# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

# CAMP JOSEPH T. ROBINSON

**June 2023**

Prepared by

**Arkansas Department of the Military**
**Deputy Chief of Staff Engineering -Environmental**
**Robinson Maneuver Training Center**
**North Little Rock, Arkansas**

*Page Intentionally Blank*

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AADZ | All American Drop Zone |
| AALZ | All American Landing Zone |
| AASF | Army Aviation Support Facility |
| ACAT | Army Climate Assessment Tool |
| AGFC | Arkansas Game and Fish Commission |
| AIRFA | American Indian Religious Freedom Act |
| ANG | Air National Guard |
| ANHC | Arkansas National Heritage Commission |
| APC&PE | Arkansas Pollution Control and Ecology Commission |
| APE | Area of Potential Effect |
| APFT | Army Physical Fitness Test |
| AQI | Air Quality Index |
| ARARNG | Arkansas Army National Guard |
| ARPA | Archaeological Resource Protection Act |
| ASPB | Arkansas State Plant Board |
| ATV | All-Terrain Vehicle |
| AWAP | Arkansas Wildlife Action Plan |
| BASH | Bird Aircraft Strike Hazard |
| BGEPA | Bald and Golden Eagle Protection Act |
| BMP | Best Management Practice |
| CATA | Central Arkansas Trail Alliance |
| CCP | Candidate Conservation Program |
| CEMML | Center for Environmental Management of Military Lands |
| CFMO | Construction Facility Management Officer |
| CKT | Containerized Kitchen Trailer |
| CRFD | Camp Robinson Fire Department |
| CRM | Cultural Resource Manager |
| CRWMA | Camp Robinson Wildlife Management Area |
| CRWMP | Camp Robinson Wildlife Management Program |
| CSTP | Civilian Student Training Program |
| CWA | Clean Water Act |
| D.O. | Delivery Order |
| dbh | Diameter at Breast Height |
| DCSEN | Deputy Chief of Staff Engineering |
| DCSEN-ENV | Deputy Chief of Staff Engineering - Environmental |
| DEQ | Department of Environmental Quality |
| DMAP | Deer Management Assistance Program |
| DOD | Department of Defense |
| DODI | Department of Defense Instruction |
| DODM | Department of Defense Manual |
| DOTM | Department of the Military |
| EA | Environmental Assessment |
| ECOS | Environmental Conservation Online System |
| EO | Executive Order |
| EPA | Environmental Protection Agency |

| | |
|---|---|
| EPM | Environmental Program Manager |
| ERDC | Engineer Research and Development Center |
| ESA | Endangered Species Act |
| EST | Engagement Skills Trainer |
| FCJMTC | Fort Chaffee Joint Maneuver Training Center |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FRM | Forest Resource Manager |
| FRMP | Forestry Resource Management Plan |
| GIS | Geographic Information System |
| GLO | General Land Office |
| GPS | Global Positioning System |
| HEAT | Humvee Egress Assistance Trainer |
| HQDA | Headquarters, Department of the Army |
| IBP | Institute for Bird Populations |
| ICRMP | Integrated Cultural Resources Management Plan |
| INRMP | Integrated Natural Resources Management Plan |
| IPaC | Information, Planning, and Conservation |
| IPMP | Integrated Pest Management Plan |
| ITAM | Integrated Training Area Management |
| IWFMP | Integrated Wildland Fire Management Program |
| LRAM | Land Rehabilitation and Maintenance |
| MACOM | Major Commands |
| MAPS | Monitoring Avian Productivity and Survivorship |
| MAV | Minimum Acceptable Visibility |
| MAWS | Monitoring Avian Winter Survival |
| MBTA | Migratory Bird Treaty Act |
| MFI | Mean Fire Interval |
| NAGPRA | Native American Graves Protection and Repatriation Act. |
| NCEI | National Centers for Environmental Information |
| NEPA | National Environmental Policy Act |
| NLEB | Northern Long Eared Bat |
| NLR | North Little Rock |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NRM | Natural Resource Manager |
| NWCG | National Wildfire Coordinating Group |
| NWPs | Nationwide Permits |
| NWS | National Weather Service |
| OBS | Oklahoma Biological Survey |
| OPS | Operations Officer |
| PAO | Public Affairs Officer |
| PDSI | Palmer Drought Severity Index |
| PHDI | Palmer Hydrological Drought Index |

| | |
|---|---|
| PIF | Partners in Flight |
| PMDI | Palmer Modified Drought Index |
| POW | Prisoner of War |
| PPE | Personal Protection Equipment |
| RMTC | Robinson Maneuver Training Center |
| ROHVA | Recreational Off-Highway Vehicles Association |
| ROTC | Reserve Officers' Training Corps |
| ROV | Recreational Off-Highway |
| RPG | Rocket Propelled Grenade |
| RTLA | Range Training Land Analysis |
| SAIA | Small Arms Impact Area |
| SDZ | Surface Danger Zone |
| SERDP | Strategic Environmental Research and Development Program |
| SGCN | Species of Greatest Conservation Concern |
| SHPO | State Historic Preservation Officer |
| SMP | Sportsman's Program |
| SMZ | Streamside Management Zone |
| SOCC | Species of Conservation Concern |
| SOMS | State Owned Mobilization Stations |
| SPCCP | Spill Prevention Control and Counter Measure Plan |
| SRA | Sustainable Range Awareness |
| SUA | Special Use Area |
| T&E | Threatened and Endangered |
| TA | Training Area |
| TAG | The Adjutant General |
| TNC | The Nature Conservancy |
| TRI | Training Requirements Integration |
| TSM | Training Site Manager |
| UALR | University of Arkansas at Little Rock |
| USACE | United States Corps of Engineers |
| USAR&D | U.S. and Global Research and Development |
| USDA | U.S. Department of Agriculture |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| USNVC | U.S. National Vegetation Standard |
| UTV | Utility Task Vehicle |
| UXO | Unexploded Ordinance |
| VFD | Volunteer Fire Department |
| VPS | Vascular Plant Survey |
| WASH | Wildlife Aircraft Strike Hazard |
| WMA | Wildlife Management Area |
| WQC | Water Quality Certification |
| WUI | Wildland Urban Interface |
| WWII | World War Two |
| YCP | Youth Challenge Program |

**INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE**
**ARKANSAS DEPARTMENT OF THE MILITARY**
**2023-2028**

# Signature Page

This revised Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs listed in the Sikes Act Improvement Amendments (16 U.S.C. 670a et seq.), AR 200- 1, and the "Executive Summary" within this Plan. It has set appropriate and adequate guidelines for conserving and protecting the natural resources of Robinson Maneuver Training Center (RMTC).

**APPROVING OFFICIALS:**

---

**ANTHONY HAMMETT** **DATE**
Colonel, U.S. Army
Chief, G-9 Army National Guard

---

**JONATHAN STUBBS** **DATE**
The Adjutant General
Arkansas Army National Guard

---

**DARRELL W. DANIELS** **DATE**
Environmental Program Manager
Arkansas Army National Guard

---

**CHRIS DAVIDSON** **DATE**
Deputy Field Supervisor
US Fish and Wildlife Service

---

**AUSTIN BOOTH** **DATE**
Regional Director
Arkansas Game and Fish Commission

---

*PAGE INTENTIONALLY BLANK*

# EXECUTIVE SUMMARY

Arkansas Army National Guard (ARARNG) Training Sites must provide a variety of environmental conditions and ecosystems to maximize the capability, accessibility, and availability of the land to meet the training mission. This objective must be completed in a way that:

- Provides for sustainable, healthy ecosystems.
- Complies with all applicable environmental laws and regulations.
- Provides for no net loss in the capability of military installation lands to support the military mission.

An Integrated Natural Resource Management Plan (INRMP) helps installation commanders manage natural resources more effectively to ensure installation lands remain available and in good condition to support the military mission. This document contains Policy and Guidance for the property, Camp Joseph T. Robinson Maneuver Training Center (RMTC).

The ARARNG has adopted the concept of integrating ecosystem management with its mission and mission activities. The ARARNG recognizes that its ongoing and proposed training activities can potentially use or consume the natural resources on military land and that the successful execution of its mission depends on optimum maintenance of the environment in a mode of sustainable use. The ARARNG recognizes its responsibility to guarantee continued access to its land, air, and water resources for realistic military training while ensuring the natural resources entrusted to its care are sustained in a healthy condition for scientific research, education, and other compatible uses by future generations.

The ARARNG is committed to planned, deliberate management of natural resources, supporting the operational installation mission, meeting or exceeding stewardship requirements, and enhancing the quality of life for its personnel and guests.

Implementation of this INRMP will promote adaptive management that protects and enhances natural resources for multiple uses, sustainable yield, and biological integrity, while supporting the military mission. This document complies with applicable Army and DoD policies, as well as federal, state, and local mandates and regulations. Implementation of this INRMP is subject to the availability of annual funding.

# Table of Contents

# APPENDICES

# ANNUAL REVIEW AND FIVE-YEAR REVIEW SIGNATURE PAGE

This page is used to certify the annual review and coordination of this Integrated Natural Resources Management Plan with the United States Fish and Wildlife Service and the Arkansas Game and Fish Commission for the Arkansas Army National Guard.
By their signatures below, the certifying official acknowledges that the annual review and coordination of the Integrated Natural Resources Management Plan has occurred for the specified year.

| Date of Annual Review | Name and Title of ARARNG Reviewing official |
|---|---|
| | |
| | |
| | |
| | |
| | |

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 Arkansas Game and Fish Commission only sign this document during major revisions

# 1.0 INTRODUCTION

An Integrated Natural Resource Management Plan (INRMP) helps installation commanders manage natural resources more effectively to ensure installation lands remain available and in good condition to support the military mission. This document contains Policy and Guidance for the property, Camp Joseph T. Robinson Maneuver Training Center (RMTC).

The ARARNG has adopted the concept of integrating ecosystem management with its mission and mission activities. The ARARNG recognizes that its ongoing and proposed training activities can potentially use or consume the natural resources on military land and that the successful execution of its mission depends on optimum maintenance of the environment in a mode of sustainable use. The ARARNG recognizes its responsibility to guarantee continued access to its land, air, and water resources for realistic military training while ensuring the natural resources entrusted to its care are sustained in a healthy condition for scientific research, education, and other compatible uses by future generations.

The ARARNG is committed to planned, deliberate management of natural resources, supporting the operational installation mission, meeting or exceeding stewardship requirements, and enhancing the quality of life for its personnel and guests.

## 1.1 PURPOSE

The Integrated Natural Resources Management Plan (INRMP) is a comprehensive document developed for the sustainable management and use of natural resources at Robinson Maneuver Training Center (RMTC). This document is a guideline to ensure the sustainable use of our natural resources (i.e., land, water, soil, plants, and wildlife) while supporting the military mission. Effective natural resources management of military installations adequately maintains military training lands by providing no net loss of the installation's capability to support the military mission while simultaneously providing natural resource protection, maintaining ecosystem integrity, and allowing for multipurpose land use. Sustainable use is accomplished through native habitat restoration, biodiversity preservation, surveys and studies, invasive species control, and environmental contaminant prevention and monitoring.

This INRMP aims to guide installation staff and personnel in preserving and restoring natural resources on RMTC. Works designed in agreeance with this document are to provide continued use and improvement of native and realistic habitats to support military training goals. To fulfill this purpose, the INRMP provides guidelines and identifies issues and areas needing improvement for fulfilling natural resources management goals and objectives at RMTC. In essence, the purpose of this INRMP is to:

- Provide a comprehensive planning document that allows ARARNG to carry out its mission, promote ecosystem health, and maximize biodiversity at its installations and in the surrounding region.
- Fulfill National Environmental Policy Act (NEPA) and Sikes Act requirements.
- Ensure compliance with all applicable federal, state, local, DoD, and Army laws and regulations.
- Establish the framework for implementing natural resources programs and ecosystem management.

- Document specific natural resources management goals, objectives, policies, and the desired future direction of natural resources programs.
- Provide a centralized source of information on the status of natural resources programs.
- Maintain guidelines for ecosystem management that result in no net loss to the military training mission.
- Record the personnel, funding, and support required for INRMP implementation.
- Coordinate with federal, state, and local agencies and organizations involved in natural resources management to ensure proper land and natural resources management.

The Sikes Act, DoDI 4715.03, and AR 200-1 require that INRMPs be developed and maintained for DoD and Army lands. These plans are required to comply with federal statutes, executive orders, and DoD and Department of Army regulations.

## 1.2 SCOPE

This INRMP applies to all organizations involved with managing or using RMTC natural resources and lands. The scope of this INRMP includes all lands under the jurisdiction of RMTC. Lands included are the cantonment area and all ranges and training areas. Provisions of this INRMP apply to all organizations, commands, units, outlying detachments of personnel assigned or attached to the installation, tenants (government and private), external parties, contractors, and individuals who either directly or indirectly use RMTC's lands and/or natural resources. This INRMP is an integral part of the RMTC Master Plan.

## 1.3 AUTHORITIES

The updated INRMP for the RMTC has been prepared by the ARARNG/DOTM per the Sikes Act and DoDI 4715.03, Natural Resources Management Programs, AR 200-1, National Guard Bureau (NGB) policy, Implementation of the Sikes ACT: Updated Guidance, and the Memorandum of Understanding (MOU) among DoD, FWS, and the International Association of Fish and Wildlife Agencies (IAFWA) for a Cooperative INRMP on Military Installation, and ARNG Installations & Environment guidance.

### 1.3.1 Arkansas Department of the Military

The ARARNG's Adjutant General (TAG) has overall authority over the preparation and implementation of an INRMP. The INRMP must fulfill stewardship, legal, and training requirements determined by TAG.

### 1.3.2 Camp Joseph T. Robinson Maneuver Training Center

Under the DOTM, the DCSEN-E EPM, and the RMTC-Training Site Manager (TSM) has day-to-day responsibility for developing and coordinating the implementation of the INRMP.
A component of the Deputy Chief of Staff Engineering (DCSEN) Office, the EPM has oversight responsibility for the DCSEN-E, which contains the RMTC Natural Resources Management Program (NRMPG). The RMTC Natural Resources Manager (NRM) currently serves as the lead representative for the RMTC NRMPG.

### 1.3.3 External Stakeholders

In addition to the ARARNG/DOTM, internal and external stakeholders include the FWS, AGFC, ANHC, the United States Natural Resources Conservation Service (NRCS), the Native American Tribes, and adjacent landowners. These stakeholders are vested in how the natural resources at ARARNG/DOTM installations are managed. As such, stakeholders are included in the natural resources planning process and can provide technical and regulatory input. Concurrence with this INRMP by these agencies represents a mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources. The ARARNG/DOTM has coordinated the update of the INRMP with FWS, AGFC, and ANHC. Letters sent to these agencies, as well as other organizations and agencies, letters of reply, and concurrence memos, are all included.

### 1.3.4 Memorandum of Understanding (MOU)

ARARNG/DOTM and the AGFC implemented an MOU in October 2000, revised in 2018. The purpose of this MOU is to provide for the cooperative management of portions of RMTC. The portion of RMTC, including TAs north of Clifton Mountain, but not including the Mortar Impact Area, was designated as the Camp Robinson Wildlife Management Area (CRWMA). The MOU recognizes the INRMP as the guideline for the management of natural resources on RMTC and establishes responsibility for the following:

1. Land and resources management practices that will benefit wildlife and the environment.
2. Cooperative management of fish and wildlife.
3. Enforcement of all state fish and game regulations.
4. Authority to resolve differences related to the MOU.

# 2.0 GENERAL INFORMATION, MANAGEMENT PHILOSOPHY

## 2.1 MANAGEMENT PHILOSOPHY

This INRMP was developed and updated under the following four concepts:

1. Sustainable use of military lands with a goal of "no net loss in the capability of military lands to support the military mission."
2. Natural resources stewardship.
3. Biodiversity protection.
4. A comprehensive ecosystem management approach.

### 2.1.1 Military Mission

The primary mission objective of the ARARNG/DOTM is to provide trained and equipped units capable of immediate expansion to war strength. These units must be available for service in times of war, national emergency, or when appropriated to augment the active Army. The primary state mission is to support civil authorities in the protection of life and property, as well as supporting the preservation of peace, order, and public safety under competent orders from state authorities. The ARARNG/DOTM requires sufficient land to accomplish these missions.

According to the ARARNG Range and Training Land Program Development Plan, the availability of training land is limited in Arkansas (ARNG 2000). As stated in the Sikes Act guidance, the INRMP will ensure sustainable use of military lands with a goal of "no net loss in the capability of military lands to support the military mission." To achieve this goal at RMTC, the ARARNG/DOTM must manage, protect, and enhance the biological integrity of the training site.

### 2.1.2 Natural Resource Stewardship

Natural resource stewardship is the responsible use and management of resources to maintain the resilience of natural systems. The stewardship goal of the ARARNG/DOTM is to sustain multiple benefits of natural resources over the long term. Benefits include mission activities, forestry, outdoor recreation, aesthetics, and ecosystem preservation.

### 2.1.3 Biodiversity

Maintaining and increasing biodiversity is an overall goal of the ARARNG/DOTM. The diversity of ecological communities, variation of and within species, and variation within and between ecosystems are measures of biodiversity. Biodiversity is influenced by abiotic factors such as precipitation, soil types, and fire regime. Management to maintain biodiversity ensures ecosystem health and resilience and assures the sustainable use of lands to accomplish military missions. Sustainable use of RMTC training lands can be achieved through natural resource programs that integrate mission activities with sound management practices.

The Department of the Military is committed to protect biodiversity and use a comprehensive management approach to integrate wildlife and forestry. The shortleaf pine initiative and the white oak initiative are two aspects that have been adopted by the DOTM to aid in increasing

two species in that are in serious decline in the southern region. While the shortleaf pine is not the fastest growing or the most lucrative of the yellow pine species it has been adopted by the DOTM to combat a species and forest type in serious decline. The white oak is also in serious decline and is widely known to benefit most of the important wildlife species in this region. Discussions in the forestry meetings will continue with various participants offering a number of ideas regarding their particular area of interest but this does not mean the will be set into policy. The DOTM Is not interested in merely increasing pine production or in increased revenue as stated. The DOTM is interested in an integrated management approach to include Training needs, Natural Resources, Forestry and Cultural resources.

### 2.1.4 Ecosystem Management

Ecosystem management is a style of natural resources management wherein a broad approach is used to integrate relationships of all organisms, including humans, with each other and with nonliving elements of their environment. It is a tool for the ARARNG/DOTM to protect and enhance biodiversity and sustain the use of its lands. This method emphasizes decisions prioritizing managing natural resources at a community or ecosystem level rather than individual species, but consideration must be given to species of conservation concern during project planning because these species are provided legal protection. Maintaining and improving an ecosystem's quality, integrity, and connectivity will enable multiple species to prosper, including threatened species and species of conservation concern. Furthermore, maintaining ecosystem health will ensure the land/resources can sustain current and future military missions.

## 2.2 NATURAL RESOURSE IMPLEMENTATION AND PLANNING

The Natural Resources Planning structure has been developed based on installation-specific management situations. It facilitates issue identification prioritization, project funding, implementation, and tracking of natural resource projects. Natural resource action is defined in Figure 2.2-1 and covers the process of decision making for INRMP Goals and Objectives.

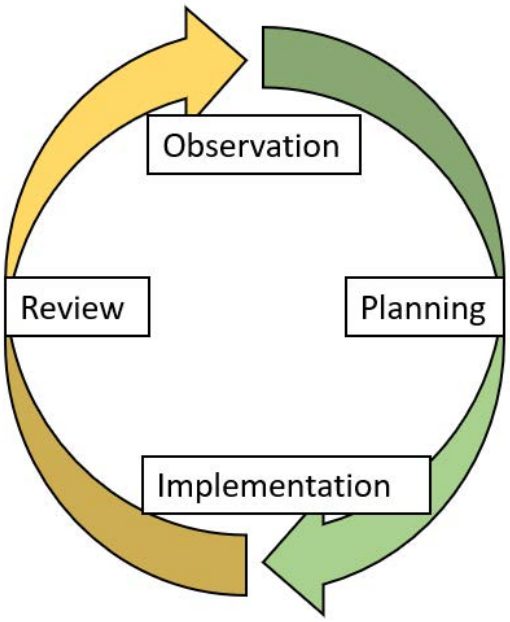



*Figure 2.2-1 Natural Resource Planning and Implementation Structure*.

### 2.2.1 Observation

Natural resources issues and concerns are defined as any action, process, activity, or program that might constrain operations and mission activities, readiness, and future planning at RMTC. DCSEN-E staff, in conjunction with the RMTC-TSM, are responsible for identifying issues and concerns by determining training needs and identifying how Natural Resources Management impacts training and by evaluating natural resources programs and conducting assessments of the status and trends of natural resources. This process is necessary to meet the "no net loss" standard. The programs are based on assessing existing information on the military mission, current programs, and natural resources. This same structure is used for calculating the impact natural resources on the mission, including adding species of concern, or listing of T&E species.

### 2.2.2 Planning

All action both military, and resource preservation will have to be planned prior to implementation, this includes legal review of limitation, and best practices. Planning for natural resources must establish Best Management Practices (BMP) for actions where natural resource use or effect cannot be completely mitigated. Planning identifies new management issues, concerns, goals, and objectives. The natural resources planning framework presented in this INRMP are based on assessing existing information on the military mission, current programs, and natural resources. ARARNG/DOTM recognizes the need for an adaptive management approach which allows RMTC to address changing land use requirements, natural resource conditions, and other unforeseen factors that might prohibit implementation of some or all project-specific goals.

### 2.2.3 Implementation

Implementation will be discussed at length in the following section but is the most crucial step in this process, and therefore must be detailed.

### 2.2.4 Review

Periodic assessment is an integral part of the natural resources planning process that evaluates program status, measures progress, and identifies new management issues, concerns, goals, and objectives. Although floral, faunal, and wetland resource surveys had been conducted at RMTC, the original INRMP established formal programs for many natural resource issues at the installation. The updated INRMP documents the status of natural resources programs and proposes modifications where appropriate. The state of programs or management activities at the RMTC is provided in Appendix B, along with recently identified natural resources issues and program development needs.

# 3.0 IMPLEMENTATION, ROLES AND RESPONSIBILITIES, FUNDING

## 3.1 PLAN IMPLEMENTATION SUMMARY

RMTC intends to implement the project-specific objectives and management actions in this INRMP based on available funding and personnel. ARARNG/DOTM recognizes the need for an adaptive management approach which allows RMTC to address changing land use requirements, natural resource conditions, and other unforeseen factors that might prohibit implementation of some or all project-specific goals under the schedule. Implementation for natural resource projects can be simplified as the Goals and Objectives that are defined in Appendix A.

This section presents estimated staffing and funding requirements for implementing the updated ARARNG/DOTM INRMP for RMTC and the implementation schedule. Following ARNG INSTALLATIONS & ENVIRONMENT Supplemental Guidance, the staffing and funding requirements were reviewed and updated as part of a review for operation and effect (ROE) conducted at least five years from the previous INRMP ROE.

It is unlikely that program goals will vary; however, unforeseen factors might prohibit the ARARNG/DOTM from implementing some of the project-specific plans per the implementation schedule. In addition, implementation of project-specific goals is contingent upon funding availability and other project funding priorities within the DA, ARNG INSTALLATIONS & ENVIRONMENT, and ARARNG/DOTM. The INRMP will be routinely reviewed and updated to address changing conditions.

A detailed INRMP implementation summary is presented in Appendix B. The summary includes information for each project-specific goal, including scheduling information, staffing requirements, funding requirements, and funding sources. Implementation of this INRMP is subject to availability of funding.

## 3.2 STAFFING REQUIREMENTS

Staffing for implementation of the INRMP comes from the DCSEN-E and RMTC-TSM staff, as well as outside contractors, when necessary. Cooperating agencies, non-governmental organizations, and contractors may provide additional staffing for specific INRMP projects. The NRM at NGB offers technical guidance and support to implement various aspects of the INRMP. Effective implementation of the INRMP will require a variety of ARARNG/DOTM staff.

Activities are coordinated between the EPM, NRM, FRM, RMTC-OPS, and unit commanders. Other units/sections within the ARARNG/DOTM may provide vital implementation support for the INRMP, especially within LRAM, Surface Waters and Wetlands Management, and Pest and Invasive Species Management programs.

To the extent possible, INRMP projects that require specialized design and engineering services will be integrated into Engineer units' Annual Training and Initial Active Duty (IAD) training. The DCSEN will also provide design support.

The DCSEN-E EPM currently has overall responsibility for the Environmental Management Program at RMTC. The RMTC NRM serves as the lead representative for natural resources-related issues. Specific responsibilities regarding the RMTC INRMP include the following:

1. Identifying and evaluating management issues and concerns
2. Providing policy, guidance, and oversight for the development of goals and objectives
3. Overseeing development, implementation, and revision of the INRMP
4. Fostering environmental awareness and good stewardship at RMTC

A multidisciplinary ARARNG/DOTM team represents military land use needs and provides natural resources subject matter expertise to ensure sound management of all natural resources at RMTC.

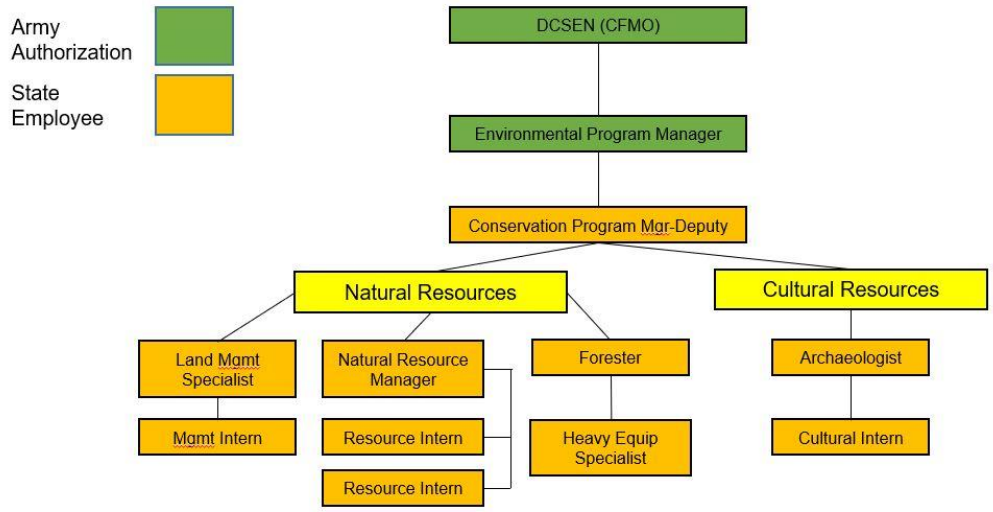



*Figure 3.2-1 Deputy Chief of Staff Engineering, Environmental Branch Conservation Section Organizational Chart.*

## 3.3 FUNDING

Funding for the DCSEN-E and standard supplies comes from direct funding sources. A variety of funding sources, including the following, may be used to implement specific projects:

- Status Tool for the Environmental Program (STEP) -Conservation Program
- Integrated Training Area Management (ITAM) Program
- DoD Legacy Program
- State Wildlife Grants
- State Forestry Management Returns

# 4.0 INRMP EVALUATION AND REVISION

The Sikes Act requires an annual review of the INRMP and an update at least every five years to keep the plan current in operation and effect. Page revisions are permitted when significant modifications are unnecessary. Periodic assessment is an integral part of the natural resources planning process that evaluates program status, measures progress, and identifies new management issues, concerns, goals, and objectives. Periodic evaluations and corrections are conducted under the management of the DCSEN-E with input from the RMTC-TSM and the required stakeholders.

The original INRMP established formal programs for many natural resource issues at the installation. The updated INRMP documents the status of natural resources programs and proposes modifications where appropriate. The previous five-year review was completed in 2016. Due to unforeseen circumstances and combined with employee turnover, this document was rewritten entirely in 2023. This rewrite follows the 2018 DOD Manual 4715.03, INRMP Implementation Manual.

## 4.1 PUBLIC REVIEW AND THE NEPA PROCESS

The Sikes Act requires that INRMPs be made available to the public for review. The INRMP shall be made available for public inquiry at public libraries, and notices of availability will publish in local newspapers. The INRMP will be made available for review to appropriate agencies, Indian tribes, and non-governmental organizations (NGOs). Letters documenting this are to be included in signature. The original version of the INRMP and corresponding NEPA documentation are available from DCSEN-E upon request.

NEPA requires federal agencies to consider the potential environmental consequences of proposed actions in their decision-making process. The NGB General Counsel determined that the Sikes Act requirements for INRMP implementation necessitate preparing NEPA documentation before plan approval. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee federal processes.

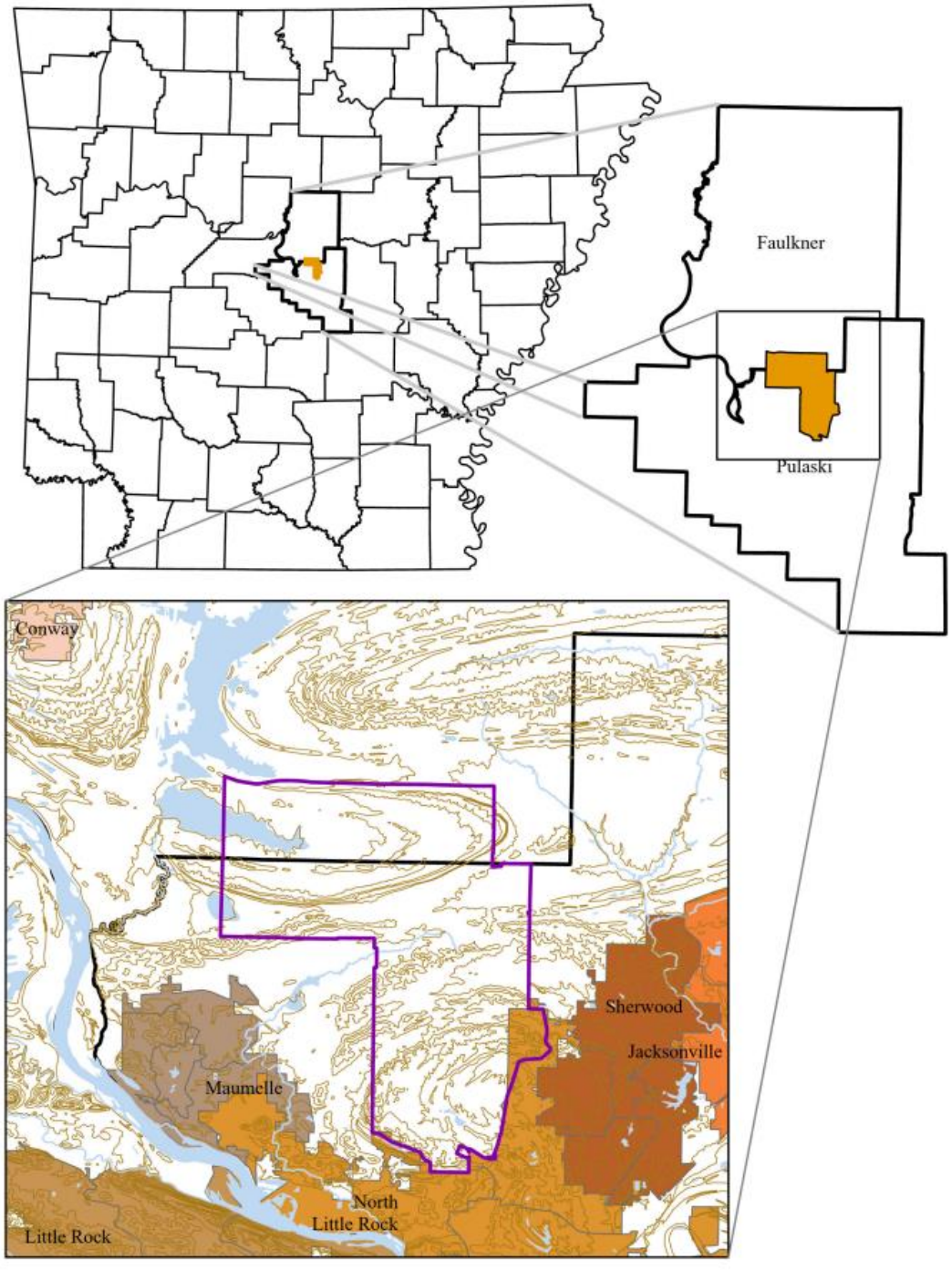
The CEQ issued the Regulations for Implementing Procedural Provisions of the National Environmental Policy Act (40 CFR § 1500-1508) (CEQ 1978). These regulations specify that an EA be prepared to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI.
- Aid in an agency's compliance with NEPA when no EIS is necessary.
- Facilitate the preparation of an EIS when one is necessary.

Following NEPA, an EA was prepared to evaluate the potential environmental consequences of implementing the original RMTC INRMP. The EA was prepared in 2001 following NGB guidance for preparing NEPA documents for INRMPs and was made available for public review. Thereafter, all INRMP updates tiered off the original EA using a Record of Environmental Consideration (REC). A new REC was prepared for this current update of the INRMP.

# Camp Joseph T. Robinson

## North Little Rock, Arkansas



# Appendix A: Natural Resources Goals and Objectives

As pursuant to the direction of the Sikes Act, 7 main goals have been identified for the resources contained with the bounds of RMTC, as described here.

Goal 1: Manage natural resource programs compatible with and supporting the military mission while complying with applicable federal, military, and state laws, regulations, and policies.

Goal 2: Ensure Ecological health, and diversity is maintained, and restored with no net loss to military mission.

Goal 3: Manage RMTC's land to minimize the impacts of invasive species using an Integrated Pest Management Approach.

Goal 4: Manage resources for Threatened and Endangered (T&E), and listed species using an ecosystem approach with no net loss to military mission.

Goal 5: Manage Non-Consumptive, and Consumptive public use of natural resources for sustainment of game, and forest resources.

Goal 6: Mitigate the effects of climate change on natural resources and increase resiliency to support military training.

Goal 7: Managing wildland fire to support military training while reducing risks and maintain ecological health.

## A.1.0 Program Management

Program management includes those elements of INRMP implementation related to the overall program. Elements necessary for successful INRMP implementation include environmental awareness, natural resources personnel training, INRMP annual reviews, adaptive management, and similar programmatic activities. Objectives are described in each following section.

## A.1.1 Environmental Awareness

Environmental awareness and public outreach at RMTC have two primary audiences: military users (units, leaders, commanders, and training center staff) and non-military community members (hunters, and community groups). The intent is to inform military users about RMTC sensitive resources and related restrictions and to minimize damage to sensitive resources. Details are included in Solider Field Cards are distributed to trainers and units training on RMTC. The field card contains additional information about federally protected species, cultural

resources, pest management, and hazardous waste/materials. Annual training briefings attended by key command personnel include informing military personnel of natural and cultural resources, the environmental review process, and contact information for key environmental personnel.

Public outreach efforts educate the public and garner support for both the military mission and natural resources management at RMTC. The most successful components are communication with the public and soldiers through briefings, public outreach, and program literature. Public outreach includes maintaining information on the Arkansas National Guard website, signs at key access points. In addition, Environmental personnel present at scientific conferences, secondary schools, colleges, and other community organizations when appropriate.

### A.1.2 Natural Resource Management Training

The Environmental Office is comprised of a team of subject matter experts. Essential duties include assisting trainers, range control, construction, and facilities personnel to ensure compliance with various federal and state laws. The CFMO and ITAM programs also implement portions of the INRMP and specialized training may be required to ensure protection of sensitive resources and sufficient expertise to implement their relevant components of this INRMP.

Environmental staff and others that implement this INRMP will require classes, hands on experience, and participation in conferences and workshops to maintain and improve their expertise. When the ARARNG does not have expertise or staff in-house to complete projects, other agencies and contractors are used, including: NRCS, USFS, Arkansas Department of Agriculture Forestry Division, Arkansas Game and Fish Commission, The Nature Conservancy, and private contractors.

### A.1.3 Objectives

1.1. Maintain a program that allows for environmental education of the public, and military force to prevent misuse, or damage to natural resources.

1.2. Provide and maintain all applicable equipment for the implementation and planning for environmental staff.

1.3. Maintain an educated environmental staff that meets, and exceeds regulations for Subject Matter Experts, and Technicians.

### A.1.4 Regulations

- Ensure programs planned and implemented under the environmental department comply with all applicable regulations, and Best Management Practices (BMP).

- Revise, and maintain Memorandums of Understanding, and Agreements with all applicable agencies.

## A.2.0 Resource Management

Managing natural resources is a multi-faceted system that relies on an ecological approach of looking at the smallest, and largest resources, and managing for all. With the goal of resource management being the conservation of all native species, and culturally significant species, and their system of which they rely, and contribute to, some major sections can be decerned, Soil, Water, Vegetation.

