology and behavior, habitat requirements or modifications or management schemes in order for them to make informed decisions and minimize aircraft-wildlife strikes; serving as a member of the Robert Gray AAF Wildlife Detection and Dispersal Team (WDDT) and performing all lethal taking of wildlife pursuant to WASH activities; acquiring all necessary State/Federal permits for harassment/depredation of nuisance wildlife and providing permits to the Airfield Manager; and identifying the remains of dead wildlife and ensuring proper disposal of remains pursuant to permits.

## *Current Condition*

The wildlife watch warning system is one of the most critical WASH procedures as it is an immediate exchange of information between Gray Tower, Base Operations, Airfield Management and aircrews concerning the existence and location of wildlife that pose a hazard to aircraft operations. The Airfield Manager may declare specific WWCs based on WDDT, aircrew, and/or Gray Tower observations. The following WWCs are used at Fort Cavazos to warn aircrew and Robert Gray AAF/Killeen-Fort Cavazos Regional Airport personnel of the current wildlife threat to aircraft operations.

1. WWC SEVERE – Generally defined as a heavy concentration of birds and wildlife on or immediately adjacent to the active runway or other areas of the airfield that present an immediate hazard to aircraft operations. WWC SEVERE may also be declared when birds/wildlife of any size or quantity present an immediate hazard. Aircrews should thoroughly evaluate mission criticality prior to aircraft operations in WWC SEVERE areas. Landing or departing in WWC SEVERE is likely to result in aircraft damage from a bird/wildlife strike.
2. WWC MODERATE – Wildlife activity near the active runway or other areas of the airfield representing an increased potential for wildlife/aircraft strikes. WWC MODERATE requires increased vigilance by all airfield agencies and caution by aircrews.
3. WWC LOW – Wildlife activity on and around the airfield representing a low potential for wildlife/aircraft strikes.

The WDDT actively patrols Robert Gray AAF on an as-needed basis and uses appropriate active deterrence methods. Prior to the initiation of dispersal actions, the WDDT team leader coordinates the location and methods with the Airfield Management and Gray Tower and ensures the appropriate WWC has been declared prior to dispersal activities on the active runway. Dispersal techniques may include the use of visual deterrents, vehicle horns and sirens, propane cannons, pyrotechnics, and lethal control.

Occasionally, wildlife must be killed to reinforce other animal frightening techniques. Shooting

one or two birds from a flock, then following with a volley of pyrotechnics is generally a very effective strategy for deterrence. Domestic pigeons, European starlings and house sparrows may be removed without permit. All migratory birds (as defined by the MBTA) require an approved fish and wildlife depredation permit prior to removal. NCRMB will coordinate for all depredation permits and will perform all pyrotechnic and lethal control measures on Robert Gray AAF.

Two of the most effective and long-term methods of discouraging wildlife from using the airfield is the removal of attractive habitat features and the maintenance of fences to discourage and/or prevent large mammal access. The Robert Gray AAF WASH Plan outlines the primary means of habitat management to include vegetation maintenance (including drainages and wetlands), the elimination of bare areas and old surfaces, fence maintenance, the elimination of trees and brush within aircraft operating areas, monitoring of perch and nesting sites, and proper storage and collection of organic waste.

## *Program Goals and Objectives*

The goal of the WASH plan is to mitigate human/wildlife conflict, while maintaining varied wildlife populations and habitats.

**Table 4-32. Goals and Objectives for WASH Prevention**

| Goals | Objectives |
|---|---|
| Minimize WASH-related health risks, safety risks, and environmental damage. | NCRMB Objectives<br>Coordinate the current WASH Plan and WASH reduction guidance with the INRMP for habitat modification, active harassment, and bird awareness education for all personnel.<br><br>Develop strategies and actions to minimize WASH threats.<br><br>DPW-Engineering and Maintenance Objectives<br>Maintain airfield turf between 6" and 12" in height.<br><br>Eliminate bare areas and seed with grass to establish a thick turf. Reseed construction sites as soon as possible after project completion.<br><br>Properly maintain established ditches with steep sides and trimmed vegetation. Remove vegetation as necessary to prevent standing water on or near the airfield. Routinely remove wetland vegetation to prevent recurrence of aquatic vegetation, reduce the attractiveness of birds, and to prevent heavy vegetation growth from complicating maintenance. Install crisscross rebar/steel in drainage culverts on the upstream side to preclude wildlife access to the airfield.<br><br>Conduct weekly (at a minimum) checks of the airfield perimeter fence to ensure that there have been no breaches by wildlife, that all gates are secured, that no vegetation has developed on the fence, and that both the internal and external 20' clear zones are clear. Maintain airfield fences and gates with no more than 3" gaps to limit wildlife access.<br><br>Eliminate, whenever possible, trees and brush inside airfield security |

| Goals | Objectives |
|---|---|
| | fences.<br>Monitor sites such as isolated trees, airfield structures, airfield signage, poles, and equipment for birds using them as perches or nesting sites.<br><br>Store all organic wastes in enclosed containers until collected and removed. Cover all construction containers as well as public trash containers to limit access by birds and other wildlife |
| Comply with applicable laws and regulations. | The WHWG will review any habitat alterations to ensure that it does not affect the safety of the mission. The WHWG will establish procedures to identify high hazard situations and to aid supervisors and aircrews in disseminating information, issuing alerts and altering or discontinuing flying operations when required.<br><br>Maintain WASH awareness with all proposed land use activities. |

*Program Regions*

Robert Gray AAF is in the South (West Fort Cavazos) MU (refer to **Figure 2-4**).

*Monitoring*

The NCRMB representative will attend the quarterly WHWG meetings to ensure compliance with all aspects of the WASH Plan and this INRMP.

## 4.14 Army Readiness and Environmental Protection Integration (Army REPI) and Conservation Easements

At Fort Cavazos, as at many U.S. military installations, security considerations and the need for safety buffer zones have limited access and created islands of biodiversity amid seas of ever-expanding residential and industrial development. This development encroaches on both the military mission and the biodiversity that the installations harbor. To address the problem of incompatible development or "encroachment," Congress authorized DoD to partner with "eligible entities" to create "buffers" in the vicinity of bases (10 USC 2684a). The program is named the Readiness and Environmental Protection Initiative (REPI), but the Department of the Army refers to it as the Army Readiness and Environmental Protection Integration (Army REPI) Program. The ARMY REPI Program was created to establish buffer areas around Army installations to limit effects of encroachment and maximize land inside the installation that can be used to support the mission.

The military training mission at Fort Cavazos is impeded by several forms of encroachment, which DoD defines as "the cumulative result of any and all outside influences that inhibit necessary training and testing." The forms of encroachment affecting the mission at Fort Cavazos include regulatory encroachment and urban development.

Regulatory encroachment involves the restrictions on training and the effort expended to comply with the provisions described in the ESMC and the BO for management of habitat for the black-capped vireo and the golden-cheeked warbler. Currently, there are no training restrictions in endangered species habitat. Like most military installations, Fort Cavazos is surrounded by

increasing urban and suburban development. As such development occurs, there is increasing potential for conflict between urban residents or business interests and certain aspects of military training, which are not confined to Army property. For example, noise and smoke produced on Fort Cavazos might be detected in adjacent urban settings and deemed undesirable there.

## *Program Data Management*

Fort Cavazos is actively engaged in the ARMY REPI Program to evaluate the feasibility of acquiring conservation easements, purchase of development rights, or other perpetual agreements on surrounding lands that will both provide an effective buffer to encroachment on the military training mission and have a high conservation value. Fort Cavazos's most recent study was conducted in 2017, a copy of which can be found in **Appendix B9**.

Fort Cavazos's ARMY REPI Program is maintained by the NCRMB. Natural resources professionals assist in reviewing implementation of the program and play a supporting role whenever called upon. Fort Cavazos partners in the ARMY REPI Program include the NRCS and the CLF.

## *Program History*

Under the authority provided in the National Defense Authorization Act of 2003, Fort Cavazos's ARMY REPI Program was officially established in November 2012. The ARMY REPI Program allows military departments to partner with private landowners to establish conservation easements or buffer areas around active installations to limit the effects of encroachment. These partnerships are beneficial in several ways:

Benefits to Fort Cavazos:

- Manages development adjacent to, and near Fort Cavazos
- Protects effective training space to the installation boundaries
- Averts training restrictions
- Mitigates against noise and smoke complaints

Benefits to Fort Cavazos Community Partners:

- Protects Fort Cavazos mission and strength
- Does not remove lands from tax base
- Maintains local agricultural and wild landscapes

Benefits to Landowners:

- Maintains current, compatible land uses
- Provides cash-in-hand
- Retain rights to ownership and management of land

## *Current Condition*

Fort Cavazos's conservation partners work directly with willing landowners to secure

conservation easements and are also responsible for recording, monitoring, managing, and enforcing the easements. These conservation easements prohibit incompatible development in perpetuity, while keeping the land in private ownership and allowing for traditional land uses such as agriculture, forestry, and recreation. Fort Cavazos has secured easements from willing landowners, protecting land through military and partner funds. These areas consist primarily of agricultural and open lands.

### *Program Goals and Objectives*

Fort Cavazos's partnerships under the ARMY REPI program preserve high-value habitat and limit incompatible development near the installation. The established buffer areas around Fort Cavazos limits the effects of encroachment and maximizes land inside the installation that can be used to support the installation's mission.

**Table 4-33. Goals and Objectives for the ARMY REPI Program**

| Goals | Objectives |
|---|---|
| Avoid/limit encroachment and provide long-term sustainability of Army ranges. | Work with NRCS and CLF to maintain easements on off-post land to protect habitat and buffer training without acquiring any new land for Army ownership.<br><br>Protect private lands outside of Fort Cavazos through conservation easements in several Priority Areas.<br><br>Maintain compatible land uses through the implementation of new conservation easements with willing landowners.<br><br>Increase outreach to expand the partnership base with diverse organizations. |

### *Program Regions*

All Fort Cavazos and surrounding lands.

### *Monitoring*

CLF will continue working closely with the NCRMB, other Fort Cavazos personnel, and the NRCS to manage the current lands under easement and to assess the needs for additional land easements under the ARMY REPI program.

## 4.15 Other Programs

### 4.15.1 Integrated Training Area Management (ITAM)

AR 350-19, The Army Sustainable Range Program, defines and describes the ITAM program. ITAM is an Army Garrison, DPTMS, Range Operations Branch program that provides training land management capabilities ensuring Army training lands are always accessible, available, and capable of supporting training requirements.

ITAM integrates the mission requirements derived from the Range and Training Land Program (RTLP), with environmental requirements and environmental management practices, and

establishes the policies and procedures to achieve optimum, sustainable use of training and testing lands by implementing a uniform land management program. ITAM provides Army range officers with the capabilities to manage and maintain training lands to support maneuver training throughput and mission readiness. The ITAM program is actively managed to respond to changing land conditions, training schedules, mission priorities, and environmental compliance. Training land management is coordinated through Garrison and IMCOM offices, and project planning is subject to installation coordination and approval. ITAM integrates the training mission requirements in the RTLP and uses installation environmental requirements to formulate best management practices for training land repairs. ITAM coordinates future land repair projects through the installation's Integrated Training Land Management (ITLM) process and submits installation-approved workplans to IMCOM for funding.

ITAM has five components, which work in unison to accomplish the ITAM mission:

- Range and Training Land Assessment (RTLA)
- Land Rehabilitation and Maintenance (LRAM)
- Training Requirements Integration (TRI)
- Sustainable Range Awareness (SRA)
- Geographic Information Systems (GIS)

## *Range and Training Land Assessment (RTLA)*

The RTLA Coordinator provides RTLA capabilities, recommendations and support to the ITAM Program including LRAM, GIS, TRI, and SRA components, by developing and maintaining an RTLA Plan and an annual report of RTLA monitoring results. The RTLA Coordinator functions as ITAM's scout and becomes the eyes for training land upgrades and repairs. RTLA monitors and assesses land conditions to provide information required to support land management decisions to sustain maneuver training lands capacity, capability and accessibility. RTLA assessments are driven by commander/training needs for the training land. This includes recommending and implementing assessment procedures and technologies, coordinating methodologies for gathering and analyzing data, assessing the condition of training land resources on the installation, making recommendations for the work locations to improve the quantity of training, and incorporating findings into an annual RTLA report.

The RTLA component shares RTLA results with the LRAM and ITAM Coordinators (and with installation agencies) to guide LRAM projects (e.g., erosion, vegetation loss, or maneuver damaged sites). The RTLA Coordinator monitors the effectiveness of LRAM projects to validate LRAM methodologies, techniques, and procedures. RTLA develops and monitors special plots to evaluate LRAM site recovery, vegetation regrowth, returns of undesirable vegetation, and to recommend when areas require new work. The RTLA Coordinator assists the LRAM Coordinator in identifying LRAM work sites, designing LRAM projects, and the development of ITAM Work Plan activity packets. RTLA attends Installation Project Review Board (IPRB) meetings to ensure ITAM project sites have not significantly changed, allowing for last minute considerations prior to commencement of work on planned projects.

## *Land Rehabilitation and Management (LRAM)*

LRAM is the land and maintenance component and is a key enabler for sustaining realistic training land conditions and supporting the training missions on the installation. LRAM is a preventive and corrective land rehabilitation and maintenance program that reduces the long-term impacts of training and testing on Installation lands. Its primary function is to maintain training land to ensure land capabilities can support the Army mission. It combines preventive and corrective land rehabilitation, repair, and/or maintenance practices to reduce the impacts of training and testing on an installation. It includes training area redesign and reconfiguration needed to meet training requirements. LRAM projects are identified by onsite ITAM observations, trainer feedback, DPW feedback, G3 guidance, and Senior Commander (SC) goals. The LRAM Coordinator identifies, plans, and designs projects for work. ITAM projects are prioritized by the ITAM Coordinator and presented, for consultation and coordination, during ITLM meetings with DPTMS, DPW, and DES for discussions and coordination of planned work. Projects are presented to the Garrison Commander (GC) for the installation's approval of each ITAM Work Plan.

LRAM designs projects utilizing coordinated and approved ITAM/LRAM methodologies by collecting field data, utilizing GIS maps, and by consulting with subject matter experts across many installation organizations. Final project designs are approved by the ITAM Coordinator and incorporated into the RCMP and ITAM Work Plans. LRAM oversees project work from start to completion by regular onsite visits, meetings with Contract Officer Representative (COR) or Non-Federal Entity (NFE) representative, inspections, and acceptance of work project deliverables during final inspections.

## *Training Requirements Integration (TRI)*

The primary focus of TRI is to ensure sustained accessibility to training areas while ensuring adequate training land availability to support training to standards under realistic land conditions, and to provide military trainers and land managers with the necessary technical and analytical information to integrate doctrinally based training and testing within land capabilities. The integration of requirements occurs through continuous consultation among the DPTMS, DPW, natural and cultural resource managers, and other environmental staff members.

ITAM-TRI actively participates in range and land management planning and execution, ensuring mission needs are considered in environmental and facilities planning, and environmental constraints are considered in mission planning. TRI achieves the "training-environmental" balance and interface which is key to the installation and requires continuous interaction and coordination between the operations/training staff and the natural resources management/environmental staff. This ensures wise land use planning, and land management and repair decisions are made to meet regulatory compliance and meet training and testing activity requirements. TRI provides training input for developing and updating the INRMP, in accordance with AR 350-19.

TRI utilizes the Range Facilities Management Suppport System (RFMSS) as an operational program that provides locations for DPW and ITAM work areas and timeframes of work for unit planning and avoidance. RFMSS, through the use of co-use agreements, allows units to utilize active work sections of training areas not currently under construction/repair work and provides a process for units to coordinate with work contractors for Soldier and contractor safety.

Trainers can coordinate with ITAM to refine the active work boundaries for a specific timeframe or to request re-location of work for priority training.

TRI facilitates training planning though the Military Training Excavation Program, where ITAM manages training areas military training excavations and ensures planned dig sites do not impact sensitive resources and real property infrastructure before approving the unit dig requests. ITAM manages training area (TA) No-Dig overlays for each TA, which are provided to trainers to allow units to plan for needed dig sites to support MRA training. ITAM No dig overlays are available to facility trainer planning prior to units submitting a FC200-10, Excavation request. Commanders' options are supported through the excavation program by instantly identifying dig restricted areas. The process provides timely feedback for any unit planning changes needed to support MRA training.

## *Sustainable Range Awareness (SRA)*

The primary goal of SRA is to provide the proactive means to develop and distribute educational materials to trainers/users of training lands to educate them with the intent of avoiding unnecessary and avoidable damage to maneuver training land and natural and cultural resources. ITAM offers SRA products to provide planning information to trainers to ensure training can be done without impacting environmental or safety concerns. SRA materials relate the principles of land stewardship and the practices of reducing training impacts to training land infrastructure and assets, including the local natural and cultural resources.

ITAM maintains a Soldier Field Card, an Aviation Field Card, and a Sustainable Training Land Use video, which provide guidance to trainers on various training aspects conducted at Fort Cavazos. ITAM SRA also maintains a Military Training Excavation SOP, which provides specific information on various types of training area dig requirements and how to complete a FC Form 200-10 permit request.

For SRA, ITAM provides standard and customized maps to support unit training which include: the Fort Cavazos Military Installation Map (MIM), land navigation maps, maneuver training planning maps, live fire range maps, specific training area maps, excavation map products, and other custom maps and digital data for units. Maps can be requested at ITAM as paper and/or digital copies, and via the SRP SharePoint site under the Fort Cavazos installation pages.

## *Geographic Information Systems (GIS)*

Using GIS, installations can create, analyze, manage, and distribute standardized geospatial information, products, and services to support range modernization, range operations, training, and the ITAM Program. There are five programmatic activities for the ITAM GIS program:

1. Contribute to the development and maintenance of an annual ITAM Work Plan, coordinating information technology support, and conducting required travel and training. GIS support functions are inherently iterative, require frequent coordination, reviews, and approvals with Garrison offices, and are subject to individual installation timelines and processes.
2. Provide geospatial analysis and cartographic support to Range Operations.

3. Gather and create geospatial data and perform geospatial analysis to support Range Modernization planning charrettes and Modernization reconfigurations to include range siting.
4. Provide training support products in direct assistance to the execution of training strategies and missions on the installation's ranges and training lands. Develop and maintain geospatial data, perform geospatial analysis, and create training support cartographic products (maps) in support of unit training.
5. Develop, update, manage, report, and maintain the DAMO-TRS (SRP) proponent SDSFIE Army Adaptation geospatial data layers in accordance with the DAMO-TRS SRP Geospatial Data Strategy, the SRP geospatial data Quality Assurance Plans (QAPs), and the SDSFIE Army Adaptation. Serve as the installation/site(s) Data Steward for all DAMO-TRS (SRP) proponent geospatial data layers. Coordinate all range and training area related facility data with the installation real property office to ensure correct real property attributes are included in the geospatial data and real property databases. Staff, review, and validate data for each GIS data layer. Develop, maintain, and update the Military Installation Map (MIM) with the required data layers to support mission requirements found on SRPWeb. Maintain, develop, and retain a copy of the existing geospatial data to include the creation of the required geospatial data layers to fill the MIM map extent. Digitally plan to update the MIM every five years, or as needed when major changes have been made to range and training land designations to support training and infrastructure updates.

### *ITAM Program and the ITLM Group*

Fort Cavazos has been proactive in supporting the long-term sustainment of training lands by integrating the ITAM Program, which functions as the ITLM chair, with the natural resources management program to support training requirements; land stewardship education; and environmental, cultural, and conservation management. The Fort Cavazos Range Complex Management Plan (RCMP), of which the ITAM Work Plan is a part, is the vehicle for the integration of natural, cultural, range master planning and infrastructure, and ITAM Program objectives for the installation.

The responsibilities for sustainment of the training lands and environmental compliance have been divided among DPTMS, Range Operations Branch (ITAM Program); DPW- ENV; DPW Operations and Maintenance Division, Roads and Grounds Branch; and DPW Master Planning Branch, and Engineer Branch to work together to maintain, repair, and reconfigure the training lands infrastructure to support readiness training. The Training Lands Committee has established a 25-year sustainment goal. The goals and management activities for the agencies involved have been divided into short-, mid- and long-range plans. The short-range plan involves the ITLM Program to repair and enhance land resources. The ITLM Program manages training land and supports training through the mid- and long-range components of the plan by repairing new maneuver land damage, minimizing erosion, reducing the backlog of training land repairs, and maintaining maneuver trail networks.

## 4.15.2 ITLM Program

Fort Cavazos is proactive in supporting the long-term sustainment of training lands by integrating

the ITAM Program, which functions as the Integrated Training Land Management (ITLM) chair, with DPW, DPTMS and natural and cultural resources management programs. In 2003, the ITLM Committee established its 25-year sustainment goals. The goals and management of activities for the agencies involved have been divided into annual plans to repair, enhance, and sustain the natural and training land resources. The ITLM process manages training land sustainment and supports training through the agencies' plans for repairing maneuver training lands, maneuver/land damage, minimizing erosion, reducing training land repair backlogs, the continuous maintenance requirements for maneuver trail networks, and wildland fire risk reduction. The ITLM group meets regularly to coordinate and approve planned repair projects and to discuss current and upcoming training land management needed for land repair projects. Bi-annually, the ITLM presents an ITAM Work Plan to the Garrison Commander for update and approval, prior to submitting to IMCOM for funding.

To address training and natural resource needs, the ITLM Program has identified the following objectives/goals for improving the training landscape and creating the requisite conditions for the long-term sustainability of the training lands:

- Improve the training landscape to support training and the environment;
- Enhance readiness training capabilities through best management practices;
- Reduce training obstacles in the primary heavy and infantry brigade combat team (BCT) maneuver training areas;
- Reduce soil erosion rates through BMPs;
- Identify and select native vegetative cover to reduce vegetation loss and bare ground;
- Provide an environment that will remain viable to support current and future maneuver and military readiness activity training while protecting environmental areas.

### 4.15.3 Cultural Resources

Cultural Resources are not discussed in this document. Refer to **Appendix B10** for a complete copy of the Fort Cavazos Integrated Cultural Resource Management Plan (ICRMP).

# Chapter 5 Implementation

## 5.1 Environmental Awareness

DoD Instruction 4715.3, *Environmental Conservation Program*, May 3, 1996, Paragraph D.1.i. states: "DoD installations may engage in public awareness and outreach programs to educate the public regarding the resources on military lands and DoD efforts to conserve those resources." In this case, the "public" includes both Soldiers and their families living on Fort Cavazos and in the community, as well as the general public in the region.

Environmental awareness and outreach is essential to long-term sustainability. In general, the more people know about an installation's unique and valuable natural resources and the reasons for protecting those resources, the more responsibly they will act toward them.

Natural resources professionals on Fort Cavazos conduct numerous environmental education programs for the public. Environmental information is provided in formats suited to each audience, including displays and presentations for local schools and scouting organizations; events such as Earth Day; assistance with service and community projects; and publications in the form of brochures, newsletters, and press releases. Natural resources professionals also assist the Public Affairs Office with information, articles, and interviews when called upon.

It is a goal of the NCRMB to continue to participate in outreach programs or events to explain contemporary natural resources issues and management as time and resources allow. Outreach participation has included involvement with the following organizations: Scout programs, Wounded Warriors, homeschooling associations, Texas A&M University Central Texas, University of Mary-Hardin Baylor, Twin Lakes Audubon Society, and the Fort Cavazos Sergeant Audie Murphy Club. In addition to working with non-profit organizations, NCRMB staff also participates in events that host hundreds of local children, educating them on the importance of environmental stewardship and exposing them to technologies used for natural resources management.

*GIS Day*

Nearly 1,300 local 6th graders participate in the annual Killeen GIS Day. The event near Fort Cavazos is one of the largest in the nation and is held annually during World Geography Week to teach children about geography and conservation. The event includes several city departments, Soldiers demonstrating how they use GIS technology, DPW-ENV staff members, emergency responders, and TPWD employees as well as other entities.

NCRMB contributes by providing interactive presentations about the use of GIS for natural resources management prepared by the on-staff geographer. The NCRMB AIM program also participates by discussing the use of GIS to monitor avian and monarch butterfly populations and track migration.

*Earth Day*

Fort Cavazos hosts over 1,000 3rd through 5th graders in an outreach effort through the post's DPW- ENV office. Earth Day begins with a tree planting ceremony. Students rotate to stations

learning about the benefits of biodiversity and clean air and water. The event ends with a display from Zoomagination, a local wildlife rehabilitation program that provides children with an opportunity to see rare and endangered species up close.

NCRMB staff play an active role by creating multiple learning stations and holding a tree planting ceremony with Fort Cavazos leadership. Each station covers a different area of natural resources conservation. Stations discuss: bat conservation, MBTA and avian nesting ecology, and pollinator science.

*Birding Tours*

Birding tours are available by advance reservation only and are provided by the natural resources outreach coordinator. The following organizations participate in field trips annually: Killeen ISD Advanced Placement Biology class, Twin Lakes Audubon Society, Travis Audubon Society, Central Texas College, Texas A&M University Central Texas, Central Texas Master Naturalists, and Texas Hawking Associations. Tours provide visitors with a chance to view multiple avian species in a wide variety of habitat types. When feasible, tours may offer the opportunity to view endangered songbirds in their natural habitat.

*Scout Involvement*

NCRMB staff regularly work with eagle scouts, and boy and girl scouts on community enrichment projects. Projects teach children responsible and ethical land stewardship and foresters a deep appreciate and respect for wildlife. The events hosted by NCRMB often include construction or enhancement of natural areas. The NCRMB Native Pollinator gardens serves as a backdrop for hosting such events. Children learn about central Texas flora and fauna with an added opportunity to leave their mark on the community through construction projects. The scouts have built flower beds, planted native plants, and have constructed and painted bird and bat houses. When resources are available the following days are typically used to host such events: Migratory Bird Day, Make a Difference Day, Great Backyard Bird Count, Pollinator Week, BIO Blitz, Earth Day (2016- 2018).

*Christmas Bird Count*

The AIM program hosts an annual Audubon Christmas Bird Count on the installation. Nature enthusiasts from Fort Cavazos and surrounding areas take part in this Fort Cavazos holiday tradition that typically takes place the 2nd or 3rd Thursday in December. Fort Cavazos's landscape is rich and diverse, being comprised of grasslands, wetlands, woodlands, and shrub lands. This diversity affords us a unique opportunity to observe a wide variety of bird species.

Each year, the Audubon Christmas Bird Count mobilizes over 72,000 volunteer bird counters in more than 2,400 locations across the Western Hemisphere. The Audubon Christmas Bird Count utilizes the power of volunteers to track the health of bird populations at a scale that scientists could never accomplish alone. Data compiled on Fort Cavazos will record every individual bird and bird species seen in a specified area, contributing to a vast citizen science network that continues a tradition stretching back more than 100 years.

To date, the count on Fort Cavazos has produced over 32,000 individual avian observations that detected over 142 different species, some of them being rare and undocumented for the area

(2016-2020). More than 60 volunteers from Oncor Energy, Dominion Energy, ACRT Inc., Twin Lakes Audubon Society-Belton, Texas A&M University Central Texas, and local homeschooling associations joined Fort Cavazos biologists to track the number of species seen within a 15 mile-wide radius of the installation.

*Environmental Compliance Officer Course*

Opportunities to learn about management of Fort Cavazos's natural resources are also made available to Soldiers and contractors. Fort Cavazos trains Soldiers, civilians, and contractors as Environmental Compliance Officers (ECOs), who serve as the backbone for their organization's environmental program, overseeing compliance in their areas of operation and providing training to all personnel.

During a 40-hour course, individuals are trained to recognize compliance requirements, as well as understand the intent and rationale behind the requirements for all of Fort Cavazos's environmental and conservation programs. In FY16, 240 individuals were trained as ECOs. Topics covered include: cultural resources, natural resources, MBTA guidance, entomology, environmental hazards, dig/water permitting, karst management, pest management, and cantonment wildlife.

*Awards*

The NCRMB's work has garnered local, regional, and national recognition. The following are awards and designations received by the NCRMB teams:

- USFWS Military Conservation Partner Award (2017)
    - The Military Conservation Partner Award is a national award presented annually to a military installation whose efforts result in significant conservation accomplishments by partnering with the USFWS and other conservation agencies.
- National Military Fish and Wildlife Association Model Program Award (2017, 2022, and 2023)
    - Presented to the AIM Program for proactive management of at-risk species.
    - Presented to NCRMB for Branch-wide accomplish ments 2022
    - Presented to NCRMB volunteer 2022
    - Presented to NCRMB volunteer 2023
- Cavazos Hero Awards
    - Outstanding Commitment to a Job AIM Team (2017)
    - Community Involvement Christmas Bird Count Team (2016-2017)
    - Volunteer in the Communities Make a Difference Day Team (2017)
    - Outstanding Commitment to a Job Wildlife Management Team (2015)
- Tree City USA Arbor Day Foundation (2006-present)
- Partners in Flight Group Investigations Award (2001)
    - For outstanding contributions to bird conservation.
- President's Conservation Achievement Award (1997)
- Important Bird Area Designation American Bird Conservancy
- Texas Organization for Endangered Species Landowner Stewardship Award
    - For long term efforts to seek compatibility between the military mission

and conservation of natural resources

## 5.2 Natural Resources Staff and Training

Fort Cavazos has a staff of professionally trained natural resources management personnel necessary to implement this INRMP. The University of Illinois (U of I) provides natural resources personnel and assistance through a cooperative agreement. The personnel that currently constitute the natural resources management staff at Fort Cavazos, including contract personnel, are listed in **Table 5-1**.

**Table 5-1. Fort Cavazos Natural Resources Management Staff**

| Permanent, Full-Time Personnel | |
|---|---|
| Number | Position |
| **Fort Cavazos NCRMB Staff** | |
| 1 | Supervisory Natural Resources Manager (Army civilian) |
| 1 | Supervisory Natural Resource Specialist (Army civilian) |
| 1 | Supervisory Wildlife Biologist (Army civilian) |
| 1 | Agronomist (Army civilian) |
| 1 | Wildlife Biologist (Army civilian) |
| 7 | Natural Resource Specialist (Army civilian) |
| 1 | Entomologist (Army civilian) |
| 1 | Bio Science Specialist (Army civilian) |
| 1 | Geographer (Army civilian) |
| 1 | Outreach Coordinator & Cowbird Tech (Army civilian) |
| **U of I Staff** | |
| 1 | Field Biologist - warbler |
| 1 | Field Biologist - vireo |
| 2 | Field Biologist – wildlife tech |
| 16 | Endangered Species seasonal biologists |
| 3 | AIM Field Biologist Team Leads |
| 1 | AIM Field Biologists |
| 4 | AIM Seasonal Biologists |

Additional sources of temporary labor, hired with term limitations, include seasonal employees (NCRMB and U of I), other university hires, and outside agency reimbursable hires. However, the natural resources management professionals currently in-house provide the foundation and fulfill the managerial roles necessary to continue the highly successful natural resources program at Fort Cavazos.

Implementation of several projects discussed in this INRMP will require active outside assistance. This assistance will come from State and Federal agencies, private consortiums and organizations, universities, and contractors. These resources have proven to be the most efficient and cost-effective method for acquiring expertise on a temporary basis, when Army personnel are not available. Some of the parties will be reimbursed for their assistance, as agreed upon in MOUs and contractual agreements, whereas others will supply their assistance in accordance with cooperative agreements.

NCRMB will send at least one person to each of the following annual workshops or professional conferences as appropriate (dependent on availability of funding):

- International Erosion Control Association
- National Military Fish and Wildlife Association annual workshop
- American Society of Agronomists/Arboriculture annual meeting
- North American Natural Resources Conference
- Southeastern Association of Fish and Wildlife Agencies
- TSS Workshop
- The Wildlife Society Conference
- GIS workshops and Training
- American Fisheries Society Annual Workshop
- Society for Range Management
- Speleology conferences and workshops
- Bat/mammalogy conferences and workshops
- Land Trust Alliance conference
- Ornithological conferences and workshops
- Texas Mussel Workshop
- Texas Plant Conservation Conference

Other conferences and workshops will be evaluated for their usefulness, and decisions will be made based on the relevance to ongoing projects and funding availability. Meetings that are especially useful include ornithological workshops, remote sensing training, GIS basic and advanced training, turkey symposia, white-tailed deer symposia, Watchable Wildlife workshops, invasive species symposia, wetlands training, mammalogy workshops, speleology workshops/training, and endangered species training.

Personnel will be trained in their environmental fields. NEPA training will be required of all supervisory personnel, as well as others who review or prepare NEPA documents.

## 5.3 Knowledge and Information Gaps

### 5.3.1 Pending Issues

*Vegetation* – Previously, non-native, invasive vegetation (primarily B Dahl, an old-world bluestem) was planted to revegetate highly eroded areas across the installation. NCRMB began designing a study to evaluate a better approach to revegetation with native grasses and forbs that rebound quickly and protect the landscape from heavy maneuver training. The study will evaluate which plants grow best in the various soil types and required seeding rates to meet desired conditions.

*Herbicides* – Another study is currently underway to evaluate the effectiveness and necessity of using herbicide to chemically manage grasslands on the installation. This study includes the need to use herbicides on native hardwood trees. The study is being conducted by ERDC. This multi-year study will monitor migration of herbicides within the site through both soil and water resources, as well as track re-growth of treated vegetation.

### 5.3.2 Unresolved Issues

*Grazing* – The primary unresolved issue involves the extent of grazing that will occur on Fort Cavazos lands. The land that makes up Fort Cavazos was purchased from the original landowners over a long period. The original landowners have been allowed to graze the lands through the out-lease programs, first directly through the owner, and later through the CTCA.

In recent years, the combined effects of military maneuver, a required activity for military readiness, and continuous grazing on the training lands at Fort Cavazos has adversely affected the military mission, readiness, and training, as well as the current condition and long-term sustainability of the training lands. Because there are no fences to contain cattle, the animals are free to move about the installation with little regard for the actual stocking rates on any one GMU. As a result, the vegetative communities on many of the training areas have been reduced to species types with shallow root systems that are unsuitable for holding soils and preventing or minimizing erosion. Stormwater runoff has severely eroded the training areas, creating extensive gullies that impede vehicle and troop movement. In 2015, a new 5-year grazing lease was executed with terms to annually assess the forage consumable quantity and military training intensity, considering both when determining a stocking rate for the next grazing year. While the lease itself establishes the methodology, one of the key lease terms is to finalize and implement a Grazing Management Plan that clearly defines the approach and procedures used annually to establish a stocking rate with the overall goal of maintaining and improving the ecological condition of military training lands.

*Contract review* – Another unresolved issue includes contract verbiage to protect environmental and natural resources in projects occurring on Fort Cavazos. More oversight and review of proposed projects' products and methodologies is needed to ensure that environmental and natural resources aspects are included.

*Conservation Law Ennforcement/Game Warden Requirement* – A requirement and need for additional CLEO/Game Warden staff was identified both internally and during a recent EPAS inspection. Law enforcement in the training areas is a critical aspect of enforcing the requirements of this INRMP. 16 USC 670e-2 Section 107 states: "To the extent practicable using available resources, the Secretary of each military department shall ensure that sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to perform tasks necessary to carry out this subchapter, including the preparation and implementation of integrated natural resources management plans." Additionally, DoDI, 4715.03, Enclosure 3, para 1.l. INRMP PREPARATION, REVIEW, AND IMPLEMENTATION further requires that, '…DoD Components shall ensure that sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to manage their installations' natural resources…" Steps mist be taken immediately to remedy this unresolved issue.

## 5.4 Funding

All requirements set forth in this INRMP requiring the expenditure of funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. Section 1341). No obligation undertaken by Fort Cavazos under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

The Office of the Secretary of Defense considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, a high priority. The reality, however, is that not all the projects and programs identified in **Chapter 6.0** of this INRMP will receive immediate funding. Consequently, the programs and projects have been screened and only the high-priority projects are included. The prioritization of the projects is based on need, and need is based on a project's importance in moving the natural resources management program closer to successfully achieving its goals. Therefore, projects will be conducted subject to the availability of funding.

Project funding is derived from a variety of sources. Annual Work Plan (AWP) requests for both recurring and nonrecurring projects are submitted to Installation Management Command (IMCOM) for approval. When funding is received, IMCOM distributes funding based on approved projects on the AWP for implementation at the installation level. In addition to AWP funding, programs within NCRMB compete for grants and other award funding. Projects are conducted subject to the availability of funding and personnel to complete required tasks.

# Chapter 6 Five-Year Implementation Plan

| INRMP Objective | Proposed Project Title | Region (Refer to Figure 2-4) | Monitoring Frequency (Estimate how often the indicator will be observed or measured) |
|---|---|---|---|
| Manage wildlife and fisheries resources within the principles and guidelines of ecosystem management to maintain productive habitats and viable populations of native species. | Ecosystem Plantings | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | In cantonment areas as needed/required for tree replacement |
| | Habitat Delineation | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Updated annually |
| | Invasive Species Management and Control | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | As needed and approved by NCRMB |
| | Planning Level Surveys | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | As needed |
| | Vegetation Classification Mapping | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | 5 Year Cycle or as funded |
| | Wildlife Management | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | As needed |
| | Prescribed Burning | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Annually/Seasonally |
| Prevent the degradation of water quality, protect aquatic and riparian habitats, and identify and restore degraded habitats. | Waters of the U.S. Survey | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | Every 5 years |
| | Native Seed Mix Study | Grassland Habitats in the LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | As needed for BMP recommendations |

| INRMP Objective | Proposed Project Title | Region (Refer to Figure 2-4) | Monitoring Frequency (Estimate how often the indicator will be observed or measured) |
|---|---|---|---|
| Provide quality consumptive and non-consumptive recreational opportunities while avoiding impacts on training and maintaining a balanced and diverse ecosystem. | Fisheries Management | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | Annually/Seasonally |
| | Lake and Pond Management | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | Annually/Seasonally |
| Provide special protection and management that leads to the recovery of threatened and endangered species and conserve species of concern and their habitats so that new species are not listed. | Protection and management of Golden-cheeked Warblers | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Annually/Seasonally |
| | Protection and management of Black-capped Vireos | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Annually/Seasonally |
| | Brown-headed Cowbird Control | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Annually/Seasonally |
| | Vegetation Monitoring of Fire Effects in Endangered Species Habitat | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | As needed |
| | Cave Monitoring | LTA, Northeast, Northwest, South, Southeast MUs | Monthly to Annually |
| | Cave Survey, Mapping, and Inventory | LTA, Northeast, Northwest, South, Southeast MUs | Monthly to Quarterly |
| | Survey of Endemic Cave Salamander | LTA, Northeast, Northwest, South, Southeast MUs | Quarterly |
| | Implementation of Karst Management Plan | LTA, Northeast, Northwest, South, Southeast MUs | Quarterly |
| | Warm season bat population monitoring & cold season bat counts | LTA, Northeast, Northwest, South, Southeast MUs | Monthly |
| | Freshwater mussel surveys | Fort Cavazos Streams located in LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs, and the Cantonment Areas | Annually |

| INRMP Objective | Proposed Project Title | **Regions** (Refer to Figure 2-4) | **Monitoring Frequency** (Estimate how often the indicator will be observed or measured) |
|---|---|---|---|
| | Plains spotted skunk survey | Northeast, Northwest, South, Southeast, Southwest MUs | 5 Year Cycle |
| | Monarch Butterfly/Pollinator surveys | LTA, NFC, WFH, Northeast, Northwest, South, Southeast, Southwest MUs and Belton Lake | Annually |
| | Avian Mission-Sensitive Species Surveys | LTA, NFC, Northeast, Northwest, South, Southeast, Southwest MUs | Annually |
| | Whooping Crane Surveys | Bodies of water in the Southeast areas and Belton Lake | Annually |

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# Chapter 7 National Environmental Policy Act Compliance and Integration

## 7.1 Introduction

This integrated EA is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 US Code [U.S.C] 4321 et seq.), the Council on Environmental Quality (CEQ) *Regulations Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] Part 1500-1508), and the Army NEPA Regulation (*Environmental Analysis of Army Actions*; 32 CFR Part 651, 1 January 2007).