## A.2.1 Soil

Land management practices affect erosion, soil integrity and sediment loss, which in turn affects stormwater runoff and ultimately surface water and groundwater quality. The issues and management strategies for this section overlap significantly with the next section on water resources. This section is primarily focused on soil integrity and limiting erosion, while the next section on water resources includes other water quality protection measures. Improper erosion control can lead to notices of violation, thus potentially resulting in fines and other penalties that could impact the military mission on RMTC. Regardless of regulatory compliance, appropriate soil conservation and erosion control are vital to sustaining the military mission. Unmanaged and extensive soil erosion can threaten the military mission by resulting in closures of areas, damage to training infrastructure, and can require diversion of funds from other priorities. Delays in managing the erosion can increase the cost to repair by several orders of magnitude. Some examples of the effects of poor soil and erosion management include:

- Undermining of roads and bridges.
- Loss of topsoil and vegetation and increasing erosion area.
- Impacts to streams or other aquatic habitats with reduced water quality.
- Creation of unusable areas due to erosion.

### A.2.1.1 Objectives

**General**

2.1.1. Proper use and maintenance of roads, trails, firebreaks, low water crossings, and training areas is required to minimize impacts to water resources.

2.1.2. Routine maintenance activities and all construction at RMTC will use appropriate BMPs and follow any permit requirements.

**Management Practices to protect Herps from ground disturbance seasonally and during migration**

BMP's to help minimize impacts on reptiles and amphibians (Herps) will be used to the best possible extent without interfering with training activities. These management guidelines are provided by Partner's in Amphibian and Reptile Conservation or PARC. This organization provides information on herps, and management guidelines tailored to regional habitat types. Our region being southeastern region will use the same management guidelines as these.

- New permanent road construction should be minimized where possible.
- Road placement should consider the locations of sensitive habitats and migration routes.
- Soil erosion can be minimized by planting native grasses and forbs
- Minimizing traffic on roads and closing roads to non-training activities seasonally can help species and habitat.
- Reducing speed limits, installing speed bumps, and adding cautionary signage may help motorists avoid hitting migrating amphibians and reptiles, especially where migrating routes have already been identified.
- Provide awareness to visitors to the installation such as loggers, hunters, bicyclists, and those going fishing and any other visitors with Rec Access.

2.1.3. Minimize the exposure of bare soil during any training operations.

**Road and Trail Maintenance**

- Monitor the roads and trails regularly and repair them before significant erosion occurs.
- Keep culverts, waterbars, inlets, outlets and ditches clear of sediment and debris.
- Repair or replace culverts and waterbars when necessary, ensuring they are sized appropriately for the crossing.
- Replace culverts with materials capable of exposure to wildland fire.
- Protect any exposed soil with annual cover crops until native vegetation is reestablished.
- Crown, out-slope, or waterbar roads (and trails when appropriate) to dissipate surface runoff and minimize erosion.

**Firebreaks**

- Firebreaks will be located on the contour and, if the slope exceeds 10%, will have erosion control measures installed to prevent sediment loss.

- Firebreaks will be reworked as needed, especially during high wildfire risk or prior to a prescribed fire.

- Permanent firebreaks are considered disturbed like a road or trail and are typically maintained using a double action disk with a bulldozer. Vegetated firebreaks should be evaluated for potential nesting birds prior to mowing and either delay mowing or place a buffer around active nests.

A.2.1.2 Regulations

- All ground disturbance must be reviewed and approved through a Dig Permit. Any BMPs or permits required must be installed, maintained, and removed as appropriate.

- Disturbances greater than 1 acre in size must develop and implement a Stormwater Pollution Prevention Plan and comply with Section 401 of the CWA through DEQ

- Keep all vehicles on established roadways and trails, unless an off-road activity is approved by Range Control and DCSEN-ENV.

- Slash or debris from road operations will not be deposited into adjacent stream channels.

- Keep all vehicles hauling petroleum and related products in the Cantonment Area in designated refueling areas. Refueling can ONLY be conducted in the field with:

    - Proper spill prevention best management practices implemented and spill control materials on-hand

    - Secondary containment properly in-place

    - More than 250 feet from a lake, pond, stream or wetland.

    - Report any spills to Environmental and Range Control immediately.

- Wash vehicles at the wash rack in the Cantonment Area.

- Implement any spill plans or stormwater prevention plans associated with any activity.

A.2.2 Water

The USACE regulates the discharge of dredged or fill material into “waters of the US”, including wetlands, under Section 404 of the CWA. Even an inadvertent encroachment into waters of the US resulting in a displacement or movement of soil or fill material has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE. Waters of the US are defined under 33 CFR 328.3(a) and referred to as jurisdictional waters. Jurisdictional

waters may include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, wetlands, and other waters, that if degraded or destroyed could affect interstate commerce.

Section 401 of the CWA gives the State of Arkansas the authority to regulate, through the Arkansas water quality certification program, proposed federally permitted activities that may result in a discharge to water bodies, including wetlands. The State of Arkansas may issue certification, with or without conditions, or deny certification for activities that may result in a discharge to water bodies. In Arkansas, the DEQ is responsible for issuing Section 401 Water Quality Certification (WQC).

Projects that cause relatively minor impacts to wetlands or other waters of the US may be covered by Nationwide Permits (NWPs) issued by USACE. These general permits are issued by the USACE and are designed to regulate with little, if any, delay, or paperwork certain activities having minimal impacts. Activities can be authorized under NWP only if that activity meets all the NWP's terms and conditions, including regionally specific conditions or limitations set forth by DEQ. Projects that fall outside of NWP conditions require an individual 404 permit and 401 WQC from the USACE and DEQ, respectively.

Maintenance and ITAM activities on RMTC are typically covered under NWPs (contact USACE for current NWPs and conditions). Low water crossings are the primary activity requiring Section 404 compliance. The DCSEN-ENV Office determines if projects are subject to Section 404 and 401 of the CWA and the appropriate permit(s) to obtain.

Management of wetlands on federal lands and military installations is further governed by EO 11990 (Protection of Wetlands) and DoDI 4715.03, respectively. Under those instructions, wetlands are required to be managed for "no net loss" on federal lands, including military installations. In support of these policies, long- and short-term adverse impacts associated with the destruction or modification of wetlands and support of new construction in wetlands should be avoided to the maximum extent possible.

Riparian Areas

Riparian areas serve as interfaces between aquatic and terrestrial ecosystems and provide essential habitat for a variety of species. Riparian areas also provide critical ecosystem services relating to water quality and flood control. To supplement Streamside Management Zones 50-foot zone, there is an additional 200 feet (for a total of 500 feet) of riparian buffer with limited activities. The riparian buffers are placed around perennial streams and any pond or wetland more than 1 acre. More activities are allowed within the 500-foot buffer with appropriate protective measures and DCSEN-ENV approval (i.e., tree removals, development, necessary vehicle use), while activities within the 50-foot buffer are limited to foot traffic only, with no digging or off-road vehicle use allowed. Both buffers exclude existing road and stream crossings and any existing infrastructure, although these should be monitored in case any erosion is associated with them.

A.2.2.1 Objectives

**General**

2.2.1. Implement operations and maintenance to minimize effects on water resources, and modify activities as needed to reduce those effects.

2.2.2. Avoid the net loss of size, function, or value of wetlands and modification of wetlands, where there are practicable alternatives.

2.2.3. Use appropriate stormwater and erosion and sediment control BMPs.

2.2.4. Minimize impervious surfaces in newly developed areas, to the extent practicable.

2.2.5. Manage invasive species to promote desirable native species.

**Streamside Management Zones (50 feet)**

- Monitor existing stream crossings and repair or modify as needed.
- Avoid digging, tree removal, mowing, or construction activities, unless absolutely necessary and only with prior approval from DCSEN-ENV.

Riparian Buffers (250 feet)

- Minimize construction and new development, which require approval from DCSEN-ENV.
- Limit activities that could cause erosion or vegetation damage, especially during wet weather.
- Tree removals should be limited to winter months and during dry periods; techniques used for tree removals must minimize ground disturbance.
- Minimize digging, mowing, or construction without prior approval from DCSEN-ENV.
- Any action affecting water resources, including wetlands, requires review by DCSEN-ENV.
- Maintain riparian buffers around water resources, in particular limiting tree removal and ground disturbance within these areas.
- Avoid, minimize, and mitigate for losses of wetlands and other water resources.
- Continue implementing water quality protection programs and using stormwater and erosion BMPs.
- Use regionally appropriate, native species for revegetation and ecological restoration.
- Design stream crossings to minimize disruption of natural hydrologic flow paths and design for at least the 100-year flood.

A.2.2.2 Regulations

**General**

- Do not allow vehicles within water resources or their buffers, unless on established roads and crossings.

Streamside Management Zones (50 feet)

- Off limits to all vehicles, except on existing roads and trails.
- Cross streams only at designated crossings and minimize stream crossings.

**Riparian Buffers (250 feet)**

- Off limits to vehicles, except on existing roads and trails, unless approved by DCSEN-ENV.
- Tree removals should be limited to winter months and during dry periods; techniques used for tree removals must minimize ground disturbance.
- No fueling, digging, or earth-moving activities are allowed within 250 feet of any lake, pond, stream or wetlands
- No cutting trees or other ground disturbance within 50 feet of any lake, pond, stream or wetland (SMZ); limiting cutting of trees within 250 feet of any lake, pond, stream or wetland.

A.2.3 Vegetation

Vegetation management includes maintaining the natural disturbance processes, while maintaining intact functional landscapes, ecosystems, and communities. Vegetation management also is fundamental to fish and wildlife habitat management and T&E species habitat management. It also overlaps with wildland fire, invasive species, and water resources management – basically a fundamental management component for managing natural resources on RMTC. The ecosystem management approach used at RMTC incorporates multiple techniques including prescribed fire which is vital to maintaining training lands and healthy ecosystems. Objectives are varied depending on the Ground type, and cover as described in the following sections, some general objectives can be defined.

2.3.1. Conduct prescribed burns following the schedule in the IWFMP to reduce fuel loading, reduce invasive species, and reduce woody encroachment, which also opens the understory in woodlands and forests.

2.3.2. Timing and integrated management of lespedeza, and privet will be critical to preventing invasives from dominating any natural vegetation.

2.3.3. Monitor results of management for desired effect(s) and modify methods accordingly.

2.3.4. Locate roads, trails, and firebreaks where they will not fragment intact tracts or impact riparian buffers and streams.

2.3.5. Leave snags (trees with less than 10% live growth) and fallen logs (coarse woody debris) when they are not safety hazards to troops.

2.3.6. Use BMPs to minimize soil disturbance and sediment loss.

2.3.7. Use native plant species for any revegetation or ecological restoration.

### A.2.3.1 Natural Area Management

High priority Natural Areas include Prairie remnant zones, and Glades which occur on less than 10% of RMTC, but are experiencing encroachment from nonnative, and invasive species. Simple objectives must be applied because of the diversity of these sites.

2.3.8. Continue using prescribed fire, and brush clearing of Native Areas as needed, but avoid the breeding season for ground-nesting birds (May-August) unless required by understory management. April is also a sensitive time for bats, so avoid areas that include or are adjacent to suitable bat habitat It may also be necessary to avoid fall time depending on bat activity in the area,. This is especially important if any listed bat species are likely to occur in the area. Prescribed fire is halted by April 15$^{th}$ to protect ground nesting birds and April 1$^{st}$ for those areas suitable for suspected or known bat habitat. To date the only listed species found on the installation is the Northern Long-eared Bat, which was found in 2006 in a survey by Britzke and Redman but hasn't been detected recently. This information will be re-evaluated with a bat survey that is planned for FY 2024 to determine if the NLEB is still on the installation. We will also re-evaluate when the final listing determination is made for the tricolored bat, which is scheduled in the fall, as there have been tricolored bats found on the installation in the past.

2.3.9. Implement the prescribed fire schedule in the IWFMP to reduce woody encroachment and improve native plant diversity of the natural areas.

2.3.10 As much as feasible, natural areas should be burned every 3-5 years to minimize woody encroachment and reduce the need for brush clearing.

### A.2.3.2 Forest Management

90% of RMTC Training area consists of 4 types of forestry cover, Pine Plantations, Blackjack Oak, and mixed Shortleaf Pine Oak, and Willow Oak Cypress wetlands. Each of these cover types does have specific objectives that benefit them, but for sake of manageability the General objectives are defined below. Details pertaining to the State Forestry Program are defined in appendix I.

2.3.11. Manage for an open story and minimize brush encroachment and minimize soil loss, using a combination of methods.

2.3.12. Reduce eastern red cedar, privet and winged elm density.

2.3.13. Implement the prescribed fire schedule in the IWFMP to open the understory of forests and expand the grassland component of savannah habitat.

A.2.3.3 Improved Grounds Management

The RMTC Cantonment Area as well as other developed areas (e.g., developed range footprints, etc.) scattered throughout the installation are characterized as improved and semi-improved grounds. Improved grounds are developed areas that have either an impervious surface (e.g. sidewalks, parking lots, roadways, and buildings) or landscaped areas that require intensive maintenance and upkeep. Semi-improved grounds are areas where periodic maintenance is performed for operational reasons (e.g. road shoulders).

The treatment of pests and invasive species is governed by the IPMP. No insecticides shall be used outside of the Cantonment Area or range footprints without review and approval by DCSEN-ENV and ensuring compliance with Regulations. In general, pesticides are only used in buildings and structures within the Cantonment Area. Herbicides are used along roads and to treat invasive plants in training areas. Using native trees and shrubs in landscaped areas usually reduces the need for fertilizers, pesticides, and watering. Additionally, planting native trees and shrubs enhances wildlife habitat within improved grounds.

2.3.14. Use species native to the ecoregion in landscaping.

2.3.15 Use of nonnative fescue, and lespedeza are strictly prohibited to prevent encroachment of known native areas.

2.3.16 Minimize parking and impervious cover within the drip line of trees.

A.2.3.4 Regulations

- No tree removal between 1 April – 1 November, without prior approval from DCSEN-ENV. No cutting trees within 50 feet of any lake, pond, stream or wetland; limited cutting within 250 feet.

- Limit mowing of roads, and bivouacs (not turf lawns) between April and September to protect ground-nesting grassland birds and provide food and habitat for pollinators.

- Re-establish native vegetation following site disturbance using appropriate seeding specification in any areas with ground disturbance.

- Invasive plants will NOT be used in landscaping or revegetation projects.

- Military training and related activities shall follow a “Leave No Trace” policy.

## A.3.0 Invasive Species

Invasive and exotic species may include plants, insects, or animals. An invasive species is defined as “any native or alien species whose lack of control or introduction does or is likely to cause economic or environmental harm or harm to human health.” An alien (or non-native) species is defined as a “species including its seeds, eggs, spores, or other biological material capable of propagating that species that is not native to that ecosystem (EO 13112).” Because of their invasive capacity, many exotic species can spread rapidly through ecosystems since their natural predators are often not present. Such species often retard natural succession and reforestation and generally cause a reduction of biological diversity in natural ecosystems.

Noxious weeds are defined as “any living stage (e.g. seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the US, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation or the fish and wildlife resources of the US or the public health (Federal Noxious Weed Act of 1974).”

RMTC will default to the Integrated Pest Management Program (IPMP) for direct Objectives for each known species, but for the sake of this section broad objectives will be defined. Integrated pest management 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. The statewide IPMP plan provides a list of pesticides, rodenticides, and herbicides that are approved for purchase and use by ARARNG personnel. No pesticides shall be applied directly to wetlands or water resources unless its use is specifically approved on the label. In addition to aquatic habitats, sensitive areas also include habitat of endangered, threatened, or rare flora or fauna species, and unique geological and other natural features.

### A.3.1 Objectives

The IPMP should be referenced for detailed information pertaining to pest management and the use of pesticides at RMTC. The following are management prescriptions for managing invasive species on RMTC.

3.1. Implement early detection and rapid response for new species and new populations.

3.2. Implement BMPs to minimize ground disturbance and vegetation removal which favors invasive plant species.

3.3. Use an integrated approach to reduce populations of invasive species and to minimize impacts on non-target species.

3.4. Incorporate invasive species detection and prevention in the environmental awareness program.

3.5. Implement prescribed fire program and incorporate invasive plant control needs into the IWFMP.

3.6. Work cooperatively with state agencies and individual counties to prevent the introduction and establishment of noxious weed infestations, control existing infestations, and share resources and expertise.

3.7. Identify priority areas each year for monitoring and treatment.

A.3.2 Regulations

- Comply with federal and state laws, such as Noxious Weed Control Act, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), and other laws and regulations. State laws for natural resources are typically found through the AR Dept. of Agriculture, Arkansas Dept of Environmental Quality, and the Arkansas Code Annotated (ACA).

- Implement IPMP:

    - All pesticide use, and storage will be compliant with the IPMP, permits, labels, and relevant laws and regulations.

    - Maximize integrated strategies and minimize pesticide use when possible.

- When new species or populations are identified, implement early control and rapid response to invasive species and pests to minimize impacts and reduce costs over the long-term.

- During planning for any management, conduct a noxious weed risk assessment and incorporate mitigation and control as needed into any action. During any management actions, ensure that all equipment is weed-free.

- Ensure state property, and military vehicles are free of invasive plant species propagules.

- Do not use invasive plants in landscaping or revegetation.

A.4.0 Threatened and Endangered Species

T&E Species are more greatly discussed, and defined in appendix L, and will contain more defined objectives, for the sake of this section broad objectives are being used for all possible listed species.

Based on the current USFWS and AGFC species lists, nine federally protected species have the potential to occur on or in the vicinity of RMTC. There are two other bat species (NLEB, Ozark

big-eared bat) with the potential to occur on RMTC and two species currently under review by USFWS (little brown bat, tri-colored bat).

In accordance with AR 200-1 and DoDI 4715.03, ARARNG has conducted primary surveys for federally threatened and endangered species and is currently planning survey for federal candidate species.

NLEB have not been documented on RMTC and the potential habitat is considered moderate quality and on the edge of their range. Until full presence/absence surveys have been completed, however, the ARARNG is assuming they are present. NLEB is a tree roosting bat that could use the numerous large oak and other deciduous trees for summer roosting and maternity colonies. There are no known hibernacula on or near RMTC. Similar to the NLEB, the Indiana bat (and some of the other bat species currently being evaluated for listing) roost in trees during the summer and use them for maternity colonies as well. The Indiana bat would be outside its known range at RMTC, and potential habitat is moderate quality for this species on RMTC. They are more particular than NLEB in the type of tree they will use for roosting. They are, therefore, even less likely at RMTC than NLEB. The conservation measures and management undertaken to support NLEB would apply to Indiana bat and other tree roosting bats as well.

The tricolored bat has now been proposed endangered and the final listing determination is scheduled for this fall. The tricolored bat has been found on the installation in the past. A 2024 bat survey is likely to be approved for FY 2024 and will be helpful in determining if the bat is still present on the installation.

### A.4.1 Objective

The following management prescriptions are intended to provide a management benefit to those identified for the other federally listed bats and birds that have some potential to occur but have not been documented on RMTC.

4.1. Complete surveys for federally listed species regularly to verify presence/absence and update potential habitat.

4.2. Maintain a habitat mosaic using an ecosystem management approach that incorporates prescribed fire, selective thinning, brush clearing, and invasive species control to support a diversity of rare species.

4.3. Implement stormwater and erosion control BMPs to protect water quality within RMTC streams, ponds, wetlands, and Grassy Lake.

4.4. Incorporate information on rare species protection and any related restrictions in environmental awareness documents and briefings to educate site users and prevent incidental take.

### A.4.2 Regulations

- All ground disturbing and tree removal projects will be reviewed by DCSEN-ENV prior to implementation. All impacts must be documented and provided to DCSEN-ENV.

- Implement the listed species awareness training program on RMTC for personnel who may have contact with listed species or their habitat.

- Appropriate permits are required by anyone handling or surveying listed species from USFWS, AGFC, or other agencies as necessary.

- Evaluate conservation measures and management priorities based on new data and modify as needed, while minimizing impacts to military training.

- Conduct an environmental review for pesticide applications, use of smokes and obscurants, and prescribed fires that are proposed within or adjacent to suitable habitat.

- Section 7 may be required prior to implementation of certain proposed actions.

## A.5.0 Public Resource

With the size of RMTC, and personnel limitations of DCSEN, many programs can benefit from public assistance in the form of Consumptive Harvesting, and Citizen Science. This section will discuss the limitations, and preference of publics input in this form. RMTC offers public access opportunities through its recreation program everywhere except the Range areas. AR 200-1 provides guidance for providing access to military lands and waters by recreational users. Based on this regulation, public access will be within manageable quotas subject to safety, military security, threatened or endangered species restrictions, and cannot impair natural resources. Limitations on public access will be enforced during training exercises and wildland fire operations to minimize safety risk. Some possible threats to public safety related to training activities include unexploded ordnance, training residue (e.g. concertina wire), and training mechanisms (e.g. vehicles, smoke, and live fire on ranges). All of these are potential hazards during outdoor recreation at RMTC.

### A.5.1. Consumptive Harvest

Consumptive harvest includes the taking of Game Species as defined by AGFC's Current Guidebook. RMTC contains two Public Access hunting program as defined in detail in appendix N. RMTC TSM also retains the ability to provide "Firewood Permits" for harvest of forestry products as defined by DCSEN-ENV Forester.

### A.5.1.1 Fish and Wildlife

Fish and wildlife management at RMTC is focused on maintaining and restoring natural habitats favorable for native fish and wildlife in a manner consistent with the military mission and all applicable laws and regulations. There is sufficient habitat to support a healthy diversity of wildlife on RMTC. The vegetation communities present on RMTC, and the active prescribed fire program support a high diversity of native wildlife. RMTC does contain a General Public WMA through an MOU with AGFC (appendix N). The WMA does allow general public to harvest game species withing the regulations set by AGFC. DCSEN-ENV, particularly the Natural Resources Manager and environmental specialists at RMTC, provide input on allowable species and limits and coordinates with AGFC for changes to the program and renewal of the MOU. RMTC also contains an internal Restricted Public management program CRWMP (appendix N). The internal program does include input from DCSEN-ENV, particularly the Natural Resources Manager and Environmental Deputy Chief at RMTC.

### A.5.1.2 Forestry Products

DCSEN retains a state forestry program managed by a Forester, who's primary goal is to maintain the Pine Plantations, and adjoining forestry stands. The forester can provide public harvest for firewood, and other consumptive harvest that is approved by the TSM. Utilizing the public to prevent excessive pile burning associated with improvement, or forestry management.

The Department of the Military is committed to a protect biodiversity and use a comprehensive management approach to integrate wildlife and forestry. The shortleaf pine initiative and the white oak initiative are two aspects that have been adopted by the DOTM to aid in increasing two species in that are in serious decline in the southern region. While the shortleaf pine is not the fastest growing or the most lucrative of the yellow pine species it has been adopted by the DOTM to combat a species and forest type in serious decline. The white oak is also in serious decline and is widely known to benefit most of the important wildlife species in this region. Discussions in the forestry meetings will continue with various participants offering a number of ideas regarding their particular area of interest but this does not mean the will be set into policy. The DOTM Is not interested in merely increasing pine production or in increased revenue as stated. The DOTM is interested in an integrated management approach to include Training needs, Natural Resources, Forestry and Cultural resources.

### A.5.2. Citizen Science

RMTC will utilize the currently available system (e.g. INaturalist) to include the public data collection method to supplement ongoing species research on RMTC. Other agency access including the Audubon Society, ANHC, and AGFC will retain access for natural resource inventory, and research. DCSEN-ENV NRM will retain the ability to vet data provided from the public system to provide insight to sampling dynamics for planned surveys.

A.5.3 Objective

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of these habitats is focused to benefit indigenous species, particularly threatened and endangered species, game species and pollinators. ARARNG will continue to manage the wildlife and its habitats at RMTC by using the following management prescriptions:

5.1. Complete surveys for game species regularly to verify herd health and update take limitations.

5.2. Ensure proper habitat maintenance to reduce, and prevent transmission of herd diseases (ie, Blue Tongue, and Chronic Wasting)

5.3. Leave snags, den trees, and fallen logs undisturbed unless they are a safety hazard (snags are standing dead trees, while den trees are live trees with cavities in them).

5.4. Maintain corridors between wetlands, lakes, and other waterbodies to provide for wildlife movement between areas.

5.5. Minimize habitat fragmentation by minimizing land clearing, new road construction, and expansion of firebreaks.

5.6. Limit insecticide use to the Cantonment Area and range infrastructure to help protect pollinators. Limit herbicide near milkweed to protect Monarchs.

5.7. Limit mowing only to areas where it is necessary to implement the training mission. This will help keep nectar bearing plants that provide food for pollinators as well as protections for birds and small mammals.

5.8. Use prescribed fire to enhance wildlife habitat and maintain a mosaic of habitat types, with an emphasis on reducing woody encroachment and increasing understory grasses.

A.5.4 Regulations

- Maintain signs and gates needed to prevent conflicts with military use and sensitive resources.
- All public users must comply with restricted/off-limits/closed areas.
- Anyone who does not comply with policies will be subject to banning or other actions
- Standing trees and branches may not be cut.
- Remove all trash and material; leave no trace.

- Live bait fish may not be used.
- Do not handle or collect any fish and wildlife, other than those allowed through the hunting and fishing programs.
- Ensure stream crossings (including culverts) do not create barriers to upstream or downstream passage for aquatic-dependent species.
- No tree removal between 1 April and 15 November without DCSEN-ENV approval to prevent spread of tree diseases and minimize disturbance of nesting birds and roosting bats.
- Limit mowing between March and August in native grasslands to minimize impacts to ground-nesting birds as well as pollinators.

## A.6.0 Climate Change

RMTC being in the central region of Arkansas is not directly affected by sea level rise, or is noted to experience long spans of drought, but will be affected by other changes with the general climate shift. The changes, and affects are described in detail in Appendix F. For the sake of this section, broad objectives have been adopted until more data, and better research result in more specific objectives being identified.

### A.6.1 Objectives

6.1. Continue regional collaborations with federal, state, local, and non-profit agencies to analyze trends, update models, plan and implement actions.

6.2. Collaborate with other agencies to develop a regionally scaled model to help inform decision making.

6.3. As vulnerability assessments are completed/updated, evaluate results for species and communities at RMTC that might be at risk and identify potential actions to mitigate.

6.4. Collaborate with other agencies to complete vulnerability assessments for communities and species at RMTC based on scaled model.

6.5. Prepare wildfire responders for the fire behavior results of increased temperatures, extreme heat, drought, and lower water levels through training and equipment needs.

6.6. Anticipate changes in forest health should heat-stressed trees be more susceptible to forest pests and invasive plant species.

6.7. Continue early detection and response to identify new invasive species and respond quickly.

6.8. Prioritize rare species that have potential to persist in spite of climate change.

6.9. Prioritize invasive species with potential for control under changing climate conditions.

6.10. Recognize that novel vegetative communities may form and, as much as possible, identify those novel communities that are likely to become the new 'normal' for RMTC.

### A.6.2 Regulations

- Collaborate with established partners to improve models, assess vulnerabilities, and develop graphical depictions of the potential impacts from climate change on RMTC.

## A.7.0 Wildland Fire

One of the primary natural resources management tools used on RMTC is prescribed fire. Prescribed fire is vital to both ecosystem management as well as sustaining the overall condition of RMTC lands for military training. This section of focuses on the priorities relative to the overall wildland fire program on RMTC. The IWFMP is the primary planning tool for the wildland fire program and presents the program in detail.

The IWFMP lays out specific guidance, procedures, and protocols for the prevention, detection, and suppression of wildfires and the planning and operating procedures involved with prescribed burning on RMTC. Its purpose is to convey the methods and protocols necessary to minimize wildfire frequency, severity, and size, while conducting beneficial prescribed burns and supporting the military mission. The IWFMP also defines the responsibilities of all offices, departments, and agencies involved. For more on the RMTC wildland fire program, refer to the RMTC IWFMP.

RMTC uses prescribed fire as a land management tool to increase soldier safety during training, reduce wildfire risk, and protect and enhance fire-dependent vegetation at the installation. The RMTC prescribed fire program is addressed in detail in the IWFMP. The objectives for prescribed fire on RMTC include reducing risk of catastrophic wildfires by managing fuel loads and supporting military training, ecological health, biodiversity, and rare species by implementing the IWFMP and the burn plan within it.

### A.7.1 Objectives

7.1. Use prescribed fire to maintain natural vegetation on RMTC, promote habitat for rare species, reduce density of invasive plants, and to maintain fuel breaks.

7.2. Provide and maintain all applicable equipment for the implementation and planning of wildland fire for environmental staff, and response staff.

7.3. Target mean fire return intervals (MFIs) for Burn Units depend on military mission needs, dominant vegetation, and long-term ecosystem management goals.

**MFIs**

o Annual – areas prone to wildfires from military training

o Every 1-3 years – prairie remnants, pine plantations glades, and some areas with cedar encroachment

o Every 3-5 years – open, and closed canopy forests.

7.4. Monitor following prescribed fires and wildfires to identify areas that may need assistance with soil stabilization or revegetation. Implement mitigation measures as needed.

7.5. Implement more growing season burns, July through October to increase biodiversity and ecological health. Rotating growing and dormant season burns is beneficial to many habitat types and help meet training needs.

A.7.2 Regulations

- All policies identified in the IWFMP, including training, incident command, approvals, and prescription requirements, including:

  o Fire suppression will be the first response to wildfires on RMTC except in those cases when it is possible to allow wildfires to burn out on their own in areas where that will be beneficial to native species and without risk to people or property.

  o Provide wildland fire training to ARARNG and partner personnel as appropriate, following training requirements in the IWFMP.

  o Maintain trained and experienced wildland fire team with adequate equipment.

  o Implement the 20-year burn plan.

  o Maintain mutual aid agreements.

  o Implement smoke management as needed.

- Reduce the risk of large crown fires by managing fuel loads

- No open fires, or fire producing ammunition are allowed during fire restrictions (Red Flag Days).

- The use of pyrotechnics is weather-dependent and must be approved by Range Control.

## Appendix B: Project Implementation Table

| Project Name | Project Description | INRMP Goal | INRMP Objective | STEP Catalog | STEP Project Number | Project Class | Fiscal Year | Status |
|---|---|---|---|---|---|---|---|---|
| **RMTC INRMP Implementation** | Project to purchase misc. equipment and materials to support RMTC INRMP implementation | 1 | 1.2 | 2908 | ARC55060042 | 0 | 2007-xxxx | Annual |
| **General Equipment Maintenance** | Project to repair and perform routine maintenance on ATVs, UTVs, heavy equipment, implements, and trailers | 1 | 1.2 | 2908 | ARC55200003 | 0 | 2020 - xxxx | Annual |
| **UTV Life Cycle** | Project to replace aged and broken UTVs and ATVs | 1 | 1.2 | 2908 | ARC55220002 | 3 | 2022 - 2024, 2024-xxxx | Pending funding |
| **Interns/Seasonal Employees-Natural Resources (Miscellaneous)** | Project to fund part time employees for the implementation of natural resource planning, and projects | 1 | 1.3 | 235 | ARC55190002 | 0 | 2018 - xxxx | Annual |
| **Environmental Staff TRNG - CNS** | Project to fund travel, and training events for environmental department staff, emphasized for education purposes. | 1 | 1.3 | 212 | AR000060043 | 0 | 2018 - xxxx | Annual |
| **Mission Travel – Natural Resources** | Project to fund travel, and training events for environmental department staff, emphasized for mission required purpose. | 1 | 1.3 | 231 | AR0NG190013 | 0 | 2018 - xxxx | Annual |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Administrative Supplies And Services-Natural Resources** | Project to fund general office supplies for planning, and implementation of natural resource projects. | 1 | 1.2 | 225 | AR0NG230001 | 0 | 2018 - xxxx | Annual |
| **Civilian Employees/Contractors Salaries-Miscellaneous Natural Resources** | Project to fund full time employees for planning and implementation of natural resource projects. | 1 | 1.3 | 227 | ARC50190003 | 0 | 2018 - xxxx | Annual |
| **Native Habitat Restoration** | Project to restore habitats to historic ecosystem mosaic through chemical and mechanical thinning | 3 | 3.3 | 2908 | ARC55220003 | 2 | 2022 - xxxx | InProgress Planning for Annual submittal |
| **Invasive or Destructive Fauna Control** | Project to control Feral Hogs, Nutria, and Beaver populations | 3 | 3.7 | 2908 | ARC55180003 | 2 | 2018 - xxxx | Annual |
| **Invasive Flora Control** | Project to control and eradicate invasive flora | 3 | 3.7 | 2908 | ARC55170004 | 2 | 2017-2019, 2022-xxxx | Annual |
| **Bat Survey** | Project to determine bat species presence, focusing on T&E and candidate species and locating their maternity colonies | 4 | 4.1 | 2505 | ARC55230008 | 1 | 2024 | Planned |
| **Monarch and Diana Fritillary Survey** | Project to survey for concentrated host plant locations and high-quality foraging sites to determine priority conservation and restoration areas | 4 | 4.1 | 2523 | ARC55240002 | 2 | 2024 | Planned |
| **Chicken Turtle and Crawfish Frog Survey** | Project to determine and delineate the presence of Chicken Turtles and Crawfish Frogs and their habitat | 4 | 4.1 | 2908 | ARC55240003 | 3 | 2024 | Planned |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Bat Boxes** | Project to acquire and mount bat houses and condos | 4 | 4.2 | 2908 | ARC55220005 | 3 | 2024 | Pending funding |
| **Bird Boxes** | Project to acquire and mount bird houses for various species | 4 | 4.2 | 2908 | ARC55220006 | 3 | 2025 | Proposed |
| **Quail and Grassland Birds Survey** | Project to study NBW Quail and Grassland Birds' abundance and distribution and habitat associations | 5 | 5.1 | 2908 | ARC55230005 | 3 | 2025 - 2026 | Planned |
| **Pollinator Garden Expansion** | Project to expand, maintain, and continue to improve native pollinator garden | 6 | 6.1 | 2908 | ARC55200006 | 3 | 2020 - xxxx | Planned |
| **RMTC IWFMP** | Project to update RMTC IWFMP and reformat to new NGB template and to conduct wildfire risk analysis | 7 | 7.1 | 4009 | ARC55220007 | 0 | 2023, 2025 | Update in progress, Analysis planned. |
| **Repair and Replace Rx Fire Equipment** | Project to repair and replace equipment that is used to conduct prescribed burns for ecosystem management | 7 | 7.2 | 2908 | ARC55140007 | 0 | 2016 - xxxx | Annual |

# Appendix C: Guidelines for Environmental Protection

The projects identified in the previous appendix are intended to improve the management and conservation of the natural resources of RMTC. In addition to large-scale projects, however, appropriate care is necessary for the day-to-day operations and activities of the installations to ensure excessive damage is not inflicted through misuse or carelessness. The following sections provide guidance for the significant activity categories occurring on the installation to ensure that the ARARNG abides by all relevant laws and regulations, the intent of this INRMP, and good stewardship in its use and management of the training sites' resources. Recommendations and Rules are direct results of the following Regulations: the Sikes Act, EO 13112 [Invasive Species], EO 13514 [Federal Energy Management], EO 13423 [Strengthening Federal Environmental, Energy and Transportation Management], and the Presidential Memorandum of April 1994 [Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds

## C.1 Training Operations

RMTC exists to train National Guardsmen, and that training does have Environmental impacts. The following guidelines should be incorporated into all training activities.

### C.1.1 Tactical Concealment

Because soldiers must train under conditions that approximate wartime, occasional vegetation cutting is necessary. However, indiscriminate cutting of vegetation has the potential to cause undesirable and long-lasting effects; thus, the following guidelines will be followed:

- Tactical concealment will be focused on Previously Disturbed Areas.
- Natural concealment and camouflage netting will be used whenever available.
- Smaller trees and bushes (< 2 inches dbh) will be used whenever possible. Vegetation will be selectively removed.
- Brush and small vegetation may be used for camouflage and training barricades.
- Only branches from the lower third of larger trees will be selected.
- Marked trees will not be cut without prior approval from the Environmental.
- Smoke and other obscurants should be used to a minimum to avoid any undue harm or stress to local wildlife in the area.

### C.1.2 Bivouacking

Bivouacking is essential to military training, and suitable bivouac sites are often in short supply. The landscape requirement for bivouac sites is open forest stands. Increased forest management on the installations (i.e., thinning operations, prescribed burning) will be utilized to achieve these open forest areas, increasing the availability of potential bivouac sites. Improper placement and rotation of bivouac sites can permanently damage a site. Adherence to the following guidelines will reduce the potential for significant environmental damage.

- Bivouacking will be focused on Previously Disturbed Areas.
- Bivouac sites will be located near/adjacent to maintained roads.
- Bivouac sites will be rotated to allow areas to recover from disturbance.
- Bivouac sites will be located on ridges to minimize erosion potential when possible.
- Sites will be cleaned, and garbage will be removed upon termination of training.
- Use of designated Sanitation areas for CKT and cooking activities is required.

### C.1.3 Roads and Vehicles

Military vehicles and heavy equipment are standard components of many training exercises. The following guidelines will help to minimize damage to soil and vegetation.

- Track vehicles are restricted to trails and hardened crossings when authorized to move between training areas.
- Vehicular use of forest stands is limited to roads as much as possible, except for particular training areas.
- When training or fire-fighting operations are required, off-road, heavy vehicles will be allowed in Previously Disturbed Areas and Natural Area lands on existing roads and firebreaks only. No new entrances or roads will be made into any training area or range without the approval of Range Control and DCSEN-ENV.
- Vehicle use on steep slopes, in stream bottoms, and during wet conditions must be avoided.
- Stream crossings will occur on existing or newly constructed hardened stream crossings.
- Keep all vehicles hauling petroleum and related products in the Cantonment Area in designated refueling areas. Refueling can ONLY be conducted in the field with the following:

  - o Proper spill prevention best management practices implemented and spill control materials on-hand
  - o Secondary containment properly in-place
  - o More than 250 feet from a lake, pond, stream, or wetland
- Report any spills to Environmental and Range Control immediately.
- Attempt to contain spills and keep them from reaching waterways.

### C.1.4 Plants and Animals

- Personnel will comply with Arkansas Game and Fish Laws and Regulations.
- Interaction with wildlife should be avoided due to health and safety concerns.
- Do not disturb food plots or other wildlife management equipment or facilities.
- Snags will be left undisturbed except when they threaten safety. Snags are standing dead trees that provide essential habitat for wildlife species, including food and cavities for nesting. Many birds that live in snags eat insects, which helps prevent insect and disease problems in other living trees.
- Understory and native shrub vegetation will be left intact to provide nesting habitat and cover for birds and small mammals.
- Do not damage or remove trees greater than 6” in diameter.
- Air space or flight path restrictions will be implemented to reduce undue stress and possible BASH issues in specific TAs during Waterfowl migrations.

### C.1.5 Streams and Wetlands

- SMZs (stream management zones) shall be identified around all water bodies. There shall be an SMZ 100 feet wide surrounding all wetland areas. Perennial and intermittent streams will have an SMZ extending 50 feet to either side of the stream for a total width of 100 feet.
- Riparian Areas shall be identified around all SMZs, an additional 200 Feet perpendicular to the water's edge (a total of 250 linear feet from the water's edge).
- Avoid operating vehicles in SMZs, and Riparian Areas.

- Road crossings of SMZs and streams will only be conducted at designated points.
- Spills will be immediately contained and reported according to the installations' SPCC/IC Plan.
- Foot traffic is allowed in SMZs, and Riparian Buffers.
- Vehicular traffic is not allowed in Riparian Buffers except on established roads.
- There will be no dredging, filling, or dumping of material within wetland areas. Any exceptions must be approved by the Environmental and required state and federal permits obtained before the activity takes place.

### C.1.6 Wildfire Management

- Open burning is not allowed.
- Avoid spark-producing activities in dry weather.
- The use of tracer rounds will be suspended during periods of very high fire danger.
- Accidental fires in training areas will be combated by the unit occupying the site or the nearest unit to an unassigned area immediately upon discovery.
- The discoverer of fire will immediately notify Range Control and his own immediate superior officer. Range Control will immediately notify Camp Robinson Fire Department.
- Each succeeding commander in the chain of command will act as appropriate to provide forces to extinguish or control fires pending the arrival of fire-fighting specialists.
- Prescribed fires will be initiated by trained ARARNG personnel. Suppose the military mission requires an area of the installation to be burned. In that case, this information will be provided to the Natural Resources Manager so that the site can be integrated into the overall burn plan for the year.

## C.2 Land Rehabilitation and Maintenance (LRAM) and Construction

Activities that disturb the vegetation and soil can particularly damage the environment if improper methods lead to erosion and sedimentation problems. Even actions intended to improve conditions, such as LRAM projects, can cause damage if not handled appropriately. LRAM and construction are the two areas that routinely involve earth-moving activities and are both subject to the following guidelines:

- Schedule and perform LRAM projects as soon as possible following disturbance, allowing sufficient time for soils to recover. Seed during optimum seeding periods for individual species. Seeding made in the fall for winter cover should be mulched.

- Use temporary erosion control methods (such as cover crops) to protect the soil during rainy periods.

- Include all necessary rehabilitation work, BMPs, and associated costs in project proposals, construction contracts, and specifications.

- Only native plant species will be used for landscaping and reclamation work, wherever feasible.

- When planting native grasses, include non-persistent grasses that act as a cover crop for the first two or three years to minimize erosion before native species become established, for example, ryegrass.

- Areas that fail to establish vegetative cover will be reseeded as soon as such areas are identified and weather permits.

- Present all construction or other ground-disturbing project plans to the Environmental for review as far in advance as possible: special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

### C.2.1 Construction Management Measures

- Clearing and grubbing must be held to the minimum necessary for grading and equipment operation. Grading activities must be avoided during periods of highly erosive rainfall. Construction must be sequenced to minimize exposure time of cleared surface area.

- Construction must be staged or phased for larger projects. Areas of one phase must be stabilized before another phase can be initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.

- Erosion and sediment BMP measures must be in place and functional before earth-moving operations begin and must be appropriately constructed and maintained throughout the construction period.

- Regular maintenance is vital to the success of erosion and sediment control systems. All control measures shall be checked twice weekly, 72 hours apart, before anticipated storm events, and after each rainfall. During prolonged rainfall, daily checking is necessary.

- Construction debris must be kept from entering any stream channel.

- Stockpiled soil shall be far enough from streams or drainage ways that runoff cannot carry sediment downstream.
- A specific individual shall be designated responsible for erosion and sediment controls on each project site.
- Digging of field latrines is not authorized.
- No digging within 250 yards of water sources, streams, creeks, or wetlands.
- All mechanical excavation training is restricted to the approved engineer lanes.
- All excavated areas will be returned to their original condition before clearing the training area.
- If the area to be disturbed is one acre or greater, an Arkansas Construction General Permit is required. The Notice of Intent must be submitted to the state at least 30 days before any site disturbance. Land disturbing activities shall not start until written approval is obtained from the DEQ.

### C.2.2 Vegetative Controls

- A buffer strip of vegetation at least as wide as the stream shall be left along any stream bank. On streams less than 25 feet wide, the buffer zone shall extend at least 50 feet from the water's edge on both sides.
- Vegetation ground cover shall not be destroyed, removed, or disturbed more than 15 calendar days before grading.
- Temporary soil stabilization with appropriate annual vegetation (e.g., annual ryegrass) shall be applied on areas that will remain unfinished for more than 30 calendar days.
- Permanent soil stabilization with perennial vegetation shall be applied as soon as practicable after final grading.

## C.3 Facilities Management

Maintenance of an attractive, tidy facility is essential; however, even activities in a heavily modified cantonment area can impact the environment. Mowing, landscaping, and pesticide use in the managed landscape should be undertaken considering this impact.

- Avoid mowing open grasslands from April to September to protect nesting birds. Areas in which taller growth will not impede training should be mowed in late March and allowed to grow until November.

- Only native species will be used for landscaping and replanting purposes without clearance from the Environmental. Native plants are better adapted to local conditions and require less fertilizer and herbicide/pesticide input. The use of natives also limits the spread of invasive, exotic species.

- Consider seasonal variables (e.g., timing and quantity of average rainfall, appropriate planting season) in planning and scheduling projects.

- Consider erosion factors when choosing training, construction, or management sites.

- Always include appropriate surface restoration, fertilization, and seeding (or other revegetation practice) as the final stage of any project which disturbs the soil or vegetation.

- Apply BMPs to all ARARNG projects.

- Use biological control methods wherever feasible and economical. Only apply pesticides when effective natural or mechanical control methods cannot be found or are prohibitively expensive. See the ARARNG IPMP for more information.

- Certified applicators can only apply pesticides and herbicides and must be reported to the Pest Management Coordinator.

- Herbicides will be utilized to control weedy vegetation in the most time- and cost-effective manner.

- A NPDES permit may be required if pesticides (including herbicides) are applied in or near waters of the U.S. or wetlands. NPDES permits are required for any point source discharge to waters of the U.S. from the application of (1) biological pesticides and (2) chemical pesticides that leave a residue. The USEPA identified four pesticide use patterns that generally include the full range of pesticide application activities that meet this condition, including mosquitoes and other flying insect pests, weeds and algae, animal pests, and forest canopy pests.

## C.4 Road Construction and Maintenance

Roads can be a significant source of sediment and an ongoing drain on funds if poorly designed. Proper placement, design, and construction can alleviate many problems associated with unpaved roads, even when utilized by heavy-wheeled and track vehicles.

### C.4.1 Access Road Location

Access roads shall be designed and located to prevent sediment from entering the state's waters. Methods to avoid sedimentation in streams include, but are not limited to, the following:

- Minimize the amount of road to be constructed using existing roads where practical.
- Locate roads as far from streams and lakes as possible and practical.
- Locate roads as far as practical from SMZs, and Riparian Buffers.
- Avoid or minimize stream crossings. If crossings are necessary, roads should cross streams as close to right angles.
- Avoid sensitive areas that could interfere with drainage and cause soil compaction or erosion.

### C.4.2 Access Road Construction

Access roads shall be constructed to prevent sediment from entering the waters of the state. Methods to avoid sedimentation include, but are not limited to, the following:

- To the extent possible, construct and revegetate new roads several weeks or longer before logging/use.
- Avoid road construction during periods of wet weather.
- Construct roads on grades of 2 to 12 percent where possible. Steeper grades are acceptable for short distances, provided additional attention is given to water control/drainage structures. Control runoff from roads using techniques such as varying the slope of the road, crowing, out-sloping, wing ditches, sediment traps, sediment control structures, broad-based dips, rolling dips, water bars, and cross drain culverts and other measures recommended by the Department of Agriculture. Runoff from roads should not directly discharge into a stream channel. Runoff from stream crossings should be minimized.
- When possible, trees and brush cleared for road corridors should be pushed to the downhill side of the road to assist in trapping sediment.
- Avoid excessive soil disturbance during road construction.
- Revegetate exposed soil in potential problem areas (i.e., culverts, stream crossing, fill areas).

### C.4.3 Road Retirement

Access roads shall be retired in such a way as to prevent sediment from entering the waters of the state. Methods to avoid sedimentation include, but are not limited to, the following:

- Water bars or other drainage structures should be constructed immediately after active logging/road use has ceased. If logging is delayed substantially, temporary drainage and erosion control structures should be built.

- Upon logging/road use completion, remove temporary bridges and culverts; remove sediment and debris from dips, ditches, and culverts; and revegetate problem areas.

- Use lime, fertilizer, mulch, and seed when needed to prevent soil erosion. Amounts should be based on recommendations from the Department of Agriculture.

## C.5 Water Resources

The water resources on RMTC include several different ecotypes: perennial and intermittent streams, the riparian areas surrounding the streams, and wetlands. While the characteristics of these areas can vary widely, they share the critical factor of water and a significant role in the water cycle and are essential habitats for many creatures. Protection of water resources is of the utmost importance, and they are habitats that can be easily damaged by accident or careless action. One of the simplest BMPs for the protection of water resources is the establishment and use of SMZs. SMZs are buffer strips adjacent to perennial or intermittent streams or other bodies of water within which activities are limited in order to protect water quality. They shall be designated and managed to buffer water temperatures, prevent sediment and other pollutants from entering the state's waters, and provide travel corridors and habitats for wildlife. SMZs should be established along any stream (perennial or intermittent) or water body where the potential exists for the movement of sediment or pollutants into the stream or water body. Methods to prevent sedimentation to streams include, but are not limited to, the following:

- Establish SMZs along any stream (perennial or intermittent) or water body where the potential exists for sediment movement into the stream or water body.

- In association with wetlands, establish SMZs at least 100 feet in width surrounding the wetland area.

- There shall be no digging for training purposes, forest management, or construction activities within an SMZ without prior review and permission from the Environmental. Certain activities may require a state or federal permit prior to initiation of the activity.

- Do not remove any trees within an SMZ if such removal would result in soil potentially getting into the stream. If trees can be harvested without risk of soil loss, maintain 50 to 75 percent of the vegetation canopy shading a perennial stream.

- Avoid operating any vehicles or other equipment within an SMZ.

In addition to the protection of SMZs, other actions and limitations are essential to maintain high water quality and habitat quality:

### C.5.1 Streams and Riparian Areas

- Training is allowed in riparian areas outside of the SMZ, following guidelines for forestlands. Use extra caution to avoid causing sedimentation or other contamination of the associated waterway.
- Spills will be immediately contained and reported according to the installations' SPCC Plan.
- Dumping of any substance on the training site is not allowed.
- Minimize stream crossings. If regular creek crossings or seasonal conveyance are necessary, hardened crossings provide more protection. Contact the Environmental office before making any alterations to any stream crossing.
- Monitor for erosion problems along stream banks. Report any erosion, exposed soil, or stream bank collapse to the Environmental office as soon as possible.
- Utilize native species for plantings to stabilize banks. Vegetative structures are preferable to riprap or concrete structures in most situations.
- Use Erosion Control BMPs during all LRAM projects, road construction, relocation, and maintenance.
- Any activity impacting a stream or wetland must be presented to the Environmental office well before the planned action date. Special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams, and these permits take time to obtain.

### C.5.2 Wetlands

- Foot traffic is allowed in wetlands.
- Vehicular traffic is not allowed in wetlands except on established roads.
- Any non-foot traffic, training, or land management activity within a wetland should be coordinated with the Environmental.
- No dredging, filling, or dumping of any material within wetland areas will exist. Any exceptions must be approved by the Environmental Office, and required state and federal permits must be obtained.
- Only herbicides and pesticides labeled for wetland/surface water use will be applied within wetland boundaries (e.g., Rodeo, Aquamaster, Habitat, Accord). Within 50 feet of any

wetland boundary, foliar application of herbicides will be limited to those products labeled for application to water because of the risk of drift. All other herbicide applications made within the SMZ area will be made via stem treatments (cut stump, basal bark, or stem injection).

- A NPDES permit may be required if pesticides (including herbicides) are applied in or near waters of the U.S. or wetlands.
- Any ground-disturbing activities near wetland areas that might alter the system's hydrology must be reviewed by the Environmental office before any work takes place.
- Implement Erosion and Sediment Controls in construction areas and maneuver areas, streambank stabilization methods, and forestry BMPs to minimize sediment and chemical pollutants delivery to wetland areas.
- Present all construction plans to the Environmental office for review as soon as possible. Special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

## C.6 Pest Management

Pest management is an integral part of maintaining facilities and protecting the health and safety of personnel and the integrity of natural ecosystems. ARARNG pest management activities are regulated by federal and state law and by DoD regulation. These restrictions and the management goals and guidelines for pest control on ARARNG facilities are presented in the statewide IPMP.

- All herbicide or pesticide applications on the installations must be by a State- or DOD-certified applicator.
- All herbicide or pesticide applications must be reported to the ARARNG Pest Management Coordinator.
- Use non-chemical control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive.
- Pesticides and herbicides should be applied when they will be most effective against the pest to achieve maximum control for the minimum application. See the IPMP for more information.
- A NPDES permit may be required if pesticides (including herbicides) are applied in or near waters of the U.S. or wetlands.
- Invasive plant species control will follow the methods and guidelines in the Invasive Species Management Plans.

- Only native species will be used in landscaping and reclamation work.

Contractors who apply pesticides on RMTC must:

- Show proof of liability insurance.
- Have State commercial certification and licensing in the category or categories of work to be performed.
- Use only USEPA-registered pesticides or herbicides on the "Approved Pesticide List" for ARARNG sites (see the IPMP).
- Furnish ARARNG personnel with legible copies of specimen labels and the Safety Data Sheets of all pesticides proposed for use.
- Furnish ARARNG personnel with the information required for pest management record keeping (see the IPMP).
- Pesticides must be mixed, stored, and disposed of per Federal, State, and local regulations and procedures established by the ARARNG.

## C.7 Endangered Species Monitoring and Protection

In 2006 a survey was done by Britzke and Redman in which the Northern Long-eared bat was detected on three different test days in different locations using Anabat II. At the time this species was detected the NLEB was not a federally listed species; however, findings indicate that suitable habitat for this species exists on the installation (Britzke and Redman). The NLEB was listed as endangered in November of 2022. There is a future bat survey proposed for FY 24 on the installation pending funding. At that time the presence/absence of the Northern Long Eared Bat will be revisited to see if they are still detected on RMTC.

In a 2021 survey conducted by GBMc, the proposed Alligator Snapping Turtle was found on the installation. Two ASTs were captured in Jim Creek in TA-10. Findings indicate that suitable habitat for this species exists on the installation (GBMc, 2021). Plans to conduct additional surveys may become necessary if this species becomes federally listed.

## C.8 Cultural Resources Management

The ARARNG Cultural Resources Management Policy is defined in the ICRMP for Arkansas. The following are critical points in the protection of cultural resources:

- The ARARNG will consult the SHPO so that known historical, archaeological, and Native American sites may be avoided.

- Cemeteries will be protected and maintained through fencing.
- For ground-disturbing undertakings:
    - Before any ground disturbance, contact the CRM office to verify that the site is clear of known cultural resources.
    - The avoidance or mitigating adverse impacts to NRHP-eligible sites shall be proactively incorporated into the design and planning process rather than deferred until archaeological deposits may be discovered during construction.
    - All machine-aided excavations or other earth-moving projects shall be designed to avoid damage to archaeological sites or other historic properties that may be eligible for inclusion in the NRHP.
    - Until the SHPO has determined an archaeological site to be not eligible or has concurred with a recommendation that an archaeological site is not eligible, any newly discovered sites will be treated as potentially eligible and will be avoided whenever possible.
    - In the event of Inadvertent Discovery of Archaeological Deposits (ICRMP SOP #5)
        - Contact the CRM immediately. Stop all work at the site.
        - Archaeological deposits newly discovered in the construction of any undertaking shall be evaluated for their NRHP eligibility.
        - Until the SHPO has determined an archaeological site to be not eligible or has concurred with a recommendation that an archaeological site is not eligible, any newly discovered sites will be treated as potentially eligible and will be avoided whenever possible.

# Appendix D: Site Overview

## D.1 Military Mission

The Arkansas Army National Guard (ARARNG) has proudly served as a community-based, combat-proven force of citizen Soldiers and Airmen. The ARARNG aims to provide trained and well-equipped soldiers for domestic and federal service. More than 8,600 men and women have enlisted since its establishment in 1804.

Robinson Maneuver Training Center (RMTC) is the headquarters of the ARARNG State Area Command and is home to the Arkansas National Guard Joint Force Headquarters, 39th Infantry Brigade Combat Team, 77th Combat Aviation Brigade, 87th Troop Command, and the ARARNG logistics, maintenance, and administrative directorates. RMTC is a Level II Garrison Training Center, formally a Maneuver Training Center-Heavy , and is centrally located within the state in North Little Rock, Arkansas. RMTC is within four hours of travel time of all ARARNG units.

RMTC strives to meet the overall goal of the ARARNG through its primary mission, which is to command, operate, manage, and administer a Level II Maneuver Training Center that provides resourced levels of customer support and services for administration, engineering, logistics, training and operational support to assigned, attached, transient and tenant units, as well as joint forces activities. On order, RMTC conducts operations in support of state and federal missions. RMTC supports this mission by providing a variety of facilities and training ranges that support the ARARNG's weekend and annual training needs. These include:

- 233rd Regiment Regional Training Institute
- National Guard Marksmanship Training Center
- National Guard Professional Education Center
- Urban Assault Complex
- Infantry Squad Battle Course
- Engineer Bridge Site
- Obstacle Course
- APFT Track
- Rappel Tower
- Combined Support Maintenance Shop
- Army Aviation Support Facility
- Driving Training Courses (Day/Night)
- Vehicle Recovery Facility
- 28 Multi-Purpose Ranges including:
  - Small Arms
  - Heavy Machine Gun
  - Grenade
  - Demo
  - TOW
  - MK19
  - Sniper
  - Field Artillery <105 mm
- Simulations complex including:
  - EST 2000
  - Call for Fire Trainer
  - HEAT Rollover
  - Javelin Basic Skills Trainer
  - Individual Gunnery Basic Trainer
  - Virtual Convoy Operations Trainer
  - Virtual Battlespace Lab
- Aircraft training capabilities include:
  - Attack Helicopter Hover Fire Gunnery
  - 22.8 Square Miles of Dedicated Flight Areas (up to 16,000 feet)
  - 15 Landing Zones
  - Drop Zone (capable of supporting up to a C-130)

Range capabilities include all small arms through 50-caliber, an M-16, 25-meter zero/50-night firing range, M-16 record fire ranges, and firing points for the grenade launcher, mortar, and 105-millimeter howitzer. Howitzers and mortars are fired into a 2-square-mile impact area in the northeastern corner of the installation. The remaining arms are fired into a 7-square-mile impact area in the southeastern portion of the installation. Infantry movement, field navigation, and bivouacking exercises are held in all TAs except 2 and 3. A Multi-purpose Machine Gun Range and Aerial Door Gunnery Range have been proposed and undergone the NEPA Environmental Assessment (EA) process. It is currently in the process of being developed.

Camp Robinson is utilized as a training facility by multiple entities, including the AR Air National Guard (ANG), DoD Reserve and Active components, Air Force Reserve, US Army, U.S. Marines and Marine Reserves, U.S. Naval Reserves, Reserve Officers' Training Corps (ROTC), Military Academy, Civil Air Patrol, Boy Scouts, Department of Corrections, US Federal Bureau of Investigation, US Bureau of Alcohol, Tobacco, and Firearms, and the Arkansas State Police along with other law enforcement agencies, including county and city police departments.

Furthermore, RMTC is classified as a State-Owned Mobilization Station (SOMS). SOMS is designed to mobilize and prepare troops for combat in the event of war. The primary mission of RMTC in the event of war would be to train and support Army soldiers and officers. The use of RMTC's training facilities by the ARARNG and other entities mentioned above is predicted to continue to increase annually because of increased training capabilities and facilities and potential funding decreases for out-of-state training.

## D.2. History

Camp Robinson was established in 1917 as US Army Camp Pike in honor of General Zebulon M. Pike, a noted soldier and explorer. Thousands of officers and enlisted men were trained at Camp Pike during WWI; up to 40,000 soldiers occupied the post. At its height, Camp Pike had 2,000 buildings, 30 miles of paved roads, and 10,000 horses. From 1918 to 1922, 6,485 acres were acquired for Camp Pike through purchase and condemnation, including a central reservation, rifle range, and "remount" area. In 1922 the State of Arkansas was granted an easement by the Secretary of War to use the Camp Pike reservation for its National Guard training program, which became known as Camp McRae. Then in 1937, the camp was renamed by the War Department as Camp Joseph T. Robinson in honor of the late politician who had served Arkansas as a legislator, governor, US Representative, and Senator. That year, Camp Pike was dismantled as part of the reconstruction of Camp Robinson. Everything that could be removed was sold, leaving only the concrete floors and walls of old latrines and buildings. Little evidence remained of the original structures that housed troops at Camp Pike just 20 years earlier.

Following the onset of WWII, Camp Robinson expanded to 48,000 acres, with the assistance of the US Government and the US Army Corps of Engineers, from 1940 to 1942 to include artillery ranges, maneuver training areas, and a cantonment area. The Cantonment area consisted of hutments, administration buildings, mess halls, warehouses, a laundry, a hospital, and various utilities. The acquired land primarily consisted of woodlands and farmland.

Evidence of past farming operations, cattle ponds, and pastureland from the annexation period can still be observed across the installation.

A 100-acre prisoner of war (POW) camp was established in 1943 to house German prisoners. This POW camp was located on the north side of Purdham Hill, northwest of the current cantonment area. Remnants of the POW camp still exist, such as a network of old roads, bridge crossings, concrete slabs, and the remains of an aging wastewater treatment plant. Most WWII structures were removed from Camp Robinson in 1955, but remnants of the old encampment include abandoned sewer lines, manholes, concrete foundations and slabs, and masonry walls.

Following the end of WWII, Camp Robinson has continued to develop with the construction of several new facilities, including headquarters and administration buildings, classrooms, billeting and other housing, armories, hangars, maintenance shops, warehouses, facilities for handling and storing recyclables and solid waste, and an upgraded wastewater treatment plant. However, Camp Robinson has been reduced to approximately 33,000 acres since WWII, because of various land transactions, primarily with the City of North Little Rock, the Arkansas Game and Fish Commission (AGFC), and private landowners.

## D.3. Cultural Resources

All cultural resources identified at RMTC are viewed as having the potential to contribute information of value to various groups, including the academic community, Native American Tribes, historical societies, and people whose ancestors settled in the area, and therefore require protection from any activities that may negatively impact them. A statewide Integrated Cultural Resources Management Plan (ICRMP) was prepared for all ARARNG installations (RMTC, FCMTC, and statewide Readiness Centers) in 2001. It was most recently updated in 2020.

Cultural resources are defined as any archeological site (prehistoric, historical, or contact era); historic building, structure, or architectural district; historic cemetery or individual burial; or object significant to American history, architecture, archaeology, engineering, or culture, including artifacts, records, and material remains related to such property or resource. The ICRMP should be consulted for detailed information and procedures for cultural resources management at RMTC (see ICRMP Ch. 4). This plan addresses archeological and architectural inventories, evaluations, and protection of cultural resources on all ARARNG installations.

The ICRMP is an internal compliance and management tool that integrates the entirety of the cultural resources program with ongoing military mission activities. Federal and state laws and regulations governing the management of cultural resources on ARARNG property include the National Historic Preservation Act (NHPA), Archaeological Resources Protection Act (ARPA), Native American Graves Protection and Repatriation Act (NAGPRA), American Indian Religious Freedom Act (AIRFA), EO 13007 (Indian Sacred Sites), EO 13175 (Consultation and Coordination with Indian Tribal Governments), Arkansas Antiquities Act, and the Arkansas Grave Protection Act (see Ch. 2 of the ICRMP for a complete list). Standard Operating Procedures (SOPs) for the accidental discovery of artifacts or human remains can be found in Section 4.1.5 of the ICRMP. The NHPA requires that cultural resources be

considered during the planning stage of all proposed undertakings. The ARNG Cultural Resources Manager will evaluate proposed ground-disturbing activities to determine what NHPA Section 106 requirement will be needed (if any). The Cultural Resources Manager will indicate this requirement if an archeological inventory is required.

Implementing INRMP objectives has no potential to impact historic architectural resources at RMTC adversely. Erosion control projects should be limited to areas that have been heavily used and previously disturbed. Therefore, these areas have a low potential for intact archaeological resources to be present. Nonetheless, potential impacts of ground-disturbing activities will be evaluated on a case-by-case basis before implementation to ensure that impacts are avoided. Before implementing these activities, the area of potential effect (APE) will be evaluated to determine the potential for impacting cultural resources. This evaluation will be based on the results of previous archaeological surveys, the level of prior disturbances, and the overall archaeological potential of the site.

## D.4. Acreage and Land Ownership Status

RMTC is a 32,950-acre state-owned facility with a developed cantonment area, mortar artillery impact area, small Arms impact area, and training areas (TA). Acreages for each of the major subdivisions of RMTC are listed in Table D.3.1.RMTC also has agreements with and leases land to multiple tenants. Tenants include the Arkansas Air National Guard, Camp Pike, Arkansas Game and Fish Commission, US Air Force, Arkansas State Police, Arkansas Department of Emergency Management, Arkansas Department of Human Services Civilian Student Training Program, and the RMTC Golf Course. Most of the tenant properties are in cantonment. The AGFC Camp Robinson Wildlife Management Area (WMA) and the US Air Force All-American Drop Zone/Landing Zone (AADZ/AALZ) are in the TAs. The WMA is currently 9,319 acres in the northern portion of RMTC, encompassing TA-10, 11, 12, and 13. The AALZ/AADZ is 678.8 acres and is in TA-07. In 2019 the WMA was reduced from 19,648 acres to lessen recreational interference with military training.

| Training Area | Area (Acres) |
|---|---|
| Cantonment | 2,340.8 |
| TA-01 | 436.1 |
| TA-02 | 637.0 |
| TA-03 | 832.8 |
| TA-04 | 834.5 |
| TA-05 | 1,315.1 |
| TA-06 | 502.0 |
| TA-07 | 1,404.6 |
| TA-08 | 608.1 |
| TA-09 | 1,872.4 |
| TA-10 | 3,881.2 |
| TA-11 | 1,335.5 |
| TA-12 | 2,613.7 |
| TA-13 | 1,490.2 |
| TA-14 | 2,726.3 |
| TA-15 | 437.1 |
| TA-16 | 444.9 |
| TA-17 | 1,427.6 |

| | |
|---|---|
| TA-18 | 833.4 |
| TA-19 | 722.6 |
| TA-21 | 392.8 |
| TA-22 | 202.1 |
| TA-23 | 356.5 |
| Small Arms Impact Area | 5,302.7 |
| Mortar Impact Area* | 1,096.0 |
| Psyam Drop Zone* | 166.9 |
| All-American Drop Zone/Landing Zone* | 678.8 |
| Camp Robinson Wildlife Management Area* | 9,320.6 |
| TOTAL | 32,950 |

* Area is not calculated in the total acreage as these areas are within TAs.
Table D.3.1. Robinson Maneuver Training Center Acreage Summary

## D.5 Ecological History of the Landscape

Robinson Maneuver Training Center is located predominantly in the foothills of the Ouachita Mountains ecoregion in the Fourche Mountains, with a smaller, northwest portion located in the Arkansas Valley ecoregion in the Arkansas River floodplain (Woods et al. 2004). Several explorers in the 1800s and 1900s noted a very different landscape from todays. Elk, Bison, and White-tailed Deer roamed in open pine and hardwood forests with diverse herbaceous understories (Hendrick et al., 2007). Historically, wildfires helped to maintain this habitat structure. The frequency at which fires occurred in this area, pre-European settlement, is poorly documented. However, studies in other parts of the Ouachita Mountains suggest that these areas may have experienced, on average, fire regimes in less than ten-year intervals (Masters et al. 1995). Since European settlement, the landscape has changed drastically. Land use changes and land development have led to a reduction in native habitat through fire suppression, habitat fragmentation, disturbance, and destruction, altered composition and structure of habitats, erosion, the introduction of non-native species, logging, livestock grazing, agriculture, and climate change (Dale et al. 2001, USDA 2009).

In Pulaski and Faulkner counties, RMTC is in central Arkansas, north of the Arkansas River. The larger municipality of North Little Rock encompasses the southern boundary. Multiple smaller communities are located to the west and east. The Little Rock US Air Force Base is located approximately four miles due east. The area to the north is less populated; the central to the eastern portion of the northern boundary comprises houses scattered among interspersed woodlands and old agricultural land and pastures. The area surrounding the northwest corner of RMTC consists of the Camp Robinson Special Use Area (SUA) and Bell Slough Wildlife Management Area (WMA), is owned and operated by the AGFC.
Bell Slough State WMA, located to the west, is a 2,040-acre site that serves as a beneficial site for migrating waterfowl, Neotropical migrants, and shorebirds and includes the western portion of Grassy Lake Greentree Reservoir that is shared with RMTC. Camp Robinson SUA, located to the north, is a 4,029-acre site previously part of RMTC. The SUA was deeded to the State of Arkansas in the 1940s through the War Asset Administrator, under and according to the authority contained in Public Law 537, 80th Congress of May 10, 1948. The SUA is identified as the 'RMTA WMA' on the 1986 DMA Installation Map. It is currently known as the Camp Robinson State Wildlife Management Area. In case of war and the federalization of land, the SUA may revert to federal control; the RMTC Military Installation Map notes that it

is an "area subject to recapture upon mobilization." Currently, the SUA is managed for conservation purposes, and public hunting.

Continued growth, expansion, and development of North Little Rock and the areas surrounding RMTC suggest that the less or more sparsely populated areas around the installation perimeter will continue to become more developed.

## D.6. Military Land and Natural Resources Management Requirements

The ARARNG requires adequate land, training areas, ranges with proper surface danger zones (SDZ), bivouac sites, facilities, and airspace to achieve their training mission goals properly and safely. Several training and maneuver areas have already been established to support mission requirements. In addition, new maneuver areas and ranges are continuously being proposed, considered, and initiated to uphold future use requirements and evolving military training missions. In addition to the ARARNG, other DoD soldiers, local law enforcement officials, and other government entities utilize RMTC.

The RMTC natural resources management program requires adequate funding, personnel, and training to properly manage, protect, and restore the landscape for sustainable use to continue to support the military training mission (DoD 4715.03, Sikes Act, AR 200-1). Completing the requirements above will allow for the successful preparation, implementation, and routine update of this Integrated Natural Resources Management Plan (INRMP). It would also allow for the proper monitoring, surveying, and management of RMTC's land and natural resources to support the military training mission and increase biodiversity and habitat quality.

# Appendix E: Mission Impact on Natural Resources

## E.1 Overview

Robinson Maneuver Training Center (RMTC) expanded to its peak size of 48,000 acres during WWII. Before the military acquisition, this area consisted of several homesteads and was used for agriculture and livestock. RMTC has since reduced to 32,950 acres and has undergone several land use changes. Currently, RMTC consists primarily of hardwood and pine forests with several multi-use and dedicated training areas with varying effects on RMTC's natural resources and a 2,341-acre cantonment area with minimum impact on natural resources.

## E.2 Land Usage

RMTC serves as the central training site for the Arkansas Army National Guard (ARARNG) and is supported by Fort Chaffee Joint Maneuver Training Center (FCJMTC), located in northwest Arkansas. Approximately 360,000 people train at RMTC annually; most annual training activities occur from April through August. The most frequently utilized portions of RMTC are the ranges.

RMTC has 26 ranges in a 5303-acre designated training area known as the 'Small Arms Impact Area' located in the southeastern section of the installation, and a rocket-propelled grenade (RPG) range and field mortar/artillery impact area in a 1096-acre area known as 'Mortar/Artillery Impact Area' located in the northeastern section of the installation. Additionally, a 37-acre' Demo Range' is situated in the north-central section of the installation. An Aerial Door Gunnery Range' was recently added, and a 236-acre Multipurpose Machine Gun Range' was recently approved for construction in the northwestern section of the installation. The Multipurpose Machine Gun Range and Aerial Door Gunnery ranges would require an approximately 6,479-acre SDZ. Approximately 22,500 people use one or more of the ranges at RMTC annually.

Range capabilities include all small arms through 50-caliber, an M-16, 25-meter zero/50 nighttime firing range, M-16 record fire ranges, and firing points for a grenade launcher, mortar, and 105-millimeter howitzer. Howitzers and mortars are fired into a 2-square-mile impact area in the northeastern corner of the installation. The remaining arms are fired into a 7-square-mile impact area in the southeastern portion of the facility. Infantry movement, field navigation, and bivouacking exercises are held in all TAs except 2 and 3.

RMTC is utilized as a training facility by multiple entities, including the AR Air National Guard (ANG), DoD Reserve and Active components, Air Force Reserve, US Army, U.S. Marines and Marine Reserves, U.S. Naval Reserves, Reserve Officers' Training Corps (ROTC), Military Academy, Civil Air Patrol, Boy Scouts, Department of Corrections, US Federal Bureau of Investigation, US Bureau of Alcohol, Tobacco, and Firearms, and the Arkansas State Police along with other law enforcement agencies, including county and city police departments.
Furthermore, RMTC is classified as a State-Owned Mobilization Station (SOMS). SOMS is designed to mobilize and prepare troops for combat in the event of war. The primary mission of RMTC in the event of war would be to train and support Army soldiers and officers.

The use of RMTC's training facilities by the ARARNG and other entities mentioned above is predicted to continue to increase annually due to increased training capabilities and facilities and potential funding decreases for out-of-state training.

RMTC also maintains 18 bivouac sites across the installation totaling 93 acres. Approximately 47,000 people per year use the bivouac sites.

There are three aviation drop/landing zones located on RMTC; the 167-acre Psyam Drop Zone' the 679 acres 'All American Drop Zone/Landing Zone' (AALZ/DZ) located in the northern-central section of RMTC, and the 189 acres 'Army Aviation Support Facility (AASF) located in cantonment. The Arkansas Air National Guard utilizes the Psyam Drop Zone and the AASF, while the AALZ/DZ is leased and used by the Little Rock Air Force Base. Fixed-wing and rotary aircraft utilize RMTC. 15 medivac or helicopter emergency landing sites are also maintained across the installation. Multiple training areas are used for land navigation exercises and force training. RMTC maintains approximately 179.6 miles of roads and trails. Roads are used for convoy and vehicle training. A vehicle recovery pit has also been established for vehicle recovery training.