Under NEPA and its implementing regulations, Federal agencies are required to consider the environmental impacts of major proposed actions in the form of an EA or EIS. This NEPA analysis records the development process for and evaluates the potential environmental effects of implementing the updated INRMP for Fort Cavazos. This INRMP updates the 2014-2018 INRMP and specifies the land management practices and adaptive management strategies that will conserve ecological integrity, Army training, and promote the health of Fort Cavazos's lands.

NEPA regulations collectively establish a process by which the Army considers the potential environmental impacts of its proposed actions and invites the involvement of regulators and interested members of the public prior to deciding on a final preferred course of action. As such, this EA will facilitate the decision-making process regarding this INRMP. This EA will also provide the basis for determining if a Finding of No Significant Impact (FNSI) is appropriate, or if an EIS is required in accordance with the above regulations.

The Army's approach to natural resources management is embodied in its vision of the relationships between its military mission and the natural resources upon which that mission depends. Together, natural resources professionals and military personnel will strive to promote the long-term ecological sustainability of Fort Cavazos for multiple-use opportunities.

## 7.2 INRMP and NEPA Integration

Army guidelines recommend that the INRMP and its associated NEPA analysis and documentation be prepared concurrently. Recognizing the efficiencies in cost and time that could be realized from a fully integrated approach to the planning development process, Fort Cavazos has fully integrated this INRMP and its associated NEPA analysis and documentation into a single report. Combining an INRMP and its associated EA is the preferred approach for integrating environmental analysis and documentation. This approach embraces the intent and spirit of NEPA, as well as the requirements of 32 CFR Part 651 and AR 200-1.

To allow the reader to readily identify elements of the NEPA analysis, **Table 7-1** presents a "road map" to the corresponding EA sections embodied in this document. All remaining sections pertain primarily to the INRMP.

Additionally, except for the Grazing Lease, the ICRMP, and the RCMP, the documents referenced

in **Appendix B** of this document shall be considered an extension of this INRMP for the purposes of NEPA review and documentation. As such, the environmental review and subsequent NEPA process applies to these documents in Appendix B. The documents referenced have been reviewed for operation and effect and have been updated as a part of this INRMP review process. Therefore, the NEPA documentation completed for this INRMP shall be extended to, and applies to, the documents referenced in Appendix B of this document, except for the Grazing Lease, the ICRMP, and the RCMP which each have their own NEPA documents.

**Table 7-1. Road Map Indicating NEPA Analysis and Corresponding INRMP Sections**

| Required NEPA Analysis | Corresponding INRMP Section |
|---|---|
| The **Executive Summary** briefly describes the proposed action, environmental consequences, and mitigation | Provided immediately |
| The **Purpose of and Need for the Proposed Action** summarizes the Proposed Action's purpose, explains why the action is needed, and describes the scope of the environmental impact analysis process. | **Section 7.3** |
| **Scope of Analysis** describes the scope of the environmental impact analysis process. | **Section 7.4** |
| **Description of the Proposed Action and Alternatives** describes the Proposed Action of implementing the INRMP (i.e., the selected management measures) and alternatives to implementing the Proposed Action. | **Section 7.5** |
| **Affected Environment** describes the existing environmental setting. | **Chapters 2.0** and **4.0** |
| **Environmental Consequences** identifies potential environmental effects of implementing the Proposed Action and the No Action Alternative. | **Section 7.7** |
| **References** provides bibliographical information for cited sources. | **Appendix A** |
| **Agency Correspondence** includes the persons and agencies consulted during preparation of this INRMP/EA, recipients of this INRMP/EA, and agency consultation letters. | **Appendix D** |

## 7.3 Purpose of and Need for the Proposed Action

The purpose of updating and implementing the INRMP is to meet the requirements of the Sikes Act (Title 16, U.S.C 670a et seq.) as amended, which provides the primary legal basis for the Secretary of Defense to carry out a program for the conservation and rehabilitation of natural resources on military installations. To facilitate such a program, the Act requires the Secretary of each military department to prepare and implement an INRMP at appropriate military installations throughout the United States under their respective jurisdictions. Moreover, such plans shall be prepared in cooperation with, and reflect the mutual agreement of, the Secretary of the Interior (acting through the Director of the USFWS) and the head of each appropriate State fish and wildlife agency for the State(s) where the military installation is located.

According to the Sikes Act, the INRMPs must address the following:

- The management of land, forests, fish and wildlife, and fish and wildlife-oriented recreation
- Wetland protection and enhancement
- Fish and wildlife protection and enhancement or modification
- Sustainable public use of natural resources and public access for such use (subject to requirements necessary to ensure safety and military security)
- Integration of and consistency among the various activities conducted under the INRMP
- Natural resources management goals, objectives, and time frames for this Proposed Action
- Enforcement of applicable natural resources laws (including regulations)

- No net loss of the capability of the installation to support the military mission
- Other activities as the Secretary of the Army determines appropriate

Fort Cavazos has ensured that the 2024-2028 INRMP has met the Sikes Act requirement as listed above. The focus of the INRMP is to be ecosystem based, rather than management for single- species or resource. To ensure that Fort Cavazos can meet its mission needs now and into the future, the natural resources that provide the training environment must be managed such that they are ecologically sustainable. Updating and implementing the INRMP ensures that desired future conditions, which envision all aspects of a future ecosystem and include conservation and military mission related needs, are integrated and consistent with applicable Federal and State stewardship requirements. Fundamentally, the INRMP represents a proactive approach in assuring training over the long-term continues through the sustainability of natural resources.

## 7.4 Scope of the Environmental Assessment

This EA provides a detailed comparative analysis of the following alternatives:

> **Proposed Action** – Implement the updated 2019-2023 INRMP defined in **Section 7.5.1** to fulfill the assigned environmental protection requirements of Fort Cavazos. This is Fort Cavazos's preferred alternative.
>
> **No Action Alternative** – Continue natural resources management under the 2014-2018 INRMP.

The following resources were identified and analyzed for the Proposed Action and No Action Alternative: land use, air quality, noise, geology, soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, facilities, and hazardous and toxic materials/wastes. This EA also considers the cumulative effects of the Proposed Action when added to other past, present, and reasonably foreseeable actions within the region.

As specified under NEPA and CEQ Regulations 40 CFR 1500-1508, a monetary cost-benefit analysis is not required as part of the EA. The Proposed Action and its alternatives have been developed based on Federal and State environmental regulations and mission requirements. As such, no quantitative financial assessment has been performed.

## 7.5 Description of the Proposed Action and Alternatives

### 7.5.1 Proposed Action

The Proposed Action is to implement the updated 2024-2028 INRMP for Fort Cavazos. This action would meet the Army's underlying need to train Soldiers in a sustainable setting that complies with current environmental regulations and policies. The proposal includes natural resources management measures involving geographic areas associated with the contiguous properties of the installation. The INRMP is a "living" document that will be modified (adaptively managed) over time. The Proposed Action focuses on a 5-year planning period, which is consistent with the time frame for the management objectives described in the INRMP. The Proposed Action involves putting in place the management goals, objectives, and projects presented in **Chapters 4.0** and **6.0**.

Additional environmental analyses might be required as new management objectives are developed over the long term (beyond 5 years). Implementation of some INRMP related projects might also require evaluation to determine the need for and appropriate level of NEPA documentation.

### 7.5.2 No Action

The No Action Alternative would not immediately change management direction or the level of management intensity. Under the No Action Alternative, Fort Cavazos would continue to operate using existing programs and management practices in accordance with the 2014-2018 INRMP. Current management measures for natural resources would remain in effect, and existing conditions would continue as the status quo. The No Action Alternative includes the existing INRMP that has not been updated and would fail to meet the described purpose and need. CEQ regulations prescribe inclusion of a No Action Alternative, which serves as a benchmark against which proposed Federal actions can be evaluated.

### 7.5.3 Alternatives Eliminated from Further Consideration

The selection of management measures within the INRMP involved a screening analysis of resource-specific management alternatives. The screening analysis involved the use of accepted criteria, standards, and guidelines when available, as well as best professional judgment, to identify management practices for achieving Fort Cavazos's natural resources management objectives. The outcome of the screening analysis led to the development of the Proposed Action. Obviously, an infinite number of permutations of specific management alternatives are possible. Consistent with the intent of NEPA, this process focused on considering a reasonable range of resource-specific management alternatives and, from those, developing a plan that could be implemented, as a whole, in the foreseeable future. It then omitted from detailed analysis management alternatives deemed to be infeasible.

Management alternatives considered during the screening process, as is the rationale for their being omitted from detailed analysis are summarized as follows.

***Conservation Law Enforcement.*** Fort Cavazos is a large, open installation that demands intensive vigilance and patrol to ensure compliance with all laws, regulations, and policies. Current Natural Resources Law Enforcement staffing levels are minimally sufficient to provide adequate protection. Because a less-intensive management approach to law enforcement would not afford a sufficient level of protection and compliance, this approach was not considered.

***Soil, Erosion, and Sedimentation.*** Intensive management measures are proposed for the soil resources on Fort Cavazos under the Proposed Action. Other soil management alternatives that represented a program consisting of fewer, and less intensive, management measures were considered but rejected. The other management alternatives considered represented the minimum approach to achieving a soil management program that could comply with the guidelines established in AR 200-1. The management alternatives in the minimum approach were aimed at controlling or reacting to erosion, soil loss, and disturbance that could occur, rather than taking the proactive steps necessary to prevent, to the maximum extent practicable, the likeliCavazos of such events occurring. Given that nearly 87 percent of the soils on Fort Cavazos are vulnerable to erosion, this minimal approach to soil management was rejected. The intensive use of tracked and wheeled vehicles requires continuous vegetative cover, and the ability to sustain this cover over the long term could be jeopardized by a minimal management approach and severe climatological events (e.g., heavy rains and wind). The effort and resources necessary to implement the proposed approach are a prudent investment toward ensuring the long-term sustainability of the soil resources.

***Water Resources.*** A less intensive approach to water resource management was considered but rejected. The CWA has severe regulatory implications for noncompliance that could adversely affect the ability of Fort Cavazos to support its mission. In addition, potential liability is associated with not knowing the conditions of water from which people catch and eat fish, and drink. These conditions warrant implementing the intensive water monitoring program described under the Proposed Action.

***Sensitive Species.*** Because protection of Federally listed species is mandated by Federal law and protection of State-listed and rare species is required by Army regulation, other management alternatives that would have afforded less protection to these species were not considered. A lower-intensity management approach to listed species would include reducing or easing management for these species altogether. That management approach was rejected because it would not comply with the spirit of AR 200-1 or comply with the agreed-upon provisions of the ESMC and the 2015 BO.

Species that are candidates for Federal listing or are State-listed as threatened, endangered, or of special concern are not protected under the ESA. However, because candidate species might be listed in the future, installations are required to avoid taking actions that result in the need to list these species and are encouraged to participate in conservation agreements with the USFWS. For State-listed species, installations are encouraged to cooperate with State authorities in efforts to conserve these species.

Because Army regulations require protection of Federal and State-listed and rare species, other management alternatives that would have afforded less protection to these species were not considered. A lower-intensity management approach would include reducing or ceasing management for these species and their habitat altogether. That management approach was rejected because it would not comply with proactive management to preclude listing.

***Recreation.*** A management alternative that included more intensive measures to enhance recreational opportunities was considered but rejected. The most resource-efficient management approach is to focus on maintaining and improving the ecological integrity of terrestrial and aquatic habitat. Therefore, a higher-intensity management alternative would not be a prudent use of resources.

***Fisheries Management.*** Restricting access to the riparian and aquatic areas at Fort Cavazos was considered, but it was rejected because training restrictions in those areas would impede training under realistic conditions. Improving water crossings for all the streams to protect the integrity of the aquatic habitats was also considered. However, the more prudent allocation of resources involves prioritizing stabilization projects based on need. In addition, ground-disturbing activities associated with such projects could contribute additional sediment loads and disturb aquatic habitats during the stabilization process. It is possible to protect, conserve, and enhance the aquatic habitats at Fort Cavazos to ensure long-term ecological integrity, support healthy fish populations, and provide recreational opportunities without placing undue restrictions on the military mission. Therefore, implementation of these other management alternatives is not necessary.

A more intensive (and traditional) approach to fisheries management, in which management techniques focus on more intensive manipulation of the food chain, gamefish stocks, and increased levels of stocking, was considered. This intensive or traditional approach to fisheries management is costly and less effective in the long term than the approach presented under the Proposed Action. Habitat improvement and protection measures are far more effective than intensive stock manipulation, and they have a higher probability of producing long-term improvements in the quality of recreational fishing at relatively low costs.

***Game Management.*** A lower-intensity approach to game management, in which management techniques would be minimized and implemented on a smaller scale, was considered. Under a lower-intensity management approach, fewer steps would be taken to manage wildlife resources and management would more closely resemble the status quo, or less. Although the effect of such a course of action would be gradual and not immediately apparent, the long-term impacts could be very detrimental to the military mission and to biodiversity. Ultimately, the ability of the installation to manage wildlife populations with accepted scientific methods and support the mission would be impaired. Furthermore, it is conceivable that with a lower-intensity management scheme additional species might become Federally listed, resulting in additional training restrictions. Thus, lower-intensity management was eliminated from further consideration.

***Flora and Habitat.*** A higher-intensity approach to vegetation management, in which management techniques similar to the Proposed Action would be implemented on a larger scale, was considered.

Under this alternative, the acreage of training lands defined as critical areas and potential critical areas would be increased and more of these areas would be repaired and revegetated annually. Moreover, additional training lands would be included in the TRAP and tighter restrictions on cattle grazing would be implemented. However, such an increase in the intensity of vegetation management would have an adverse effect on the area of land available for training, and deferment of grazing activities is not possible due to a lack of fencing in the training areas. As a result of the adverse effects on training, this alternative was eliminated from further consideration.

Under a lower-intensity management approach, fewer steps would be taken to manage vegetation. For example, the area of land in the TRAP would be decreased or the program would be eliminated completely. The effort and resources expended to identify and repair degraded lands would be decreased. This alternative would quickly result in the degradation of the training lands, proving detrimental to the military mission. In addition, increased erosion and sedimentation would adversely affect water resources, aquatic habitat and biological communities, overall biodiversity, and karst habitats and the sensitive species that inhabit them. A lower intensity of management would also subvert Fort Cavazos's goal of environmental sustainability of its training lands. Thus, lower-intensity vegetation management was also eliminated from further consideration.

***Forest/Woodland Management.*** More intensive management efforts were considered but rejected. More efforts to manage the forests and woodlands at Fort Cavazos would direct limited funds and resources away from programs requiring more intensive management. Use of herbicides on species other than jujube and mesquite were rejected due to the need to minimize pesticide use as well as the need to allow re-growth of native species in areas where training activities are low.

***Wildland Fire Management.*** The fire management and prescribed burning measures proposed for Fort Cavazos are those minimally required for effective fire management and protection of endangered species habitat. Other management alternatives that require more or less aggressive fire management were considered but rejected. Because accidental fires result from the use of pyrotechnics and some types of ammunition during training, a more conservative alternative would involve increasing the restrictions on the use of pyrotechnics and ammunition or eliminating their use altogether. This management strategy would place an unacceptable level of restriction on training activities and the military mission, and therefore was rejected. This conservative approach would also attempt to extinguish all wildfires outside the impact area regardless of whether they posed a direct threat to endangered species habitat, human health, or facilities. This approach could allow fuel loads to build to levels that would make it difficult to quickly and safely extinguish future fires. The fires of 1996 occurred during a time when fuel loads were very high and resulted in extremely hot fires that were difficult to contain and extinguish. These extreme wildfires adversely affected training and destroyed a significant amount of endangered species habitat. The let-burn policy will assist in maintaining fuel loads at more manageable levels that should not result in extreme and difficult-to-control fires.

***Agricultural Leases.*** Less intensive management alternatives were considered but rejected. Overuse by cattle in the past has resulted in degraded rangeland vegetative cover, eroded training lands, and numerous interruptions of training exercises. Applying a more liberal use of training

lands for grazing could adversely affect the long-term sustainability of training lands and increase interruptions of training. Measures to protect the golden-cheeked warbler are required to ensure compliance with the ESA and BO.

More intensive management alternatives were also considered but rejected. Fort Cavazos has had a long-standing relationship with the local cattlemen and is committed to providing multiple uses of its resources. More conservation management alternatives are not necessary provided that overuse does not adversely affect the long-term sustainability of the training lands and that sediment loads to the water resources serving the surrounding communities do not degrade water quality, aquatic habitat, and water supply capacity.

***Integrated Pest Management.*** The pest management measures in use at Fort Cavazos, as described in the IPMP, are relatively low in intensity. Lowering that intensity further would not provide sufficient control of invasive species and nuisance animals, which would create a potential for those species to adversely affect Fort Cavazos and increase human health risks. More intensive pest management measures would result in increased usage of pesticides. This would be counterproductive and counter-directive to the Army's goal of reducing pesticide usage. More aggressive efforts to eliminate pests such as exotic and invasive species might further reduce their populations in targeted areas, but the small incremental benefit would not offset the significant implementation costs. Therefore, higher-intensity management approaches were also dropped from further consideration.

***Noxious Weeds and Invasive Species.*** Intensive invasive species management measures have resulted in increased usage of pesticides and herbicides, as well as hunting and trapping of feral animals. More aggressive efforts to eliminate exotic and invasive species might further reduce their populations in targeted areas, but the benefit would not offset the significant implementation costs. Therefore, higher-intensity management approaches were dropped from further consideration.

Application of this screening process in developing the Proposed Action (implementation of the management measures contained in the 2024-2028 INRMP), eliminated the need to define and evaluate hypothetical alternatives to plan implementation. As a result, less-intensive and more- intensive management measures were eliminated from further consideration, and this EA formally addresses only two alternatives, the Proposed Action (implementation of this INRMP) and the No Action Alternative.

## 7.6 Statement of Preferred Alternative

According to 40 CFR Section 1502.14(e), the Army must identify its preferred alternative. This statement serves as identification of the "Proposed Action" as Fort Cavazos's preferred alternative.

## 7.7 Affected Environment and Environmental Consequences

This section identifies potential direct, indirect, and cumulative effects of the Proposed Action and No Action Alternative on each resource.

This is a "focused EA," consistent with guidance issued by the CEQ at 40 CFR 1501.7(a)(3). In considering environmental and socioeconomic resources and conditions, the Army has determined that certain resources would not be affected by either the Proposed Action or No Action Alternative and, therefore, do not need to be evaluated in detail. The following resources would not be measurably affected by the Proposed Action or the No Action Alternative.

***Air Quality.*** No effects would be expected. The primary concern regarding air quality and potential environmental effects pertains to increases in pollutant emissions; exceedances of National Ambient Air Quality Standards and other Federal, State, and local limits; and impacts on existing air permits. Potential effects on existing pollutant emissions are precluded by the fact that the Proposed Action does not involve any activities that would contribute to changes in existing air quality. Therefore, there would be no effects regarding air quality as a result of implementing the Proposed Action.