The transient training population of RMTC ranges from 1,500 to 3,500 troops, peaking in the late summer. The Cantonment Area has an average daily population of approximately 1,600, including federal and state employees, students in Professional Education Center courses, and resident students in the Youth Challenge Program (YCP) and Civilian Student Training Program (CSTP). The installation has a resident population of approximately 50 and a full-time workforce of almost 900.

## E.3 Impacts

Ongoing military training conducted at RMTC in support of the ARARNG's mission alters the environmental setting and conditions of the natural resources. While any environmental goals and plans are generally considered secondary to and should be managed not to inhibit but to help enhance military mission requirements. However, any training intensity and frequency changes could adversely impact natural resources and the challenges of managing these resources. They must be appropriately planned to ensure minimized damage and meet growing regulatory and stewardship requirements. With the construction of the new machine gun range and aerial gunnery, RMTC is likely to see an increase in multiple types of training operations and new areas being utilized for military training. Increases in training frequency in these new areas will affect natural resources and the management challenges accompanying them.

Additionally, wildlife resources and habitats must be managed in compliance with federal laws, such as the Sikes Act, the Endangered species act, the Clean Water Act, state laws, and US Army Regulations and Guidance. A well-developed management plan will help maintain healthy habitats and restore native conditions that promote biodiversity and enhanced training areas.

To properly evaluate the relationship between biodiversity and habitat conditions on RMTC, accurate information is needed regarding the type, time, intensity, and frequency of usage of

the TAs (Foti 1996 progress report, Heidt and Karlin 1996). The Range Facility Management Support System (RFMSS) should supply this information for management purposes.

Many military operations and activities, current and planned, impact the environment in different ways. Some of these impacts have adverse effects on the environment.

| Activity/Use | Potential Effect on Natural Resources | Potential Effect on Training/Combat Readiness |
|---|---|---|
| Vehicles operated off-road. | • Degradation of soil, water, and vegetation<br>• Erosion gullies<br>• Soil compaction<br>• Soil and water contamination from field maintenance | • Loss of training realism<br>• Loss of camouflaging for vehicles and troop locations<br>• Safety hazards in eroded areas<br>• Contamination of soils could limit the availability of training areas<br>• Increased maintenance costs |
| Foxholes | • Soil displacement<br>• Erosion; eroded soils unable to support vegetation | • Loss of training realism<br>• Safety hazards in eroded areas |
| Bivouac areas | • Soil compaction or erosion<br>• Loss of vegetation/forest understory and overstory | • Loss of training realism<br>• Loss of camouflaging for vehicles and troop locations<br>• Limit usable training areas |
| Cutting of vegetation for camouflage/field fortifications | • Wilting and discoloration of cut vegetation contrasts with the natural background<br>• Eventual loss of vegetation | • Loss of training realism<br>• Exposed fighting position<br>• Dead vegetation is an easy target for infrared radar |
| Field maneuvers/ range firing | • Soil compaction, erosion, and inversion<br>• Loss of vegetation/forest understory and overstory<br>• Wildfires from pyrotechnics, tracer ammunition, or shell detonation<br>• Litter from ammunition brass, plastic paintball containers, communication wire, concertina wire<br>• Artillery training produces a heavy metals residue<br>• Metal contamination of commercial timber stands | • Accidental fires result in the loss of usable training areas<br>• Loss of training realism<br>• Immobilized vehicles mired in mud<br>• Potential administrative restrictions because of disturbance to federally protected species or habitat |

Table E.3-1 Effects of Training and Natural Resources

It is also essential to observe what impacts are caused by the following activities and provide guidance on how to mitigate adverse effects that may come from activities such as:

- Mowing
- Noise
- Runoff
- Flares
- Wildfire/Rx fire – fuel reduction
- Herbicide/Pesticide Application

This may include specific guidelines involving seasonal, biological, or geographical constraints. Seasonal policies that restrict mowing or prescribed fire at times when ground-nesting birds are breeding, or geographical guidelines that restrict particular training activity within a certain distance of a riparian or stream management zone, at this time, regulation of these activities is under review and will assist in reducing impacts.

## E.4 Integrated Training Area Land Management Program (ITAM)

To achieve its missions, the Army must have lands capable of indefinitely supporting training and other functions. The Integrated Training Area Management program, or ITAM, was developed by the DA to integrate training and other mission requirements for land use with sound natural resources management of the land. Components of ITAM can be thought of as preventive maintenance of training land. Just as the Army conducts preventive maintenance programs to protect its investment in tactical equipment, it also must invest in preventative maintenance of its training lands.

The overall goal of the ITAM Program at RMTC is to ensure sustained use of the installation lands for military training while integrating sound natural resources and land management practices and aligning training land management priorities with training and readiness priorities.

The ITAM Program establishes procedures to achieve optimum, sustainable use of training and testing lands by implementing a uniform land management program that includes the following:

1. Inventorying and monitoring land conditions
2. Integrating training and testing requirements with training land carrying capacity
3. Educating land users to minimize adverse impacts
4. Providing training in Land Rehabilitation and Maintenance (LRAM)

The ITAM Program is based on user requirements derived from continuous interaction among HQDA, Major Commands (MACOMs), and installations. It applies to Active Army, Army Reserve, and ARNG installations with a significant training or testing mission, including those managed by NGB. The ITAM Program is comprised of the following four components:

1. Range Training Land Assessment (RTLA)
2. Training Requirements Integration (TRI)
3. Land Rehabilitation and Maintenance (LRAM)

4. Sustainable Range Awareness (SRA)

Range Training Land Assessment (RTLA)

The RTLA is a management procedure that inventories and monitors land conditions. It incorporates relational databases and GIS technologies into the land-use decision process. RTLA collects physical and biological resource data from training land to relate land conditions to training and testing activities. This data provides the information to manage land use and natural and cultural resources effectively. By documenting and understanding training-related impacts, excessive or irreversible damage, and associated land rehabilitation costs can be minimized.

Training Requirements Integration (TRI)

The TRI component is a decision support procedure that integrates all land-use requirements with natural and cultural resource management processes. TRI combines the installation training requirements for land use derived from the Range and Training Land Program, the range operations and training land management processes, and the installation training readiness requirements with the installation's natural resources conditions.

Land Rehabilitation and Management (LRAM)

The LRAM component is a preventive and corrective procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and curative land rehabilitation, repair, and maintenance practices. It includes TA redesign or reconfiguration to meet training requirements.

Sustainable Range Awareness (SRA)

The SRA provides a means to educate land users on their environmental stewardship responsibilities. It provides for the development and distribution of educational materials to land users. These materials relate to the principles of land stewardship and the practices of reducing training and testing impacts. SRA also includes information provided to environmental professionals concerning operational requirements.
Specific objectives and management actions of the RMTC ITAM Program are organized according to the four ITAM Program components described previously.

The RMTC-TSM provides oversight of the ITAM program to ensure that ITAM funds protect and enhance the ability of ARARNG/DOTM training sites to support ARARNG/DOTM training. Overall program development responsibilities will be coordinated among the DCSEN staff and RMTC-TSM.

# Appendix F Physical Environment

F.1 Topography, Geology, and Soils
F.1.1 Topography

RMTC is situated within Arkansas Interior Highlands, which consists of three provinces. The installation is the transitional zone between two physiographic regions, the Arkansas River Valley and the Ouachita Mountains. An essential element of this setting is that the Arkansas River enters the Mississippi Embayment only a few kilometers downstream from RMTC's location. RMTC is situated within the northeastern portion of the Ouachita Mountains Physiographic Province and consists of the Fourche Mountains. Historic RMTC Property lies on the southeastern edge of the Arkansas River Valley immediately north of Hwy 89. The Ouachita Mountain physiographic province is situated in central and western Arkansas, and eastern Oklahoma consists primarily of thick sequences of sedimentary rocks deposited in a deep ocean basin that has been uplifted and compressed northward into east-west trending complex folds (anticlines and synclines) and thrust faults due to significant orogenic (mountain building) processes. The most intensely deformed area is in the central portion of the fold belt. The topography of RMTC consists of rolling to steep, east to west trending, long narrow ridges, and broad valleys. The rolling to steep hills consists of tilted and folded bedrock of interbedded sandstone and shale of the Jackfork Formation. RMTC varies in topology with numerous sharply defined features and elevations ranging from 255 to 590 ft (80-180 meters) above sea level. RMTC is drained by several streams that are oriented roughly east to west. All streams and drainage ways that occur on RMTC Originate on the Property. Eastbound streams include Kellogg, Miles, Leopard, Woodruff, and Spring Creeks. Westbound streams include Newton, Jim, Miles, and Winfree Creeks, including White Oak Bayou.

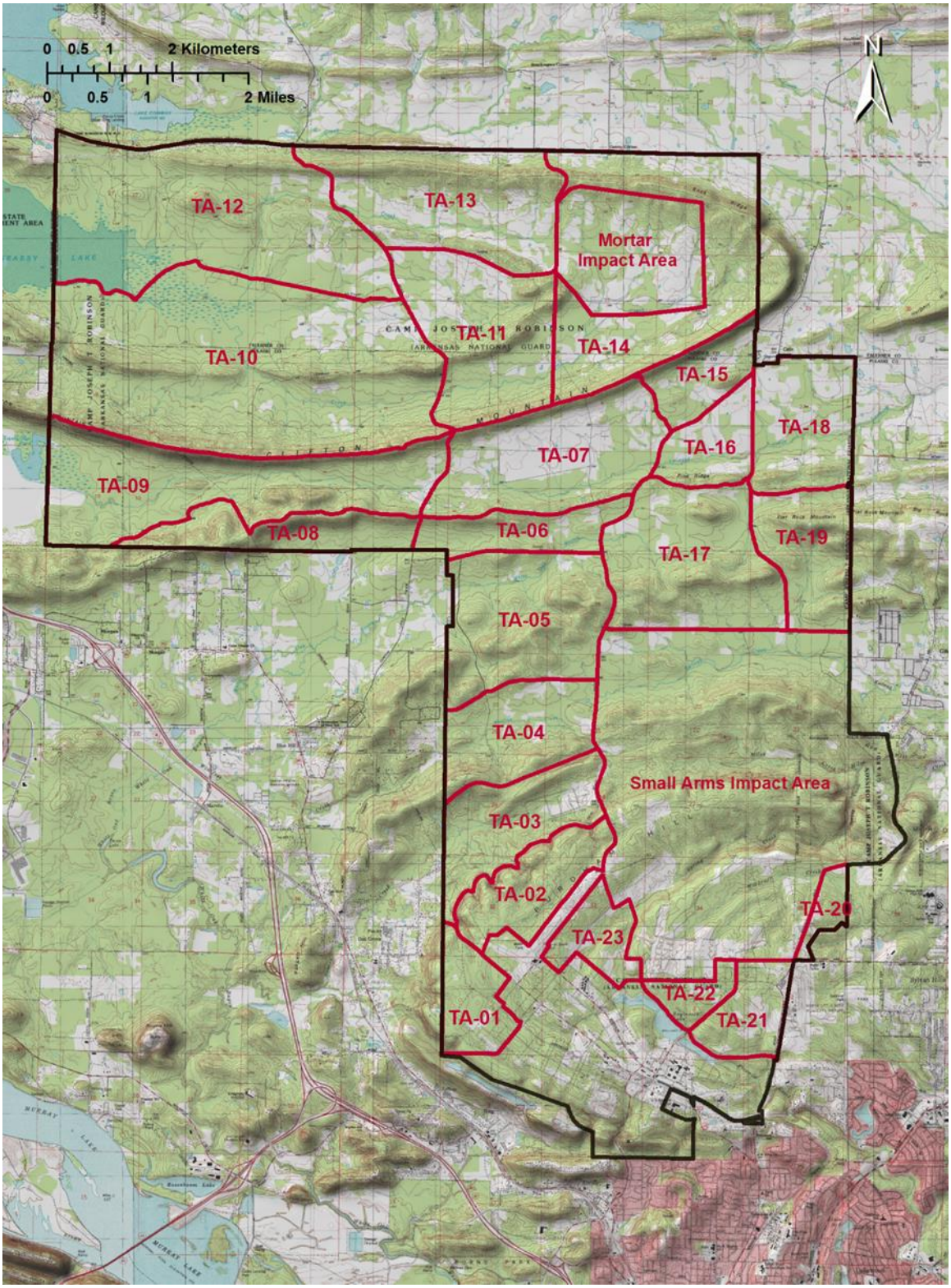



Figure F.1-1 Topography of RMTC.

## F.1.2 Geologic Setting and Formations

The Ouachita Mountains consist of east-west Fold Mountains containing thick Paleozoic formations deposited in an ocean trough. Within the boundaries of RMTC, two of these Paleozoic formations are present – the Jackfork and the Atoka formations. Both formations are Pennsylvanian in age and consist primarily of sandstone and shale depositional units folded into doubly-plunging anticlines and synclines. Both formations are exposed in mostly east-west trending ridges of resistant sandstone overlying shale deposits. The resulting hillslopes are of steep to moderate relief. Elevations range from about 270 ft mean sea level (msl) to 580 ft msl.

The interridge valleys adjacent to these ridges within the installation are mainly a result of faulting within the formations and weathering of the less resistant shale. Because large amounts of silica are present in the Atoka and Jackfork formations, quartz and quartzite are commonly found in depositional contacts and bedrock fractures. Numerous fault areas are noted for both formations.

### F.1.2.1 Atoka Formation

The Atoka Formation was named after the town of Atoka, Oklahoma, where approximately 7,000 ft of the faulted formation is well exposed (Stone 1968). It lies below the Jackfork Formation and above the Hartshorne Formation and is composed of alternating sandstone and shale beds of varying thicknesses (Croneis 1930). It has the greatest areal extent of any Paleozoic formation in Arkansas and is the surface rock in much of Pulaski County, Arkansas (Anderson 1942:10). The Atoka formation is divided into three members, the Lower, Middle, and Upper. All three of these members are present within RMTC.

The Lower member of the Atoka formation comprises approximately three square miles within RMTC on the eastern and western edges, bordered by the Jackfork formation to the south. It consists of roughly 9,000 to 13,000 ft of alternating very thin to occasionally thick-bedded, brownish gray, poorly sorted, fine to medium grained, silty, micaceous, sandstone; micaceous, sandy, often sooty gray siltstone; and silty black shale (Stone 1968). Shale is the predominant deposit in the formation, comprising approximately 40%. Sandstone makes up about 35%, followed by siltstone at around 25% (Stone 1968).

The Lower Atoka was deposited within an elongate remnant ocean basin (Sprague 1985) and described as a deep basin turbidity current deposit (Stone 1968).

The Middle Atoka is a shallow marine deposit representing a progression from deep basin to continental slope deposits (Stone 1968). The Middle Atoka comprises approximately 1.5 square miles within RMTC and is in the east-central portion of the installation, bordered by the Upper Atoka to the north. The Middle Atoka consists of approximately 6,000 ft of sandstone and shale at its widest margin and typically has thick, gray-black silty shale at the base. Sandstone units in this formation are generally gray, thin-bedded, fine-grained, silty, and micaceous.

The Upper Atoka is in the northern portion of RMTC and comprises approximately 30% to 40% of the installation. The Upper Atoka is about 6,500 ft thick at its widest margin and consists of 90% shale (Stone 1968). The shale in this unit is generally gray-black, and the sandstone ranges from fine-grained silty to occasionally quartzose sandstone (Stone 1968). The presence of coal beds and invertebrate fossil horizons in portions of this formation

indicate that cyclothemic processes with alternating continental and shallow marine environments formed the deposits (Stone 1968).
Within the Upper Atoka formation in RMTC, the sandstone ridges of a well-defined syncline named Clifton Mountain topographically rises around the younger shale deposits. This syncline was formed by the uplift of the layered rock strata in association with downward folding, causing a trough appearance (Leet et al. 1982).

F.1.2.2 Jackfork Formation
The Jackfork Formation is in the southern half of RMTC and comprises approximately 50 to 60% of the installation. Taff named this formation after Jackfork Mountain in Pittsburg County, Oklahoma. It is underlain by the Stanley shale and overlain by the Atoka formation, and its resistant sandstone makes up a large percentage of mountains in the Ouachita range (Croneis 1930). The lowering of sea level causing erosion of the shelf filled the Ouachita trough with clastic sediments to comprise the matrix of the Jackfork formation (Morris 1977). The
Jackfork formation consists mainly of sandstone but contains small amounts of shale and millstone grit (Purdue 1929). The total thickness of the formation ranges from approximately 3,500 ft to 6,600 ft, and the sandstone beds range from a few inches to 50 ft thick (Anderson 1942).

F.1.3 Soils

The most recent soil survey of the installation was completed by the US Department of Agriculture NRCS in 2006. The results of this survey are published in the Soil Survey of Camp Joseph T. Robinson compiled by the NRCS. The survey data were used to create detailed maps and figures. Soils found at RMTC are listed and described in Table F.1.3-1. In general, Carnasaw, Pirum, Purdham, Littlefir, and Zafra soils dominate the hills and ridges; and Cato, Psyam, Olmstead, and Maumelle soils dominate the valleys.

| Soil | Characteristics | Setting |
|---|---|---|
| Carnasaw | Deep, well-drained, slow permeability. | Tops of ridges; side slopes of hills. |
| Carnasaw-Pirum | Moderately deep to deep; well-drained; slow to moderate permeability. | Narrow ridge tops of mountains; north-facing side slopes of mountains. |
| Carnasaw-Zafra | Moderately deep to deep; well-drained; slow to moderate permeability. | South-facing side slopes of mountains. |
| Cato | Deep; moderately well drained; moderate permeability. | Valley floors; the slopes of hills. |
| Littlefir | Moderately deep to deep; moderately well drained; slow permeability. | Tops of ridges; side slopes of hills. |
| Olmstead | Very deep, somewhat poorly drained, moderate, slow permeability. | Drainage ways and depressional areas. |
| Perry | Very deep, poorly drained, very slow permeability. | Floodplains of the Arkansas River and its tributaries. |
| Maumelle | Very deep, very poorly drained, moderate permeability. | Sloughs and backswamps on floodplains. |
| Pirum | Moderately deep to deep; well-drained; moderate permeability. | Tops of ridges; side slopes of hills. |
| Psyam | Very deep, moderately well drained, moderately slow. | Valley floors; toeslopes of hills |
| Yorktown | | Backswamps, sloughs, and abandoned oxbow lakes on the floodplains of the Arkansas River and its tributaries. |
| Purdham | Moderately deep; moderately well drained, slow permeability. | Tops of ridges; side slopes of hills. |
| *Source: Soil Survey of Camp Joseph T. Robinson, NRCS, 1999 and 2006* | | |

Table F.1.3 - 1 Soils of RMTC.

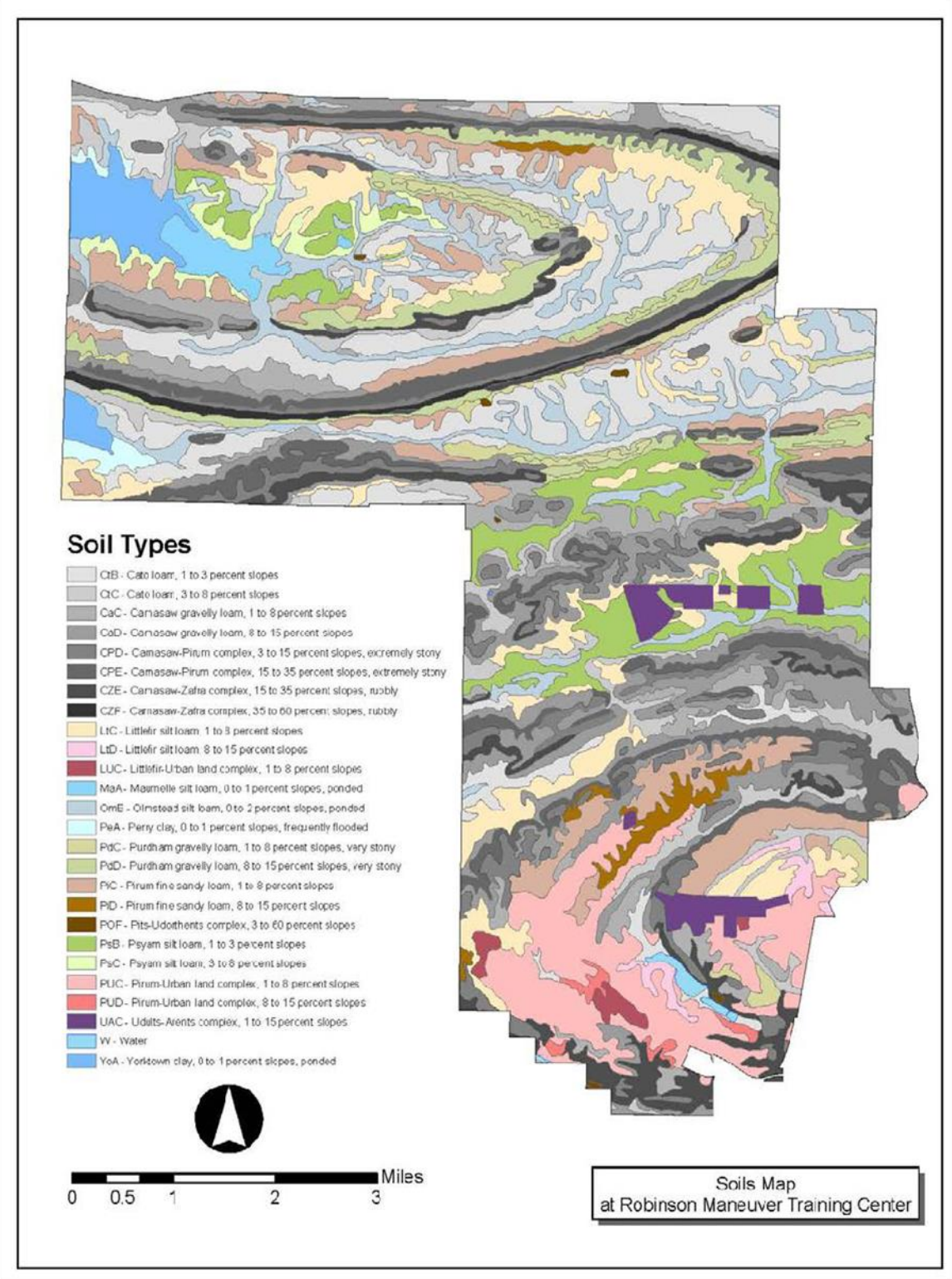



Figure F.1.3 - 1 Soil map of RMTC.

F.2. Climate

The climate is defined as a region's average or long-term weather patterns. Weather parameters determining a region's climate include temperature, precipitation, wind, humidity, and sunshine/cloud cover, to name a few. These climatic regions may scale from a city up to a global level. Regional climates play a significant role in their respective ecosystems. Climate change can significantly affect those ecosystems and the plants, animals, and humans that inhabit those regions. Thus, it is essential to continuously monitor and study climate patterns and how they may affect local resources, ecosystems, human health, and communities. Subsequently, several agencies and organizations have focused on monitoring climates and studying the effects of climatic variations across the globe.

The National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) is a leading source for climate data. NCEI has identified nine climatically consistent regions within the contiguous United States (CONUS). Those nine regions are further divided into 344 climate divisions (https://www.ncdc.noaa.gov/cag/). Arkansas is in NCEI's Southern climate region and is classified as having a subtropical climate, with warm and humid summers and mild winters. Arkansas's widely variable topography and proximity to the warm waters of the Gulf of Mexico are significant determinants of the state's weather patterns. Accordingly, Arkansas is split into 9 NCEI climate divisions. RMTC is in the Central Arkansas division.

### F.2.1 Central Arkansas Temperatures

In the Central Arkansas division, average monthly summer (June-August) temperatures over the last century range from 76°F to 84°F, averaging 79.5°F. The growing season lasts approximately 194 days (Arkansas State Climatologist, 2014). Average monthly maximum temperatures range from 86°F to 98°F, averaging 91°F; while average monthly minimum temperatures range from 64°F to 72°F, averaging 68°F; with several days reaching above 100°F (NOAA, 2021).

Fewer scorching days (100°F or greater) were observed in Arkansas in the second half of the 20th century than during the first half (Runkle et al., 2017). The statewide temperature experienced a cooling period from the 1960s to the 1980s. However, it was followed by a warming period starting in 2010, with annual temperatures reaching levels comparable to the warmest period on record, the 1930s. Additionally, further warming is projected during the 21st century. By the mid-century, models project 40 to 50 more days per year above 90°F (Vose et al., 2017) and about 30 more days above 95°F (Kunkel et a., 2013). Arkansas is also projected to experience an additional 20-30 nights per year exceeding temperatures equivalent to the top 7 warmest annual nighttime temperatures (nighttime temperatures staying above 67-75°F, depending on state location) (Shafer et al., 2014).

Average monthly winter (December-February) temperatures, in this division, over the last century range from 35°F to 48°F, averaging 42.4°F. Average monthly maximum temperatures range from 44°F to 59°F, averaging 53°F; while average monthly minimum temperatures range from 25°F to 38°F, averaging 31.8°F; with several days staying below 32°F (NOAA, 2021). Chances of overnight frost/freeze persist through March or early April.

According to Vose et al. (2017), Arkansas's average temperature has not changed much over the past 120 years, and the southern half of the state has cooled slightly. However, its coldest

temperature of the year has warmed by about 2 to 6°F. Climate change is projected to decrease the frequency and intensity of cold waves (Vose et al., 2017). By mid-century, Arkansas is projected to experience 15 to 25 fewer days below 32°F, with a more significant reduction of up to 30 fewer days across the northwest portion of the state. Warmer winters signify that the cold season will shorten. Extreme cold events will continue to impact Arkansas; however, they will occur less frequently and with less intensity (Vose et al., 2017).

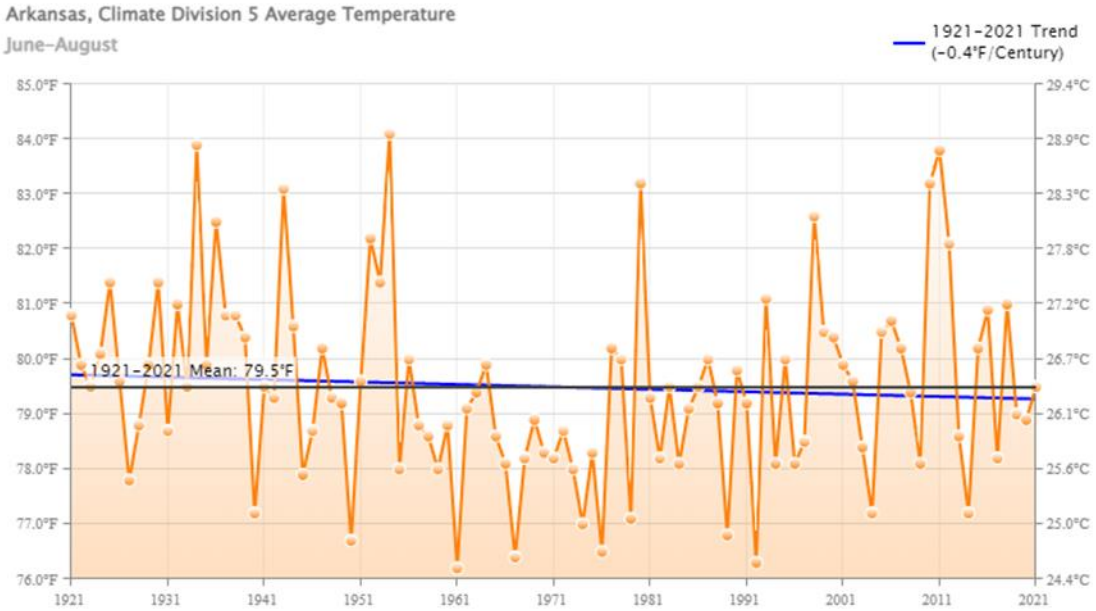



Figure F.2.1-1 Central Arkansas average monthly summer temperatures. NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series 2021

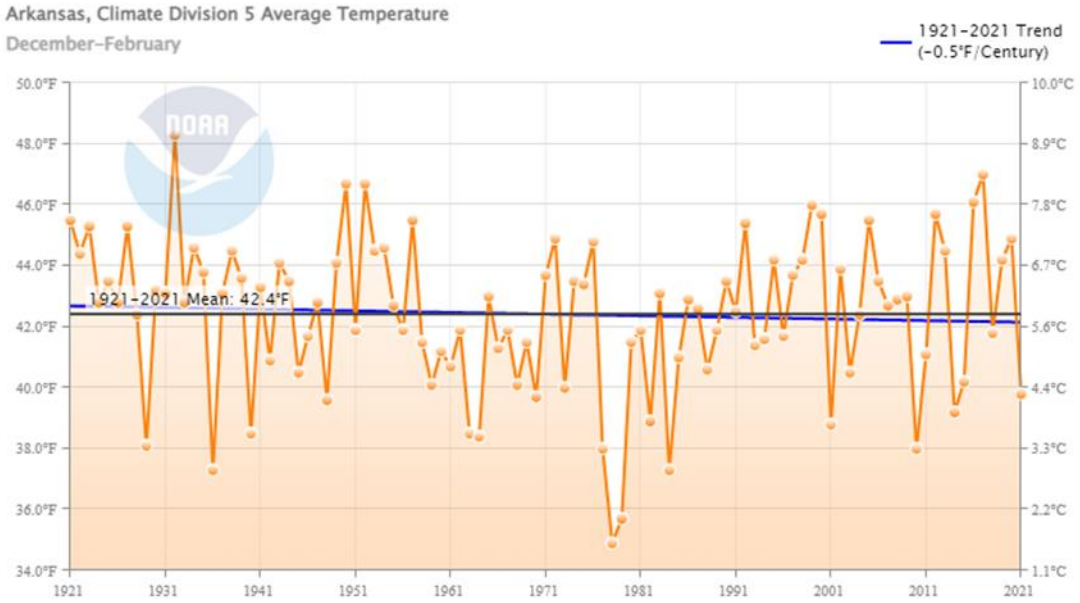


Figure F.2.1-2 Central Arkansas average monthly winter temperatures. NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series 2021

F.2.2 Central Arkansas Precipitation

In Arkansas, the primary sources of precipitation are mid-latitude cyclones/low-pressure systems with various fronts, tropical lows from the Gulf of Mexico, orographic uplift, thunderstorms, or a combination of these (Arkansas State Climatologist 2014).

In the Central Arkansas division, annual precipitation over the last century ranges from 33.38 inches to 80.06 inches, averaging 51.97 inches per year (Figure 2.1). Annual summer (June-August) precipitation totals range from 3.05 inches to 18.5 inches, averaging 11.13 inches per summer, with summer being typically the driest season. Annual fall (September-November) precipitation totals range from 2.73 inches to 26.06 inches, averaging 12.13 inches per fall. Annual winter (December-February) precipitation totals range from 4.13 inches to 23.78 inches, averaging 12.69 inches per winter. Annual spring (March-May) precipitation totals range from 3.97 inches to 28.78 inches, averaging 16.02 inches per spring, proving spring to be generally the wettest season (NOAA, 2021).

Heavy rainfall and flooding have always been part of Arkansas' climate. Annual precipitation has increased for all but east central Arkansas. The most significant increase in rainfall occurred in the fall, and the most significant decrease occurred in the summer (Easterling et al., 2017). Heavy rainfall (the top 1% of annual events) in the Southeast US increased by 27% between 1958 and 2016. Seasonally, precipitation is projected to slightly increase in winter and spring in Arkansas and decrease in summer and fall by the end of the 21st century. The projected seasonal changes are small compared to natural variations, however. However, scientific confidence is strong that there will continue to be an increase in the frequency and intensity of heavy rainfall events over the 21st century (Easterling et al., 2017), which increases the chance of flooding.

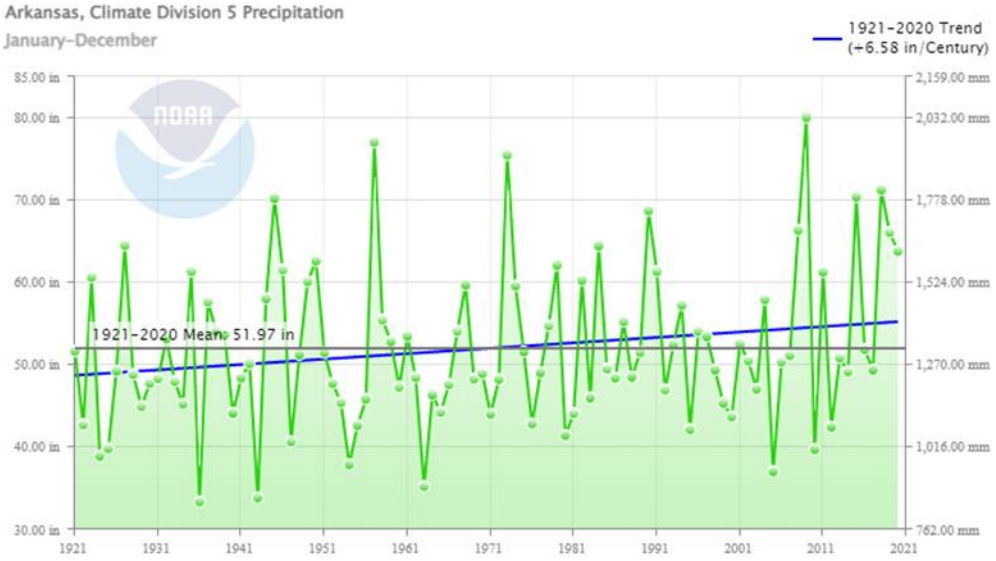


Figure F.2.2-1 Central Arkansas annual precipitation totals. NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series 2021

F.2.3 Drought

Drought is defined as a deficiency of moisture that adversely impacts people, animals, or vegetation over a sizeable area (NWS, 2009). Droughts are frequent in areas where annual evaporation may exceed yearly precipitation. Drought is rated by the weekly U.S. Drought Monitor (2018) on a scale from D0 (abnormally dry) to D4 (exceptional drought). D0 occurs, on average, in any given location about 21-30% of the time. D1, moderate drought, occurs 11-20% of the time, or roughly once every 5-10 years. D2, severe drought, occurs 6-10% of the time, or about every 10-20 years. D3, extreme drought, occurs 3-5% of the time, and D4, exceptional drought, occurs 0-2%, or about every 50 years.

In assessing water availability via precipitation totals, it is essential to consider the effects of evaporation and evapotranspiration rates. Higher evaporation and evapotranspiration rates, which increase with higher temperatures, may drastically affect surface and groundwater availability and soil moisture availability and can contribute to droughts. Evaporation or evapotranspiration data is not readily available. However, drought conditions may be assessed using the Palmer Modified Drought Index (PMDI), an operational version of the Palmer Drought Severity Index (PDSI), and the Palmer Hydrological Drought Index (PHDI).

Over the past century in Central Arkansas, droughts of various durations and severities have been oscillating. However, an upward trending PMDI value (+1.31) over the last century illustrates decreased drought duration and severity, generally increasing soil moisture availability (Figure 3.1). Similarly, an upward trending PHDI value (+1.42) over the past century also corroborates a decrease in drought duration and severity, showing a generally increased availability of surface and groundwater (Figure 3.2).

Arkansas has historically experienced flash droughts, which are droughts that develop quickly. Drought conditions come and go but have been shorter and more intense than further west, such as in Oklahoma and Texas. However, droughts are projected to increase in severity and frequency due to rising temperatures and increased evaporation. Rising temperatures will also lead to an increased demand for water and energy which could stress natural resources (Shafer et al., 2014). Models project that Arkansas will experience a decrease in soil moisture across all seasons by the end of the century, with the most significant reduction in the summer (Carter et al., 2014; Wehner et al., 2017).