***Noise.*** No effects would be expected. The primary concern regarding noise and potential environmental effects pertains to increases in sound levels, exceedances of acceptable land use compatibility guidelines, and changes in public acceptance (i.e., noise complaints). However, potential effects are precluded by the fact that the Proposed Action does not involve any activities that would affect noise conditions. Therefore, there would be no effects regarding noise levels or sound quality as a result of implementing the Proposed Action.

***Floodplains.*** No effects would be expected. The primary concern regarding floodplains is construction within and loss of floodplain capacity. The Proposed Action does not involve any activities that would involve construction within the floodplains of Fort Cavazos; therefore, there would be no effects as a result of implementation of the Proposed Action.

***Coastal Zone Contingency.*** No effects. Congress enacted the Coastal Zone Management Act to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses. According to the Texas General Land Office, Fort Cavazos is not located in the Texas Coastal Zone.

***Socioeconomic Resources.*** No effects would be expected. The Proposed Action would not involve any activities that would contribute to changes in population, housing, industry earnings and employment, or personal income.

***Environmental Justice.*** No effects would be expected. Implementation of the Proposed Action would not create any advantage or disadvantage for any group or individual and would not create disproportionately high or adverse human health or environmental effects on children or minority or low-income populations at, or surrounding Fort Cavazos.

***Facilities.*** No effects would be expected. All facilities would continue to be maintained and operated in accordance with required permits and capabilities of the systems. Under the Proposed Action, the demand for utilities and roads would not be expected to increase and therefore would not adversely affect existing facilities.

***Hazardous and Toxic Materials.*** No effects would be expected. All hazardous and toxic materials would continue to be handled in accordance with Federal laws and Army regulations, including the Resource Conservation and Recovery Act; the Federal Insecticide, Fungicide and Rodenticide Act; the Toxic Substances Control Act; and AR 200-1. Thus, no adverse effects regarding the generation of hazardous and toxic materials would be expected under the Proposed Action.

### 7.7.1 Land Use

The current land uses at Fort Cavazos are outlined in **Section 2.2** of the INRMP.

*Effects of the Proposed Action*

Beneficial effects would be expected. Under the Proposed Action, Fort Cavazos would continue to pursue and implement an effective ARMY REPI, which would limit urban sprawl and reduce potential encroachments on the military mission.

*Effects of the No Action Alternative*

Moderate adverse effects would be expected. Without pursuit of the ARMY REPI program as proposed in the INRMP, urban sprawl could be expected to continue along Fort Cavazos's borders resulting in further encroachments on the military mission.

### 7.7.2 Soils

Soils, sedimentation, and erosion are discussed in detail in **Section 4.4**.

*Effects of the Proposed Action*

Beneficial effects would be expected. By implementing a comprehensive soil resource management program, impacts on soils associated with erosion and sedimentation on Fort Cavazos would be minimized. As part of the Proposed Action, existing sites where erosion has been determined to be a problem would be addressed through the RCMP and the TRAP Program. In addition, monitoring soil conditions to identify potential problem areas, implementing conservation measures, improving the type and area of vegetative cover, managing cattle grazing, and, when possible, avoiding activities likely to result in erosion would minimize potential impacts on the soil resource and result in a reduction in erosion at Fort Cavazos.

*Effects of the No Action Alternative*

No effects would be expected. Current resource management measures would continue to monitor soil conditions and erosion and sedimentation rates on the installation and evaluate conservation measures to reduce these rates. In addition, the RCMP and TRAP Program would continue to address problematic erosion sites.

### 7.7.3 Water Resources

The current condition of water resources at Fort Cavazos are discussed in detail in **Section 4.6**.

*Effects of the Proposed Action*

***Water Quality.*** Beneficial effects would be expected. Implementing a comprehensive sampling and assessment plan and developing a database would allow Fort Cavazos to readily track the

status and trends of water and habitat quality in the training areas and provide a methodology for evaluating the effectiveness of BMPs. The Proposed Action also facilitates the identification of problem areas with high erosion and sedimentation and maintains protective riparian buffer zones to prevent degradation of water resources and aquatic habitats.

***Surface Water.*** Beneficial effects would be expected. The assessment of aquatic habitats at Fort Cavazos would provide a basis for developing a management program that would both protect and enhance these habitats on the installation. Assessment of aquatic habitats would also provide a baseline that could be used in tracking the conditions and trends of these habitats, which would allow management practices to be applied where and when needed. The continued observance of riparian buffers around surface water bodies at Fort Cavazos would provide protection to habitats both in and adjacent to the resource. Where impacts on aquatic habitats occur as a result of mission activities, management objectives would provide for the timely mitigation of the impacts. Beneficial effects could be expected as a result of the development of a plan to monitor and control aquatic vegetation before it becomes a significant problem.

***Wetlands.*** Beneficial effects would be expected. Implementation of the Proposed Action would protect wetlands by providing a basis to evaluate and monitor habitat conditions through the development of a wetlands management plan. Maintaining buffers would continue to minimize potential impacts on wetlands associated with adjacent activities. Additional efforts would be made to reduce impacts on wetlands by planning mission activities, when possible, in a manner consistent with wetland protection objectives. Where current activities might be affecting wetland functions, efforts would be made to identify the types and sources of impacts; where applicable, restoration of affected habitats would be implemented.

*Effects of the No Action Alternative*
No effects would be expected. Current resource management measures would continue to monitor and enhance water quality aquatic habitat, and wetlands on the installation.

### 7.7.4 Sensitive Species

Federally-listed threatened and endangered species and other species, not Federally-listed, that are declining and appear to be in need of conservation in order to sustain Fort Cavazos's military mission in the near-term or foreseeable future are discussed in detail in **Section 4.7**.

*Effects of the Proposed Action*
Beneficial effects on all Federally listed species at Fort Cavazos would be expected. Current natural resources management practices do meet the minimum requirements of the ESA and limit incidental take of endangered species and their habitat to the minimum necessary to implement projects on the installation and consider the loss of habitat due to wildfire. Implementation of the Proposed Action would provide additional and expanded protection and management for these species. Furthermore, these species would be treated with added importance and valued for their contributions to the unique natural heritage of Fort Cavazos.

An emphasis on mechanical, cultural, and biological techniques to manage invasive/exotic species would reduce the overall probability that listed species are harmed, directly or indirectly, by the

spreading of invasive/exotic species. Use of the pest management techniques outlined in the integrated pest management guidance would be expected to protect sensitive species in and around specific project sites. No pest management operation that has the potential to adversely affect protected species or their habitats would be conducted without prior coordination with the USFWS. Actions for natural resources management under this alternative would be more proactive than reactive and would be expected to allow fewer impacts than the other alternatives.

*Effects of the No Action Alternative*
No effects would be expected. The current management of Federally listed endangered species would continue in accordance with the ESMC and the 2015 BO issued by USFWS.

### 7.7.5 Fish and Wildlife

Current MBTA management, fish and wildlife management, game management, and non-game management at Fort Cavazos is discussed in detail in **Sections 4.8** and **4.9**.

*Effects of the Proposed Action*
All the projects composing the Proposed Action are designed to mimic or enhance natural processes and would be expected to enhance fish and wildlife resources in general. There is a high potential for beneficial results from these management activities. The Proposed Action would provide management of fish and wildlife resources at Fort Cavazos on an integrated basis. The INRMP uses an ecosystem management strategy to achieve biological diversity while emphasizing the use of native species for restoration activities. The programs incorporated into various management plans under this INRMP include protection from wildfires, monitoring of a variety of plants and animals, and minimization and repair of damage to habitats from training activities.

Beneficial effects would also be expected to terrestrial habitat. From this perspective, implementation of the Proposed Action would result in improved terrestrial habitat conditions for wildlife because maintaining a high level of habitat diversity is a priority of the INRMP. Implementation of the Proposed Action would result in improved quality of perennial cover, expansion of native species, and control of non-native invasive species at Fort Cavazos.

*Effects of the No Action Alternative*
No effects would be expected. Current resource management measures would continue to maintain and potentially increase the abundance and biodiversity of wildlife, protect and enhance wildlife habitats (aquatic, riparian, wetland, and terrestrial), and increase the quality and complexity of the habitat.

### 7.7.6 Vegetation

Current vegetation cover types and management activities are discussed in detail in **Section 4.10**.

*Effects of the Proposed Action*
Moderate adverse impacts to vegetation would be anticipated as the result of the WSM Program implemented by ITAM. However, implementation of the Proposed Action, which limits

construction that includes, but is not limited to, land maintenance, repairs, restoration, and reconfiguration, during the endangered species and migratory bird nesting seasons, would minimize adverse effects to these species. Loss of vegetation would be a temporary adverse effect, as vegetation re-growth would occur.

*Effects of the No Action Alternative*
Moderate adverse impacts to vegetation as described for the Proposed Action would continue under the No Action Alternative as a result of the continuation of the existing WSM Program.

### 7.7.7 Cultural Resources
The status of cultural resources is discussed in detail in **Section 4.15.3**.

*Effects of the Proposed Action*
Beneficial effects on the cultural resources at Fort Cavazos would be expected. The primary concern regarding these resources pertains to protecting prehistoric and historic sites within the boundaries of Fort Cavazos. Implementation of the Proposed Action provides for consultation and coordination with the Cultural Resources Manager prior to the initiation of any activity that might affect historic or cultural resources. The purpose of the consultation is to determine whether historic or cultural resources are in close proximity to the proposed activity and whether the activity would have the potential to adversely affect those resources. Under the Proposed Action, the probability of disturbing potential cultural resources would be greatly reduced.

*Effects of the No Action Alternative*
No effects would be expected. The current management of cultural resources on the installation would continue in accordance with the ICRMP. The existing INRMP also requires consultation and coordination with the Cultural Resources Manager prior to the initiation of any activity that might affect historic or cultural resources.

### 7.7.8 Cumulative Effects
In 40 CFR 1508.7, the CEQ defines *cumulative effects* as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal of non-Federal) or person undertakes such other actions."

Several proposed projects on and near Fort Cavazos warrant identification:

- Mission Training Center, estimated completion date January 2020
- OTC Lab and Test Building, estimated completion date Spring 2019
- Infantry Platoon Battle Course, estimated completion date Fall 2019
- Clabber Creek Range Projects, estimated completion date April 2018
- Renovation of 1CD HQ, Building 28000, estimated completion date fall 2018 (construction), spring 2019 (equipment, furnishings and accreditation)
- Renovation of H-Frame Barracks, 9200 Block, four barracks with central energy

plant, estimated completion date fall 2018
- Renovation of Hangar 90033, estimated completion date summer 2018
- Renovation of 1st CAV Washrack, estimated completion date summer 2018
- Replacement of Georgetown Road Bridge at Cowhouse Creek, estimated completion date February 2018
- Robert Gray AAF Runway Repairs, estimated completion date June 2018
- Renovation of Rolling-Pin Barracks, 21000/41000 (5 barracks), estimated completion date Fall 2019

The USFWS has recognized that Fort Cavazos was critical to the recovery of the black-capped vireo and, is critical to the recovery the golden-cheeked warbler, and that conservation and protection of habitat for these species is essential to recovery. In addition, Fort Cavazos's endangered species biologists conduct important research on endangered species that can be used to further recovery efforts for the species and provide a greater understanding of the ecology of the warbler and vireo. Fort Cavazos has submitted and continues to receive REPI funds.

Fort Cavazos's karst habitats are home to karst/cavernicole species that are endemic to Fort Cavazos. Because Fort Cavazos is the only location currently known for these rare species, it is possible that without proactive management, monitoring and protection, the species, their habitat, and surface processes could become candidates for listing under the ESA. This could then lead to increased restrictions on training activities at Fort Cavazos.

Implementation of the INRMP would result in a comprehensive environmental strategy for Fort Cavazos that represents compliance, restoration, prevention, and conservation; improves the existing management approach for natural resources on the installation; and meets legal and policy requirements consistent with national natural resources management philosophies. Over time, adoption of the Proposed Action would enable Fort Cavazos to achieve its goal of maintaining ecosystem viability and ensuring the sustainability of desired future conditions.

Fort Cavazos can be viewed as an island of generally stable, well-managed natural systems surrounded by areas of varying levels of growth and development. Although growth and development can be expected to continue in the areas surrounding Fort Cavazos, the environmental effects, although possibly adversely affecting natural resources within the ecoregion, would not be expected to result in cumulatively adverse effects on these resources when added to the effects of activities associated with the proposed management measures contained in the INRMP.

## 7.8 Comparison of Alternatives and Conclusions

This section provides a summary matrix of the potential effects of the Proposed Action and the No Action Alternative. By including this matrix, this EA complies with CEQ's 40 Most Frequently Asked Questions (Number 7) and 40 CFR Part 1502.14. This section presents the environmental, cultural, and socioeconomic effects of the alternatives in comparative form, thus sharply defining issues and providing a clear basis for choice among options by the decision-maker and the public (40 CFR Part 1502.14). This matrix is drawn from the Environmental

Consequences analysis (**Section 7.7**).

In summary, the EA findings are consistent with the goals of the natural resources management program to ensure the long-term sustainability of desired military training area conditions; to maintain, protect, and improve ecological integrity; to protect and enhance biological communities, particularly sensitive, rare, threatened, and endangered species; to protect the ecosystems and their components from unacceptable damage or degradation; and to identify and restore degraded habitats. The management measures recommended by the INRMP, if implemented, would directly and positively affect the health and condition of natural resources at Fort Cavazos.

**Table 7-2. Potential Environmental Effects of the Alternatives**

| Technical Resource Area | No Action Alternative | Proposed Action |
|---|---|---|
| Air Quality | No effects | No effects |
| Noise | No effects | No effects |
| Floodplains | No effects | No effects |
| Texas Coastal Zone | No effects | No effects |
| Socioeconomic Resources | No effects | No effects |
| Environmental Justice | No effects | No effects |
| Facilities | No effects | No effects |
| Hazardous and Toxic Materials | No effects | No effects |
| Land Use | Short-term, less than significant adverse effects | Long-term, beneficial effects |
| Soils | No effects | Long-term, beneficial effects |
| Water Resources | No effects | Long-term, beneficial effects |
| Sensitive Species | No effects | Long-term, beneficial effects |
| Fish and Wildlife | No effects | Long-term, beneficial effects |
| Vegetation | Short-term, less than significant adverse effects | Short-term, less than significant adverse effects |
| Cultural Resources | No effects | Long-term, beneficial effects |
| Cumulative Effects | Adverse effects | Long-term, beneficial effects |

Analysis of the existing (baseline) conditions identifies no serious environmental concerns. In addition, AR 200-1 requires installations to conduct a major revision of "all parts" of their INRMPs every 5 years. An annual review has been required to track any changes and evaluate effectiveness with the USFWS and appropriate State agencies. Each INRMP must be reviewed for operation and effect at least every 5 years. Therefore, implementation of the No Action alternative is not favored.

The evaluation performed within this EA concludes that there would be no significant adverse effects, either individually or cumulatively, to environmental, cultural, or socioeconomic resources as a result of the implementation of the Proposed Action. Overall, beneficial impacts are anticipated. This EA's analysis determines, therefore, that an EIS is unnecessary for implementation of the Proposed Action, and that a FNSI is appropriate (see **Appendix E**). This EA recommends implementation of the Proposed Action.

## 7.9 Interagency Coordination and Review

Once the INRMP was been drafted, this EA was used as a tool to inform decision makers and the public of the likely environmental and socioeconomic consequences of implementing the Proposed Action and alternatives. In addition, Fort Cavazos provided for public participation in the NEPA process to promote open communication and better decision making.

***Public Participation.*** Public notices were published in the *Killeen Daily Herald* newspaper. All documents were posted on the Fort Cavazos website (http://www.Cavazos.army.mil/DPW/) under the public notices section. Requests for further information on this EA/draft FNSI and comment submissions were directed to the NEPA Program-ENV Division, Directorate of Public Works, Building 4622 Engineer Drive, Fort Cavazos, Texas 76544 or email vicki.d.dean3.civ@mail.mil or amber.l.dankert.civ@mail.mil.

No comments were received during the 30-day public review period.

***Decisions to be Made***. The decision maker will consider both the environmental and socioeconomic impacts analyzed in this EA, along with all other relevant information, such as public issues of concern that arise during the comment period, prior to making a final decision. If the decision maker determines there are no significant impacts, that decision will be documented in the final FNSI, which will be signed no earlier than 30 days after the publication of this EA and draft FNSI. If the decision maker determines that the decision could have significant impacts, the Army may initiate a NOI to complete an EIS to conduct additional analysis.

# Appendix A. References

**A1. List of Acronyms**
**A2. List of Literature Cited**
**A3. Summary of Changes to INRMP**

# A1. List of Acronyms

| | |
|---|---|
| AACC | Area Access Control Center |
| AAF | Army Airfield |
| ARMY REPI | Army Readiness and Environmental Protection Integration |
| AIM | Adaptive and Integrated Management |
| AOU | American Ornithological Union |
| AR | Army Regulation |
| ATV | All-terrain Vehicle |
| AU | animal units |
| BCR | Bird Conservation Region |
| BCT | brigade combat team |
| BGEPA | Bald and Golden Eagle Protection Act |
| BLORA | Belton Lake Outdoor Recreation Area |
| BMPs | Best Management Practices |
| BO | Biological Opinion |
| BREC | Blackland Research Center |
| CAT | Critical Area Treatment |
| CEQ | Council on Environmental Quality |
| CIP | Common Installation Picture |
| CLEO | Conservation Law Enforcement Officer |
| CLEP | Conservation Law Enforcement Program |
| CLF | Compatible Lands Foundation |
| COR | Contract Officer Representative |
| CTCA | Central Texas Cattlemen's Association |
| CWA | Clean Water Act |
| DBH | diameter breast height |
| DES | Directorate of Emergency Services |
| DFMWR | Directorate of Family, Morale, Welfare, and Recreation |
| DoD | Department of Defense |
| DPTMS | Directorate of Plans, Training, Mobilization, and Security |
| DPW | Directorate of Public Works |
| EA | Environmental Assessment |
| ECO | Environmental Compliance Officer |
| EIS | Environmental Impact Statement |
| EMB | Environmental Management Branch |
| ESA | Endangered Species Act |
| ESMC | Endangered Species Management Component |
| ENV | Environmental Division |
| °F | degrees Fahrenheit |
| FHCRM | Fort Cavazos Cultural Resource Management |
| FNSI | Finding of No Significant Impact |
| FY | Fiscal Year |
| GC | Garrison Commander |
| GIS | Geographic Information Systems |
| GMU | Grazing Management Units |
| GPS | Global Positioning System |

| | |
|---|---|
| HPC | Historic Property Component |
| ICRMP | Integrated Cultural Resources Management Plan |
| IGI&S | Installation Geospatial Information & Services |
| INRMP | Integrated Natural Resources Management Plan |
| IMCOM | Installation Management Command |
| IPM | Integrated Pest Management |
| IPMC | Installation Pest Management Coordinator |
| IPMP | Integrated Pest Management Plan |
| IPRB | Installation Project Review Board |
| ITAM | Integrated Training Area Management |
| ITLM | Integrated Training Land Management |
| KISD | Killeen Independent School District |
| LTA | Live-Fire Training Area |
| LRAM | Land Rehabilitation and Maintenance |
| LSMP | Land Sustainment Management Plan |
| LUR | Land Use Regulations |
| MAS | Maneuver Access Structure |
| MBTA | Migratory Bird Treaty Act |
| MCOC | munitions constituents of concern |
| METL | Mission Essential Task List |
| MOI | Memorandum of Instruction |
| MOU | Memorandum of Understanding |
| MU | Management Unit |
| NCRMB | Natural and Cultural Resources Management Branch |
| NEPA | National Environmental Policy Act |
| NFC | North Fort Cavazos |
| NFWF | National Fish and Wildlife Foundation |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NWCG | National Wildfire Coordinating Group |
| OACSIM | Office of Assistant Chief of Staff for Installation Management |
| PIF | Partners in Flight |
| PTRCI | properties of traditional religious and cultural importance |
| QAP | Quality Assurance Plans |
| RCMP | Range Complex Master Plan |
| REC | Record of Consideration |
| REC | Recreation Equipment Checkout |
| REPI | Readiness and Environmental Protection Initiative |
| RTLA | Range and Training Land Assessment |
| SAIA | Sikes Act Improvement Act |
| SC | Senior Command |
| SDE | Spatial Database Engine |
| SDSFIE | Standards for Facilities, Infrastructure, and Environment |
| SOC | Species of Concern |
| SRA | Sustainable Range Awareness |
| SWMP | Storm Water Management Plan |
| SWPPP | Stormwater Pollution Prevention Plan |

| | |
|---|---|
| TAMUS | Texas A&M University System |
| TCEQ | Texas Commission on Environmental Quality |
| TPDES | Texas Pollutant Discharge Elimination System |
| TPWD | Texas Parks and Wildlife Department |
| TRAP | Training Restricted Area Program |
| TRI | Training Requirements Integration |
| U of I | University of Illinois |
| USACE | U.S. Army Corps of Engineers |
| USACERL | U.S. Army Construction Engineering Research Laboratory |
| USACHPPM | U.S. Army Center for Health Promotion and Preventive Medicine |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| WASH | Wildlife Air Strike Hazard |
| WDDT | Wildlife Detection and Dispersal Team |
| WFHTC | West Fort Cavazos Travel Camp |
| WHWG | Wildlife Hazard Working Group |
| WSM | Woody Species Management |
| WWC | Wildlife Watch Conditions |

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# A3. Summary of Changes to INRMP

(Changes since 2016-2017 Update)

| Section | Page | Change |
|---|---|---|
| Cover | | Dates changed to reflect coverage period. New cover designed. |
| All sections | All pages | INRMP format has been changed based on new U.S. Army Environmental Command template. |
| All sections | All pages | "management units" changed to "regions" |
| 4.8.1 | | Bald and Golden Eagle Protection Act updated to remove notifications to USFWS for every Bald Eagle spotting. |
| 4.2 and 5.3.2 | | Updated to include additional Conservation Law Enforcement (CLEO) needs |

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# Appendix B. Associated and Component Plans

**B1. Endangered Species Management Component**
**B2. 2020 Biological Opinion**
**B3. Karst Management Plan**
**B4. 2020 MOI for Landscaping and Tree Plan**
**B5. 2020-2025 Grazing Lease**
**B6. Integrated Pest Management Plan**
**B7. RGAAF Wildlife Air Strike Hazard Plan**
**B8. Installation Compatible Use Zone Study**
**B9. Integrated Cultural Resources Management Plan**
**B10. 2021 Range Complex Master Plan**

*Appendix B is a separate file and can be sent to reviewers upon request. Requests should be directed to:*

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Supervisor, Wildlife Management
Team 254-287-1088
amber.l.dankert.civ@army.mil

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# Appendix C. Native Species on Fort Cavazos

C1. Bird Species
C2. Fish Species
C3. Amphibians and Reptiles
C4. Mammal Species
C5. Mussel Species
C6. Vascular Plants

# C1. Bird Species

**ABUNDANCE & PROBABILITY CODES**

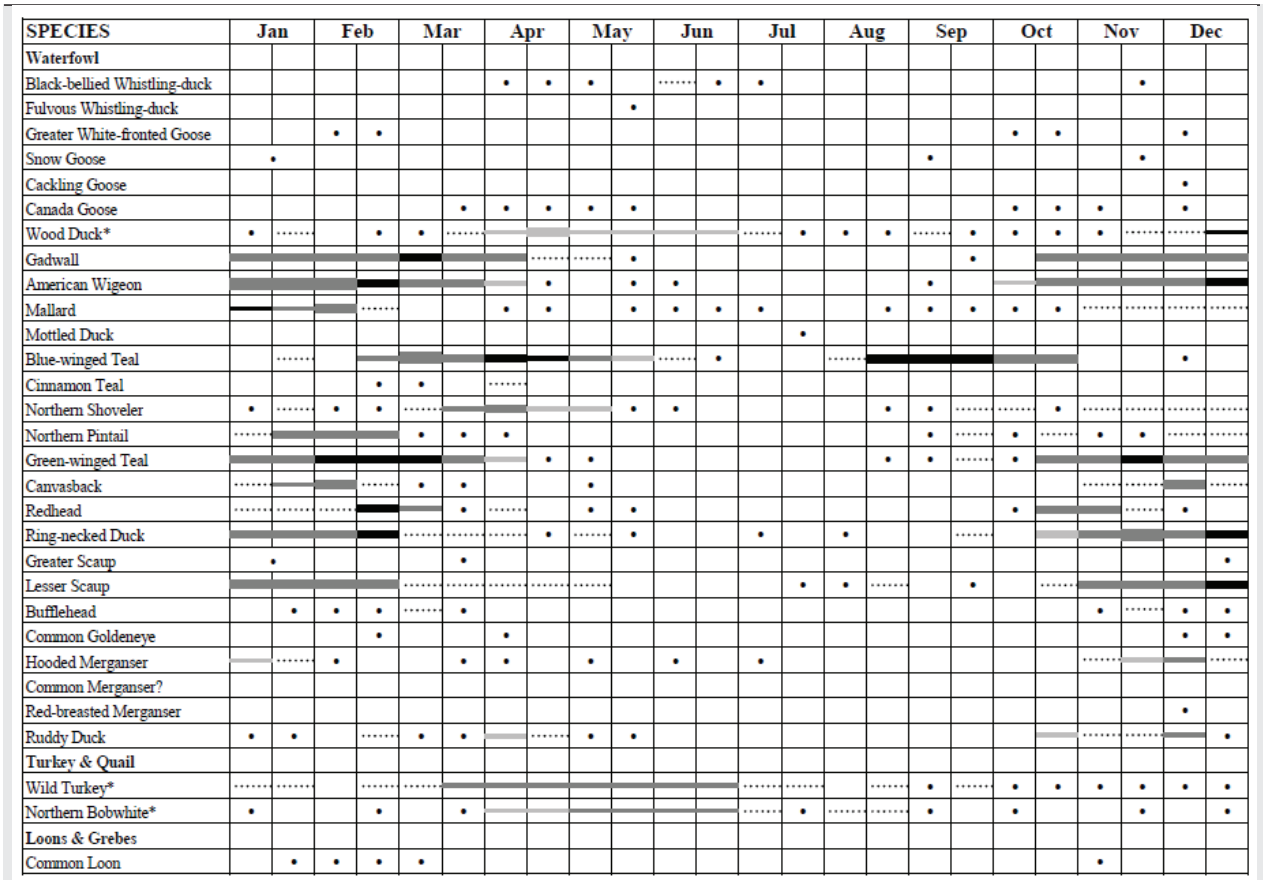
**ABUNDANCE**

**The average number of individuals to be expected in the appropriate habitats(s)**

| | Probability of Locating Typical Numbers | | |
|---|---|---|---|
| | High | Medium | Low |
| | >70% | 30-70% | <30% |
| 101+ Birds | | | |
| 51-100 Birds | | | |
| 11-50 Birds | | | |
| 1-10 Birds | | | |

**Additional Codes**

| | |
|---|---|
| • • • • • • | Casual - Not reported annually, typically reported every 2-5 years. |
| • | Accidental - Typically only 2-3 records |
| ? | Has been reliably reported/documented on Fort Hood, but data on exact date of occurrence are missing. |
| * | Has been documented as breeding on Fort Hood. |
| c | Found primarily, if not almost exclusively, in cantonment areas. |
| c | More abundant and likely to be encountered in or near cantonment areas. |



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| **Waterfowl** | | | | | | | | | | | | | | | | | | | | | | | | |
| Black-bellied Whistling-duck | | | | | | | • | • | • | | ····· | • | • | | | | | | | | | • | | |
| Fulvous Whistling-duck | | | | | | | | | | • | | | | | | | | | | | | | | |
| Greater White-fronted Goose | | | • | • | | | | | | | | | | | | | | | • | • | | | • | |
| Snow Goose | | • | | | | | | | | | | | | | | | • | | | | | • | | |
| Cackling Goose | | | | | | | | | | | | | | | | | | | | | | | • | |
| Canada Goose | | | | | | • | • | • | • | • | | | | | | | | | • | • | • | | • | |
| Wood Duck* | • | ····· | | • | • | ····· | | | | | | | ····· | • | • | • | ····· | • | • | • | • | ····· | ····· | |
| Gadwall | | | | | | | | ····· | ····· | • | | | | | | | | • | | | | | | |
| American Wigeon | | | | | | | | • | | • | • | | | | | | • | | | | | | | |
| Mallard | | | | ····· | | | • | • | | • | • | • | • | | | • | • | • | • | • | ····· | ····· | ····· | ····· |
| Mottled Duck | | | | | | | | | | | | | | • | | | | | | | | | | |
| Blue-winged Teal | | | | | | | | | | | ····· | • | | | ····· | | | | | | | | • | |
| Cinnamon Teal | | | | • | • | | ····· | | | | | | | | | | | | | | | | | |
| Northern Shoveler | • | ····· | • | • | ····· | | | | | • | • | | | | | • | • | ····· | ····· | • | ····· | ····· | ····· | ····· |
| Northern Pintail | ····· | | | | • | • | • | | | | | | | | | | • | ····· | • | ····· | • | • | ····· | ····· |
| Green-winged Teal | | | | | | | | • | • | | | | | | | • | • | ····· | • | | | | | |
| Canvasback | ····· | | | ····· | • | • | | | • | | | | | | | | | | | | ····· | ····· | | ····· |
| Redhead | ····· | ····· | ····· | | | • | ····· | | • | • | | | | | | | | | • | | | | • | |
| Ring-necked Duck | | | | | ····· | ····· | ····· | • | ····· | • | | | • | | • | | | ····· | | | | | | |
| Greater Scaup | | • | | | | • | | | | | | | | | | | | | | | | | • | |
| Lesser Scaup | | | | | ····· | ····· | ····· | ····· | ····· | | | | | • | • | ····· | | • | | ····· | | | | |
| Bufflehead | | • | • | • | ····· | • | | | | | | | | | | | | | | | • | ····· | • | • |
| Common Goldeneye | | | | • | | | • | | | | | | | | | | | | | | | | • | • |
| Hooded Merganser | | ····· | • | | | • | • | | • | | • | | • | | | | | | | | ····· | | ····· | ····· |
| Common Merganser? | | | | | | | | | | | | | | | | | | | | | | | | |
| Red-breasted Merganser | | | | | | | | | | | | | | | | | | | | | | | • | |
| Ruddy Duck | • | • | | ····· | • | • | | ····· | • | • | | | | | | | | | | | ····· | ····· | | • |
| **Turkey & Quail** | | | | | | | | | | | | | | | | | | | | | | | | |
| Wild Turkey* | ····· | ····· | | ····· | ····· | | | | | | | | ····· | ····· | | ····· | • | ····· | • | • | • | • | • | • |
| Northern Bobwhite* | • | | | • | | • | | | | | | | ····· | • | ····· | ····· | • | | • | | | • | | • |
| **Loons & Grebes** | | | | | | | | | | | | | | | | | | | | | | | | |
| Common Loon | | • | • | • | • | | | | | | | | | | | | | | | | • | | | |