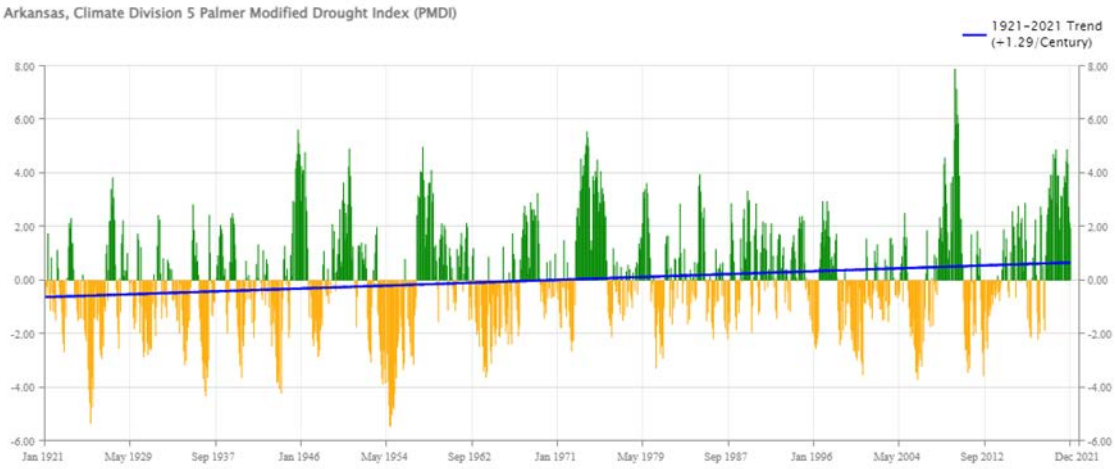



Figure F.2.3-1 NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series 2021.

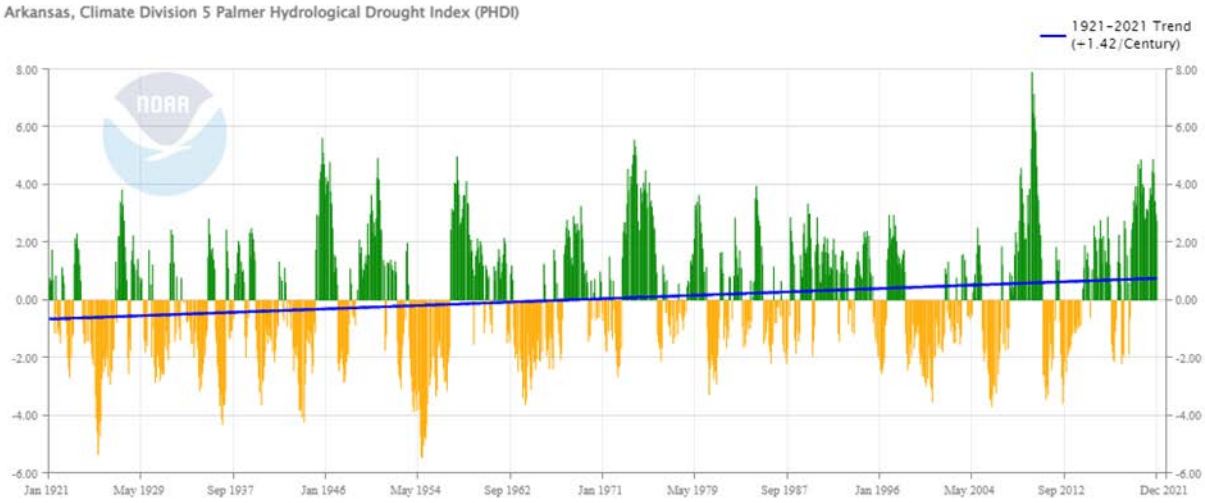



Figure F.2.3-2 NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series 2021.

## F.2.4 Severe Weather

In central Arkansas, winds are typically mild to moderate but vary seasonally and with weather events. Spring is the dominant season for severe weather in the state, with severe thunderstorms and flooding common across the state during those months. The widely varying landscape and altitudes throughout the state cause considerable weather extremes in spring and fall. Tornadoes are common across the state during the spring, averaging around 26 tornadoes a year. Damaging winds in Arkansas are associated with severe thunderstorms. More favorable environments for severe thunderstorms are expected, and increases in severe wind occurrences are projected. Climate models project an increase in the frequency and intensity of severe thunderstorms in the United States. Uncertainty remains, however, in the assumption that the favorable environments will reach their potential of producing damaging winds (Kossin et al., 2017)

Climate models project an increase in the frequency and intensity of severe thunderstorms, and events with large hail and possibly lighting occurrences are projected to increase (Kossin et al., 2017). So as more favorable environments for thunderstorms are expected across the United States, lightning and possibly hail increases are also projected. At the same time, models project an overall decrease in the number of days with hail per year (Brimelow et al., 2017). Confidence in the projections is currently low due to the isolated and sporadic nature of hail and lightning events and limited comprehensive datasets, which make it difficult to track long-term trends (Wuebbles et al., 2017a).

Tornadoes are another aspect of severe thunderstorms, particularly supercell thunderstorms – those isolated with unimpeded moisture inflow and enhanced by wind shear. Tornadoes can occur in Arkansas at any time of the year and at any time of the day. Arkansas experiences an uptick in tornadoes in the spring, but they also see tornadoes in the fall and winter as the jet stream moves toward the south. Tornado intensity is rated by the damage they produce on a scale from EF0 (weak) to EF5 (violent).

Records over the past 40 years show that there has been an increase in the frequency of days with a large number of tornadoes (i.e., tornado outbreaks) and an eastward shift in locations (Gensini & Brooks, 2018). However, there has also been a decrease in the frequency of days with tornadoes (Kossin et al., 2017). In other words, increasingly, tornadoes are more likely to occur in conjunction with a tornado outbreak. It is challenging to account for tornadoes in climate models because they appear on a tiny scale. Therefore, more research is needed to understand how climate change influences tornadoes (Walsh et al., 2014). However, progress has recently been made in understanding how the large-scale climate system relates to the conditions that support tornadoes. As such, climate models project an increase in the frequency and intensity of severe thunderstorms, which can include tornadoes. However, confidence in the details of this projected increase remains low (Kossin et al., 2017)

Arkansas winters are generally mild, with infrequent minor winter weather events. Major winter weather events typically only occur every five to ten years but have begun to occur more frequently. Winter storms occur in Arkansas between November and March and are usually created by large low-pressure systems rushing across the country. In Arkansas, ice storms are a more significant threat than blizzards. Access to moisture from the Gulf of Mexico falling over shallow cold air near the surface can produce ice accumulations of two inches or greater with tremendous damage to power distribution.

Years consisting of many snowfall days have declined across the southern United States between 1930 and 2007 (Easterling et al., 2017). Models suggest that although the number of snowfall events will likely continue to decrease given overall atmospheric warming when snow does occur, accumulations will be more significant due to increases in atmospheric moisture (Krasting et al., 2013). Models show that by mid-century, there will generally be a northward shift of the rain, sleet, and snow dividing line across the central and eastern United States. This shift will add to the complexity of determining precipitation type for winter events (rain, ice, or snow) in Arkansas. However, the increase in atmospheric moisture may bring an addition to the amount of precipitation that does fall (Easterling et al., 2017)

### F.2.5 Air Quality

Air quality problems result from the accumulation of aerosols, such as dust, pollen, smoke, salt, or human-produced chemically active compounds that build up in an area over time. Under normal conditions, winds disperse these aerosols and mixtures, but sustained periods of light winds can allow buildup to unhealthy levels. Many aerosols are produced naturally but may have artificially elevated concentrations through burning or agriculture. Industrial activities and urban environments add other sources of pollution, including photochemical smog, which is produced from the interaction of sunlight with nitrous oxides and volatile organic compounds. Ozone is a component of this smog. Air quality problems occur when dispersion – the ability of the atmosphere to spread pollutants over a large area – is inhibited. A time-averaged concentration is used because exposure to a high concentration of contaminants during a short time might have an impact equivalent to exposure to a lower concentration over a longer time (American Meteorological Society). The area is deemed non-compliant when the average exceeds public health regulations over a defined period, such as several hours a day or several days per year. One way to assess air quality for the location is to look at the daily Air Quality Index (AQI) issued by the US Environmental Protection Agency. AQI is calculated for five significant pollutants: ground-level ozone, particle pollution (particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Arkansas generally meets all federal air quality standards for criteria pollutants (UA 2023). However, the EPA's Cross-State Air Pollution Rule Update 2022 requires Arkansas's power plants to reduce nitrous oxide emissions that can cross state lines and contribute to ground-level ozone (EPA, 2022). Warming summer temperatures will increase ground-level ozone pollution across Arkansas (Carter et al., 2014). Hotter temperatures can increase the formation of ground-level ozone, which has various health effects, including asthma and respiratory problems (EPA, 2016). Air quality may also worsen during wildfire periods (EPA, 2016).

### F.2.6 Wildfire

Any free-burning uncontainable wildland fire not prescribed for the area which consumes natural fuels and spreads in response to its environment (NWS, 2009). Wildfires occur when weather conditions meet with sufficient fuel and an ignition source. Weather conditions include warm temperatures, low humidity, strong winds, and a period without precipitation allowing fuels to dry. Fuels are vegetation ranging from fine fuels such as grass and pine needles to large woody materials such as trees, dead and decaying logs, and organic material in the soil. Usually, wildfires occur when the state experiences a drought, but they can still happen at any time. Fires are common during a drought when dried vegetation provides fine fuels and warm, windy, dry days provide weather conditions that allow ignition and spread. Summer has higher temperatures that can intensify fires, but there is typically less wind and, consequently, less spread.

Wildfires in Arkansas depends upon weather conditions, seasonal climate patterns, vegetation conditions, and an available source for ignition (such as a spark, flame, or intentional). The frequency and number of acres burned across the state have decreased over the last 50 years. Those trends may be attributed to the increase in volunteer fire departments, who often respond to fires quickly and reduce the acreage, and an underreporting of smaller fires, which are only sometimes accounted for in the national database (AAD, 2018). Given its complex relationship, little is known about how climate change may affect wildfire conditions across

Arkansas. However, projected increases in temperatures that can dry refined fuels such as grasses and enhanced wet/dry cycles that promote vegetation growth and drying or dormancy, coupled with population growth along the wildland-urban interface, suggest the risks of wildfires is likely to increase.

## F.3 Climate Change

Climate change can affect multiple sectors of our society and, more specifically, may impact RMTC, including impacts on water resources, aquatic and forested ecosystems, wildlife, and other natural resources. Effects such as changes in patterns of precipitation, increase in the intensity and frequency of storms, rise in the number of flood and drought incidents, occurrence and severity of wildfires, and soil loss. The impacts of climate change also have the potential to affect natural and built infrastructure and the Military mission.

According to USEPA (EPA 430-F-16-006), Arkansas has warmed less than most of the United States, and some parts have cooled. However, the Army Climate Assessment Tool (ACAT) EPA and other sources indicate that Arkansas will become warmer and will probably experience more severe floods and drought.

Both annual rainfall and single rain events that result in heavy downpours have increased across much of the state in the last 50 years. Studies in the southeast region of the United States also indicate warming trends and increased rainfall. Publications in 2014 by the US Global Climate Change Research Program suggested that the number of days exceeding 95°F and nights hotter than 75°F has increased over the last half-century. Additionally, daily and five-day rainfall totals have also increased for this region over the same period.

Additionally, NOAA states three key messages in their climatic summary for Arkansas (https://statesummaries.ncics.org/ar).

1) Arkansas has exhibited slight overall warming since the early 20th century, but temperatures in the 21st century have been about as warm as the previous record levels of the 1930s and 1950s. Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century.
2) The intensity of future naturally occurring droughts is projected to increase because higher temperatures will increase the rate of loss of soil moisture during dry spells.
3) The number and intensity of extreme heat and extreme precipitation events are projected to increase, while the intensity of extreme cold events is projected to decrease.

### F.3.1 Impacts on Water Resources

In many areas of the state, climate change is likely to increase water demand while reducing water supplies. Climate change is expected to increase the risk of flooding and droughts and the severity of these events. EPA sources indicate that while some areas of the southeast region may experience increased runoff or flooding, rainfall averages in Arkansas for spring and summer months are predicted to decrease. With droughts and rising temperatures, increases in evaporation will occur, reducing the amount of available runoff into receiving water bodies. According to the EPA, yearly surface water and groundwater recharging are likely to decline by 5 percent.

### F.3.2 Impacts on Aquatic Ecosystems

Climate change can also harm aquatic ecosystems. Warmer water lowers dissolved oxygen levels in surface waters, which can severely limit fish and other aquatic life communities. Because fish cannot regulate their body temperatures, warmer water can make a stream uninhabitable for fish that require cooler water. Warmer temperatures can also increase the frequency of algal blooms, which can be toxic and further reduce dissolved oxygen. Summer droughts may amplify these effects, while periods of extreme rainfall can increase surface runoff, and flows can affect soil erodibility and sedimentation, nutrient loading, and other aspects of water quality on streams.

### F.3.3 Impacts on Forests

Increased temperatures and variations in rainfall are unlikely to substantially reduce forest cover in Arkansas, although the composition of those forests may change (EPA, 2016). However, increased droughts and hot temperatures would reduce forest productivity and may promote an increase in invasive plant species, fires, insects, pests, and disease damage. Furthermore, forest management practices may become more challenging, allowing increased growth rates in some areas while endangering the survival of species and forest communities in other areas. Conversely, longer growing seasons and increased carbon dioxide concentrations could more than offset the losses from drought factors.

### F.3.4 Impacts on Wildlife

RMTC is situated within the northeastern portion of the Ouachita Mountains ecoregion of the state. Of the 37 terrestrial habitats in Arkansas, as identified in the Arkansas Wildlife Action Plan (AGFC 2017), 20 occur in the Ouachita Mountains ecoregion (Ecoregion 36). Many factors threaten these habitats, including fire suppression, habitat alteration and fragmentation, invasive species, and water diversion. Climate changes could exacerbate existing threats within many habitats. Related to the projected warming trend, increases in the number and location of non-native plant species, loss of forest productivity, an increased number of harmful algal blooms, and insect-caused forest disturbances can also be expected and represent possible complications to the ARARNG natural resources stewardship, biodiversity protection, and a comprehensive ecosystem management goal.

### F.3.5 Impacts on Military Mission

Climate change can have a severe impact on the Military mission. DOD installations all over the United States are already seeing observed changes in the climate. These changes are expected to increase in the coming decades. (SERDP 2016). Four primary climate-related factors affect DOD installations and activities.

- Rising global temperatures
- Changing precipitation patterns
- Increasing frequency and intensity of weather events
- Rising sea levels and storm surges

These primary factors have the potential to impact military missions in multiple ways. Extreme weather events and rising sea levels threaten military installations and equipment, especially low-lying coastal facilities. Other climate-driven changes in natural resources that pose risks to sustaining military readiness include. Limitations on the timing of training and other activities due to increases in wildfires, floods, and other natural hazards Increased damage to facilities and operational assets due to loss in protective functions offered by wetlands, dunes, and other natural systems. Higher regulatory compliance costs and restrictions due to declines in protected species or habitats. Effects on the suitability of training and testing sites due to land loss or alteration of natural ecosystems. An excellent example of this, which is an actual situation that RMTC could face, is where structural changes in ecosystems occur; in particular, the proliferation of invasive species and dense undergrowth, which may be exacerbated by changing climatic conditions, can obscure sight lines and create other barriers to vehicular and ground movements.

According to the Assistant Secretary of the Army (Installations, Energy, and Environment), the effects of climate change can cause humanitarian disasters, undermine the weak government, and contribute to long-term social and economic disruptions. Additionally, climate change can lead to competition for scarce resources and increase the spread of infectious diseases. Moreover, impacts from climate change pose a severe threat to US national security interests and defense objectives.

The key to sustaining mission functions and requirements dependent on installation lands, waters, and other resources is incorporating climate considerations into the installation's natural resource program. Multiple DoD policies address the impacts of a changing climate on military installations and help guide military leaders and resource managers in responding to climate-related risks to natural resources. These policies include.

The ARARNG understands that there is a potential for climate change, on a local level, to impact the ability of the military to sustain the training of soldiers. Any adverse change to the vegetation of the training area could affect the training areas, promoting noxious weed infestations or compromising wildlife habitat, such as the loss of roosting sites supporting migratory birds. ARARNG will support the development of a vulnerability assessment better to understand the potential impacts of a changing climate. However, the abundance and distribution of species and habitats on ARARNG properties must be more prominent in scale to address comprehensive climate change vulnerabilities. Therefore, ARARNG will look at existing regional plans, partnerships, or other reports that other agencies, universities, or non-profits are conducting in Arkansas or nearby states on assessing, developing, and implementing climate change adaptation strategies and incorporate management strategies as appropriate. ARARNG will generally identify and implement sound natural resource strategies that benefit the ecosystem, regardless of how climate changes occur.

# Appendix G: Wetlands and Surface Water Management

## G.1 Surface Waters

Surface waters are any bodies above ground, including streams, rivers, lakes, reservoirs, creeks, and wetlands. Surface water originates primarily from rainfall and takes part in the hydrologic cycle, or water cycle, which is the movement of water to and from the Earth's surface. Surface waters can be perennial (permanent) or ephemeral. Ephemeral waters are only present occasionally and often dry up during drought or little rainfall. Each type of surface water can be found on RMTC and multiple lakes, creeks, and streams.

Wetlands are significant ecosystems that provide many beneficial services to people, fish, and wildlife. These critical functions include protecting and improving water quality, providing habitat for fish and wildlife, storing floodwaters, and maintaining surface water flow during dry periods. These functions are unique because this type of ecosystem can only provide them. Additionally, wetlands play an essential role in the ecology of a watershed.

The combination of shallow water, abundant nutrients, and primary productivity is ideal for organisms that are the foundation of the food web and ecosystem. In addition to the functions listed above, scientists are now finding that wetlands may contribute to atmospheric maintenance. Wetlands store carbon within their soil and plant communities instead of releasing it into the atmosphere as carbon dioxide. Therefore, wetlands help moderate global climate conditions. Wetlands are additionally crucial in that they:

- Protect biodiversity- freshwater ecosystems only cover approximately 1% of the Earth's surface, yet they hold about 40% of the world's species.
- Water storage- provides flood and erosion control.
- Groundwater replenishment- groundwater reservoirs store 97% of the world's unfrozen freshwater.
- Sediment retention- wetlands help prevent sediment deposition, which could block waterways downstream.
- Retention of nutrients and other substances
- Stores Carbon- Wetlands act as carbon sinks. The destruction of wetlands releases carbon dioxide into the atmosphere as a greenhouse gas.

Wetlands are federally recognized as an essential ecosystem component with many vital functions. The Environmental Protection Agency (EPA) and USACE define a wetland as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a

Prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Hydrology includes all areas with evident characteristics of wetland hydrology. The presence of water has an overriding influence on aspects of vegetation and soils due to anaerobic and reducing conditions. Wetlands filter sediment, excess nutrients, and other impurities from the water as it passes through the areas and into the surface and groundwater. They minimize flooding by their ability to store excess water outside of riparian zones. The hydrophytic vegetation that grows in wetlands protects the shoreline from erosion and provides food and shelter for wildlife. Wetlands provide a suitable environment for plants and bacteria to break down excess nutrients and contaminants.

## G.2 Regulations and Acts Regarding Wetlands

Wetlands are federally regulated and protected under Executive Order (E.O.) 11990, Protection of Wetlands (43 Federal Register 6030). This E.O. aims to reduce adverse impacts associated with the destruction and modification of wetlands. Under this order, federal agencies, including the DOD, must minimize actions that adversely affect wetlands. Additionally, the Arkansas National Guard is required to identify and locate jurisdictional wetlands and other waters of the United States that occur in areas where the resources have the potential to be impacted by military activities (e2M, 2007). Wetlands are protected as "waters of the United States" under section 404 of the Clean Water Act. Therefore, the USACE has the regulatory authority to administer the Clean Water Act, which also limits the impacts that can occur in wetlands. Floodplains are another area that is federally protected. EO 11988 was set in place for the protection and management of floodplains. If an action encroaches within the floodplain and alters flood hazards designated on a National Flood Insurance Rate Map, for example, floodplain boundaries, the Arkansas National Guard must submit an analysis reflecting any changes to the Federal Emergency Management Agency or FEMA (e2M, 2007).

Under the Clean Water Act, waters subject to federal control are referred to as jurisdictional waters or jurisdictional wetlands because they are within the regulatory jurisdiction of federal law. According to the 1987 USACE Manual for Wetland Delineation, to be a jurisdictional wetland, three parameters must be present: Hydrology, hydrophytic vegetation, and hydric soils. Wetland hydrology means that water inundates the grounds permanently or periodically or that soils are saturated at the surface at some times during the growing season. Hydric soils show reduced rather than oxidized conditions, otherwise described as anaerobic conditions (USACE 1987). Typical hydric soil indicators include a low chroma matrix, with or without mottles or gleying (grey colors). Hydrophytic vegetation contains plants adapted to grow in water or oxygen-deficient substrate. (e2M 2007).

### G.2.1 Cowardin Classifications of Wetlands

The Cowardin wetland classification system was developed for the U.S. Fish and Wildlife Service. This system classifies wetland habitats based on similar hydrologic, geomorphic, chemical, or biological factors (Cowardin et al., 1979). This classification system uses a hierarchal approach in which wetlands are classified according to Systems, Subsystems, Classes, and Subclasses. The Cowardin classification scheme lists five systems with coordinating subsystems: These wetland classes are based on substrate composition, flooding regime, and vegetative life. The five Cowardin systems are:

· Marine

· Estuarine

· Riverine

· Lacustrine

· Palustrine

Three wetland classifications were identified on RMTC: palustrine, riverine, and lacustrine.

· Palustrine- This system includes all non-tidal wetland systems dominated by trees, shrubs, persistent and non-persistent herbaceous plants, emergent mosses and lichens, and all tidal wetlands with salinity below 0.5 percent (Cowardin et al., 1979). Three classes of Palustrine systems were identified on RMTC, including emergent, forested, and scrub-shrub habitats.

· Riverine- a brief description of this system includes all wetlands or deep water habitats with a defined course as in a stream channel. Riverine systems are typically confined by palustrine wetlands or terrestrial habitats on the landward side. These systems do not have vegetative waters or water with salinity above 0.5 percent of ocean salts.

· Lacustrine- briefly described as a wetland or deep water habitat located in a topographical depression or a river channel that is dammed. This type will include permanently flooded lakes and reservoirs and intermittent lakes. This system lacks trees, shrubs, persistent emergent, emergent mosses, or lichens with greater than 30 percent aerial coverage; and exceeds 20 acres in total area.

*The descriptions above are brief and outline the characteristics found on the installation. A more extensive illustration of each can be found in the Cowardin Classification guidelines (Cowardin et al., 1979).

## G.3 Wetland Delineation on RMTC

Multiple studies on the delineation of wetlands have been conducted on RMTC. These investigations are necessary to help Natural Resource Managers with long-term management plans to protect wetlands. Studies on locating and defining the boundaries of wetland areas on the installation were completed in 1993 and 1994, 2002, and 2006. These studies were done to designate and map baseline locations and boundaries for wetlands on RMTC.

### G.3.1 Wetland Survey Study 1993 and 1994

A study was conducted from September through November 1993 and continued through 1994. Corp of Engineers personnel started the first half of this survey, and Halff associates completed the remainder. This study identified potential wetlands in the field using the existing Army Corp of Engineers wetland delineation methodology. This study aimed to

identify and map wetlands subject to the USACE jurisdiction under section 404 of the Clean Water Act. The study collected the area's hydrology, soils, and vegetation data. Data points were collected by a walking survey of the site and marked with bright flagging designated the wetland boundary lines.
Additionally, boundaries were mapped on a USGS topographical map. The study resulted in 5000 to 6000 acres of wetlands being inspected and marked. The documentation also includes detailed tables of species of wetlands indicator plants and descriptions of each wetland area. The most extensive wetland areas are associated with Grassy Lake. Grassy Lake is a natural wetland marsh modified by the construction of a levee system by AGFC. The Arkansas Game and Fish Commission typically flood Grassy Lake in November, raising the water's surface elevation by about two to four feet. The increased inundation has resulted in a large wetland fringe around the lake consisting of Willow oak, Overcup oak, Long-spike trident, and Sedge. For more information, see the RMTC wetland delineation and mapping survey 1994.

### G.3.2 Wetland Delineation Study 2002

In 2002 an additional wetland delineation study was conducted. This survey was conducted to develop a comprehensive and descriptive GIS coverage for wetlands within the installation's boundaries. A field-based planning level survey was achieved to confirm the existence, location, jurisdictional extent, and classification of wetland areas on RMTC and establish additional baseline data for each site and a flora list. The previous wetland survey and aerial photographs, topography maps, and soil surveys were utilized to complete this study. This survey resulted in a total of 1103.25 acres of wetland characteristics identified. Approximately 1057.86 acres examined were found to meet USACE jurisdictional wetland requirements. Fifty-four total areas were located, 46 of which meet jurisdictional requirements. Four different NWI classifications were identified on the installation, the most common being Palustrine Forested. Additionally, nine different Nature Conservancy Alliances were found within the wetlands of RMTC. For more details and data, see Wetland Survey March 2003 by Parsons.

### G.3.3 Wetland Field Investigation 2006

The most recent wetlands delineation study on RMTC was conducted in 2006 by Engineering Environmental Management Inc. This field investigation was conducted to determine the extent of wetlands and other U.S. waters at Robinson Maneuver Training Center. These field investigations took place between November 13th and December 16th, 2006. Multiple resources have been used in previous surveys and field studies to determine the extent of wetlands and other waters of the United States on RMTC. Resources and methods such as photointerpretation of infrared and other available aerial photography, the analysis of vegetation mapping completed in 2006, and the review of Natural Resources Conservation Service (NRCS) Soil Survey data, U.S. Geological Survey (USGS) topographic maps of the study area, wetland delineations previously conducted on RMTC, and limited field investigation (e2M 2007).

In this study, determining the occurrence of jurisdictional wetlands is based on procedures set in place by USACE Wetlands Delineation Manual, Technical Report Y-87-1(USACE 1987). As stated in previous studies, the presence or absence of hydrophytic vegetation, hydric soils,

and wetland hydrology was used to determine the location and boundaries of wetlands on RMTC.

Field investigations in this study identified 55 individual wetlands or wetland complexes. Based on on-site investigations, approximately 1105.81 acres of vegetated wetlands were found on RMTC. In addition, based on the Final Classification, Mapping and Spatial Databases Project Camp Joseph T. Robinson (e2M 2006), there are approximately 105.52 acres of non-vegetated open waters (e.g., ponds and lakes) and perennial streams on RMTC. These wetland systems were further divided into sub-classes that can be found in a detailed table that begins on page 23 of the report (e2M, 2006). This investigation and the data collected herein provide baseline wetland conditions to provide resource managers with the means to monitor long-term changes in wetland communities on RMTC.

## G.4 Surface Water Quality Surveys on RMTC

Multiple surface water surveys have been conducted on the installation in previous years. The earliest survey found was led by John Rickett with the biology department at the University of Arkansas at Little Rock. This survey ran from May 1993 through May 1995. In summary, the results state that streams on RMTC have low buffering capacity due to the impacts of alkalinity and water hardness. Additionally, primary nutrient concentrations of nitrate, sulfate, and phosphates were lower than expected, and localized soil disturbances were shown to be present by Turbidity, TDS, specific conductance, and iron level readings. These particular readings also show an interruption in water flow during the summer in both study years (Rickett, 1996).

Additional surveys were done in consecutive years, 2000 and 2001, then in 2003, 2004, and 2005. These surveys were semi-annual, so water tests were typically conducted annually in April/May and November/December. The 2005 study done by URS was generally consistent with URS' 2004 study at the exact stream sampling locations (URS, 2005), as well as the previous water quality studies done in 2003 (URS, 2004) and in 2001 (e2M, 2002).

A reasonably consistent trend was shared in the majority of these surveys. While several parameters complied with regulations the APC&PE and EPA set, a few water quality parameters exceeded applicable standards. Except for the NLR airport drainage creek, all sample sites throughout these studies have low water hardness and extremely low total alkalinity (as CaCO3). The primary source of Calcium Carbonate (CaCO3) is limestone (carbonate) bedrock, which is non-existent at RMTC. Therefore, low alkalinity is expected as most streams originate from the installation. Because of these low values, the buffering capacity of the pH of streams on RMTC is also low, which would indicate that the low pH readings are a natural condition of streams on RMTC (URS, 2006).

Additionally, low D.O. was seen in the spring surveys but not in the winter. This condition is due to higher temperatures and the low flow of intermittent streams. There were multiple other parameters tested. Heavy metals and fecal coliforms were also tested. Fecal coliforms exceeded the standards in various surveys but have been resolved by the study in 2005, as well as multiple heavy metals. Detailed tables that illustrate this information can be referenced within these studies. In conclusion, with the few exceptions previously discussed, water quality on RMTC generally meets regulation standards, and the parameters that do not meet

standards are likely the result of natural causes. Based on test results, future recommendations provided by URS include:

- Continue conducting semi-annual surface water quality monitoring at the 20 sites.
- Move the sample location of Grassy Lake to the boat ramp on the north side of the lake.
- Move the sample location of Tupelo Gum Pond to the north side for improved access from Clifton Mountain Road.
- Collect a minimum of one field blank per monitoring event to evaluate potential metal contamination.
- Utilize historical data from sample locations to evaluate trends in water quality in future reports.
- Utilize historical data from sample locations to evaluate changes in metal concentrations in sediments over time.

*For exact numbers on standards exceeded according to the EPA and APC&PE regulations, see data and tables in the existing studies and water quality surveys on RMTC.

G.5 Wetlands Management Plans and Actions

Surface waters and wetland quality can be significantly affected by land use. Consistent with the military mission at RMTC and sound ecosystem management principles, the goal for surface water and wetlands is to manage and maintain diverse natural aquatic communities by managing their associated watersheds and aquatic ecosystems. General management plans include:

- Continue periodic surveys and monitoring to enable a comprehensive inventory of jurisdictional wetlands on RMTC to measure change over time and changes related to climate change.
- Ensure that all federal regulations are adhered to involving wetlands and surface waters, including the Clean Water Act, Executive Order 11990 Protection of Wetlands, Executive Order 11988 Protection and Management of Floodplains.
- Implement the restoration of wetlands to enhance biodiversity, improve water security, maintain the ability to store carbon, and increase resilience to climate change.
- Implement prescribed fire in and around wetland areas and remove invasive plants and animals to restore wetland habitat for native flora and fauna.
- Control nonpoint source pollution to maintain or enhance water quality by implementing guidelines by NRCS, USACE, DEQ, UACES, and other state or federal agencies.

· Utilize forestry Best Management Practices (BMPs) involving silviculture practices to prevent erosion and deposition into rivers, lakes, streams, and wetlands.

· Continue periodic water quality surveys, preferably semi-annual, on surface waters at RMTC to monitor waters and ensure standards align with the EPA and APC&PE regulations.

· Where possible, maintain 100-foot vegetation buffers around water resources such as lakes, ponds, and wetlands.

· Maintain 100-foot vegetated riparian buffers around streams on RMTC.

# Appendix H: Habitat Management

## H.1 Overview

Knowledge and understanding of the components that make up a habitat are fundamental to managing it. Essentially, habitat is all food, water, and shelter resources that wildlife requires to survive. Enough of these resources is needed to maintain a healthy wildlife population. While habitat requirements for each species can differ significantly, some species often utilize similar environments. A prime example is wild turkey, and bobwhite quail thrive in very similar habitats.

Knowing the types of wildlife supported by the habitat you are managing will help you understand how to manage the specific resources these animals need. Wildlife needs food to grow healthy, reproduce, raise young, resist disease, and escape predators. Not only does food need to be plentiful, but it needs to be the right food to meet nutritional needs. Another consideration is that food choices change throughout the seasons. The food available in spring is different from in winter. While many habitats are not lacking vegetation, it is only helpful if it's something that the wildlife in these habitats eats.

Water is another resource required by wildlife. It is necessary for digestion, maintaining body temperature, and other life processes. Sources of clean water like streams, ponds, and lakes are not typically of concern for most Arkansas wildlife due to abundant yearly rainfall; however, in late summer or during years of drought, lands can become very dry.

The final resource requirement is shelter. Protection needs vary a lot between species. Wildlife needs some cover to protect itself from bad weather and to hide from predators while eating, sleeping, and raising young. To thrive, all these resources must be available in the areas used by those species. However, forests only sometimes provide all the necessary help on their own needed to support the number of species that we would like. For this reason, proper habitat management is essential to ensure the correct aspects for the desired species.

## H.2 Habitat Types on RMTC

Several habitat types are located on RMTC: forest communities, forests edge and right of ways, grasslands, wetlands, and riparian areas of stream and creek beds. Each site should be managed according to the plants and animals currently inhabiting the location and any remaining historical communities. All while paying attention to military mission needs.

The goal is to manage and maintain each area for diverse communities and promote native species. The plan is based on ecosystem management principles. These principles mean that terrestrial community management at RMTC will consider the following factors:

- Military land use needs at RMTC.
- Available forest resources as described in inventories.
- Pre-settlement plant communities as described in the GLO surveys.
- Patterns of natural disturbances include fire, tornadoes, lightning, and windstorms.
- Habitat needs of state and federal listed species and other SOCCs.

- Effects on adjacent land uses.
- Impact on additional resources and concerns such as soil and water quality.

In conjunction with the RMTC-TSM and the EPM, the RMTC NRM and Forest Resource Manager (FRM) will determine goals and objectives by integrating all available biological inventory and environmental monitoring data with military land use requirements. The RMTC-TSM will ensure that the plan supports training site objectives. Terrestrial community management will be integrated with other resource management at RMTC to support training and ecosystem management. Consistent with the military mission at RMTC and sound ecosystem management principles, the terrestrial community management goal is to manage and maintain diverse natural terrestrial communities to promote native flora and fauna and provide recreational opportunities.

### H.2.1 Settlement to Present

Before the ARARNG/DOTM owned RMTC, farmers had cultivated portions of RMTC, and loggers had removed most of the timber. Farmers cleared the floodplains for cropland and pasture. Logging, tillage, fire suppression, cultivation, and pasturing disturbed the natural habitat and altered the plant communities at RMTC.

## H.3 Terrestrial System/Native Plant Communities

A vegetation analysis was conducted with data from 130 transects "distributed within every training area (TA) on the post, except for the small arms range and the impact area." Unfortunately, this vegetation study did not use a methodology that permanently located the study areas so that the results could be accurately compared to later studies. For the first study, transects were every 0.1 miles along roads that bound each TA and were allowed to vary in direction to remain within a general vegetation type. Plots were established at "intervals of 100 meters along each transect," although the sites were informally delimited and variable in size. Within each location, all species observed were recorded (with trees, shrubs, and herbs recorded separately). Each tree over 10 inches in diameter was counted to produce a measure approximating "relative abundance."

With the data from this study and additional information from aerial photos and satellite imagery, an attempt was made to complete a vegetation communities map for RMTC. Foti et al. (1995) noted that remote sensing data indicates that plant communities on RMTC are more complex than were defined in the original study. Future studies should also provide a more refined analysis. The vegetation communities' map is essential for multiple natural resource management programs, especially forestry and fish and wildlife management. Contributions from ongoing field vegetative community surveys are expected to refine the vegetation map.

Short descriptions of the significant plant community types on RMTC are presented in the report by Foti et al. (1995), Foti (1995), and Parsons (2002). A summary of these communities is provided as follows, with some modifications based on 1) personal observations, 2) the wetland report by Halff Associates (1995), and 3) observations by T. Foti (pers. comm., 30 April 1996), and Parsons (2003). The first four communities (listed as follows) characteristically occur in upland regions of the Ouachita Mountains. At the same time, the

moist prairies, lowland woods, and cypress swamps are more characteristic of the Mississippi Valley ecoregion.

### H.3.1 Upland Dry Deciduous Woods

This vegetative association is the most widely found on RMTC. It is characteristic of the upland sites and thin soil of the Boston and Fourche Mountain region. In addition, it is oak-hickory woodland dominated by post oak, blackjack oak, black hickory, and winged elm with a locally variable mixture of shortleaf pine in more open or disturbed sites. In some areas, post oak may dominate the upland community. Other common tree species are juniper, sweetgum, September elm, black oak, southern red oak, wild black cherry, black gum, and persimmon.

Before the 1940-41 construction of RMTC, "the (Cantonment) area was covered with a dense growth of post oak, black oak, jack oak, sweetgum, and wide varieties of hickory" (CQ 1941, p. 8). Sparkleberry, persimmon, winged sumac, smooth sumac, and numerous other species were common in the understory throughout the upland hardwoods.

### H.3.2 Upland Moist Deciduous Woods

White oak and red oak with scattered hickory are characteristic of moist upland sites (especially coves and north slopes). These sites are relatively restricted in an area on RMTC and intergraded in vegetation with the more abundant drier sites. Foti et al. (1995) do not separate dry and moist upland vegetation types. They are separated here to be consistent with the separation of the high ridge savanna and post oak savanna.