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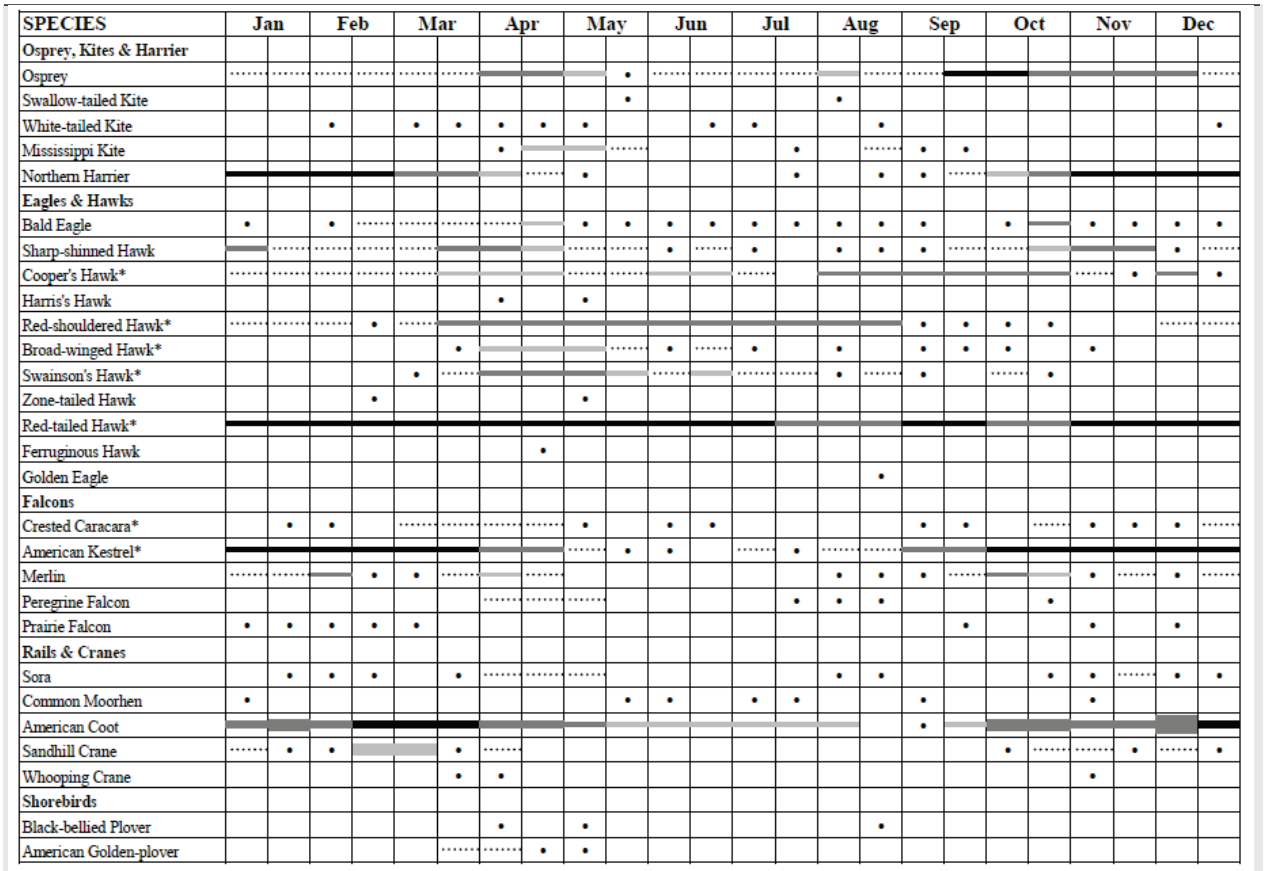
| Least Grebe | | | | | | | | | | | • | • | • | ····· | • | • | | | | | | | | |
| Pied-billed Grebe* | | | | | | | | | | | ····· | ····· | ····· | | | | | | | | | | | |
| Horned Grebe | ····· | ····· | • | • | • | ····· | • | | | | | | | | | | | | | | • | • | • | ····· |
| Eared Grebe | ····· | ····· | • | ····· | • | • | ····· | ····· | • | | | | | | | | | | | | • | • | • | ····· |
| Western Grebe | | | | • | | | | • | | | | | | | | | | | | | | | | |
| **Pelicans, Cormorants, Anhinga** | | | | | | | | | | | | | | | | | | | | | | | | |
| American White Pelican | • | • | • | ····· | • | | | | | | ····· | • | | | | | • | ····· | • | ····· | ····· | • | • | • |
| Brown Pelican | | | | | | | | | | | | | • | | • | • | | | | | | | | |
| Neotropic Cormorant | • | | | | • | ····· | ····· | • | ····· | ····· | • | • | | | | | | | • | | | | • | • |
| Double-crested Cormorant | | | | | | | | | ····· | | • | • | | • | | | • | | | | | | | |
| Anhinga | | | • | | | | | • | • | | | | | | • | | | | • | | | • | | |
| **Herons & Egrets** | | | | | | | | | | | | | | | | | | | | | | | | |
| American Bittern | • | | | | | | | | | | | | | | | | | | | | • | | | |
| Least Bittern? | | | | | | | | | | | | | | | | | | | | | | | | |
| Great Blue Heron* | | | | | | | | | | | | | | | | | | | | | | | | |
| Great Egret | • | | • | ····· | ····· | | | | | | | | | | | | | | | | | | ····· | |
| Snowy Egret | | | | | | • | | | | | ····· | ····· | | | | | | | • | ····· | • | | | |
| Little Blue Heron | | | | | | | ····· | • | | | | | | | | | | | | • | | | | |
| Tricolored Heron | | | | | | | | • | • | • | • | • | ····· | | | | ····· | • | | | | | | |
| Reddish Egret | | | | | | | | | | • | • | | | | | | | | | | | | | |
| Cattle Egret | | | | | | ····· | | | | | | | ····· | | ····· | • | | | • | ····· | • | | | |
| Green Heron* | | | | | | • | | | | | | | | | | | | ····· | • | | | | | |
| Black-crowned Night-heron | | | | | | | • | ····· | | • | | | • | • | | ····· | | • | | | | | | • |
| Yellow-crowned Night-heron* | | | | | | | | ····· | • | ····· | | | | | | | | • | | | | | | |
| **Ibis & Spoonbill** | | | | | | | | | | | | | | | | | | | | | | | | |
| White Ibis | | | | | | | | | | | • | • | | | • | | | | • | • | | | | |
| Glossy Ibis | | | | | | | | | | | | | | | | • | | | | | | | | |
| White-faced Ibis | | | | | | | • | • | • | • | | | | | • | ····· | • | • | • | | | | | |
| Roseate Spoonbill | | | | | | | | | | | | | ····· | • | ····· | ····· | • | • | • | | | | | |
| Wood Stork | | | | | | | | | | | | | | | | | • | | | | | | | |
| **Vultures** | | | | | | | | | | | | | | | | | | | | | | | | |
| Black Vulture* | | | | | | | | | | | | | | | | | | | | | | | | |
| Turkey Vulture* | | | | | | | | | | | | | | | | | | | | | | | | |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Sharp-shinned Hawk
Cooper's Hawk*
Harris's Hawk
Red-shouldered Hawk*
Broad-winged Hawk*
Swainson's Hawk*
Zone-tailed Hawk
Red-tailed Hawk*
Ferruginous Hawk
Golden Eagle
Falcons
Crested Caracara*
American Kestrel*
Merlin
Peregrine Falcon
Prairie Falcon
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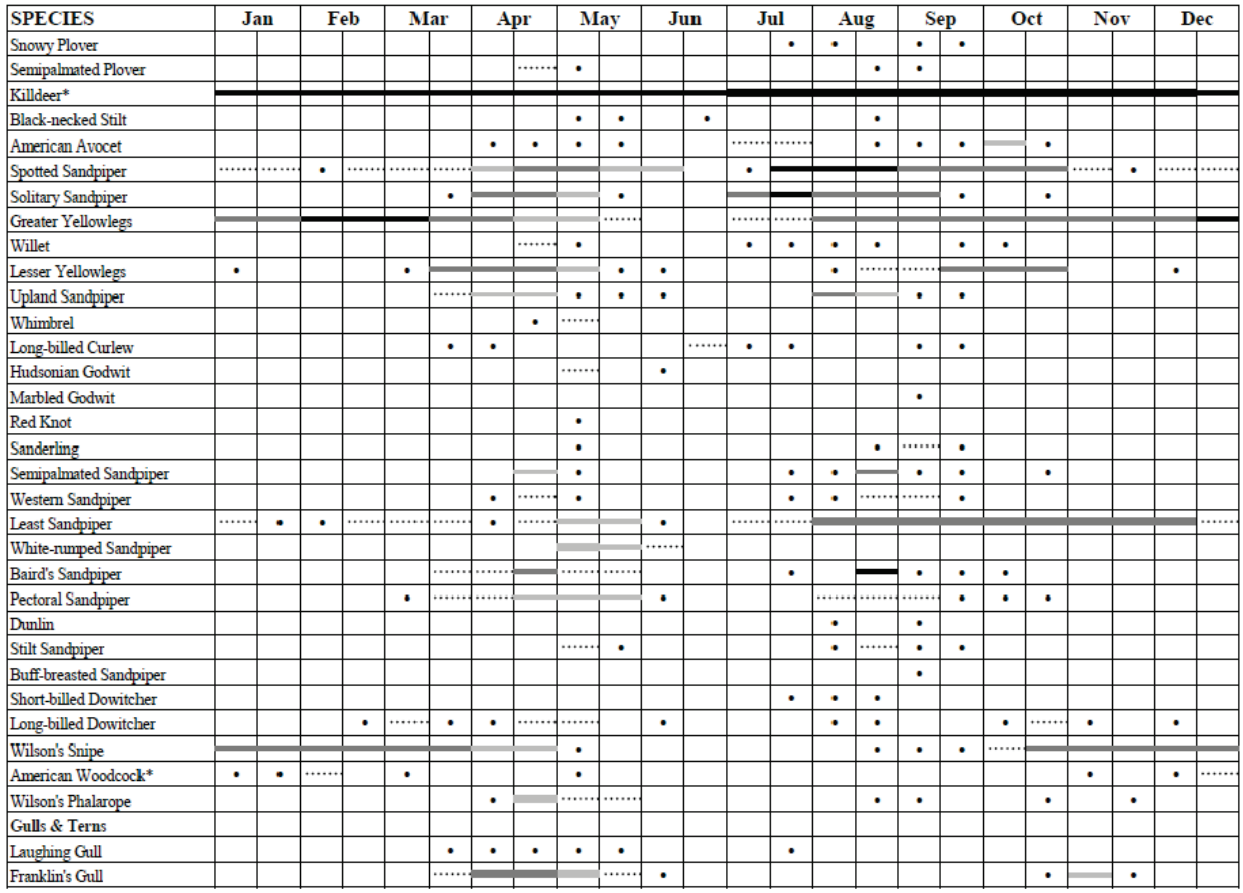
Sandhill Crane
Whooping Crane
Shorebirds
Black-bellied Plover
American Golden-plover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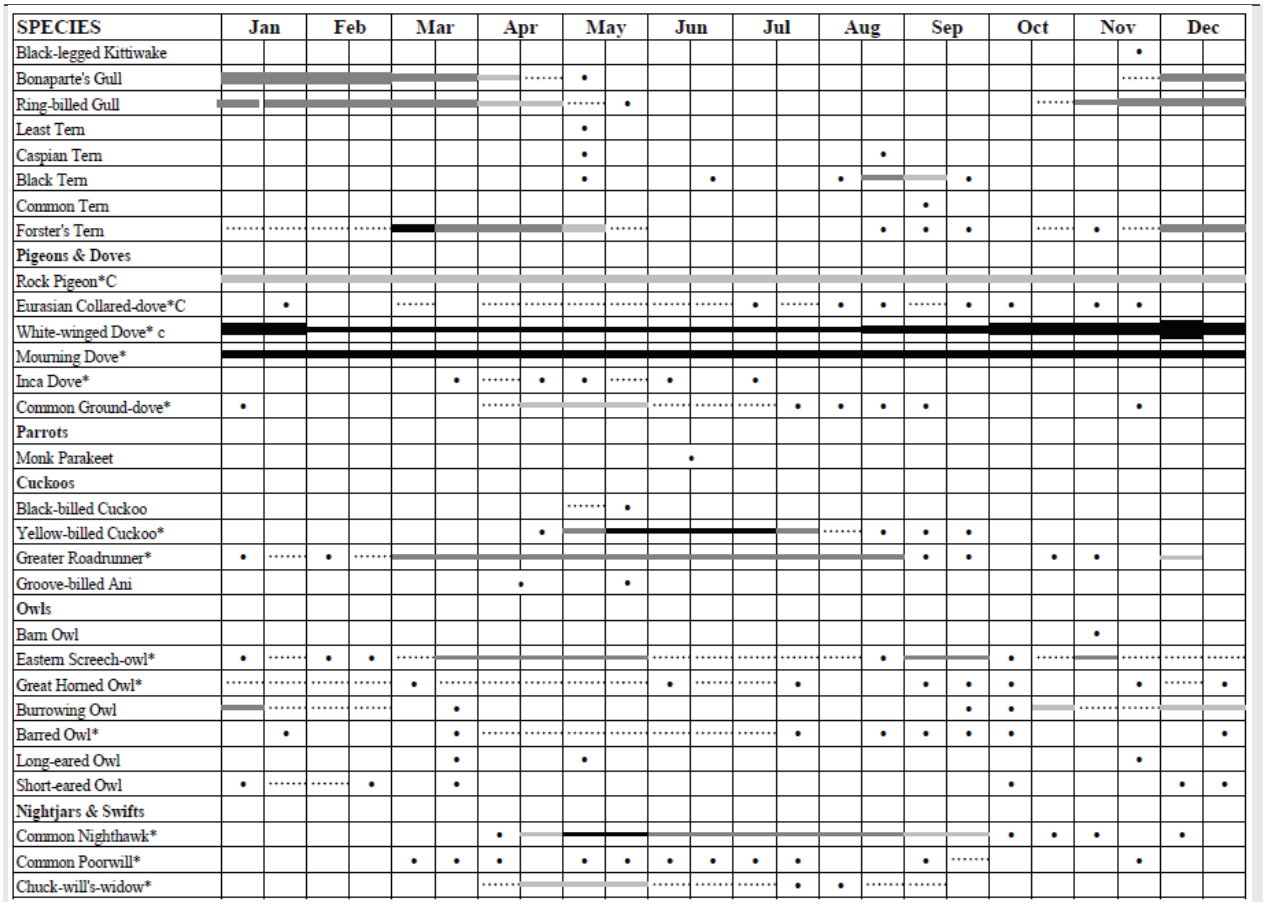
American Avocet
Spotted Sandpiper
Solitary Sandpiper
Greater Yellowlegs
Willet
Lesser Yellowlegs
Upland Sandpiper
Whimbrel
Long-billed Curlew
Hudsonian Godwit
Marbled Godwit
Red Knot
Sanderling
Semipalmated Sandpiper
Western Sandpiper
Least Sandpiper
White-rumped Sandpiper
Baird's Sandpiper
Pectoral Sandpiper
Dunlin
Stilt Sandpiper
Buff-breasted Sandpiper
Short-billed Dowitcher
Long-billed Dowitcher
Wilson's Snipe
American Woodcock*
Wilson's Phalarope
Gulls & Terns
Laughing Gull
Franklin's Gull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Black-legged Kittiwake
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Least Tern
Caspian Tern
Black Tern
Common Tern
Forster's Tern
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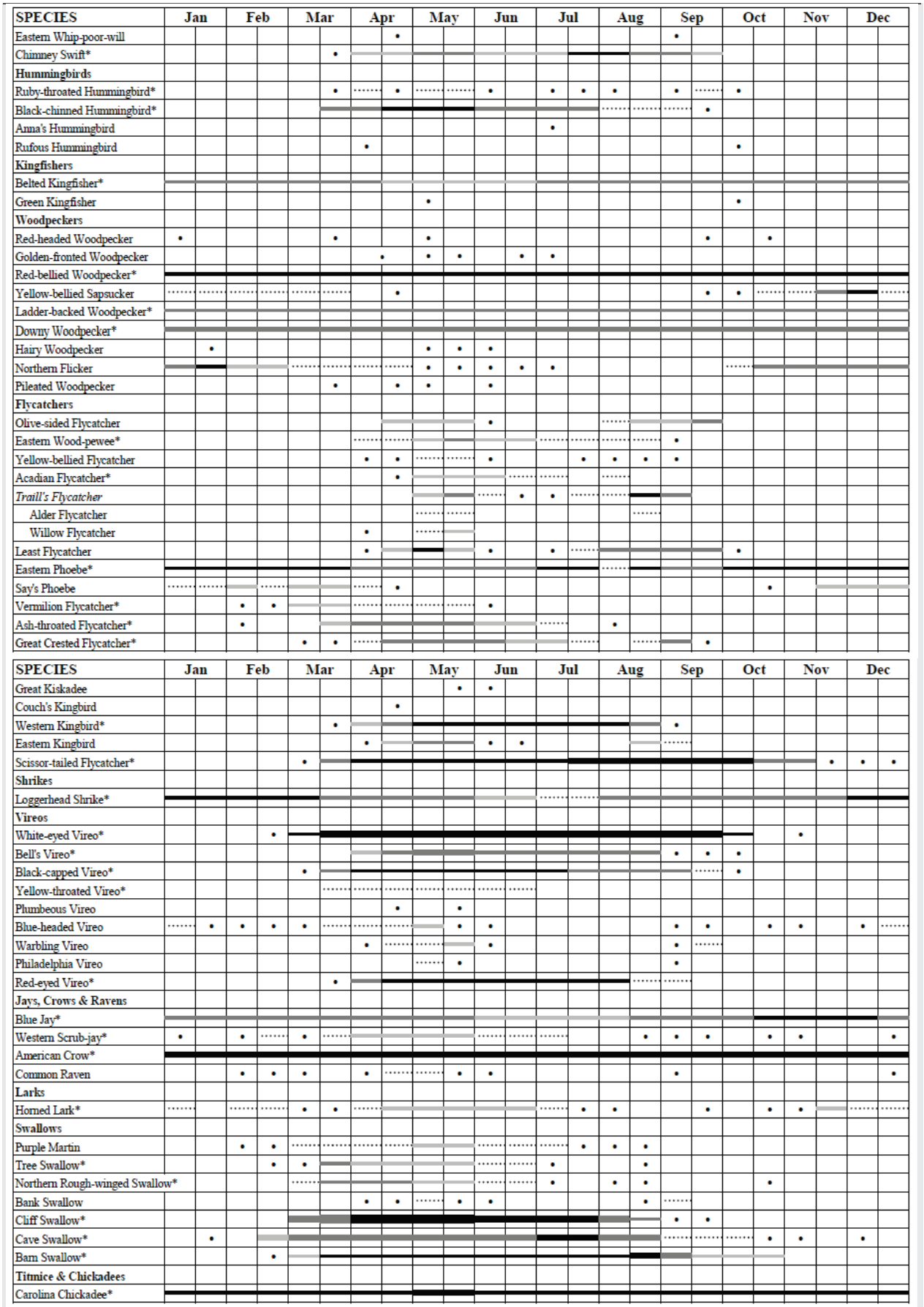
Rock Pigeon*C
Eurasian Collared-dove*C
White-winged Dove* c
Mourning Dove*
Inca Dove*
Common Ground-dove*
Parrots
Monk Parakeet
Cuckoos
Black-billed Cuckoo
Yellow-billed Cuckoo*
Greater Roadrunner*
Groove-billed Ani
Owls
Barn Owl
Eastern Screech-owl*
Great Horned Owl*
Burrowing Owl
Barred Owl*
Long-eared Owl
Short-eared Owl
Nightjars & Swifts
Common Nighthawk*
Common Poorwill*
Chuck-will's-widow*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Ruby-throated Hummingbird*
Black-chinned Hummingbird*
Anna's Hummingbird
Rufous Hummingbird
Kingfishers
Belted Kingfisher*
Green Kingfisher
Woodpeckers
Red-headed Woodpecker
Golden-fronted Woodpecker
Red-bellied Woodpecker*
Yellow-bellied Sapsucker
Ladder-backed Woodpecker*
Downy Woodpecker*
Hairy Woodpecker
Northern Flicker
Pileated Woodpecker
Flycatchers
Olive-sided Flycatcher
Eastern Wood-pewee*
Yellow-bellied Flycatcher
Acadian Flycatcher*
Traill's Flycatcher
Alder Flycatcher
Willow Flycatcher
Least Flycatcher
Eastern Phoebe*
Say's Phoebe
Vermilion Flycatcher*
Ash-throated Flycatcher*
Great Crested Flycatcher*
SPECIES
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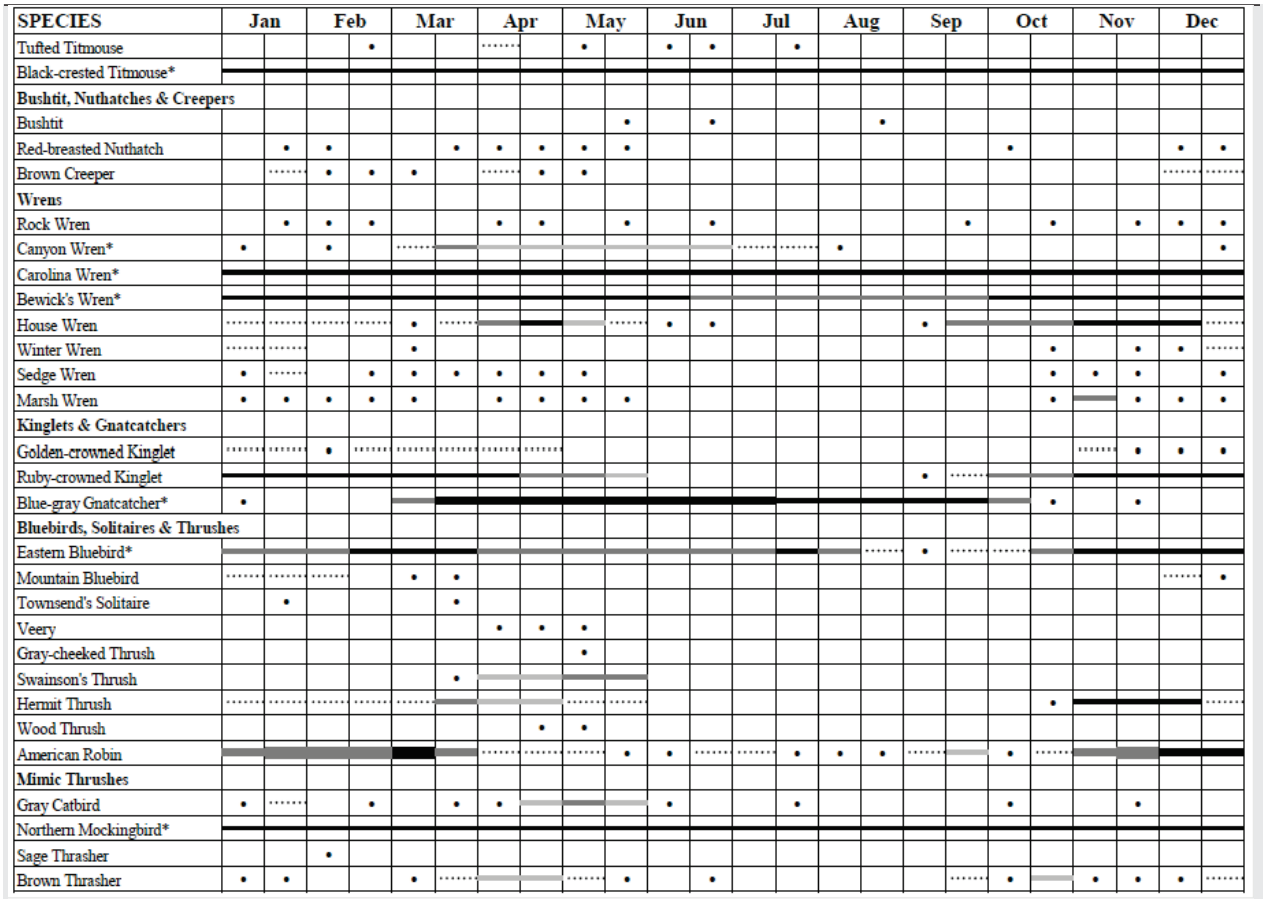
Great Kiskadee
Couch's Kingbird
Western Kingbird*
Eastern Kingbird
Scissor-tailed Flycatcher*
Shrikes
Loggerhead Shrike*
Vireos
White-eyed Vireo*
Bell's Vireo*
Black-capped Vireo*
Yellow-throated Vireo*
Plumbeous Vireo
Blue-headed Vireo
Warbling Vireo
Philadelphia Vireo
Red-eyed Vireo*
Jays, Crows & Ravens
Blue Jay*
Western Scrub-jay*
American Crow*
Common Raven
Larks
Horned Lark*
Swallows
Purple Martin
Tree Swallow*
Northern Rough-winged Swallow*
Bank Swallow
Cliff Swallow*
Cave Swallow*
Barn Swallow*
Titmice & Chickadees
Carolina Chickadee*



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tufted Titmouse | | | | • | | | ····· | | • | | • | • | | • | | | | | | | | | | |
| Black-crested Titmouse* | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ |
| **Bushtit, Nuthatches & Creepers** | | | | | | | | | | | | | | | | | | | | | | | | |
| Bushtit | | | | | | | | | | • | | • | | | | • | | | | | | | | |
| Red-breasted Nuthatch | | • | • | | | • | • | • | • | • | | | | | | | | | • | | | | • | • |
| Brown Creeper | | ····· | • | • | • | | ····· | • | • | | | | | | | | | | | | | | ····· | ····· |
| **Wrens** | | | | | | | | | | | | | | | | | | | | | | | | |
| Rock Wren | | • | • | • | | | • | • | | • | | • | | | | | | • | | • | | • | • | • |
| Canyon Wren* | • | | • | | ····· | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ····· | ····· | • | | | | | | | | | • |
| Carolina Wren* | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ |
| Bewick's Wren* | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ━ | ━ | ━ | ━ | ━ | ━ |
| House Wren | ····· | ····· | ····· | ····· | • | ····· | ┅ | ━ | ┅ | ····· | • | • | | | | | • | ┅ | ┅ | ┅ | ━ | ━ | ━ | ····· |
| Winter Wren | ····· | ····· | | | • | | | | | | | | | | | | | | • | | • | • | ····· | |
| Sedge Wren | • | ····· | | • | • | • | • | • | • | | | | | | | | | | • | • | • | | • | |
| Marsh Wren | • | • | • | • | • | | • | • | • | • | | | | | | | | | • | ┅ | • | • | • | |
| **Kinglets & Gnatcatchers** | | | | | | | | | | | | | | | | | | | | | | | | |
| Golden-crowned Kinglet | ····· | ····· | • | ····· | ····· | ····· | ····· | ····· | | | | | | | | | | | | ····· | • | • | • | |
| Ruby-crowned Kinglet | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ┅ | | | | | | | | | • | ····· | ┅ | ┅ | | | | |
| Blue-gray Gnatcatcher* | • | | | | ┅ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | • | | • | | |
| **Bluebirds, Solitaires & Thrushes** | | | | | | | | | | | | | | | | | | | | | | | | |
| Eastern Bluebird* | ┅ | ┅ | ┅ | ━ | ━ | ━ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ━ | ┅ | ····· | • | ····· | ····· | ┅ | ━ | ━ | ━ | ━ |
| Mountain Bluebird | ····· | ····· | ····· | | • | • | | | | | | | | | | | | | | | | | ····· | • |
| Townsend's Solitaire | | • | | | | • | | | | | | | | | | | | | | | | | | |
| Veery | | | | | | | • | • | • | | | | | | | | | | | | | | | |
| Gray-cheeked Thrush | | | | | | | | | • | | | | | | | | | | | | | | | |
| Swainson's Thrush | | | | | | • | ┅ | ┅ | ┅ | ┅ | | | | | | | | | | | | | | |
| Hermit Thrush | ····· | ····· | ····· | ····· | ····· | ┅ | ┅ | ┅ | ····· | ····· | | | | | | | | | • | ┅ | ┅ | ┅ | ┅ | ····· |
| Wood Thrush | | | | | | | | • | • | | | | | | | | | | | | | | | |
| American Robin | ┅ | ┅ | ┅ | ┅ | ━ | ┅ | ····· | ····· | ····· | • | • | ····· | ····· | • | • | • | ····· | ┅ | • | ····· | ┅ | ┅ | ━ | ━ |
| **Mimic Thrushes** | | | | | | | | | | | | | | | | | | | | | | | | |
| Gray Catbird | • | ····· | | • | | • | • | ┅ | ┅ | ┅ | • | | | • | | | | | • | | | • | | |
| Northern Mockingbird* | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ |
| Sage Thrasher | | | • | | | | | | | | | | | | | | | | | | | | | |
| Brown Thrasher | • | • | | | • | ····· | ┅ | ┅ | ····· | • | | • | | | | | | ····· | • | ┅ | • | • | • | ····· |