### H.3.3 High Ridge, Grass-Dominated Savanna

On the ridge along the crest of Clifton Mountain, the plant community is similar in woody species composition to that of oak-hickory communities on lower dry slopes. Along the ridgetop, individuals of post oak, black hickory, winged elm, and black locust are reduced to a nearly shrub-like habit, producing a dwarf-forest effect. Black gum, honey locust, September elm, and persimmon are also common along the ridge and reduced in stature. As are the typically shrub-like winged sumac, smooth sumac, and red buckeye. Grasses dominate the understory.

Dwarf post oak (*Quercus margarettiae*), sometimes identified as *Quercus stellata* var. *margarettiae*, occurs on the post in a single locality on the western end of Clifton Ridge (34 55'N, 92 22'W). It exists in "several stands beside the road and back toward the edge of the ridge extending for a distance of approximately 200 ft" (letter from D. Culwell to B. Swafford, 25 October 1993). It is considered a rare species in central Arkansas.

Various species can attain standard size immediately off both sides of the ridge of Clifton Mountain. The stunted growth of the individuals on the ridgetop likely results from increased desiccation due to high insolation and constant exposure to wind.

### H.3.4 Pine Woods

Timber stands dominated by shortleaf pine, or in which shortleaf pine is abundant, occur in several sites on the post. Loblolly pine is a recent introduction, but also common. Its increasing abundance in native habitats results from reseeding from trees in the Cantonment Area and plantations attaining reproductive maturity. Loblolly pine is dominant in some areas (Emerick and Thompson 2003).

Pine is prominent among the early successional species in a disturbed area, with few other woody species in competition. Abandoned agricultural pastures and regions may also be dominated by pine in the early stages of their transition toward the typical forest community assemblage for the part. Among these communities are young pine stands developed on recent burn sites. These young stands popping up are most likely due to the abundance of mature pines in the surrounding area. During the construction of the RMTC Cantonment Area, an area of nearly one acre was noted as being "covered with a vigorous growth of medium-sized yellow pine" (shortleaf pine) (CQ 1941, p. 266); this is likely the result of natural reseeding.

The successful establishment of a pine forest in the eastern United States, provided a seed source is available, seems dependent on large-scale disturbance (large blowdowns, fires, clearings from human activity). Historically, frequent, low-intensity fires set by Native Americans maintained pine-dominated communities as a sub climax community on drier sites. Pine regeneration may be evident in mature hardwood forests' natural canopy and gaps. However, pine rarely succeeds in establishing itself as a member of the overstory (Skeen et al. 1993). These observations appear authentic for RMTC, apart from the pine plantings.

In addition to pine, dominant pioneer species on early successional sites of RMTC may include broom sedge, juniper, sweetgum, hackberry, persimmon, and various shrubs. Hardwood species characteristic of the mature regional climax association assume dominant size and coverage positions on disturbed areas not heavily seeded by pine.

The development of a mature, multi-layered, deciduous forest (canopy, sub-canopy, shrubs, and herbs) may be expected after 50 to 60 years of undisturbed growth (Skeen et al. 1993). There are indications that early stages of succession in the more xeric forests of the Ozark region are slower to establish, and attaining a mature structure and composition may require 10 to 30 years longer (Foti pers. comm.; Shugart 1968).

### H.3.5 Post Oak Savanna

Post oak savannas on RMTC are recognized by the occurrence of widely spaced individuals of post oak in a grassland. The grassland is characterized by big and little bluestem grasses, Indiangrass, and other herbaceous species such as wild agave, rattlesnake master, wild hyacinth, and blazing star. It is related in floristic composition to the valley floor prairie but occurs on drier sites. A regular fire regime has historically maintained the open aspect of this community type. Post oak savannas frequently happen within the Small Arms Impact Area (T. Foti, pers. comm.) and Mortar Impact Areas. Throughout the remainder of the installation, these communities are more sporadic and smaller relative to those found in both impact areas.

### H.3.6 Valley Floor Prairie

Large, moist, grassy fields along northern Clinton Road comprise prairie vegetation in various stages of succession. The most prairie-like of these, south of Loop Road, contains the most significant species diversity of all sites on the post. Particularly characteristic at this site are big and little bluestem grasses, Indian grass, and prairie cordgrass. It also contains species of the sunflower family, sedges and rushes, mints, and numerous others. Willow oak, southern red oak, and shortleaf pine are scattered around the edges. Periodic management will be required to prevent it from being overgrown by trees. Without removing the woody species, these areas would transition to lowland deciduous forest-like nearby sites. Fire suppression over the last 50 years had previously allowed the degradation of this prairie site before developing a more robust prescribed fire program.

In central Arkansas, this lowland prairie is the most atypical community type on RMTC and the most significant in terms of its conservation. This site at RMTC and similar ones on Little Rock Air Force Base are the most extensive and least disturbed representatives of this community remaining within Arkansas. They offer the best opportunity for restoration (T. Foti, pers. comm.).

Naturally, open sites on RMTC can accommodate various types of military training. The current use of the lowland prairie site as a helicopter landing area should be monitored. The construction of openings within more abundant types of vegetation should be considered.

### H.3.7 Lowland Deciduous Forests

At RMTC, lowland deciduous forests occur in valleys along most creeks and overflow bottoms around Grassy Lake and Tupelo Gum Pond. These forests are dominated by white oak, willow oak, green ash, southern red oak, black oak, red maple, black cherry, black hickory, mockernut hickory, black gum, and sweetgum. Characteristic shrubs include deciduous holly, dogwood, and parsley hawthorn.

A variation of this habitat type with reduced diversity occurs in temporarily flooded flats along streams. Such communities have been referred to as "willow oak flats" because of the dominance of willow oak. Water oak, overcup oak, winged elm, sweetgum, and other species also vary in abundance. Water oak may also be the dominant species in these lowland forests or creekside flats.

### H.3.8 Cypress Swamps

Bald cypress, tupelo gum, and water elm are the characteristic woody dominants associated with a set of shrubs and herbaceous species that require a hydric habitat. Cypress swamps occur primarily along the mostly inundated margins of Grassy Lake, Tupelo Gum Pond, and several more significant creeks. Water stands at the surface or near it for several months of the year at these sites.

### H.3.9 Lake and Creek Edges

A characteristic association of species occurs along the margins of lakes and creeks, such as Hunter Lake, Mile Creek, and Spring Creek. Typical woody species include black willow, buttonbush, and alder. Sycamore, red elm, honey locust, red maple, black walnut, willow oak,

and water oak often occur further back from the water's edge. Typical herbaceous species include cattail, soft rush, hydro leak, spike rush, Scirpus, parrot's feather, and others.

### H.3.10 Groundwater Seep

This community was described along Spring Creek in the east-central area of the Small Arms Impact Area. It is characterized by lizard's tail, jewelweed, false nettle, sensitive fern, tall dayflower, and Virginia knotweed. Additional seeps have also been discovered in TA 2 but have yet to be sufficiently described and delineated.

### H.3.11 Cantonment Area

The lawns, parks, roadsides, vacant lots, and other weedy sites of the Cantonment Area hold several native tree species. Oaks are the primary species from native vegetative communities, naturally regenerated or replanted. However, other vegetation (woody and herbaceous) has primarily been planted. Various herbaceous species typical of urban areas over most Eastern US occur in lawns and associated areas.

Over time these habitats have become cluttered and overtaken by invasive and aggressive vegetation. As a result, the diversity of wildlife is suffering, and there is a need for effective management in multiple stands across the installation.

## H.4 Methods for Managing and Maintaining Habitat

Different methods to manage habitat depend on the outcome you want to achieve and what you are trying to control.

- Controlling noxious weeds and non-native invasive plants

  All habitat types will be monitored for invasive plants. It will be attempted to eradicate these plants before they become a significant problem, causing competition with native plants. (See Appendix M for more information on managing invasive species.) hack and squirt methods, in addition to prescribed fire, are the typical methods RMTC uses to control invasives.

- Forest thinning

  Forested habitats will be surveyed and thinned to a healthy Basal area. As funds allow, it is planned to thin a set number of acres each year to continue a project already taking place on RMTC. This project enables the opening of the forest floor, making room for native grasses and shrubs, and reduces competition between trees for resources. (See appendix I for information on thinning and management of pine stands and timber stands on RMTC)

- Prescribed fire

Prescribed fire is a method of management used for most habitat types on RMTC. (See Appendix J for more information on RMTC's wildland fire plan.) this method benefits plants and animals on the installation and enhances training lands, making it more suitable for military training and hazard reduction.

- Soil retention

  Methods to prevent erosion will be used whenever possible, especially on-stream banks and riparian areas.

- Preserving snags

  Snags will be preserved, when possible, when not a hazard or does not interfere with military training. Many wildlife species, like the Northern long-eared bat, depend on snags for shelter and roosting.

- Establishing and preserving permanent vegetation for wildlife (native grasses and forbs)

  Invasive nonbeneficial plants will be replaced with native plants, grasses, and forbs to help restore the land and benefit wildlife. While fires help reduce fuel hazards, it opens the seed bank in grasslands and allows more diversity in native vegetation.

- Forest edge improvement

  Many wildlife species nest, feed, and travel along the forest's edge. Management of this area will include invasive weed and plant control, fuel reduction, and establishment of native forbs, grasses, and plants.

- Herbaceous forest openings

  This method is a beneficial outcome of forest thinning and provides areas for grazing wildlife, ground-nesting birds, and many species of pollinators.

### H.4.1 Managing for Northern Bobwhite Quail Habitat

Northern Bobwhite quail populations have suffered significant declines across their natural range. Several organizations are working toward restoring these populations and their habitat. Partners in Flight and the NBCI (Northern Bobwhite Conservation Initiative) are among some of these organizations. Because they are non-migratory, bobwhite requires open native grasslands in spring and summer for nesting and brood-rearing that are in close range to shrubby patches for shelter to keep shaded in summer and provide cover from ice and snow in the winter.
Managing quail habitat benefits many other species, including wild turkeys and a variety of songbirds. This type of habitat will be worked in the plan to preserve and restore. As funds allow projects to manage for this species will be added to the program.

### H.4.2 Managing for White-tail Deer Habitat

White-tailed deer are an abundant species on RMTC. Their populations are monitored through hunting programs on RMTC, and they are trying to keep population levels balanced and healthy. (See Appendix N for details on the hunting program and white-tailed deer.) In the past, RMTC staff have planted various food plots that help provide browse for deer. Moving forward, managing this habitat will include opening the woodland canopy and understory to give light and space for native grasses and forbs that provide nutrition for deer while maintaining areas of cover for shelter.

## H.5 Current Habitat Projects

There is currently a native habitat restoration project in progress on RMTC by Harbor Environmental INC. The project aims to improve wildlife habitat by restoring native habitats to pre-European settlement conditions. Historic prairies, savannas, and open woodlands have succeeded in cluttered and overgrown areas, supporting less biodiversity, increased invasive plant growth, and reduced ecosystem health. Fire suppression and other anthropogenic factors have led to fragmented and drastically altered landscapes that have caused numerous environmental impacts. For FY 22 project, a goal of 500 acres was set, and it is planned to continue restoring 500 acres per year, depending on the availability of funding.

The goal of this restoration project is to restore habitat to its native condition, as well as; increase biodiversity and ecosystem health and resiliency, reduce fuel loads and connectivity, and improve accessibility and versatility of training lands.

This habitat restoration project includes 500 acres to be restored in FY 22. The 500 acres are divided into smaller plots between three training areas, with 100 acres in TA 7, 260 acres in TA 10, and 140 acres in TA 11(figure H.5-1). The project is being carried out in multiple steps beginning with a vegetation survey in each stand, followed by a stand-specific management prescription, and finally, a combination of chemical and mechanical methods to implement the prescription.

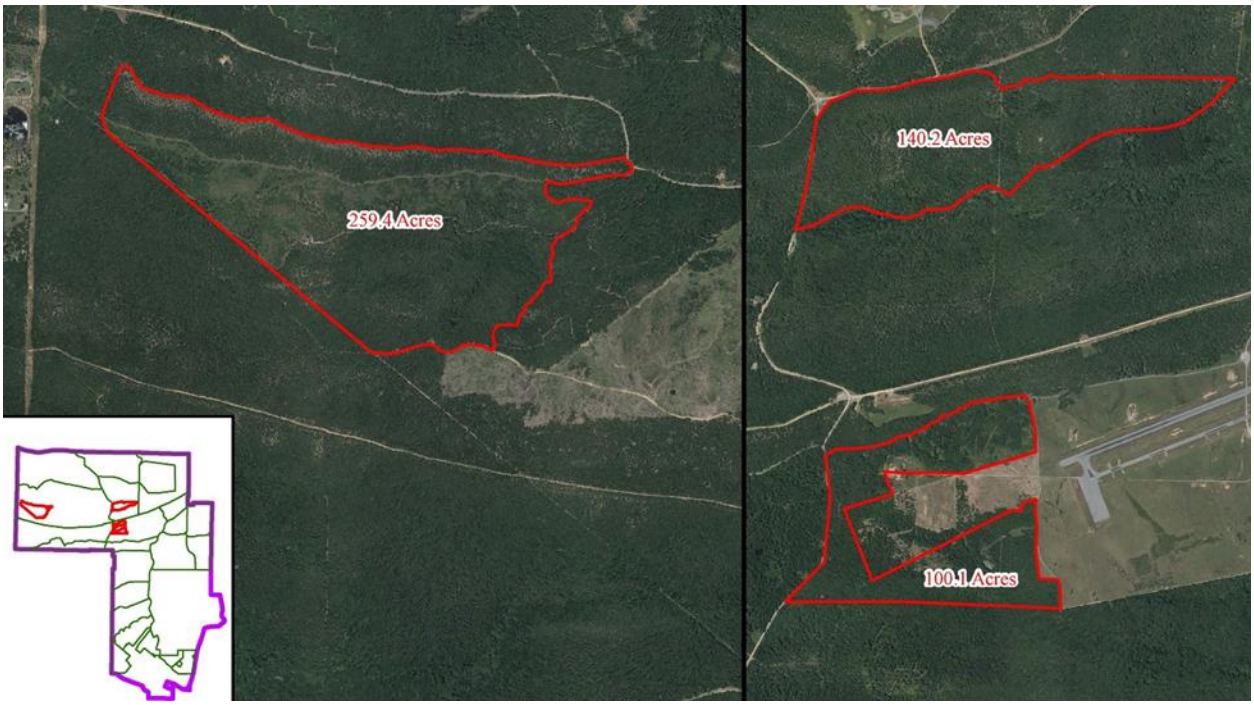



Figure H.5-1 Habitat Restoration Project area maps. Clockwise from left TA 10, TA 11, TA 7.)

# Appendix I: Forest Resource Management Plan

## I.1 Forest Ecosystem Management

The Forest Resources Management Plan (FRMP) took effect at Robinson Maneuver Training Center (RMTC) in the year 2001 and will remain on file at the RMTC Deputy Chief of Staff Engineering-Environmental (DCSEN-E) office. The harvest schedule and other planning activities extend for a 25-year period from 2001 to 2026. The 25-year horizon will be broken into five 5-year management periods, which are appropriate to meet constantly changing circumstances, objectives, and policies. The FRMP will be rolled into the INRMP to streamline and centralize the planning efforts at RMTC. Therefore this INRMP update covers forest management planning from 2017 through 2022 and will be updated again at the five-year revision period. The DCSEN-E Forestry Division will maintain detailed maps and information on individual harvests.

At the beginning of each calendar year, the Forestry Division staff will prepare annual reviews of past accomplishments and plans for the coming year. These reviews and plans will be discussed with the RMTC Forestry Management Committee and affected RMTC entities to maintain coordination among all field operations and environmental activities. Thereafter, the Forestry Division will inform DCSEN-E and the RMTC Operations Offices if changes are necessary in the annual plans. The Forestry Division will also be responsible for preparing general 5-year plan revisions at the beginning of each 5-year period.

## I.2 Timber Management

The forests of RMTC are divided into management areas according to the existing training area boundaries demarcated by the Arkansas National Guard. The 27 training area boundaries are divided primarily on the basis of geographic features (roads, ridges, drainages, etc.). The individual stands within the training area boundaries are designated by the training area number, then a consecutively numbered stand number. The GPS code corresponds to stand classification codes used by the U.S. Forest Service and the Society of American Foresters. For example, the designation TA16-02-WHO represents a White Oak/Red Oak/Hickory stand type in the second stand in Training Area 16. To allow for clear communication with forestry contractors and timber buyers, the areas where a forestry activity is conducted will be dually designated using the Government Land Office (GLO) system for legally describing land (i.e. NE ¼, NW ¼, Section 12, Township 4 North, andRange 12 West).

DCSEN-E Forestry Division is performing a complete forest inventory of RMTC as funds become available. A stand type map has been developed using current aerial photos and other spatial data. The stand type map is in a Geographic Information System (GIS) format that will enable computer assisted timber management.

Timber management at RMTC will primarily be concentrated on improving the overall health of forest ecosystems at RMTC. More intensive silvicultural activities will be practiced on the natural pine component and pine plantations. The existing natural pine stands, and pine plantations will be selectively thinned to improve the overall vigor and health of the trees. The existing natural pine stands will be regenerated at the end of the stand rotation. The hardwood stand acreage exceeds pine stand acreage 30 to 1. Accordingly, the goal is to increase the

acreage of pine to 5,000 total acres to achieve a better balance. Planting pine will be avoided in the very poorly drained (wetlands) for water protection, dry soils, and the soils with low fertility. RMTC has a comprehensive soils map in GIS format that was completed in 2006. The soils map will be used extensively to select fertile areas to plant for timber production. Open fields that are not in heavily used military training areas will be planted first. After the open fields are planted, other fertile areas will be harvested and planted with pine. Hardwood stands will be selectively thinned as needed to maintain the health of the stands. Oak trees will be planted in fertile bottomland/ upland areas that are suitable for hardwoods.

A forestry committee was formed at RMTC to provide guidance on forestry matters. The committee is composed of RMTC personnel including the Deputy Adjutant General (chairman), the Director of State Resources, the Range Control Officer, the Training Site Manager, the Environmental Section Chief, the Deputy Environmental Section Chief, and the Forester. Honorary committee members include representatives from the Arkansas Forestry Commission and the Arkansas Game & Fish Commission. The committee voted to allocate 80% of timber revenue to support the forestry program. The remaining 20% is designated for discretionary use to fund projects needed at RMTC.

### I.3.1 Desired Future Conditions

The general goals and objectives of this plan will be based on current stand structure and the comprehensive forest inventory. The comprehensive forest inventory will be completed as funding permits. Intermediate inventories will be conducted as necessary to facilitate planning. A view of the RMTC forest projected 25 years into the future would show a landscape under ecosystem management, with forest cover types appropriate to natural habitat conditions. All river, lake, and creek systems will be surrounded by functioning riparian zones, continuous throughout a watershed and connected to other watersheds by mixed species corridors. Best Management Practices (BMP) zones will be a major component of this plan for meeting the objective of soil conservation and watershed protection (Appendix C).

Pinelands and better-drained uplands will be a mosaic of mature natural pine stands, mixed hardwood stands, and pine plantations. The bottomlands will consist of mixed hardwood stands spotted with oak plantations. Oaks will be planted to reforest open areas in the bottomlands. In order to enhance aesthetics, all plantation boundaries will be nonlinear to fit the landscape (not block shaped). Xeric/poor soils will include shortleaf pine stands, upland oak stands, and mixed hardwood stands critical for wildlife and rare species habitat. Currently, these soils are occupied predominantly by mixed hardwood stands. However, in the event of natural disasters (such as fires or tornadoes), these habitats will be reforested with upland oak or pine. The inundated soils will primarily be occupied by bald cypress and water tupelo. Since soils inundated by water present severe operational hurdles, the extremely wet areas will be left undisturbed, and the natural progress of stand succession will be allowed to run its course. Fire will be regularly used throughout the RMTC to reduce fuels and control vegetation (Appendix J contains details on RMTC fire management). The result is that the majority of RMTC forestland will be composed of intermediate to mature trees with an open understory.

Complete harvesting may be employed in mature or under stocked pine stands and will be followed by silvicultural operations to ensure expeditious reforestation of each site. Natural regeneration or artificial regeneration will be used in mature natural pine stands. Natural regeneration will be utilized within hardwood stands stocked with the desirable hardwood species. Areas that are damaged as a result of military training, wildfire, disease, or high winds will be reforested. Other areas that have inadequate stocking of merchantable trees, such as overgrown fields, will also be reforested.

I.3.2 General Scenarios by Soil Conditions and Timber Type

The areas normally inundated with water (wetlands) will only be managed for protection of water resources and wildlife that occupies those ecosystems. At the other end of the soil moisture gradient, xeric sites will also be managed to meet only specific wildlife and military objectives. Sites with poor soil fertility will be managed similarly to xeric sites. In the wetlands, xeric, poor soil fertility sites silvicultural activities will be limited to meeting only wildlife and military objectives. Prescribed fires will be conducted in xeric areas on a 5 or 7-year cycle as per the RMTC Fire Management Plan to reduce organic fuel loads. In the event of natural disasters (such as fires or tornadoes), the xeric habitats will be reforested with upland oaks or shortleaf pine.

For reforestation of xeric and poor soil fertility sites after a natural disaster, fire, herbicide or mechanical operations may be used for site preparation if needed. Bare root seedlings will be planted during January-March time frame using hand or machine planting techniques. Harvests in the reforested sites will only be conducted to maintain stand vigor and protect the stands from disease. The harvests will supplement revenue from timber management conducted on sites that fall between the soil drainage extremes.

On all other fertile sites that fall between the two soils drainage extremes, forest management will follow two main strategies. Stands with desirable merchantable species that are predominately of natural origin will be maintained with natural or artificial regeneration. Open sites or sites that can be improved with more merchantable species will be harvested (if applicable) and planted. Whether stands are natural or planted, the sites with hardwoods will be gradually converted to uneven-age management and sites with pine will be managed using even- age techniques. Uneven-age management will have cutting cycles of approximately 20 years. Stand density will be maintained at basal areas between 40 and 70 square feet per acre. Even- age management will have a rotation length of 30 years or less (depending on soil fertility and silvicultural intensity). Stand density after intermediate selective harvests will be between 70 and 90 square feet per acre depending on site quality with the better quality sites carrying a higher basal area (square feet per acre). Selective harvests will be timed to maximize growth. Even-age management pine plantations may be completely harvested and planted with genetically improved seedlings at the end of the rotation. In all other stands, natural regeneration techniques may be used. Prescribed fires will be used on 5 or 7-year cycles depending on the RMTC fire management schedule or as necessary for specific management objectives. Uneven- age stands, with regeneration that will be merchantable in the future, will be protected from fire until the trees can withstand a low intensity prescribed fire.

Only trees native to RMTC will be planted. Shortleaf pine will be the species of choice in most plantations because of rapid growth rates. In areas suitable for planting hardwoods red oaks (particular species dependent upon site conditions) will be the species of choice because of mast production and merchantable value. On xeric sites and sites with poor soils, shortleaf pine and site suitable oaks will be favored for planting because of heartiness and disease resistance. Silvicultural operations will include, on a site-specific basis: complete harvesting, transition harvesting, aerial/ground herbicide site prep, shearing, raking, prescribed fire, plowing, bedding, banded ground herbicide applications, machine or hand planting, aerial/ground herbicide release from competition, early/mid-rotation fertilization, and selective harvests. These operations are practiced in Arkansas and are cost-effective with proper prescriptions. Complete harvesting results in more rapid plantation establishment and early growth than other silvicultural regeneration methods. This rapid growth and higher yield, in turn, allows the desired level of timber production to be accomplished on less area. Natural stands can therefore occupy a larger area, which will boost public confidence.

I.4 Plantation Silviculture

Plantations are a widely accepted forest management option for revenue generation, especially when local markets are characterized by high demands for logs and pulpwood. Current technologies for plantation silviculture in the southern United States have been widely studied and well documented to their contribution to plantation success, sustainability, and cost effectiveness. Many plantations in the South are in the third or fourth generation of plantings since the original forests were cleared. Key components of this silviculture technology include: genetically improved planting stock, nursery culture of robust seedlings, site preparation that focuses on improving site constraints rather than creating additional problems and cultural treatments that improve growth in established stands.

Herbicide and pesticide usage at RTMC will be kept to a minimum. Herbicide will be used in some cases, such as cleared land. Cleared land is capable of rapid resprouting of herbaceous and woody vegetation. Repeated studies have demonstrated that controlling this vegetation with aerial/ground applications of herbicide will decrease stand rotation ages by three to five years, or produce larger trees at a given rotation age, and will usually result in more complete stand stocking through better survival than if not controlled. The herbicides used for this purpose (hexazinone, glyphosate, imazapyr, sulfometuron methyl, triclopyr) act in plants on metabolic pathways that are specific to plants and not animals, and have much lower toxicity than herbicides used in the past. Their effects on the environment and vegetation have been thoroughly studied and are documented in an Environmental Impact Statement concerning their use in forestry in the southern United States (USDA Forest Service, Southern Region, 1989). Herbicides will probably be used no more than two times during a 30-year plantation rotation.

The early growth response promoted by good site preparation is also enhanced by planting genetically improved seedlings with large stem diameters and fibrous root systems. The genetically improved seedlings offer additional benefits for long rotation trees that will be sold as saw timber. One of the first traits subjected to genetic improvement was stem straightness, an important factor in the value of trees sold for lumber, veneer, or poles. In addition to straightness, genetic improvements also include disease resistance and growth rates.

In plantations grown with long rotations for the production of high value solid wood products, mid-rotation cultural treatments will increase growth rates and allow intermediate generation of revenue. Thinning dense stands will not only produce saleable timber, but will concentrate nutrients/water on residual trees. The growing space for residual trees will also be increased. Subsequent prescribed burning and fertilization will enhance foliage and wood production. Combinations of nitrogen and phosphorus fertilizers have proven to be the best supplement to early- and mid-rotation pine stands. Since fertilizer applications will be outside SMZ's there should not be any negative effects on water basins. On the other hand, the increased growth of understory vegetation that follows fertilization should have a number of positive effects on forage availability and quality for wildlife.

I.5 Effects of Forest Management

Forest management has been broken down into 24 activities that impact natural resources. These are divided into four major categories: harvesting, site preparation, fire, and fence lines/firebreaks.

Harvesting- Potential for soil erosion is always associated with harvesting activities, but can be kept to a minimum provided that slopes and stream areas are avoided, as described in Best Management Practices Guidelines for Silviculture (Arkansas Forestry Commission). Harvesting particular areas may cause changes in species composition and density that affect other species, and will be examined on a site-specific basis as it applies to the overall landscape. Management will be by selective harvesting and complete harvesting. Complete harvesting would be an appropriate harvest method when stands have surpassed maturity and are in decline as well as when stands are under stocked with site specific appropriate species.

Site Preparation- Soil erosion is also associated with site preparation and planting on slopes and stream areas. These areas will be avoided as described in Best Management Practices Guidelines for Silviculture (Arkansas Forestry Commission). Changes in species composition do occur where mechanical site preparation is practiced, and may occur with planting and fertilization, therefore, the overall effect of other species in the landscape will be considered when selecting site preparation methods.

Prescribed Fire- Prescribed burning will increase diversity and species dominance according to frequency and season of the fire. Fire also provides a more open understory that benefits training activities.

Fence Lines and Firebreaks- Disking and mowing fence lines may increase diversity and provide wildlife habitat if properly managed. The timing and depth of cut should be correlated with needs of affected species. Disking is utilized mostly on firebreaks and other limited activities and/or training needs and is not typically a favored way of managing for wildlife although may be used more as research shows it to be beneficial.

Firebreaks, specifically fire plow lines, have been used aggressively and can lead to degradation of the landscape, where natural firebreaks such as creeks and wetlands occur. Wetland firebreaks cause an unnatural, abrupt edge effect as well as altering hydrology and encouraging exotic and less desirable species encroachment. When fire plow lines must be used, re-work harrowing will lessen the impact to the landscape. Fires should not be routinely suppressed in all wetlands. Rather they should be allowed to intrude naturally into those

wetlands lacking muck, peat, or other organic soils, and suppressed in those that have these organic deposits. Fire can consume dry organic soils, and the fire may smolder for months causing a smoke management problem in violation of the Clean Air Act.

## I.6 Guidelines for Forest Management

- Implement Best Management Practices Guidelines for Silviculture (Arkansas Forestry Commission) during all forestry operations.
- Complete harvests in individual stands will be limited to a maximum size of 100 acres in almost all situations. Where stands (both individual and composite) are larger than 100 acres, they will be either subdivided into smaller cutting units by leaving residual buffer strips between cutting units, or they will be split into smaller units for harvesting, with separate units cut at the beginning and end of the designated 5-year period.
- Forest management will be designed to enhance training. Conflicts between forestry activities and training activities will be prevented by yearly coordination to properly integrate both activities. If conflicts cannot be resolved, training activities will take precedence.
- Create connections or linkages between isolated wooded areas using riparian corridors, shelterbelts, and planting trees in open areas surrounding forest patches.
- Minimize permanent clearings within existing large forest patches, and locate roads where they will not disconnect adjacent tracts of forest or impact riparian zones and streams.
- Integration of forestry practices to improve training, recreation, and hunting activities on RMTC.

# Appendix J: Wildland Fire*

*Appendix will be maintained until IWFMP is completed

## J.1. Fire Management Purpose

Fire Management is an essential element of the mission of Robinson Maneuver Training Center (RMTC). Managing fire is vital to control vegetation and the build-up of fuels to prevent the threat of wildfire. There are multiple goals we plan to achieve when managing fire:

- Habitat Management
- Fuel Reduction
- Invasive Species Control
- Timber Management
- Pest Control
- Safe Training Areas

Prescribed fire opens forested lands to help restore wildlife habitat and allows more room and less competition for native vegetation, and returns the land to historic conditions. It burns out old, accumulated fuels reducing the chance of uncontrolled wildfires and allowing for a safer environment for military training without the threat of wildfire.
If left undisturbed, areas throughout RMTC will accumulate fuel. Fuels include grass, leaves, brush, and trees. After fuels have accumulated, a hazardous condition exists during dry months. Fuels can be ignited accidentally or purposely set by arsonists. Most wildfires at RMTC are ignited because of routine military training operations. The two tools for preventing wildfires are prescribed fires and fire lines. While the primary objective is to support military training, prescribed fires should be scheduled whenever feasible to protect and enhance natural/cultural resources.

The purpose of this document is to guide the prevention/control of wildfire and prescribed fires to support the mission of Robinson Maneuver Training Center. The organizational structure and procedures will be discussed in detail.

## J.2. Organization and Responsibilities

The RMTC Forestry Management Board was organized to oversee the RMTC Forestry Program, set forestry goals, and determine the overall values that must be met for a successful program on RMTC. As a part of that oversight, the board will administer the RMTC fire management program. The board consists of representatives from the Office of The Adjutant General, Robinson Maneuver Training Center - Manager (RMTC-TSM), Range Control, and Deputy Chief of Staff-Environmental, with the Arkansas Game & Fish Commission and Arkansas Forestry Commission serving as honorary members. The board's purpose in administering the RMTC fire management program will be to formulate procedures/policies for wildfire prevention/control & prescribed fires. The board will then schedule activities. Meetings will be held twice annually to coordinate/plan wildfire prevention, prescribed fire activity, and other forestry activities. When fire management is to be discussed, the RMTC Fire Department will also be invited. The individual roles and responsibilities concerning fire management are given below.

The Office of The Adjutant General representative is the Board meetings' chairman. The Robinson Maneuver Training Center – Training Site Manager (RMTC-TSM) is the overall authority for fire management. RMTC-TSM will ensure that Range Control and the Installation Support Unit maintain or establish permanent (strategic) fire lines around and within RMTC. RMTC-TSM will approve prescribed fire burn plans to ensure that the appropriate personnel has adequately reviewed the agenda. Range Control and DCSEN-E are responsible for executing prescribed fires and fire lines. Before prescribed fires, Range Control and DCSEN-E will ensure that fire lines are maintained or established around the area to be burned. The RMTC Fire Department is responsible for wildfire control and arson investigation. Following RMTC Post Regulation 420-90, the RMTC Fire Department has been delegated the authority to determine when conditions are safe to conduct a prescribed fire. Once RMTC-OPS approves the prescribed fire burn plan, RMTC Fire Department must be contacted for approval before ignition. The Deputy Chief of Staff-Environmental (DCSEN-E) is the recorder for the Board meetings. DCSEN-E is responsible for fire management plans. The Arkansas Game and Fish Commission guide wildlife issues about fire management. The Arkansas Forestry Commission is responsible for advising on forestry issues on fire management. The above-board members with operational responsibilities must secure/maintain the equipment necessary to perform the task. DCSEN-E will supplement with available equipment and manpower.

## J.3. Prescribed Fire

### J.3.1 Purpose

Prescribed fire reduces the fuel that can potentially burn and create a wildfire. If areas are burned in a controlled situation before the dry months, there will be little fuel available for wildfires. These prescribed fires can be scheduled regularly to control fuel build-up. Prescribed fire has many other benefits that are the primary directive for DCSEN-E. Vegetation that has grown up in training operations areas makes maneuvers and bivouacs difficult or impossible. Prescribed fire would eliminate or reduce unwanted vegetation. Prescribed fires significantly reduce ticks and other pests. Trees grow faster when competing vegetation is burned. The nutrients and sunlight are concentrated on the trees because they are not shared with competing vegetation. Burning allows new foliage to be initiated. The new vegetation provides essential food and shelter for many wildlife species.

### J.3.2 Strategy

High-risk areas are defined as areas with a large amount of fuel build-up or areas with the most significant amount of activity that causes ignition. High-risk areas must be burned first. Lower-risk areas may be burned after the high-risk areas. Areas with a forest or wildlife management objective or specific training need will be burned after the high-risk areas are burned.

### J.3.3 Fuels

Fuels are comprised of various components of vegetation, live and dead, that occur on a site. The collective properties of different fuel types have become known as fuel models and can be organized into four groups: grass, shrub, timber, and logging slash. See Anderson (1982) for a review of the 13 fuel models that predict fire behavior. The fuel models that

best describe the fuels at RMTC are 1 (short grass), 2 (timber-grass and understory), 6 (dormant brush), 8 (closed timber litter), 9 (hardwood litter), and 11 (light logging slash). The training ranges and open, grass-dominated areas are best described by fuel models 1 and 2. Overgrown fields that are dominated by native mixed shrubland are best described by fuel model 6. The mature pine-dominated woodlands are best described by fuel model 8, whereas the Pine Plantations, Oak-Gum, and Oak-Hickory-dominated woodlands are best described by fuel model 9. The selectively thinned pine stands are represented by model 11. Most of the prescribed burning will take place in fuel models 1, 2, and 9. See Section 3.7 for general prescription guidelines on each fuel model.

### J.3.4 Fire Windows

Prescribed fires should be done during specific time frames to protect wildlife while rearing their young. The windows for conducting prescribed fires are from the middle of July to the middle of April. Prescribed fires should not be conducted from the middle of April until the middle of July to protect wildlife during nesting activity. More growing season burns would be beneficial to the installation, and would take place during the months of July through October. Due to varying training and wildlife requirements, prescribed burns may be conducted outside the above windows. However, effort should be made to adhere to the windows.

### J.3.5 Situations to Avoid

Prescribed fires will not be conducted when unfavorable fire or smoke conditions exist. Unfavorable fire conditions are defined as a relative humidity < 25%, wind speed at the surface > 15 mph, and/or a probability of ignition > 80% (see NWCG Fireline Handbook Attachment B Fire Behavior for the probability of ignition calculations). Unfavorable smoke conditions are defined as a Smoke Category Day of 1 or 5. The Smoke Category Day is an Arkansas Forestry Commission (AFC) category system. Contact the National weather service for category day and other fire weather forecasts. Refer to Arkansas Voluntary Smoke Management Guidelines for an explanation of the Smoke Category Day. Generally, prescribed fires are not to be conducted when the Faulkner or Pulaski County judges have declared a burn ban. No training activity with fire ignition potentials, such as mortar firing or tracer rounds, shall be conducted during a burn ban. Even though an area may have been recently burned to reduce fuels, conducting training activity known to cause ignition during a burn ban is dangerous. Prescribed fires should not be conducted in areas with juvenile pine plantations/hardwood regeneration and trees marked for a timber sale, sites of cultural significance, or rare species (Margaretta Oak trees located on the south aspect of Clifton Mountain in TA-8).

### J.3.6 Planning and Preparation

A qualified burn boss will be responsible for conducting prescribed fires. The burn boss will be an employee of DCSEN-E and should be certified as a burn boss either by the Arkansas Department of Agriculture, Forestry Division, or another appropriate agency. At least three personnel should be qualified as burn bosses. This will provide backup in case of turnover or illness and allow others to check burn plans. The burn boss will determine if conditions are acceptable for burning and conduct the prescribed burn according to the guidelines in Attachment A. Prescribed fires may also be completed by the Arkansas Forestry

Commission, Arkansas Game & Fish, or other qualified contractors. All prescribed fires will be conducted according to the guidelines in this document.

The Forestry Management Board will approve or schedule prescribed fires. In some cases, fires will be proposed for areas not covered in the general fire schedule (see Section 3.8). The proponent will present the fire location and objective to the committee. Once an area is scheduled for prescribed fire, the burn boss is responsible for carrying out the scheduled fires. Suppose the fire was scheduled involving a proponent. In that case, the proponent must ensure that the burn boss has the necessary information to execute the fire and that the fire is executed by monitoring the progress. The burn boss will prepare a written prescribed fire burn plan for each fire executed (see Attachment A). The burn plan will be reviewed by the proponent (if there is one), DCSEN-E, RMTC Installation Wildland Fire Manager, the RMTC Fire Department, the Range Control Officer, and RMTC-OPS. RMTC-TSM will make final approval. Reviews are necessary to ensure all involved are aware of the details of the fire to be executed. When the burn plan is circulated, two weeks will be allowed for review and comments. Reviewed burn plans will be given to RMTC-TSM for final approval. Following RMTC Post Regulation 420-90, the RMTC Fire Department has been delegated the authority to determine when conditions are safe to conduct a prescribed fire. Once RMTC-TSM has approved the prescribed fire burn plan, RMTC Fire Department must be contacted for approval before ignition.

Preparation must be made well in advance of the fire. Fire lines must be maintained/established around the area to be burned. Advanced preparation will allow the prescribed fire to be conducted when the weather conditions are suitable. The burn boss will monitor weather conditions and forecasts one week before the burn window to anticipate when the prescribed fire can be conducted. The burn boss will contact Range Control before the prescribed fire to ensure the fire does not conflict with training events. Usually, the burn boss will know several days to a week in advance when conditions will be suitable. The burn boss and crews should be given flexibility in their work schedule to permit them to cease other planned activities and conduct the prescribed fire when the conditions present the opportunity. If a prescribed fire is attempted during unfavorable conditions, the fire will be ineffective or hazardous.

### J.3.7 General Prescription Guidelines

The following can be used for general guidelines for burning at RMTC. These guidelines are intended to assist in preparing prescriptions and burn plans for individual training areas. Factors including training objectives, forest/wildlife management objectives, fuel load, smoke management constraints, and proximity of neighbors will dictate actual burn prescriptions for each training area.

| Parameters | 1&2 | 6 | 8&9 | 11 |
|---|---|---|---|---|
| Wind Direction | Any | Any | Any | Any |
| Effective Windspeed | 2-10 mph | 2-8 mph | 2-10 mph | 2-10 mph |
| 1-hour fuel moisture | 6-16% | 6-16% | 6-16% | 6-16% |
| 10-hour fuel moisture | N/A | 8-20% | 8-20% | 8-20% |
| 100-hour fuel moisture | N/A | >40% | >40% | >40% |
| Live fuel moisture | N/A | N/A | N/A | N/A |
| Atmospheric mixing height | >1,700 ft. | >1,700 ft. | >1,700 ft. | >1,700 ft. |
| Air temperature | 15-90° F | 15-90° F | 15-90° F | 15-90° F |
| Relative humidity | 20-55% | 20-55% | 20-55% | 20-55% |
| Days since rain | >2 | >2 | >2 | >2 |

| Acceptable Fire Behavior: | 1 & 2 | 6 | 8 & 9 | 11 |
|---|---|---|---|---|
| Max. head fire flame length | 6 ft. | 6 ft. | 4 ft. | 7 ft. |
| Min. head fire flame length | 2 ft. | 1 ft. | 0.5 ft. | 0.5 ft. |
| Max. backfire flame length | 2 ft. | 2 ft. | 1 ft. | 1 ft. |
| Min. backfire flame length | 0.5 ft. | 1 ft. | 0.5 ft. | 0.5 ft. |
| Max. headfire rate of spread | 135'/min. | 45'/min. | 30'/min. | 35'/min. |
| Min. headfire rate of spread | 16'/min. | 2'/min. | 1'/min. | 1'/min. |
| Max. backfire rate of spread | 4'/min. | 3'/min. | 1'/min. | 1'/min. |
| Min. backfire rate of spread | 1'/min. | <1'/min. | <1'/min | <1'/min. |
| Max. scorch height | N/A | 2 ft. | 4 ft. | 7 ft |

Table J.3.7-1. Fuel Models

J.3.8 Schedule

The RMTC Forestry Management Board will meet twice each year to schedule prescribed fires for the next window that follows the meeting. When the committee meets, the schedule will be made for the following prescribed fire window. The previous fire activity, equipment/manpower status, upcoming training/forestry/wildlife events, and fires to be executed in the window immediately following the meeting will be discussed. The schedule will be included with the fire management plan as an attachment.

The Mortar Impact Area, the Demo Range, & Adjacent Area (700 acres) will be burned yearly if fuel loading carries the fire. If fuels permit, the firing ranges in the Small Arms Impact Area will be burned annually. The areas immediately surrounding firing points can be burned as use requires. The remaining training areas will be burned on a five-year rotation. Prescribed fires for forestry and wildlife purposes will be scheduled based on specific objectives and will not necessarily be at regular intervals.

J.3.9 Smoke Management

Any populated or thoroughfare area within ½ mile of a burn unit (either downwind or down drainage) are critical smoke-sensitive area (Table J.3.9-1). Burning in the Small Arms Impact Area – Interior could cause smoke to accumulate in the Miles and Woodruff Creek drainages. Where the creeks cross Batesville-Pike are likely to have smoke obscuring visibility in the early morning, the day after the burn. When burning TA-4, smoke could

accumulate in the Winifred Creek drainage and irritate people in the nearby housing development. When burning in TA-2 & 3, smoke may settle in the Newton Creek drainage, potentially inundating the Oak Grove community.

When burning within ½ mile of the critical smoke-sensitive areas, do not conduct a burn when the areas are directly downwind of the burn. Burn when the lifting (mixing height) is more significant than 1,700 feet and the Smoke Category Day is 3 or 4. Visibility on roads should be kept to California Highway Patrol Minimum Acceptable Visibility (MAV; used by the Nature Conservancy). The MAV for city/community roads is 535 feet during the day or 1,070 feet at night. The MAV for Highway 89 and Batesville-Pike Road would be 800 feet in the daytime or 1,600 feet at night. A crew member should be available to check major roads for smoke.

While participating in prescribed burns, crew members are exposed to several toxins in smoke, such as carbon monoxide, total suspended particulates, aldehydes, and benzene. The level of exposure varies, depending on the crew member's position on the burn, the degree of physical exertion, the type and amount of fuel burning, the type and amount of fuel burning, and weather conditions. Symptoms of overexposure to one or more of these compounds include Headaches, nausea, vomiting, impaired judgment, slowed reaction time, and irritation of the eyes, nose, or throat. Crew members who experience symptoms of overexposure to smoke should inform the burn boss immediately. The burn boss will assist the crew member in getting out of that position on the fire line and getting them first aid if needed.

| Smoke Sensitive Area | Direction | Distance* (miles) |
|---|---|---|
| Conway | Northwest | 7.5 |
| Gold Creek Community | Northwest | 3.5 |
| Highway 89 / Community | North | .25 |
| Batesville Pike / Community | East | .25 |
| Little Rock AFB | East | 3.5 |
| Gibson Community / Sylvan Hills JHS | East | 1.5 |
| Jacksonville | East | .75 |
| Sherwood | Southeast, East | .7 |
| North Little Rock Airport | Southeast | .1 |
| RMTC Cantonment | South | .1 |
| RMTC AASF | South | .1 |
| RMTC AALZ | South | .1 |
| RMTC Northern Ranges | Southeast | .1 |
| RMTC Southern Ranges | South | .1 |
| North Little Rock | South, Southwest | .25 |
| I-40 | South, Southwest, West, Northwest | .8** |
| I-430 | Southwest | 1.25 |
| Little Rock | South | 2.25 |
| Crystal Hill Community | Southwest | .25 |

| | | |
|---|---|---|
| Maumelle | Southwest, West | 2.5 |
| Blue Hill Community | Southwest | .25 |
| Mayflower | West, Northwest | 1.5 |

**to closest burn unit boundary*
***to the closest section of HWY*
Table J.3.9-1 Approximate Distance to and Direction of Nearby Smoke Sensitive Areas

J.3.10 Weather Monitoring

Weather will be monitored one week before the burn window. The National Weather Service forecast will be monitored on the day of the burn, and fire weather or spot weather forecast will be obtained from the National Weather Service when available. Information on the transport winds throughout the state, both surface and aloft, can be obtained from the National Weather Service. For current fire weather information, look on the National Weather Service internet website at http://www.srh.noaa.gov/lzk/wxs3.php?pil=PFW. For a fire weather brief from National Weather Service personnel, call (501) 834-0308. The Arkansas Forestry Commission should be contacted for any weather or fire danger advisories.

On-site weather will be monitored with a Kestrel Pocket Weather Meter or a belt weather kit containing a psychrometer, anemometer, and compass, beginning one hour before ignition and continuing at one-hour intervals or as conditions require until mop-up is completed. Weather and fire behavior observations can be entered onto a form similar to the one in Attachment A. Burn Day Checklist.

J.3.11 Notification

The following agencies or individuals are to be notified before each burn:

LOCAL LAW ENFORCEMENT:

- Arkansas Game and Fish Commission Enforcement Division 501-604-0432
- After working hours and weekends, call RMTC Fire Dept., and they will contact you by radio.
- Faulkner County Sheriff 501-450-4914
- Mayflower Police Department 501-470-1000
- North Little Rock Police Department 501-758-1234
- Pulaski County Sheriff 501-340-6963
- Sherwood Police Department 501-835-1425

FIRE DEPARTMENTS:

- Cato Volunteer Fire Department 501-538-4232
- Mayflower Fire Department 501-470-1200
- North Little Rock Fire Department 501-340-5377/501-771-1800 Dispatch
- Oak Grove Volunteer Fire Department 501-454-6469
- RMTC Fire Department 501-212-5281
- Sherwood Fire Department 501-835-0342

RMTC

- Safety Office 501-212-5092
- Public Affairs 501-212-5020
- Aviation 501-212-5667
- Range Control 501-212-5218
- RMTC-TSM 501-212-5150
- DCSAVN 501-212-5667

OTHER OFFICIALS:

- Arkansas Dept. of Environmental Quality – Air Division 501-682-0730
- Arkansas Forestry Commission (Legal Description, Fuel Tons, POC #) 800-830-8015
- Pulaski Office of Emergency Management 501-340-6963,

The public will be notified in advance of each burn in their area. The Public Affairs Office (PAO) will inform the public along with notification of RMTC employees through the Daily Guard. In addition, RMTC will get advanced notice of any adverse public reaction and be made aware of particular problems, such as respiratory ailments, washday, etc. Advanced notice can also be published in the Arkansas Democrat-Gazette or through public radio broadcasts by the PAO.

J.3.12 Personnel Organization

A minimum of five persons usually accomplishes a typical burn: 1) The burn boss, 2) the igniter, 3) the igniter/holder, and 4) the dozer operator; however, for substantial units or units with heavy fuel load, additional crew members will be added. Personnel responsible for conducting prescribed burns are DCSEN-Environmental or Camp Robinson Fire Department.

Burn Boss

The burn boss usually writes the burn prescription for the unit to be burned, directs the prescribed fire operations, directs the ignition pattern, and coordinates fire suppression activity. The burn boss completes a crew briefing and makes crew assignments; stays in close communication with crew leaders and smoke spotters (weather persons) (on larger burns); adjusts the planned ignition pattern if needed; is constantly aware of the status of the fire.

Training Requirement:
IS-100.C Introduction to the Incident Command System
S-110 Basic Wildland Fire Orientation
S-130 Firefighter Training
S-190 Introduction to Wildland Fire Behavior,
ATV Safety Institute Online – ATV E-Course
ROHVA Safety – ROV E-Course
Arkansas Prescribed Fire as a Management Tool Course
Physical Requirement:
Successfully pass ‘Walk Test’ annually
Additional Requirements:
At least one year of burn crew experience

Must be familiar with the RMTC IWFMP

Generally, a crew consists of a crew leader, igniter, igniter/holder, or just holders. Crew Members include an emphasis on Ignition, Suppression, and Support. Crew titles include Crew Boss, Igniter, Holder, Smoke Spotter, Dozer Operator, and Pumper Operator. Depending on the area of the burn, manpower will be extended to match the size of the burn. Often additional holders will be added to each igniter to ensure the safety of the burn and control of any spot-overs, along with the possibility of extra igniters, crew leaders, and a smoke spotter (weather person).

Crew Members:

Training Requirement:

IS-100.C Introduction to the Incident Command System
S-110 Basic Wildland Fire Orientation
S-130 Firefighter Training
S-190 Introduction to Wildland Fire Behavior,
ATV Safety Institute Online – ATV E-Course
ROHVA Safety – ROV E-Course
Physical Requirement:
Successfully pass 'Walk Test' annually

The crew leader (s) directs and coordinates the activities of their crew, stays in close communication with the burn boss, oversees the ignition pattern, and coordinates the crew's response concerning spotting. The crew leader needs to keep in close contact with the burn boss regarding the progress of the other crews along the fire line; stay in close communication with the crew regarding the status of ignition, spotting over, and condition of equipment; direct igniter to any changes in the pattern of ignition; direct holder to areas that require attention; be aware of the condition of crew members, and rotate crew members out of smoke periodically.

The igniter carries the drip torch or mans the ATV with the terra torch. Typically, the igniter is the first crew person along the fire line. The goal of the igniter is to create an even ignition front along the fire line quickly and efficiently. The igniter is responsible for igniting along the fire line as directed by the burn boss or crew leader, ensuring that fire lines are secure at the ignition point, keeping a lookout for upcoming hazards along the planned ignition line, and constantly checking for spot-overs. The igniter needs to conserve drip torch fuel as much as possible commensurate with good ignition; keep the crew leader or burn boss informed of the status of torch fuel, and know where extra torch fuel is located (always notify crew leader or burn boss when the torch is ¾ empty); ignite exactly along fire breaks unless conditions cause crew leader or burn boss to indicate otherwise; always be aware of fire behavior at ignition point and call attention to any rapid or unexpected changes in fire behavior; make sure that burning fuel is not dripped outside of the unit or on self; and ensure that the drip torch is extinguished and securely upright when not in use.

The igniter/holder serves as the last person on the ignition crew and may be equipped with a water pack, rake, or flapper. The igniter/holder is responsible for ensuring that all smoldering fuels along the line are fully extinguished and that there are no potential perimeter threats, such as burning snags along the line. The igniter/holder needs to patrol the line back to the starting point for escapes outside of the unit (often, this crew member is most out of the smoke and in the best condition to see escapes, lofted firebrands, or spot-

overs); walks off the fire line and outside the burn unit to check for spot-overs; constantly be aware of conditions up the line and be ready to assist with suppression when requested; conserve water as much as possible and be mindful of tank status (inform crew leader or burn boss when the tank is 2/3 empty and know where extra water is available). On minor burns (80 acres or less), the igniter/holder will perform the holder's duties (see holder duties below).

The holder may have an appropriate water pack, rake, or flapper. The holder follows the igniter, ensuring that the fire line is secure. Depending on the burn, they may work immediately behind (or in front of) the igniter to lay out a wet line or suppress fire in flashy fuels where a fire is backing across the line, or use the backpack blower to blow stray fuels back into the perimeter of the fire lines. In other circumstances, the holder may trail far behind the igniter, patrolling long stretches of fire line and walking back and forth between the igniter and the igniter/holder. The holder needs to be aware of fire behavior along the fire line and ensure that the fire line integrity is preserved; alert the crew, especially the igniter, if problems develop; suppress any minor spot-overs or escapes along the line; and keep an eye out for any potential issues that need to be monitored, such as large snags becoming ignited; use water efficiently in suppression and be aware of tank status and know where extra water is available. Once the igniter completes the fire line, the holder will patrol the perimeter of the fire line, checking for spot-overs and assisting with suppression when requested.

The dozer operator mans a small bulldozer. The dozer operator is responsible for preventing spot-overs and escapes from becoming a wildfire. The dozer operator will use the bulldozer to assist the igniter/holder when there are perimeter threats. The dozer operator will be on hand to extinguish a test fire if conditions are not favorable for the burn. The dozer operator must be on standby to respond immediately and not be occupied with other fire tasks.
The smoke spotter (weather person) is outside the unit, often near a smoke-sensitive area such as along a road. The smoke spotter (weather person) is equipped with a radio, a Kestrel Pocket Weather Meter, or a belt weather kit and communicates with the burn boss regarding smoke accumulation and weather. They must keep a vigilant watch over smoke-sensitive areas for smoke accumulation and constantly communicate with the burn boss regarding smoke and weather problems.

The pumper operator, typically working as a holder (see Holder duties), but with knowledge in using vehicle-mounted pumps to fill bladder bags or direct attack suppression. A Wildland Fire Truck or ATV Fire Pump will usually be available to put out spot fires with a pump operator.

### J.3.13 Equipment Requirements

The following is the recommended minimum equipment list that will be on-site for every burn:

PPE

- Flame-resistant long-sleeve shirt and pants or jumpsuit.
- Undergarments made of 100% cotton, wool, or other flame-resistant blend.
- Leather boots at least 8 inches high with fire-resistant laces.
- Hardhat is rated for wildland fire and within its service life.

- Goggles or safety glasses.
- Leather gloves.
- Face shroud or mask.
- Fire shelter.
- Handheld two-way radio.

Other Gear

- First-aid kit.
- Bottled water.
- Kestrel or belt weather kit.
- Handheld drip torch, ATV mounted drip torch, or 'dragon egg' launcher, and a lighter.
- Backpack water pump.
- Backpack blower.
- Hand tools (flapper, rake, shovel, etc.).

J.3.14 Burning Debris Piles (See Attachment C)

Vegetation and waste are often piled and burned as a means of disposal. Pile burning is less extensive than prescribed fires. Piles to be burned are typically located in open areas. The open spaces around the piles act as large firebreaks. Since pile fires require less technical skill and are easier to control, there are fewer equipment and manpower requirements than prescribed fires.

The minimum number of personnel required for a pile fire is two people. One person (the burn boss) will be responsible for the fire and ignition. The burn boss does not need to be qualified for prescribed fires but must have training in wildfire control. The other person will be a qualified heavy equipment operator. A bulldozer or other heavy equipment must be on the pile fire site to prevent the fire from escaping. Additional equipment not required, as listed in J.3.13, is an all-terrain vehicle with a water sprayer, backpack pumps, flappers, food, and fire suppressant water. Even though fewer personnel and equipment are required, the burn boss must complete the planning and preparation required for prescribed fire and an Open Pile Burn Plan (see Attachment C). The approval process must also be completed. As with prescribed fire, smoke management, fire escape prevention, and personnel safety are paramount.

J.3.15 Contingencies

The ignition on any burn will stop in case of spotting over the fire line (escape of fire over the line). The burn boss or crew leader(s) will coordinate the crew members in controlling spot fires. If a crew cannot contain a spot fire, the burn boss will direct additional crew members and the dozer operator to the spot. If the spot becomes an escape, the RMTC Fire Department and the Arkansas Forestry Commission will immediately be contacted. Dedicated retreat lines are maintained under the standard operating procedure but, in a catastrophic sense, will be made ready for lines of defense. Retreat lines include Cato Road, a large, graveled road, flanks TA 2-7 & 14 on the east and the Small Arms Impact Area & TA's 15 & 17 on the west. Remount and Batesville-Pike Roads provide a firebreak on the east side of the Small Arms Impact Area. Highway 89 and a high voltage transmission line right-of-way flanks TA's 12, 13, & 24 (No Name) on the north side. Declination Road, a large, graveled road, flanks TA 17 to the south and the Small Arms Impact Area to the

north. If these lines cannot be secured, all attempts will be moved to exterior fire breaks as the last defendable line on the property.
Firebreaks will be used as escape routes for the crew if the fire becomes an escape fire. The safety zone for the crew will be identified in each prescription.

J.3.16 Records

The burn boss will be responsible for documenting prescribed burns once completed. The documentation will consist of the following information: 1) the burn boss's name and workplace, 2) the date of the prescribed fire, and 3) the approximate area burned. The information will be submitted to DCSEN-E for tracking. The form for submitting the information is in Attachment D. The areas burned will be tracked using a Geographical Information System (GIS). The GIS system will be used to schedule future prescribed burns.

J.4. Wildfire Control

J.4.1 Objectives

The two primary objectives for wildfire control are preventing damage to life and property. Once these objectives have been satisfied, the objective becomes to reduce smoke damage on surrounding properties. Paramount above all objectives is personnel safety. Personnel safety will not be compromised when fighting wildfires to prevent property loss. It must be emphasized to everyone involved that risk-taking will not be tolerated. Creating and maintaining fire lines around the perimeter of RMTC is critical. The fire lines around the boundary will serve as a last defense against fire escaping RMTC. The first line of defense is RMTC firefighting personnel.

J.4.2 Authority and Responsibilities
RMTC Fire Department (CRFD) is the responsible authority for extinguishing wildfires. When a wildfire is noticed, it should be reported at the earliest possible time to CRFD. CRFD will evaluate the fire and formulate a plan of action. If additional resources are required, bulldozers and manpower are available from Range Control and DCSEN-E-Forestry. Bambi bucket aerial water containers are available from the RMTC-OPS-MS. If the fire cannot safely be controlled by RMTC personnel, the Arkansas Forestry Commission, Arkansas Game & Fish Commission, and local fire departments will be contacted for assistance. If the fire escapes RMTC or smoke affects the public, CRFD will notify the RMTC Public Affairs Officer immediately. CRFD will serve as the incident commander and has complete authority over all personnel fighting the fire. CRFD will be responsible for training RMTC personnel in wildfire fighting. A list of the firefighting resources and contact information are shown in Attachment B. CRFD will be responsible for investigating and prosecuting fires resulting from arson.

J.4.3 Smoke Control

While putting out a wildfire is the primary concern, smoke control is also essential when burning and smoldering are left in its wake. The small fires produce smoke that is dangerous to nearby vehicle traffic and very irritating to commercial/residential areas. These small fires can also cause the wildfire to start again. Inversion layers in the

atmosphere compound the smoke problem. An inversion layer holds smoke close to the ground. Many times, the inversion layers are present at night. Smoke also accumulates in low-lying areas and drainages. Small fires must be put out using mop-up procedures to control the amount of smoke.
Mop-up is a labor-intensive activity. It involves patrolling the burned area and putting out small fires. The fires are extinguished by removing fuel from the fires or putting water on the fires. Water can be applied with a backpack or tank sprayer mounted on an all-terrain vehicle.
Mop-up personnel usually carry a counsel rake or shovel for removing fuels.
The number of personnel needed for mop-up is proportional to the size of the wildfire. It is essential to recruit as many personnel as required to mop up the wildfire as soon as possible. The burned area should not be allowed to smolder for days or when inversion conditions exist. The extra work to mop up is well worth the time to prevent potential hazards.

J.4.4 Records

A record will be kept of all wildfires. Records for wildfires contain the same information as records for prescribed burns.

J.5. Fire Lines

J.5.1 Purpose and Responsibility

Fire lines are essential for controlling wildfires and implementing prescribed fires. The construction/maintenance of fire lines is the responsibility of RMTC-OPS and DCSEN-E, respectively.

J.5.2 Construction and Maintenance

The purpose of the lines is to prevent fire from escaping RMTC. Fire lines around RMTC should be at least 25 feet wide (about two bulldozer blade widths). If houses or other structures are near the boundary line, the width should be increased to 35 feet (about three bulldozers
blade widths). The fire lines should be established around the entire RMTC perimeter. Fire lines around the perimeter should be maintained yearly before July (the start of wildfire season). The road network will primarily serve as the fire lines for the RMTC interior. Additional fire lines will be maintained around the Small Arms Impact Area ranges. These must be maintained on an annual basis. This will routinely be done as preparation for prescribed fire conducted in the area. The boundary and non-road fire lines can be sown with various winter grasses to control erosion and provide food for wildlife.

J.5.3 Records

A record will be kept on fire line construction or maintenance. Roads used as fire lines are an exception. Range Control and Post Engineers will document fire line work once completed. See Records 3.4 on how records for each section are recorded.

Attachment A. Prescribed Burning Guidelines
Before Executing Burn

1. A PRESCRIBED FIRE BURN PLAN complete with a MAP of the burn area will be prepared by the burn boss and will consider these factors:
   A. Objective of the burn.
   B. Season of the year as it relates to objective.
   C. Type of fire as it relates to objective.
   D. Weather conditions as related to safety and smoke behavior.
   E. Review personnel burning assignments and equipment (Personal Protection Equipment, dozers, All Terrain Vehicles, etc.).
   F. Security and safety issues - fire lines, smoke on highways, proximity to populated areas and other hazards.
   G. Voluntary Smoke Management Guidelines, including preparing a smoke trajectory map. H. Burn Day Checklist. Determine "Recommended Range" on Burn Day Checklist.

2. RMTC-OPS will review, approve, and sign the Burn Plan. Before RMTC-OPS's final approval, the document will be reviewed by the Proponent (if sponsored), DCSEN-E, RMTC Fire Department, and the Range Control Officer.
3. Fire lines will be constructed.
4. Adjoining landowners will be notified through the PAO.
5. Coordinate the date and time of the burn with the Range Control Officer and RMTC Fire Department.

Executing the Burn
1. The burn boss will oversee the prescribed burn. The burn boss will be responsible for all operations and will consider the following:

   A. The local weather forecast as it relates to fire and smoke behavior.
   B. Notification of Arkansas Department of Environmental Quality – Air Division, Arkansas Forestry Commission, Arkansas Game and Fish Commission, Cato Volunteer Fire Department, Mayflower Fire Department, North Little Rock Fire Department, Oak Grove Volunteer Fire Department, Sherwood Fire Department, RMTC Fire Department (approval to proceed must be obtained from RMTC Fire Department the day of the fire before ignition), Mayflower Police Department, North Little Rock Police Department, Sherwood Police Department, Pulaski Office of Emergency Management, and Pulaski/Faulkner County Sheriff, as well as, Little Rock AF Base and RMTC Safety Office, Public Affairs, Aviation, Range Control, TSM, Daily Guard, and DCSAVN.
   C. Review personnel burning assignments and equipment (Personal Protection Equipment, dozers, All Terrain Vehicles, etc.).
   D. Review Burn Day Checklist.
   E. Setting and observing a test burn to determine expected fire behavior. F. Execute burn to meet planned objectives.
   G. Temperature, relative humidity, wind speed, and wind direction will be taken hourly with a Kestrel Pocket Weather Meter or a belt weather kit during the prescribed burn.

H. The burn boss will request additional assistance from the Range Control Officer if fire behavior conditions worsen.
I. Smoke Management Guidelines will be followed. See Arkansas Voluntary Smoke Management Guidelines.

2. The Range Control Officer will be apprised of all planned prescribed fires.

3. If a prescribed burn escapes, it is an uncontrolled wildfire and should be contained quickly and efficiently. The burn boss will request Additional firefighting resources (see Attachment B). If the fire or smoke affects private property, the burn boss will notify RMTC Public Relations Office immediately.

4. The minimum size burning crew, including the burn boss, will be four personnel. A minimum of one fire plow unit will be on site. The fire plow operator will not perform any other duties and must always be on standby with the plow. Radio contact with all personnel in the fire and Range Control Office will be maintained throughout the burn.

Upon Completion of the Burn

1. Burns involving heavy fuels will be checked during the night, the following day, and as often thereafter as is necessary to ensure the fire does not escape or smoke does not become a problem. Mop-up standards will equal or exceed those for wildfires.

2. The burn boss will evaluate the burn as soon after the burn as possible and will consider the following:

- Were the objectives of the burn met?
- Did fire escape the area?
- Recommendations for improvement?

3. The burn boss will document the date, location, and area burned. The information will be submitted on the form in Attachment D to DCSEN-E.

Attachment B. Notification, Wildfire Fighting Resources, and Emergency Numbers

| Entity | Resource | Contact |
|---|---|---|
| **Robinson Maneuver Training Center** | | |
| RMTC Fire Department | Pump & Water Trucks Bulldozers, Manpower | (501) 212-5281 |
| RMTC Range Control | Bulldozers, Manpower | (501) 212-5218 |
| DCSEN-E-Forestry | Bulldozer, Manpower | (501) 212-5862 |
| RMTC-OPS-MS, SAAO, | Bambi Buckets, | (501) 212-5234/(501) 212-5660 |
| AASF Cdr, Flight OPS, | Helicopters | (501) 212-5651/(501) 212-5666 |
| Flight Operations | | (800) 206-0813 |
| **Environmental Quality** | | |
| Arkansas Department of Environmental Quality | Air Division | (501) 682-0706 |
| **Forestry/Game & Fish (alphabetical)** | | |
| Arkansas Forestry Commission | Fire Plows, Manpower Air Tanker | (800) 468-8834 |
| Arkansas Game & Fish, Mayflower | Manpower | (833) 356-0824 |
| **Fire Departments (alphabetical)** | | |
| Fires Outside RMTC | | 911 |
| Cato VFD | Pump & Water Trucks Manpower | (501) 538-4232 |
| Mayflower Fire Department | Pump & Water Trucks Manpower | (501) 470-1200 |
| Oak Grove VFD | Pump & Water Trucks Manpower | (501) 454-6469 |
| N. Little Rock Fire Department | Pump & Water Trucks Manpower | (501) 771-1800 (Dispatch) (501) 340-5377 |
| Sherwood Fire Department | Pump & Water Trucks Manpower | (501) 835-0342 |
| **Law Enforcement (alphabetical)** | | |
| Arkansas Game and Fish Commission Enforcement Division | Public Safety | (833) 356-0824 |
| Arkansas State Police | Public Safety | (501) 618-8800 |
| Faulkner County Sheriff, | Public Safety | (501) 450-4914 |
| Mayflower Police Department | Public Safety | (501) 470-1000 |
| North Little Rock Police Department | Public Safety | (501) 758-1234 |
| Pulaski Office of Em. Mgmt. | Public Safety | (501) 340-6963 |
| Pulaski County Sheriff | Public Safety | (501) 340-6600 |
| Sherwood Police Department | Public Safety | (501) 835-1425 |
| **Medical** | | |
| Baptist Memorial Medical Center (Emergency Department) | Medical | (501) 202-3355 |
| Life-Threatening Emergency | Medical | 911 |
| **Public Relations** | | |
| RMTC Public Relations | Public Information | (501) 212-5020 |
| **Weather** | | |
| National Weather Service | Weather Information | (501) 834-0308 |

Attachment C. OPEN PILE BURN PLAN
Robinson Maneuver Training Center
OPEN PILE BURN PLAN

1. BURN INFORMATION:

Location (TA #(s), or closest Cantonment Area Street intersection ):
_____

Debris pile size (height, length, width): Debris type (biomass, building material, etc.):
_____

2. OFFICIAL NOTIFICATIONS BEFORE IGNITION ON BURN DAY:

RMTC Fire Department (Mandatory): 212-5281
TSM: 212-5150
RMTC Operations: 212-5234

3. ADJACENT LANDOWNER NOTIFICATIONS (off-post within 500 feet of fire):

Name & Phone:
Name & Phone:
Name & Phone:
Name & Phone:

4. BURN PERSONNEL:

List the person's name and agency represented who is responsible for conducting the debris pile burn (if the contractor, write "contractor" after the name):
_____

List the number of personnel working on the debris pile burn:

5. MANAGING THE BURN (Describe how each of the following will be addressed):

Fire break preparation (describe interval distance and method of establishment between debris pile and nearest vegetation or material that can be ignited):
_____
_____

_____
_____

Firing techniques (describe fuel or accelerant used to ignite the debris pile):
_____

Fire-sensitive areas (adjacent young pine plantations, buildings, e

Contingencies (describe equipment on hand at the fire to prevent the escape of the fire; i.e., rake, shovel, water source, bulldozer, front end loader, flapper, etc.):

6. PREPARED BY (Proponent):

| Printed Name | Signature | Date |
|---|---|---|

7. CONCURRENCES:

DCSEN-Chief-Environmental:

| Printed Name | Signature | Date |
|---|---|---|

RMTC Fire Department:

| Printed Name | Signature | Date |
|---|---|---|

8. APPROVAL RMTC-OPS:

| Printed Name | Signature | Date |
|---|---|---|

Attachment D. Fire Activity Report
Robinson Maneuver Training Center
Fire Activity Report

1. Name/Workplace:

2. Date:

3. Report Type (Check one):

q Fire Lines
q Prescribed Fire
q Wildfire

4. Location (List Training Area(s)):
_____

5. Map (Attach Map Hand Drawn to Scale)
6. Comments:
_____
_____
_____
_____

# Appendix K: Flora and Fauna Inventories

## K. **Wildlife management and conservation BMPs for Migratory Birds, Bats, and Herps**

This portion of the INRMP is also created to be a stand-alone document regarding best management practices (BMPs) for wildlife management. These are recommendations put in place by the environmental department and are established other known BMPs and management plans that take into consideration such policies and regulations such as: The Sikes Act and the Migratory Bird Act. Plans such as AGFC's Wildlife Action Plan, and Partners in Amphibian and Reptile Conservation's (PARC) guidance on herp conservation. Other guidance such as DoD Partners in flight has also been considered in establishing BMPs for birds and herps on the installation.

### Migratory Bird and Bat BMPs

- To the greatest extent possible, conduct land disturbing activities such as: prescribed fire, pesticide application, and mowing; outside of migratory bird nesting season, or late in the season, to allow for fledging of the first nests.
- Recommend that new powerlines use avian safe designs. If possible, consider running powerlines underground or burying them where bird collisions are known to occur. Retrofit powerlines that are known to have frequent electrocutions.
- Avoid landscaping that attracts birds near windows. Add designs to windows that are know for frequent bird collisions.
- While not typically a problem on the installation, RMTC environmental department currently uses live traps to trap and remove feral cats when a situation arises.
- Establish a routine to ensure migratory birds do not nest on equipment or structures that will be needed during the breeding season. Ensure nests are removed before eggs or chicks are present.
- Check structures for birds and bats before razing them. Establish procedures on how to deal with such animals in these structures.
- Reduce lighting at night to minimize attraction to lights by migrating birds.
- Avoid to the greatest extent possible the removal of trees, prescribed fires, use of smokes and obscurants during active season for bats, especially 1 June to 31 July to reduce impacts on roosting bats, especially unknown maternity roosts.

### Amphibian and Reptile (Herps) BMPs

- Establish buffers around water bodies and riparian zones. These areas can coincide with buffer for stream management zones (SMZs). Typical buffer as recommended by NRCS is 100 feet/ 50 feet on each side of the stream. The recommendations for the riparian zones are and extra 200 feet on each side. These areas should be free of mowing. When controlling invasive species pesticide application should be minimal and applied with close attention to label use and warnings.

- When mowing during periods when herps are active, in areas where mowing cannot be avoided, mower blades should be set higher.
- Corridors for the movement of herps should be established in areas where habitat is fragmented as well as areas where mowing and other land disturbances cannot be avoided.
- Fish are not to be introduced into herp breeding ponds.
- Prohibit use of sticky traps or glue boards in all areas of the installation. This has already been in effect on the installation, and there are other methods that are safer for non-nuisance, non pest species.

## K.1 Flora

In 2003, Parsons completed a vegetative survey. This survey had no formal report, but there was an extensive mapping and layering project completed for the vegetative cover. The maps are kept at the RMTC DCSEN-E.

Also in 2003, personnel from Virginia Polytechnic Institute performed a Range and Training Land Assessment (RTLA) (previously known as an LCTA). The analysis included 71 plots previously surveyed and several new plots. The information on the vegetative make-up is comparable to the Parsons survey.

There is set of laminated specimens (one per species) representing each species known from RMTC is available for reference (herbarium specimens representing all collections made) at the herbarium at the University of Central Arkansas in Conway. Additionally there is a document on file with the RMTC staff that has uploaded photographs of all of these laminated species.

As of June 1997, 871 species of vascular plants had been documented as occurring within RMTC; 691 of these were documented by Getz and Culwell, and the remainder was added during subsequent RTLA studies and associated investigations by RMTC staff. Pulaski County is known to harbor at least 1,140 species, Faulkner County 1,044 species (Smith 1988). Culwell (1995) considered the number for RMTC to be “relatively low” (although he did not state the basis of comparison), apparently attributing the relative lack of diversity to the “apparent xeric conditions of most sites.” This is essentially equivalent to the observation that the greatest part of the RMTC area (perhaps 70 to 80%) is covered by a relatively consistent vegetation characteristic of dry sites and dominated by post oak or pine-hardwood. Nevertheless, the recent and rapidly accrued 15% increase in number of known species suggests that the estimate of plant diversity will grow further with continued exploration of the more mesic or uncommon habitats represented on RMTC. Periodic surveys in wetter years also may bring to light additional herbaceous species.