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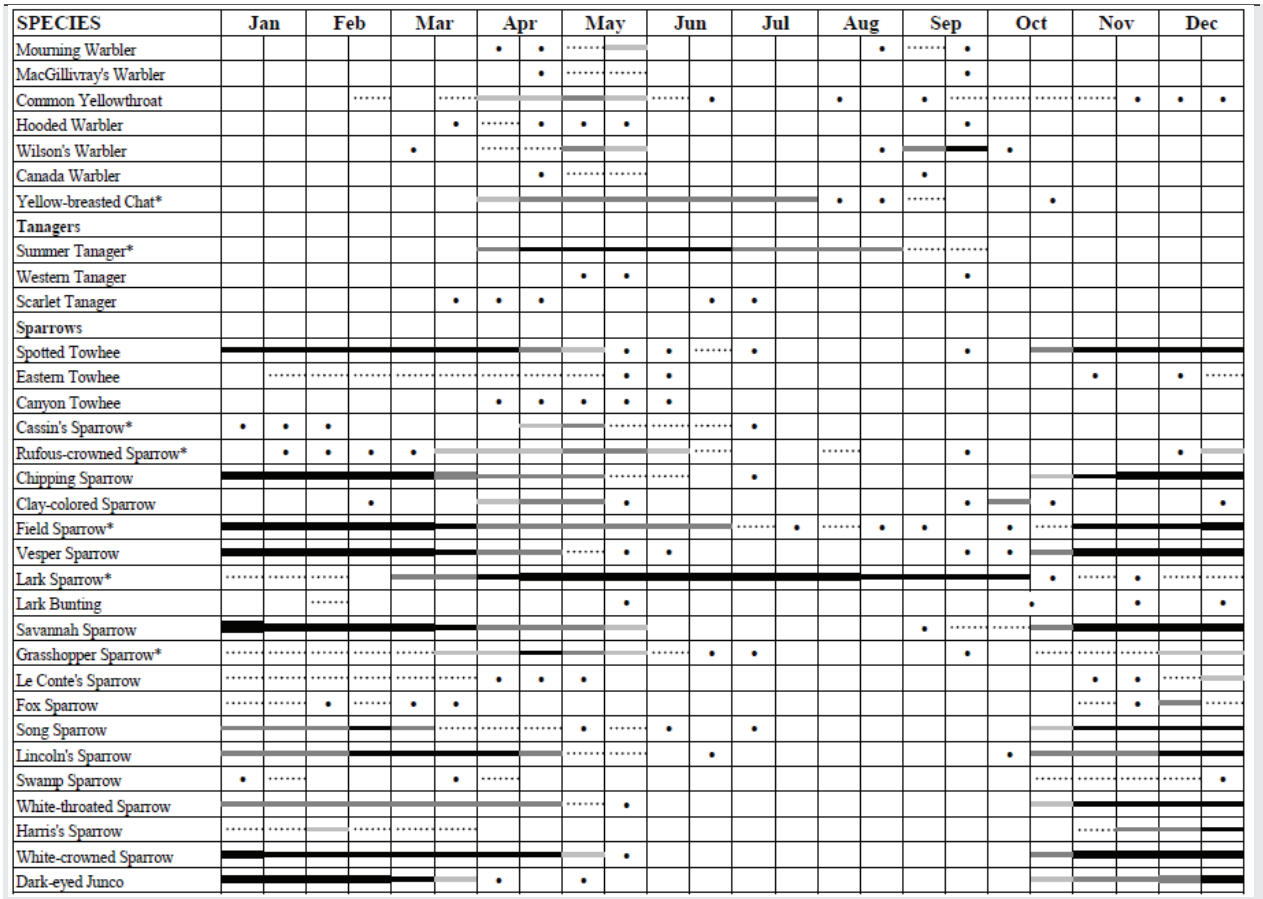
| Curve-billed Thrasher | | | | | | | • | | | • | | | • | | | | | | | | | | | |
| **Starlings, Pipits & Waxwings** | | | | | | | | | | | | | | | | | | | | | | | | |
| European Starling* | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ | ━ |
| American Pipit | ┅ | ····· | ····· | • | • | ····· | ····· | ┅ | • | | | | | | | | | | ┅ | ····· | ····· | ····· | ····· | ····· |
| Sprague's Pipit | ····· | ····· | ····· | ····· | ····· | ····· | • | • | | | | | | | | | • | | | • | ····· | • | • | ····· |
| Cedar Waxwing | ┅ | ┅ | ┅ | ┅ | ━ | ━ | ┅ | ┅ | ┅ | ┅ | • | | | | | | | | | | • | • | ┅ | ┅ |
| **Warblers** | | | | | | | | | | | | | | | | | | | | | | | | |
| Blue-winged Warbler | | | | | | | | ····· | • | | | | | | • | | | | | | | | | |
| Golden-winged Warbler | | | | | | | | • | | | | | | | | | | | | | | | | |
| Tennessee Warbler | | | | | | | | ····· | ····· | • | | • | | | | | | | | | | | | |
| Orange-crowned Warbler | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ━ | ┅ | ┅ | • | | | | | | | • | ┅ | ┅ | ┅ | ━ | ┅ | ┅ | ┅ |
| Nashville Warbler | | | | | • | ····· | ┅ | ┅ | ┅ | ····· | • | | • | | | | • | ····· | ····· | ····· | | | | |
| Northern Parula | | | | | | ····· | ····· | ····· | ····· | ····· | • | • | • | | | | | | | | | | | |
| Yellow Warbler | | | | | | | • | ····· | ━ | ━ | ····· | • | • | | ┅ | ━ | ┅ | ····· | • | | | | | |
| Chestnut-sided Warbler | | | | | | | | ····· | ┅ | ┅ | | | | | | | | | | | | | | |
| Magnolia Warbler | | | | | | | | | ┅ | ┅ | • | | | | | | | | | | | | | |
| Yellow-rumped Warbler | ━ | ━ | ━ | ━ | ┅ | ┅ | ┅ | ┅ | ····· | • | | | | | | | | | ┅ | ┅ | ┅ | ┅ | ┅ | ━ |
| Golden-cheeked Warbler* | | | | • | ━ | ━ | ━ | ━ | ━ | ━ | ┅ | ┅ | ····· | • | ····· | • | | | | | | | | |
| Black-throated Green Warbler | | | | | | ····· | ····· | ····· | ┅ | ┅ | | | | | • | | | • | • | ····· | | | | |
| Blackburnian Warbler | | | | | | | | • | ┅ | ····· | | | | | | | | | | | | | | |
| Yellow-throated Warbler | | | | | | • | | | | | | • | | | | | | | | | | | | |
| Pine Warbler | • | • | | | | | | | | | | | | | | | | | | | • | | • | |
| Prairie Warbler | | | | | | • | • | | | | ····· | | | | • | | | | | | | | | |
| Palm Warbler | | | | | | | | • | | | | | | | | | | | | | | | | |
| Bay-breasted Warbler | | | | | | | | • | • | | | | | | | | | | | | | | | |
| Blackpoll Warbler | | | | | | | | | | • | | | | | | | | | | | | | | |
| Cerulean Warbler | | | | | | | • | | | | | | | | | | | | | | | | | |
| Black-and-white Warbler* | | | | | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | ····· | • | ····· | • | • | | • | | | | | • |
| American Redstart | | | | | | | | ····· | ┅ | ┅ | • | • | | | | | | | | | | | | |
| Prothonotary Warbler* | | | | | | | ┅ | ┅ | ┅ | ┅ | ┅ | ┅ | • | ····· | | • | | | | | | | | |
| Ovenbird | | | | | | | | • | ┅ | ····· | | | | | | | | | | | | | | |
| Northern Waterthrush | | | | | | | | • | ····· | • | | | | | | | • | | | | | | | |
| Lousiana Waterthrush* | | | | | • | ┅ | ┅ | ┅ | ┅ | ┅ | ····· | ····· | ····· | | • | • | • | | | | | | | |
| Kentucky Warbler | | | | | | | • | • | • | • | | • | | | | | | | | | | | | |


SPECIES
Jan
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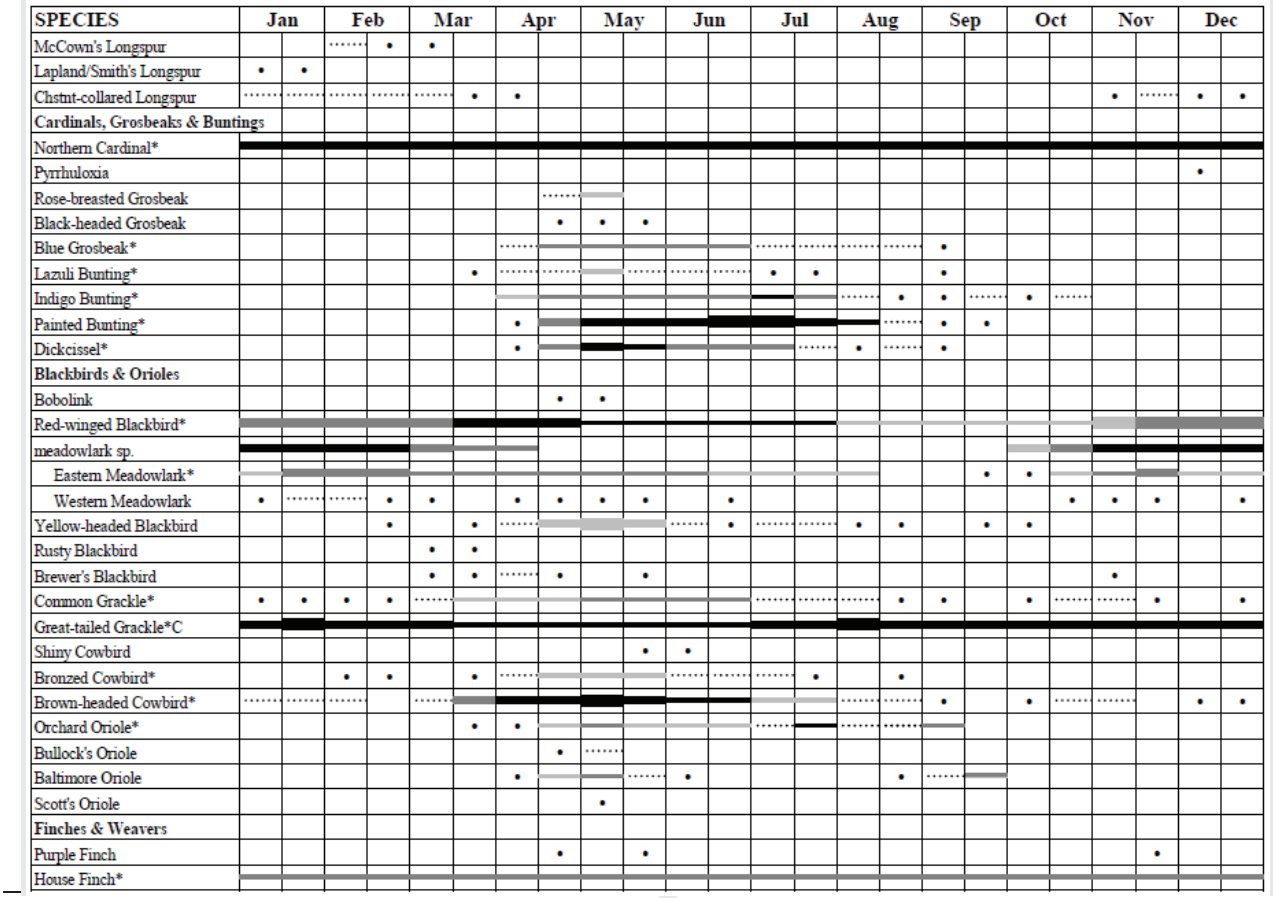
Mourning Warbler
MacGillivray's Warbler
Common Yellowthroat
Hooded Warbler
Wilson's Warbler
Canada Warbler
Yellow-breasted Chat*
Tanagers
Summer Tanager*
Western Tanager
Scarlet Tanager
Sparrows
Spotted Towhee
Eastern Towhee
Canyon Towhee
Cassin's Sparrow*
Rufous-crowned Sparrow*
Chipping Sparrow
Clay-colored Sparrow
Field Sparrow*
Vesper Sparrow
Lark Sparrow*
Lark Bunting
Savannah Sparrow
Grasshopper Sparrow*
Le Conte's Sparrow
Fox Sparrow
Song Sparrow
Lincoln's Sparrow
Swamp Sparrow
White-throated Sparrow
Harris's Sparrow
White-crowned Sparrow
Dark-eyed Junco


SPECIES
Jan
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McCown's Longspur
Lapland/Smith's Longspur
Chstnt-collared Longspur
Cardinals, Grosbeaks & Buntings
Northern Cardinal*
Pyrrhuloxia
Rose-breasted Grosbeak
Black-headed Grosbeak
Blue Grosbeak*
Lazuli Bunting*
Indigo Bunting*
Painted Bunting*
Dickcissel*
Blackbirds & Orioles
Bobolink
Red-winged Blackbird*
meadowlark sp.
Eastern Meadowlark*
Western Meadowlark
Yellow-headed Blackbird
Rusty Blackbird
Brewer's Blackbird
Common Grackle*
Great-tailed Grackle*C
Shiny Cowbird
Bronzed Cowbird*
Brown-headed Cowbird*
Orchard Oriole*
Bullock's Oriole
Baltimore Oriole
Scott's Oriole
Finches & Weavers
Purple Finch
House Finch*

| SPECIES | Jan | | Feb | | Mar | | Apr | | May | | Jun | | Jul | | Aug | | Sep | | Oct | | Nov | | Dec | |
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| Pine Siskin | • | ····· | • | • | | • | ····· | ····· | • | • | | | | | | | | | | • | • | • | • | • |
| Lesser Goldfinch* | | ····· | | • | | • | ····· | ····· | | | | | ····· | ····· | | • | • | ····· | • | ····· | | | • | |
| American Goldfinch | | | | | | | | ····· | • | • | • | • | • | • | | | | | | • | ····· | ····· | | |
| Evening Grosbeak | | | | | | | • | | | | | | | | | | | | | | | | | |
| House Sparrow*C | | | | | | | | | | | | | | | | | | | | | | | | |

# C2. Fish Species

## Ichthyofauna of Fort Cavazos

*Possible = Species possibly occurs, presence not verified

| | |
|---|---|
| **Lepisosteidae** | |
| *Lepisosteus oculatus* | Longnose Gar |
| *Lepisosteus osseus* | Spotted Gar |
| **Clupeidae** | |
| *Dorosoma cepedianum* | Gizzard Shad |
| *Dorosoma petenense* | Threadfin Shad |
| **Cyprinidae** | |
| *Campostoma anamalum* | Central Stoneroller |
| *Cyprinella lutrensis* | Red Shiner |
| *Cyprinella venusta* | Blacktail Shiner |
| *Cyprinus carpio* | Common Carp |
| *Notemigonus crysoleucas* | Golden Shiner |
| *Notropis buchanani* | Ghost Shiner |
| ***Notropis oxyrhynchus** | **Sharpnose Shiner-possible** |
| *Notropis stramineus* | Sand Shiner |
| ***Notropis texanus** | **Weed Shiner--- possible** |
| *Notropis volucellus* | Mimic Shiner |
| *Pimephales promelas* | Fathead Minnow |
| *Pimephales vigilax* | Bullhead Minnow |
| ***Carassius auratus** | **Goldfish----- possible** |
| *Notropis shumardi* | Silverband Shiner |
| **Catostomidae** | |
| *Carpoides carpio* | River Carpsucker |
| *Ictiobus bubalus* | Smallmouth buffalo |
| *Moxostoma congestum* | Gray Redhorse |
| **Characidae** | |
| ***Astyanax mexicanus** | **Mexican tetra--- possible** |
| **Ictaluridae** | |
| *Ameiurus melas* | Black Bullhead |
| *Ameiurus natalis* | Yellow Bullhead |
| *Ictalurus punctatus* | Channel Catfish |
| *Noturus gyrinus* | Tadpole Madtom |
| *Pylodictis olivaris* | Flathead Catfish |
| ***Ictalurus furcatus** | **Blue Catfish--- possible** |
| ***Noturus nocturnus** | **Freckled Madtom— possible** |

| | |
|---|---|
| **Atherinidae** | |
| *Labidesthes sicculus* | Brook Silverside |
| *Menidia beryllina* | Inland Silverside |
| **Poeciliidae** | |
| *Gambusia affinis* | Western Mosquitofish |
| **Fundulidae** | |
| *Fundulus notatus* | Blackstripe Topminnow |
| ****Fundulus grandis*** | **Gulf killifish--- possible** |
| ****Fundulus zebrinus*** | **Plains killifish--- possible** |
| **Moronidae** | |
| *Morone chrysops* | White Bass |
| ****M. chrysops x M. saxatilis*** | **Hybrid Striped Bass- possible** |
| ****Morone saxatilis*** | **Striped Bass- possible** |
| **Centrarchidae** | |
| *Lepomis Auritus* | Redbreast Sunfish |
| *Lepomis cyanellus* | Green Sunfish |
| *Lepomis gulosus* | Warmouth |
| *Lepomis humilis* | Orangespotted Sunfish |
| *Lepomis macrochirus* | Bluegill |
| *Lepomis megalotis* | Longear Sunfish |
| *Lepomis microlophus* | Redear Sunfish |
| ****Lepomis miniatus*** | **Redspotted Sunfish-- possible** |
| *Lepomis punctatus* | Spotted Sunfish |
| *Micropterus punctulatus* | Spotted Bass |
| *Micropterus salmoides* | Largemouth Bass |
| *Pomoxis annularis* | White Crappie |
| ****Micropterus dolomieu*** | **Smallmouth Bass-- possible** |
| ****Pomoxis nigromaculatus*** | **Black Crappie--- possible** |
| *Micropterus treculii* | Guadalupe Bass |
| **Percidae** | |
| *Etheostoma spectabile* | Orangethroat Darter |
| *Percina carbonaria* | Texas Logperch |
| *Percina sciera* | Dusky Darter |
| ****Percina macrolepida*** | **Bigscale Logperch--- possible** |
| ****Stizostedion vitreum*** | **Walleye--- possible** |
| **Sciaenidae** | |
| *Aplodinotus grunniens* | Freshwater Drum |
| **Cichlidae** | |
| *Oreochromis aurea* | Blue Tilapia |

**Total species verified by capture & observation = 45**

**Total species possible (currently not verified) = 15**

**Grand total = 60**

# C3. Amphibians and Reptiles

## Herpetofauna of Fort Cavazos

Possible = Species possibly occurs, presence not verified

## Amphibians

### Bufonidae

| | |
|---|---|
| *Anaxyrus debilis* | Eastern Green Toad |
| *Anaxyrus punctatus* | Red-Spotted Toad |
| ****Anaxyrus speciosus*** | **Texas Toad---possible** |
| *Anaxyrus woodhousii* | Woodhouse's Toad |
| *Incilius nebulifer* | Gulf Coast Toad |

### Hylidae

| | |
|---|---|
| *Acris crepitans blanchardi* | Blanchard's Cricket Frog |
| *Pseudacris clarkii* | Spotted Chorus Frog |
| *Pseudacris streckeri* | Strecker's Chorus Frog |
| ***Hyla chrysoscelis*** | **Cope's Gray Treefrog---confirmed in 2023** |
| ***Hyla cinerea*** | **Green Treefrog---confirmed in 2023** |
| ****Hyla versicolor*** | **Gray Treefrog---possible** |

### Craugastoridae

| | |
|---|---|
| ****Craugastor augusti*** | **Barking Frog---possible** |

### Eleutherodactylidae

| | |
|---|---|
| *Syrrhophus marnockii* | Cliff Chirping Frog |

### Microhylidae

| | |
|---|---|
| *Gastrophryne olivacea* | Great Plains Narrowmouth Toad |

### Scaphiopodidae

| | |
|---|---|
| *Scaphiopus couchii* | Couch's Spadefoot Toad |

### Ranidae

| | |
|---|---|
| *Lithobates berlandieri* | Rio Grande Leopard Frog |
| *Lithobates catesbeianus* | Southern Bullfrog |
| *Lithobates sphenocephalus* | Southern Leopard Frog |

### Plethodontidae

| | |
|---|---|
| *Plethodon albagula* | Western Slimy Salamander |

## Reptiles

### Gekkonidae

| | |
|---|---|
| *Hemidactylus turcicus* | Mediterranean Gecko |

**Crotaphytidae**

| | |
|---|---|
| *Crotaphytus collaris collaris* | Eastern Collared Lizard |

**Phrynosomatidae**

| | |
|---|---|
| *Cophosaurus texanus texanus* | Texas Earless Lizard |
| *Phrynosoma cornutum* | Texas Horned Lizard |
| *Sceloporus olivaceus* | Texas Spiny Lizard |
| ****Holbrookia lacerata lacerata*** | **Plateau Earless Lizard---possible** |
| ****Sceloporus undulates consobrinus*** | **Texas Spiny Lizard---possible** |
| ****Urosaurus ornatus ornatus*** | **Eastern Tree Lizard---possible** |

**Polychrotidae**

| | |
|---|---|
| *Anolis carolinensis carolinensis* | Green Anole |

**Scincidae**

| | |
|---|---|
| *Eumeces tetragrammus brevilineatus* | Short-Lined Skink |
| *Eumeces fasciatus* | Five-Lined Skink |
| *Scincella lateralis* | Ground Skink |
| ****Eumeces obsoletus*** | **Great Plains Skink---possible** |

**Teiidae**

| | |
|---|---|
| *Cnemidophorus gularis gularis* | Texas Spotted Whiptail Lizard |
| *Cnemidophorus sexlineatus veridis* | Sixlined Racerunner |

**Leptotyphlopidae**

| | |
|---|---|
| *Leptotyphlops dulcis dulcis* | Plains Blind Snake |

**Colubridae**

| | |
|---|---|
| *Coluber constrictor flaviventris* | Eastern Yellowbelly Racer |
| *Diadophis punctatus arnyi* | Prairie Ringneck Snake |
| *Heterodon platirhinos* | Eastern Hognose Snake |
| *Lampropeltis calligaster calligaster* | Prairie Kingnake |
| *Lampropeltis getula holbrooki* | Speckled Kingsnake |
| *Masticophis flagellum testaceus* | Western Coachwhip |
| *Nerodia erythrogaster transversa* | Blotched Water Snake |
| *Nerodia rhombifera rhombifera* | Diamondback Water Snake |
| *Opheodrys aestivus* | Rough Green Snake |
| *Pantherophis obsoleta lindheimeri* | Texas Rat Snake |
| *Pantherophis emoryi* | Great Plains Rat Snake |
| *Pituophis catenifer sayi* | Bullsnake |
| *Salvadora grahamiae lineata* | Texas Patch-nosed Snake |
| *Sonora semiannualata semiannualata* | Variable Ground Snake |
| *Storeria dekayi texana* | Texas Brown Snake |
| *Tantilla gracilis* | Flat-headed Snake |
| *Thamnophis cyrtopsis ocellatus* | Eastern Black-necked Garter Snake |
| *Thamnophis proximus rubrilineatus* | Red-striped Ribbon Snake |

| | |
|---|---|
| *Tropidoclonion lineatum* | Lined Snake |
| *Virginia striatula* | Rough Earth Snake |
| ***Lampropeltis getula splendida** | **Desert Kingsnake---possible** |
| ***Rhinocheilus lecontei tessellatus** | **Texas Long-Nosed Snake---possible** |
| ***Thamnophis marcianus marcianus** | **Checkered Garter Snake---possible** |
| ***Thamnophis sirtalis annectens** | **Texas Garter Snake---possible** |

**Elapidae**

| | |
|---|---|
| *Micrurus tenere* | Texas Coral Snake |

**Viperidae**

| | |
|---|---|
| *Agkistrodon contortrix laticinctus* | Broad-Banded Copperhead |
| *Crotalus atrox* | Western Diamond-backed Rattlesnake |

**Chelydridae**

| | |
|---|---|
| *Chelydra serpentina serpentine* | Common Snapping Turtle |

**Emydidae**

| | |
|---|---|
| *Pseudemys texana* | Texas River Cooter |
| *Terrapene ornata ornata* | Ornate Box Turtle |
| *Trachemys scripta elegans* | Red-Eared Slider |

**Kinosternidae**

| | |
|---|---|
| *Kinosternon flavescens flavescens* | Yellow Mud Turtle |
| **Kinosternon sububrum hippocrepis* | Mississippi Mud Turtle---possible |
| ***Sternotherus odoratus** | **Common Musk Turtle---possible** |

**Trionychidae**

| | |
|---|---|
| *Apalone muticus* | Smooth Softshell Turtle |
| *Apalone spiniferus pallidus* | Spiny Softshell Turtle |

**Total species verified by capture & observation = 56**

**Total species possible (currently not verified) = 15**

**Grand total = 71**

# C4. Mammal Species

Possible = Species possibly occurs, presence not verified

| | |
|---|---|
| **Didelphidae** | |
| *Didelphis virginiana* | Virginia Opossum |
| **Dasypodidae** | |
| *Dasypus novemcinctus* | Nine-Banded Armadillo |
| **Soricidae** | |
| *Cryptotis parva* | Least Shrew |
| **Talpidae** | |
| ***Scalopus aquaticus** | **Eastern Mole---possible** |
| **Vespertilionidae** | |
| ***Eptesicus fuscus** | **Big Brown Bat---possible** |
| *Lasiurus borealis* | Eastern Red Bat |
| *Lasiurus cinereus* | Hoary Bat |
| *Lasionycteris noctivagans* | Silver-Haired Bat |
| *Myotis velifer incautus* | Cave Myotis |
| *Nycticeius humeralis* | Evening Bat |
| *Perimyotis subflavus* | Tri-Colored Bat |
| **Molossidae** | |
| *Tadarida brasiliensis mexicana* | Mexican Free-Tailed Bat |
| **Canidae** | |
| *Canis latrans* | Coyote |
| *Urocyon cinereoargenteus* | Common Gray Fox |
| *Vulpes vulpes* | Red Fox |
| **Procyonidae** | |
| *Bassariscus astutus* | Ringtail |
| *Procyon lotor* | Northern Raccoon |
| **Mustelidae** | |
| *Lontra canadensis* | Northern River Otter |
| ***Mustela frenata** | **Long-Tailed Weasel---possible** |
| ***Mustela vison** | **American Mink---possible** |
| *Taxidea taxus* | American Badger |
| **Mephitidae** | |
| *Conepatus leuconotus* | Hog-Nosed Skunk |
| *Mephitis mephitis* | Striped Skunk |

| | |
|---|---|
| *Spilogale putorius* | Eastern Spotted Skunk |
| **Felidae** | |
| *Lynx rufus* | Bobcat |
| *Puma concolor* | Mountain Lion |
| **Suidae** | |
| *Sus scrofa* | Wild Pig |
| **Cervidae** | |
| *Odocoileus virginianus* | White-Tailed Deer |
| **Sciuridae** | |
| *Sciurus niger* | Eastern Fox Squirrel |
| ***Spermophilus mexicanus** | **Mexican Ground Squirrel---possible** |
| *Spermophilus variegatus* | Rock Squirrel |
| **Heteromyidae** | |
| ***Chaetodipus hispidus** | **Hispid Pocket Mouse---possible** |
| *Perognathus merriami* | Merriam's Pocket Mouse |
| **Castoridae** | |
| *Castor canadensis* | American Beaver |
| **Muridae** | |
| *Baiomys taylori* | Northern Pygmy Mouse |
| ***Microtus pinetorum** | **Woodland Vole---possible** |
| *Neotoma floridana* | Eastern Woodrat |
| *Peromyscus attwateri* | Texas Mouse |
| ***Peromyscus leucopus** | **White-Footed Mouse---possible** |
| *Peromyscus maniculatus* | Deer Mouse |
| *Peromyscus pectoralus* | White-Ankled Mouse |
| *Reithrodontomys fulvescens* | Fulvous Harvest |
| Mouse *Reithrodontomys montanus* | Plains Harvest Mouse |
| *Sigmodon hispidus* | Hispid Cotton Rat |
| **Erethizontidae** | |
| *Erethizon dorsatum* | North American Porcupine |
| **Myocastoridae** | |
| *Myocastor coypus* | Nutria |
| **Leporidae** | |
| *Lepus californicus* | Black-Tailed Jackrabbit |
| ***Sylvilagus aquaticus** | **Swamp Rabbit---possible** |
| *Sylvilagus floridanus* | Eastern Cottontail |

**Total species verified by capture & observation = 40**

**Total species possible (currently not verified) = 9**

**Grand total = 49**

# C5. Native Freshwater Mussel Species

## Unionoida of Fort Cavazos

**Unionidae**

| | |
|---|---|
| *Amblema plicata* | Threeridge |
| *Pyganodon grandis* | Giant floater |
| *Arcidens confragosus* | Rock pocketbook |
| *Cyclonaias pustulosa* | Pimpleback |
| *Cyrtonaias tampicoensis* | Tampico pearlymussel |
| *Fusconaia mitchelli* | False Spike* |
| *Lampsilis hydiana* | Lousiana fatmucket |
| *Lampsilis teres* | Yellow sandshell |
| *Leptodea fragilis* | Fragile papershell |
| *Megalonaias nervosa* | Washboard |
| *Potamilus purpuratus* | Bluefer |
| *Quadrula apiculata* | Southern mapleleaf |
| *Tritogonia verrucosa* | Pistolgrip |
| *Toxolasma parvus* | Lilliput |
| *Toxolasma texasiensis* | Texas lilliput |
| *Uniomerus tetralasmus* | Pondhorn |
| *Utterbackia imbecillis* | Paper pondshell |

*Possible = Last observed in 1931 in the Leon River. Likely extirpated from the Installation.

# C6. Vascular Plants

# Appendix D. Agency and Public Correspondence

*Reserved for correspondence between Fort Cavazos and participating reviewing parties during review of this INRMP/EA.*

## *Distribution List*

U.S. Fish and Wildlife Service
Texas Coastal and Central Plains Ecological
Services, Fort Worth Sub-Office
Sean Edwards, Fish and Wildlife Biologist
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Texas Parks and Wildlife Department
Wildlife Division: Wildlife Habitat Assessment Program
Laura Zebehazy, Program Leader
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Texas Parks and Wildlife Department
Wildlife Division: Wildlife Habitat Assessment Program
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# Appendix E. Finding of No Significant Impact

# FINAL
# FINDING OF NO SIGNIFICANT IMPACT (FONSI)

## Implementation of the FY 2024-2028 Fort Cavazos Integrated Natural Resources Management Plan

## FORT CAVAZOS, TEXAS

DPW

FORT CAVAZOS ENVIRONMENTAL

**DIRECTORATE OF PUBLIC WORKS**

**June 2024**

# FINAL FINDING OF NO SIGNIFICANT IMPACT (FONSI)
# IMPLEMENTATION OF THE FY 2024-2028 FORT CAVAZOS INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN, FORT CAVAZOS, TEXAS

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. NEPA is implemented through regulations promulgated by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500–1508) and within the United States (U.S.) Department of the Army (Army) by 32 CFR 651, *Environmental Analysis of Army Actions*. In accordance with these requirements, Fort Cavazos prepared an Environmental Assessment (EA), which is incorporated by reference, to consider environmental effects that could result from the implementation of the *FY 2024-2028 Fort Cavazos Integrated Natural Resources Management Plan* (INRMP) at Fort Cavazos, Texas (hereby referred to as the Proposed Action).

## 1.0 TITLE OF ACTION

*Implementation of the FY 2024-2028 Integrated Natural Resources Management Plan, Fort Cavazos, Texas*.

## 2.0 BACKGROUND INFORMATION

The Environmental Division, Directorate of Public Works (DPW) at Fort Cavazos, Texas has prepared an EA to analyze potential environmental impacts resulting from the Proposed Action and alternatives from the implementation of the INRMP. The EA (included as Chapter 7 of the INRMP), which is hereby incorporated by reference, was prepared in accordance with NEPA, CEQ, and Army regulations.

The U.S. Army Garrison Fort Cavazos, Texas (Fort Cavazos) has an estimated on-installation population of 61,117. Fort Cavazos is located in Central Texas, approximately 60 miles from both the cities of Austin and Waco, adjoining the cities of Belton, Killeen, Copperas Cove, and Gatesville. Fort Cavazos is located in Bell and Coryell counties, with the majority of its training lands in Coryell County.

Fort Cavazos occupies approximately 342 square miles or 218,823 total acres. It is one of the largest installations in the U.S. and is home for approximately 20 percent of the active Army. Approximately 196,797 acres of this land is range and training land. Approximately 132,525 acres is used for maneuver training area and 64,272 acres is used for range Live-Fire Training Area (LTA).

## 3.0 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes the implementation of the FY 2024-2028 updated INRMP, which supports the management of natural resources. The purpose of the Proposed Action is to continue several management programs currently in place

and to carry out the set of resource-specific management measures developed in the INRMP. This enables Fort Cavazos personnel to effectively manage the use and condition of natural resources on the installation. Implementation of the Proposed Action supports the U.S. Army's continuing need to ensure the safety and efficiency of its mission while practicing sound resources stewardship and compliance with environmental policies and regulations.

The Proposed Action supports an ecosystem approach and includes natural resources management measures to be undertaken on Fort Cavazos. The Proposed Action focuses on a 5-year planning period, which is consistent with the timeframe for the management measures described in the INRMP. This planning period will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years. Additional environmental analysis might be required as new management measures are developed during annual reviews of the INRMP, or over the long term (i.e., beyond 5 years). The INRMP will be revised and updated at the end of the 5-year period.

## 4.0 ALTERNATIVES

### 4.1 Preferred Action Alternative

The Preferred Action Alternative or Proposed Action is to implement the FY 2024-2028 updated INRMP on Fort Cavazos, Texas.

### 4.2 No Action Alternative

The CEQ regulations and Title 32 CFR 651 Chapter V (*Environmental Analysis of Army Actions*) require that a No Action Alternative be evaluated. Analysis of the No Action Alternative assists in understanding the anticipated impacts of the proposal and the severity of those impacts. It allows for a comparison to be made of future environmental, social, and economic conditions, both with and without completion of the proposed plan. The No Action Alternative must be considered for comparison purposes, while other alternatives to the proposal may be eliminated from consideration. The No Action Alternative includes any actions or changes that would occur, regardless of any alternative.

Under the No Action Alternative, the proposed management measures set forth in the FY 2024-2028 updated INRMP would not be implemented. This would limit the implementation of an effective ARMY REPI, which limits urban sprawl and reduces potential encroachments on the military mission. The No Action Alternative would not immediately change management direction or the level of management intensity. Under the No Action Alternative, Fort Cavazos would continue to operate using existing programs and management practices in accordance with the 2019-2023 INRMP. Current management measures for natural resources would remain in effect, and existing conditions would continue as the status quo. The No Action Alternative includes the existing INRMP that has not been updated and would fail to meet the described purpose and need.

Impacts under the No Action Alternative are the same as the Proposed Action except for land use. Long-term, less than significant impacts could occur without the

implementation of the ARMY REPI program. Without pursuit of the ARMY REPI program as proposed in the updated INRMP, urban sprawl could be expected to continue along Fort Cavazos's borders resulting in further encroachments on the military mission. Additional care in following standard procedures or applying precautionary measures to minimize adverse impacts to encroaching communities may be required for training lands.

## 5.0 SUMMARY OF ENVIRONMENTAL EFFECTS

The analysis of the potential environmental impacts is documented in the EA (Chapter 7 of the INRMP). Table FONSI-1 provides a summary of the potential impacts to environmental, social, and economic resources that would result from implementing the Proposed Action and No Action Alternative.

Cumulative impacts were also analyzed for past, present, and reasonably foreseeable future projects. The analysis considered activities within the Areas of Interest (AOI), which is defined as Bell and Coryell counties. The Proposed Action is located on military lands; therefore, Fort Cavazos projects were included in the cumulative impacts for this AOI. For each potential environmental impact detailed below, the cumulative impact is also addressed.

In terms of cumulative impacts, the Proposed Action and No Action Alternative were analyzed for air quality, noise, socioeconomics and environmental justice, facilities, hazardous and toxic materials, land use, soils, water resources, biological resources, and cultural resources. Following review of the alternative actions in combination with other past, present, and reasonably foreseeable future actions within the lands of Fort Cavazos, the Army determined that no significant cumulative impacts would occur. Implementation of the Proposed Action would be considered beneficial by enabling Fort Cavazos to achieve its goals of maintaining ecosystem viability and ensuring the sustainability of natural resources and land conditions.

**Table FONSI-1. Summary of Environmental, Social, and Economic Impacts**

| Technical Resource Area | No Action Alternative | Proposed Action |
|---|---|---|
| Air Quality | No effects | No effects |
| Noise | No effects | No effects |
| Floodplains | No effects | No effects |
| Texas Coastal Zone | No effects | No effects |
| Socioeconomic Resources | No effects | No effects |
| Environmental Justice | No effects | No effects |
| Facilities | No effects | No effects |
| Hazardous and Toxic Materials | No effects | No effects |
| Land Use | Short-term, less than significant adverse effects | Long-term, beneficial effects |
| Soils | No effects | Long-term, beneficial effects |
| Water Resources | No effects | Long-term, beneficial effects |
| Sensitive Species | No effects | Long-term, beneficial effects |
| Fish and Wildlife | No effects | Long-term, beneficial effects |
| Vegetation | Short-term, less than significant adverse effects | Short-term, less than significant adverse effects |
| Cultural Resources | No effects | Long-term, beneficial effects |
| Cumulative Effects | Adverse effects | Long-term, beneficial effects |

## 6.0 PUBLIC COMMENTS

A Notice of Availability (NOA) of this document was published in the Killeen Daily Herald newspaper on May 2, 2024. During the 30-day public review and comment period, copies of the EA and Draft FONSI were made available at the Killeen Public Library located at 205 East Church Avenue, Killeen, Texas 78544. An electronic copy was also made available at https://home.army.mil/cavazos/units-tenants/Garrison/DPW/ENV/NOA.

No comments were received during the public review period.

## 7.0 CONCLUSION

Based on a careful review of the EA, which is incorporated by reference, I have concluded that no significant environmental impacts are anticipated to result from the implementation of the Proposed Action. Therefore, an Environmental Impact Statement (EIS) is not required. Fort Cavazos sincerely appreciates the participation of the public in the EA process. All public and agency comments are part of the Administrative Record and have been carefully considered by Fort Cavazos prior to making final decisions covered under this analysis.

APPROVED:

THURSTON.ELIZABETH.G.1077224960
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