Some of the floral species on RMTC that receive designation of state SOCCs by the ANHC include:

- American pillwort (*Pilularia americana*)
- Northern tubercled-orchid (*Platanthera flava var. flava*)
- Hyssop-leaved boneset (*Eupatorium hyssopifolium var. hyssopifolium*)

- Shortleaf skeletongrass (*Gymnopogon brevifolius*)

However, other formally listed rare species are known to occur in other areas of Faulkner and Pulaski Counties, and it is possible that these might eventually be located on RMTC in mesic upland habitats (Tucker 1974): *Claytonia caroliniana* (Faulkner Co.), *Heuchera arkansana* (Faulkner Co.), and *Spiraea tomentosa* (Pulaski Co.). However, the distinctive type of steep bluff habitat that might support these species does not exist on RMTC property (D. Culwell, pers. comm., 29 April 1996).

Certain species found on RMTC property, that are of uncommon occurrence in this region of Arkansas, are not state or federally listed as rare (Foti et al. 1995). The following are species that were described as uncommon by Foti: several genera of orchids (*Spiranthes*, *Platanthera*, *Malaxis*), scrub post oak (*Quercus margarettiae*), quillwort (*Isoetes melanopoda*), adder's tongue fern (*Ophioglossum vulgatum*), and Virginia snakeroot (*Aristolochia serpentaria*).

A vegetation classification and mapping project was conducted in 2011 by CEMML (Center for Environmental Management of Military Lands).

Exotic or non-native plants often become invasive and replace native plant species. Exotics are generally the most common around the cantonment area and other areas that have experienced man-made disturbances, such as right-of-ways for roads and utility corridors. Exotic plant species can be controlled by preventing soil disturbance and erosion or through the use of prescribed burning, mechanical removal or mowing, biological controls, or the selective use of herbicides. The most prominent and potentially destructive invasive plant species occurring on RMTC are all Asian origin, introduced to North America for ornamental or dietary purposes. (See appendix M for guidelines and information on handling invasive plants on RMTC)

Sometimes native plant species can grow aggressively in some areas due to fire suppression, mowing, or other anthropogenic land alteration. Some of the more prevalent species include eastern red cedar, sweetgum, and Bahia grass. These species will be controlled by acceptable mechanical and chemical methods.

A vascular plant survey project was done on RMTC in June through November of 2017 by GBMc. This survey serves as an addendum to previous flora surveys done by $e^2M$ and Cogon Tech inc., Parsons, and RMTC staff. In conjunction with existing vascular plant data from previous studies, the identification and location of vascular plants during the VPS will allow for ecological impact considerations during the planning phases of proposed activities and will provide the basis for future monitoring efforts that will facilitate long-term monitoring of vascular plant communities (GBMc, 2017). The methods used in the survey are designed to focus on expanding the current species list for RMTC by recording presence/absence data and also identify any species of concern.

The 2017 VPS resulted in the identification of approximately 850 vascular plants consisting of 229 individual species. Two hundred and eight (208) vascular plant species of the 746 species previously identified on the RMTC (as reported in the e2M 2006 report) were identified in the 2017 VPS. Appendix C contains a list of the vascular plant species identified during the 2017 VPS. Additionally, a compiled list of species previously identified and those identified during

the 2017 survey is included in Appendix C. While an emphasis was placed on finding rare and sensitive plant species, no vascular plants of this kind were found on the RMTC during the 2017 VPS (GBMC, 2017).

## K.1.1 New Species and Varieties Identified

This information was taken straight from reports provided from GBMc. A total of 21 new vascular plant species were identified on the RMTC during the 2017 VPS increasing the vascular plant species count for the RMTC to 767 species. Furthermore, 4 new varieties and 1 new subspecies were added to the existing RMTC species list.

| Scientific Name | | | Common Name |
|---|---|---|---|
| Family | Genus | Species | |
| Amaranthaceae | *Froelichia* | *floridana* | plains snakecotton |
| Asteraceae | *Eurybia* | *hemispherica* | southern prairie aster |
| Asteraceae | *Helianthus* | *silphioides* | rosinweed sunflower |
| Asteraceae | *Thelesperma* | *filifolium* | stiff greenthread |
| Clusiaceae | *Hypericum* | *gymnanthum* | claspingleaf St. Johnswort |
| Clusiaceae | *Hypericum* | *perfuratum* | common st. Johnswort |
| Cyperaceae | *Carex* | *crus-corvi* | foxtail sedge |
| Cyperaceae | *Carex* | *tribuloides* | blunt broomsedge |
| Cyperaceae | *Rhynchospora* | *cephalantha* | bunched beaksedge |
| Gentianaceae | *Sabatia* | *bachiata* | narrowleaf rose gentian |
| Juglandaceae | *Carya* | *glabra* | pignut hickory |
| Juncaceae | *Juncus* | *torreyi* | Torrey's rush |
| Juncaceae | *Juncus* | *validus* | roundhead rush |
| Lamiaceae | *Teucrium* | *canadense* | Canada germander |
| Moraceae | *Maclura* | *pomifera* | osage orange |
| Oleaceae | *Forestiera* | *acuminata* | swamp privet |
| Orchidaceae | *Spiranthes* | *praecox* | giant ladies' tresses |
| Poaceae | *Dichanthelium* | *polyanthes* | roundseed panicgrass |
| Rosaceae | *Pyrus* | *calleryana* | Bradford pear |
| Rutaceae | *Poncirus* | *trifoliata* | trifoliate orange |
| Scrophulariaceae | *Aureolaria* | *pectinata* | combleaf yellow false foxglove |
| Asteraceae | *Rudbeckia* | *grandiflora var. alismifolia* | rough coneflower |
| Asteraceae | *Rudbeckia* | *grandiflora var. grandiflora* | rough coneflower |
| Linaceae | *Linum* | *medium var. texanum* | common yellow flax |
| Malvaceae | *Hibiscus* | *moscheutos ssp. lasiocarpos* | rose mallow |
| Melastomataceae | *Rhexia* | *mariana var. mariana* | Maryland meadow beauty |

TableK.1-1 New Vascular Species Identified

### K.1.2 Vegetation Survey 2020

In 2020 another vegetation survey was repeated by GBMc & Assoc. Sampling took place between January and September of 2020. Vegetation plots were sampled in accordance with the U.S. National Vegetation Standard, Version 2 (USNVC 2020). Occurrence plots were used to verify previously defined vegetation community types (GBMc, 2020).

Sampling plots were decisively selected to distinguish the representative vegetation at RMTC, and also areas where data was needed for verification of the vegetative communities. Aerial imagery and existing maps were used in selecting the survey plots.

#### K.1.2.1 Results

According to GBMC's data, twenty-two alliance level vegetation communities and 2 cultural vegetation communities were used to define existing vegetation at RMTC. The total number of current map units is fewer than in the 2011 CEMML report because Version 2 of the USNVC combines many forest and woodland alliances. Additionally, many woody ruderal or early successional alliances may have both forest and woodland components. Forest and woodland alliance account for 15 vegetation communities and cover approximately 27,597 acres within RMTC. The predominant forest and woodland community is Post Oak - Blackjack Oak Forest & Woodland Alliance (A3216) which accounts for approximately 13,050 acres. Planted pine stands account for 1,157 acres. Three shrubland alliances cover 670 acres of RMTC.

The most predominant shrubland alliance is the Blackberry species - Plum species - Roughleaf Dogwood Eastern Ruderal Shrubland Alliance (A3322). A3322 describes combinations of taxa for which no natural analog exists and often occurs in areas where recent logging has occurred. Four herbaceous alliance, including an aquatic alliance, account for 2,578 acres on RMTC. The Broomsedge Bluestem - Annual Ragweed - Canadian Horseweed Eastern Ruderal Grassland Alliance (A3321) accounts for 1,977 acres and is the most prevalent herbaceous alliance. A3321 includes grassy roadsides, herbaceous utility corridors, firebreaks, and fields that are mowed and regularly maintained. In summary, the majority of RMTC is comprised of hardwood deciduous forests. In dryer landscape settings Quercus stellata and Quercus marilandica tend to dominate. In sloping mesic landscapes Quercus falcata, Carya spp. and Quercus alba are common. Lower mesic and subhydric riparian areas predominantly support Quercus phellos, Quercus nigra, and Liquidambar 31 December 2, 2020 styraciflua dominated alliances.

Grassy lake, in the northwest corner of RMTC, is primarily made up of Nyssa aquatica and Taxodium distichum forests. Grassy lake also hosts Cephalanthus occidentalis shrub alliances and herbaceous Polygonum spp. and aquatic communities. Low lying areas around Tupelo Gum Pond on the west side of the facility are primarily comprised of Quercus lyrata, Quercus phellos, Salix nigra, Cephalanthus occidentalis, and ruderal wetland alliances. Natural pine and mixed pine-hardwood forest alliances dominate the west central section of RMTC. Pine plantations can be found throughout the installation but are most commonly found on the north side of RMTC. Ruderal grasslands are found throughout RMTC while natural prairie

alliances are generally found on the north side of the facility. Ruderal shrublands commonly occur in disturbed areas or where logging has recently occurred (GBMc, 2020).

## K.2 Fauna

### K.2.1 Mammals

A faunal assessment of RMTC was started in 1994 (Penor et al., 1996a, 1996b) with the following objectives:

Determine the distribution and abundance of native mammals.
Survey for rare and endangered species.
Determine the impact of human activities on sensitive habitats and fauna.

Mammals were located during 1994-1996 by direct observation, live trapping, scent stations, pitfall trapping, active hunting, spotlighting, predator calling, and mist-netting (for bats).

A total of 29 mammal species were recorded for RMTC out of a possible 54 that occur in Central Arkansas (Sealander and Heidt 1990). Two of these records were obtained from the UALR museum archive. There were eight bat species, nine rodent species, five carnivore species, two insectivore species, and a lagomorph not recorded on RMTC during the faunal assessment. It is likely that at least some of these may be found with more intensive sampling. None of the mammal species found on RMTC are considered rare or threatened by the ANHC (ANHC 2012).

Habitats were categorized as either “Deciduous” (hardwood) or “Mixed-Evergreen” (mixed hardwood/pine) forest. In these categories, five common small mammal species were captured most often (149 captures) in hardwood communities and six common mammal species were captured 82 times in mixed hardwood/pine communities. In total, more species were found in the deciduous forested TAs (24 species) than in the mixed-evergreen forested TAs (14 species) (Penor et al. 1996b). The red bat, eastern cottontail, coyote, and white-tailed deer were common throughout the installation.

RMTC staff conduct deer surveys during both the spring and fall. This is accomplished by traveling predetermined routes and spotlighting the deer. Binoculars are used to differentiate doe from buck, though it is not always possible to do so. The surveys occur over a period of six to ten consecutive nights. These spotlight surveys will continue indefinitely and could be supplemented with scent/bait stations, infrared aerial photography or stationery infrared digital photography dependent on resources available.

Penor et al. (1996a) speculated that disturbance from human activities, present or past, may have been responsible for the absence of several species normally common in the area. These species are mink, river otter, and least shrew. To evaluate the relationship between biodiversity and habitat conditions on RMTC, accurate information is needed regarding the type, time, intensity, and frequency of usage of TAs (Foti 1996 progress report; Heidt and Karlin 1996). The Range Facility Management Support System (RFMSS) should supply this information and is a possible source for future in house projects for mammal surveys.

A preliminary predator survey was conducted on RMTC in 2003-2004 by GBMc and Associates. Multiple methods were used to conducts the survey including infrared digital photographic stations, scent/bait stations, and nocturnal spotlight surveys. This survey essentially provided a presence/absence level of documentation of particularly large predators such as the mountain lion (*Felis concolor*) and the black bear (*Ursus americanus*). While the target predators were not found to be present, the survey did document other predator species that were found on RMTC. Five predators were positively identified and documented on the installation, with coyote (*Canis latrans*) and bobcat (*Lynx rufus)* were the most common predators encountered during the survey. Additionally, two predator species that were also found present on RMTC, were not sighted but identified by tracks left at the scent/bait stations are the spotted skunk (*Spilogale putorius*) and the Grey Fox (*Urocyon cinereoargenteus*). Overall seven species of predators were found by one or more of the methods used to conduct the survey,

*Spotted or(striped) Skunk (*Spilogale putorius*)
Coyote (*Canis latrans*)
Mink (*Mustela vison*)
River Otter (*Lutra candensis*)
Grey Fox (*Urocyon cinereoargenteus*)
Red Fox (*Vulpes fulva*)
Bobcat (*Lynx rufus*)

*The tracks found at the bait station for the skunk were not able to be identified between spotted or striped skunk.

According to this study it is recommended to follow up with additional survey/tracking efforts in future years to determine presence/absence of species not yet documented. As well as studies to document population densities and carrying capacity of habitat on a site-specific basis after multiple year species surveys on Camp Robinson (GBMc &Assoc. 2004).

In 2003-2004 the Arkansas Game and Fish Commission conducted a rodent survey across fifteen of their Wildlife Management Areas (WMA) to include the Camp Robinson WMA. The study was published in the Journal of the Arkansas Academy of Science in 2017. Of the fifteen WMA's surveyed, RMTC was one of three sites with the highest species diversity of five species. The five different species found on RMTC include:
Eastern deer mouse *(Peromyscus maniculatus)*
White footed mouse *(Peromyscus leucopus)*
Marsh rice mouse *(Oryzomys texensis)*
Fulvous harvest mouse *(Reithrodontomys fulvescens)*
Woodland vole *(Microtus pinetorum)*
The Eastern deer mouse was the most abundant on RMTC with a total of 5 individuals out of 14 total. There were 3 Marsh rice rats found on the installation, and one was a single female with three embryos. This set a new county record for Faulkner County. The woodland vole was the least abundant with only one individual found ON RMTC.
Bats
There had been two bat surveys previous conducted on RMTC. The first survey took place in 2006 in which several bat species were found using Mist netting and acoustic surveys. At this time the Northern Long Eared bat was found on RMTC. Multiple individuals were found however at the time they were not an ESA listed species. In 2021 a T&E survey was done

which included bat species. At this time the NLEB was not detected on the installation. Since there was a large gap in surveys it is not known whether the NLEB population on RMTC never returned or if this is a reflection of declining numbers. More data and additional surveys are needed to find whether other areas of the installation may have populations of this species. Since eighteen years have gone by since the NLEB was observed here, we assume currently there are no populations on the installation. Future surveys will be scheduled to look again. Included below are Tables of the two surveys and the species found on the installation.

2006 Survey of Bat Species found on RMTC.

| Species | Common Name | Spring | Fall |
|---|---|---|---|
| ***Lasiurus borealis*** | Red Bat | n=18 | n=23 |
| ***Eptesicus fuscus*** | Big Brown Bat | n=8 | n=14 |
| ***Lasiurus cinereus*** | Hoary Bat | n=6 | n=2 |
| ***Nycticeius humeralis*** | Evening Bat | n=5 | n=1 |
| ***Perimyotis subflavus*** | Tricolored Bat | n=3 | n=9 |
| ***Myotis septentrionalis*** | NLEB | n=3 | n=1 |
| ***Myotis lucifugus*** | Little Brown Bat | n=1 | n=0 |

2021 T&E survey, Bat species presence/absence data

| Species | Common Name | Spring | Fall |
|---|---|---|---|
| ***Lasiurus borialis*** | Red Bat | √ | X |
| ***Eptesicus fuscus*** | Big Brown Bat | √ | √ |
| ***Lasiurus cinereus*** | Hoary Bat | √ | √ |
| ***Nycticeius humeralis*** | Evening Bat | √ | √ |
| ***Perimyotis subflavus*** | Tricolored Bat | X | X |
| ***Myotis septentrionalis*** | NLEB | X | X |
| ***Myotis lucifugus*** | Little Brown Bat | X | X |
| **Tadarida brasiliensis** | Brazilian Free-tailed Bat | √ | X |

K.2.2 Birds

The variety of birds at RMTC reflects the mix of forest, prairie, and brushy habitats found there. Four major avifaunal studies have been conducted on RMTC. In 1996, Kenton Lohraff completed the first study under the direction of Dr. Kimberly Smith, UA-F. The George Miksch Sutton Avian Research Center of Oklahoma Biological Survey (OBS) completed the second study in 1999. The third study, by Engineer Research and Development Center (ERDC), began in April 2002 and concluded in February 2003. Additionally, RMTC was included in the Institute for Bird Populations (IBP) and USACE Monitoring Avian Winter Survival (MAWS) Program on DoD Installations in the Southeastern United States. This study was completed in 2007 (Sarraco et al. 2008).

Records for birds on RMTC were previously available only from the 1993 Christmas Bird Count conducted by members of The Nature Conservancy, who observed 35 species. The 1996 study recorded the occurrence of 141 species on the post. The OBS study focused on five of these species. The ERDC study focused on the inventory of the bird communities throughout the installation in a variety of habitats. The 2003 study recorded an occurrence of 251 species on the installation during spring, summer, fall and winter counts (Avian Community Inventories on Camp J.T. Robinson, Arkansas Fall 2003).

The 1996 Lohraff study proceeded with selection of 15 study sites to include a range of different vegetational habitats. Each site was a linear transect within an area of uniform vegetation, with as many census points as possible (to a maximum of 6) at 150 meter intervals. A point count was made at each census point, primarily within a 50-meter radius. Surveys were conducted at 75 census points, and the nature of the habitat and vegetation (34 variables) at each point was recorded. Each transect was visited several times during 1994-1996 (fall 1994, spring 1995, winter 94-95, winter 95-96).

Seventy-seven species were recorded at the census points (within and outside the 50-meter circles) during the breeding season surveys. Shannon diversity and evenness indices show that all transects were relatively similar. Most of the transect locations were similar in large-scale vegetational habitat characteristics. Distinctively high numbers of species were observed in the Grassy Lake, White Oak Bayou, and Tupelo Creek transects. This is likely due to the greater structural heterogeneity of the vegetation. The most common species recorded during breeding season, across all transects, were the blue-gray gnatcatcher and tufted titmouse.

For each of the 26 most frequently observed species, various biological features were recorded. These biological features included both migratory status and primary breeding habitat. Eight were classified as forest interior specialists and 18 were considered as forest or edge breeders. Among the 13 vegetational characteristics that differed significantly among these transects (characteristics of ground cover, understory, and canopy height and cover), four were most predictive of the occurrence of forest interior breeding specialists. Of these, canopy height, canopy cover, and number of conifers 8 to 23 centimeters diameter breast height (cm dbh) appear to be the most important features influencing habitat selection for the interior specialists.

The occurrence of several rare bird species on RMTC was recorded during the Lohraff study. Bachman's sparrow, loggerhead shrike, and cerulean warbler were all observed during both seasons. A bald eagle was observed flying over the western boundary of the installation in

May 1994. A sharp-shinned hawk was observed over the western boundary several times during both breeding seasons.

In 1999, OBS was contracted to determine if management practices needed to be implemented at RMTC for three of the rare bird species – loggerhead shrike, cerulean warbler and Bachman's sparrow. They also studied the northern bobwhite and brown-headed cowbird populations on the post.
The following recommendations were made by OBS concerning these species:

1. Neotropical migrants and point counts
    a. Continue monitoring bird populations with point counts. Ideally, surveys would be conducted annually; however, conducting surveys approximately once every three years may be sufficient to detect population changes.
2. Brown-headed Cowbirds
    a. Present parasitism rates do not justify controlling cowbird populations. Continue monitoring parasitism rates to determine if a control program is warranted in the future.
    b. Limit Forest fragmentation to prevent access to forest interiors by cowbirds.
3. Northern Bobwhite
    d. Use prescribed burns to improve habitat conditions. Burns should be 5 to 10 hectares in extent and conducted during winter months. Burns will also benefit Bachman's Sparrows.
    e. Continue monitoring bobwhite population sizes to measure the effectiveness of management actions in increasing bobwhite numbers.
4. Bachman's Sparrow
    a. Do not mow old fields and grasslands from the 15 April to the 15 September, if possible.
    b. Use prescribed burns to improve habitat conditions. Burns should be 5 to 10 hectares in extent and conducted during winter months. Burns will also benefit Northern Bobwhites.
    c. Continue monitoring sparrow population sizes to measure the effectiveness of management actions in increasing sparrow numbers.
5. Loggerhead Shrike
    a. Allow hedgerows to develop either naturally or with plantings near potential shrike habitat on the Cantonment Area (particularly near the golf course) and the firing ranges on the Small Arms Impact Area, if feasible.
6. Cerulean Warblers
    a. Allow bottomland hardwood forests to mature. Limit forest fragmentation in this habitat.

A Breeding Bird Survey was conducted May-July of 2005 (GBMc 2005b). Eighty-three species total were recorded. Eleven of those species are on the Audubon Arkansas Bird of Conservation Interest list, and eleven on the DoD Partners in Flight (PIF) list of Birds of Conservation Concern.

Recommendations:

- Repeat the surveys as completed during 2005. This will provide data to account for annual variability and establish a multi-year assessment baseline.

- The multi-year survey also facilitates an assessment of habitat manipulations and/or training operations as it relates to the avian breeding community.

- Develop and implement area specific surveys to quantify the effect of habitat management/utilization by documenting both species contact and habitat utilization during 2006 and 2007 in areas of training activity.

- Develop and implement a process to quantify the habitat utilized by those species identified as sensitive or as species of conservation interest.

- The habitat management recommendations provided by Guilfoyle and Fischer, 2003 should continue to be implemented in support of habitat preservation and enhancement.

- Join with other agencies to plan and coordinate management activities to enhance the available habitat in the three co-joined important bird areas (RMTA, Bell Slough and RMTC).

During April 2002, the ERDC was contracted to inventory bird communities and to make recommendations for PIF PSC throughout the installation in a variety of habitats. The initial task was to survey the 75 point-count locations that were established during the 1999 OBS avian communities study. An additional 34 point count locations were added to increase sample size for specific habitat types. All new survey points were placed 250 meters apart and at least 250 meters away from the 1999 survey sample points (ERDC 2003). There were 10 additional survey stations established along roadsides in a variety of habitats to survey nocturnal species such as owls and nightjars (i.e., Chuck-Will's-Widow, Whip-Poor-Will, and Common Nighthawk), which were sampled during the spring and fall migration. The research team added a waterfowl count during the winter bird survey. (ERDC 2003).

Surveys were conducted once per season at sampling stations from the spring of 2002 to the winter of 2003. During the spring migration survey, 1,600 birds of 88 different species were counted. The most common occurrences were the Eastern Tufted Titmouse and Indigo Bunting. The summer breeding bird survey showed an occurrence of 1,200 birds of 71 species, with the most common being the Yellow-billed Cuckoo and Indigo Bunting. Significant numbers of the Blue-gray Gnatcatcher were also documented. The fall breeding bird survey revealed over 1,400 birds of only 48 varying species with the Blue Jay and Eastern Tufted Titmouse being the most common species (USAR&D 2003).

The over-wintering survey conducted in 2003 revealed the most common resident birds to be the Red-winged Blackbird and the Blue Jay. One afternoon during this survey, a 3-hour waterfowl survey was conducted from a canoe on Grassy Lake. Twelve bird species were recorded during this count, including five species of waterfowl. The most common waterfowl recorded were the mallard and the wood duck (USAR&D 2003).

The Final Report provided recommendations for PIF PSC in the following habitats:

1. Bottomland Hardwood and Riparian Management Areas:

a. Protect existing bottomland hardwood forests in the Grassy Lake and Tupelo Creek areas from development, timber harvest, and/or intensive military training exercises.
b. Limit access roads into bottomland hardwood areas.
c. Promote restoration of bottomland forests when and where practical.
d. Monitor and control beaver activities when appropriate.
e. Maintain exiting riparian areas when possible, leaving wide (at least 50 meters) forested buffers on each side of streams and wetlands during any future planned silvicultural activities.
f. Any forest alterations (e.g., cutting, burning) or disturbances (e.g., mowing) that are planned in the future should not occur during the breeding season (approximately April 15th to August 15th).
g. Retain or encourage snags 25 cm dbh or greater.
h. Minimize the number, length, and width of new roads in development plans.

2. Open Grassland and Early Successional Management:
   a. Protect and maintain current grassland and early successional habitats.
   b. Expand sizes of current grassland and early successional areas.
   c. Consider planting native grass and forbs species in restoration efforts.
3. Waterfowl Management:
   a. Establish Wood Duck nesting boxes throughout the Grassy Lake and Tupelo Creek Areas.
   b. Maintain or increase vegetative heterogeneity throughout Grassy Lake by planned drawdown of the water level.

The Monitoring Avian Winter Survival (MAWS) program was initiated to study temperate-wintering bird species, including sparrows and other species that prefer early successional stage habitats, which are in population decline. According to Monitoring Avian Productivity and Survivorship (MAPS) Program results, low rate of survival is cited as the main reason for the decline. Other evidence points to habitat loss and degradation as the main causes of the decline. Since DoD lands are maintained in a manner that creates early successional stage habitat, army training sites may be valuable in monitoring these bird populations.

To obtain these data, MAWS stations were set up at military installations and standardized mark-recapture methodology implemented from November to March annually for four winter seasons. A model was then applied to the survival estimates and indices of bird body conditions (indicator of habitat characteristics). The goal is formulation of management guidelines and strategies targeting these temperate-wintering migratory land bird species.

K.2.3 Amphibians and Reptiles

1996 Herpetofaunal survey by Heidt, Karlin, & Penor et al.

Thirty-three species of amphibians and reptiles were documented on RMTC by Heidt and Karlin (1996) of a total of 86 herpetofaunal species whose distributions potentially are included on the post (Dowling 1957). For 51 species not documented on RMTC, most were forest-dwelling salamanders, river-dwelling turtles, and small and secretive snakes. Habitat (lowland swamp, prairie grassland, sandy soils) for the two remaining undocumented species may be the limiting factor. RMTC is not within the known distribution of any federally or locally rare, threatened, endangered, or protected species of amphibians or reptiles. It was

concluded that military land use patterns have not limited the herpetofauna either in number of species or number of individuals.

2011 Herpetofaunal survey by RMTC Staff

A herpetofaunal inventory was conducted by the RMTC natural resources personnel in the spring and summer of 2011. This survey was conducted to follow up on the surveys done from 1994-1996 by Heidt, Karlin, and Penor et al. The level 1 type survey techniques used in this survey are similar to the techniques used by earlier surveys. Techniques include road surveys, time constrained surveys, area constrained surveys, cover board arrays, auditory surveys, and basking surveys. During sampling, animals were captured, classified, photographed and released. In some cases, the presence of one type of specialist predator can infer the presence of other species. For example, the Western Mud snake captured in Jim Creek, which specializes in prey such as Sirens and Amphiuma. It is reasonable to expect the occupancy of these species although they were not caught during this survey. As a result of this survey, three species of salamander and 12 species of frogs were documented along with five turtle species, five lizard species and 12 species of snakes. (see Camp Joseph T. Robinson 2011 Herpetofaunal inventory for species on species along with photographs).

2017 Herpetofaunal Survey by GBMc

The Herpetofauna survey of 2017, conducted by GBMc & Assoc. focused on documenting terrestrial and aquatic reptile and amphibian communities inhabiting RMTC. Three sampling events that lasted a week each were conducted in July, October, and November of 2017. This survey serves as an addendum to the survey that was conducted in 2011 on RMTC. The primary objective of this survey is to provide additional natural resource data to facilitate long term habitat management to compliment the RMTC mission goals, activities, and objectives (GBMc, 2011). The Project Study Plan (PSP) in this survey serves to provide presence/absence data for herpetofauna on the installation. This data provides a basis for future monitoring efforts.a variety of habitat types were considered and there were 15 sites finalized by GBMc and RMTC staff to include:

Grassy Lake
Tupelo Gum Pond
Jim Creek (Intermittent stream)
Leopard Creek (Intermittent stream)
TA-01 Seep (Intermittent stream)
Rocky Hillside
TA-03 Pond
Kaplan Pond
TA-11
Psyam
Clifton Mountain
Jewitt Lake
Hunter Lake
Lower Engineer Lake
Lower Lake

(Survey areas map GBMc 2017)

Multiple survey techniques were used, visual encounters, acoustic surveys, coverboards, hoop nets, pitfall and minnow traps. All collections were made using capture and release methods.

Conclusion of Confirmed Herp Species on RMTC

The results of this 2017 survey, according to table 3 in their report documents 31 species found in 2017. When the 2017 survey was conducted they did not take into account the survey from 2011. The 1994-1996 survey confirmed 33 species. In 2011 there were 38 species confirmed, adding 5 more than the previous survey. Eight more species were added from the 2017 survey that were not previously found on either of the previous surveys. When combining all three studies there was a total of 46 herp species confirmed on RMTC.

| **Common name** | ***Scientific name*** | **Survey Year** |
|---|---|---|
| Broad-banded water snake | *Nerodia fasciata* | 2011, 2017 |
| Diamondback water snake | *Nerodia rombifer rombifer* | 2017 |
| Eastern coachwhip | *Masticophis flagellum flagellum* | 2011 |
| Eastern racer | *Coluber constrictor spp.* | 2011, 2017 |
| Eastern Garter Snake | *Thamnophis sirtalis sirtalis* | 2017 |
| Flat-headed Snake | *Tantilla gracilis* | 1994-1996 |
| Midland Brown Snake | *Storeria dekayi* | 2017 |
| Midland Watersnake | *Nerodia sipedon pleuralis* | 2011, 2017 |
| Prairie Kingsnake | *Lampropeltis calligaster calligaster* | 2011 |
| Prarie Ringneck Snake | *Diadophis punctatus arnyi* | 2017 |
| Rough Green Snake | *Opheodrys aestivus* | 2011 |
| Speckled Kingsnake | *Lampropeltis getula holbrooki* | 1994-1996, 2011 |
| Southern Copperhead | *Agkistrodon contortrix* | 1994-1996, 2011 |
| Western Cottonmouth | *Agkistrodon piscivoris* | 94-96, 2011, 2017 |
| Western Mud Snake | *Farancia abacura* | 2011 |
| Western Rat Snake | *Pantherophis obsoleta* | 2011, 2017 |
| Western Ribbon Snake | *Thanophis proximus* | 2017 |
| Yellow-bellied Water Snake | *Nerodia erythrogaster flavigaster* | 1994-1996, 2011 |
| | | |
| Broad Headed Skink | *Eumyces laticeps* | 1994-1996, 2011 |

| | | |
|---|---|---|
| Five-lined Skink | *Plestidon fasciatus* | 94-96, 2011, 2017 |
| Little Brown Skink | *Scincella lateralis* | 94-96, 2017 |
| Southern Coal Skink | *Plestidon anthracinus pluvalis* | 94-96, 2017 |
| Slender Glass Lizard | *Ophisaurus attenuatus* | 1994-1996 |
| Green Anole | *Anolis Carolinensis* | 94-96, 2011 |
| Northern Fence Lizard | *Sceloporus undulatus hyacinthinus* | 94-96, 2011, 2017 |
| Six-lined Racerunner | *Cnemidophorus sexlineatus* | 1994-1996, 2011 |
| Alligator Snapping Turtle | *Macrochelys temminckii* | 2021 |
| Common Snapping Trutle | *Chelydra serpentina* | 94-96, 2011, 2017 |
| Eastern River Cooter | *Pseudemys concinna* | 2011 |
| Map Turtle | *Graptemis geographica* | 1994-1996, 2011 |
| Mississippi Mud Turtle | *Kinosternon subrubrum* | 2011 |
| Red-eared Slider | *Trachemys scripta elegans* | 94-96, 2011, 2017 |
| Southern Painted Turtle | *Chriysemys picta dorsalis* | 1994-1996 |
| Spiney Softshell | *Apalone spinifera* | 1994-1996, 2017 |
| Stinkpot Turtle | *Sternotherus odoratus* | 1994-1996 |
| Three-toed Box Turtle | *Terrepene triunguis* | 94-96, 2011, 2017 |
| | | |
| American Bullfrog | *Lithobates catesbeianus* | 94-96, 2011, 2017 |
| Blanchard's Cricket Frog | *Acris crepitans* | 94-96, 2011, 2017 |
| Cajun Chorus Frog | *Pseudacris fouquettei* | 94-96, 2017 |
| Cope's Gray Treefrog | *Hyla crysoscelis* | 2011, 2017 |
| Gray Treefrog | *Hyla versicolor* | 94-96, 2017 |
| Green Frog | *Lithobates clamitans* | 94-96, 2011, 2017 |
| Green Treefrog | *Hyla cinerea* | 94-96, 2011 |
| Northern Spring Peeper | *Pseudacris crucifer crucifer* | 94-96, 2011 |
| Southern Leopard Frog | *Lithobates spenocephala* | 94-96, 2011, 2017 |
| Western Bird-voiced Treefrog | *Hyla avivoca avivoca* | 2017 |
| Western Chorus Frog | *Pseudacris triseriata* | 2011 |
| | | |

| | | |
|---|---|---|
| Dwarf American Toad | *Anaxyrus americanus* | 94-96, 2011, 2017 |
| Eastern Narrow-mouth Toad | *Gastrophryne carolinensis* | 94-96, 2011 |
| Fowler's Toad | *Anaxyrus fowleri* | 94-96, 2011, 2017 |
| | | |
| Marbled Salamander | *Abystoma opacum* | 94-96, 2017 |
| Spotted Salamander | *Abystoma maculatum* | 94-96, 2011 |
| Three-toed amphiuma | *Amphiuma tridactylum* | 2017 |
| Western Lesser Siren | *Siren intermedia* | 2011 |

K.2.3-1 Species found on RMTC from the 1994-1996, 2011, 2017 surveys.

In 2021 a Threatened and endangered species survey was conducted by GBMc and Assoc. More on this survey can be found in appendix L, including information on state species of concern. During this survey in 2021 the alligator snapping turtle was detected. Two individuals were found in Jim creek in TA-10.

K.2.4 Fish

Samples of fish and macrobenthos were collected from streams representative of a range of disturbance conditions on the post. Two sampling stations each were located on White Oak Bayou and Leopard Creek and two stations each were located on Spring Creek and Jim Creek (Rickett 1995; Rickett 1996; Harris and Rickett 1996). Sampling was conducted in portions of the creeks over a period of three years: 1994 (fall), 1995 (winter, spring, fall), and 1996 (spring).

Rickett collected 23 species of fish (14 genera, 10 families). Diversity indices for fish at all sites were close in value. The downstream site on each of the four streams yielded more individuals but usually slightly lower diversity indices. Five species (numbers are inconsistent) were collected at all sites; 11 of the species were found in all four streams, while another 7 were found in three of the four streams. Nine species were collected during every seasonal sampling series and 4 species were taken during 4 of the 5 sampling series. Redfin shiners were the most abundant of all taxa present. Leopard Creek contained the greatest number of species (perhaps because sampling was easiest there), followed by Jim Creek, White Oak Bayou, and Spring Creek. Spring Creek is potentially a top-quality stream but suffered badly in 1995 from silting and pollution of unknown origin (Rickett 1996).

With knowledge of habitat requirements and geographic ranges (Robison and Buchanan 1988), several additional species of fish might have been expected in the RMTC streams. However, none of the collected species warranted special concerns and none were in unexpected microhabitats. “In the absence of a fixed standard, it is [Rickett's] professional judgement that the ichthyofauna of RMTC was of marginal quality and quantity. This was likely due to the unusual intermittency of the streams in the area, considering the migrations required to recolonize all reaches of streams after re-establishment of continuous flow. In conclusion, 22 species were still confirmed in this survey.

In 2003, GBMc & Associates, along with Genesis Environmental Consultants, performed an aquatic life survey in nine representative streams within the RMTC boundaries. The purpose of this survey was to determine the biological conditions of major stream systems within RMTC. The nine streams surveyed were Jim Creek, Tupelo Gum Creek, White Oak Bayou, Winifree Creek, Newton Creek, Leopard Creek, Kellogg Creek, Spring Creek, and Five-Mile Creek.

The purpose of this survey was to determine water quality within perennial habitat that is adequate to support populations of fish and macroinvertebrates. Each stream was sampled separately for biotic diversity. They were then compared to typical Arkansas River Valley Ecoregion streams and the Boston Mountain Ecoregion streams of similar watershed size determined from reference material developed by ADEQ.

Study reaches of each stream were field measured and biologically sampled. Biological communities, water quality, habitat quality, and anthropogenic effects were determined through the measurements and sampling. A Sampling and Analysis Plan detailed the project and sampling methods. Biotic characteristics were determined by the two watershed types — the Arkansas River and the Bayou Meto. The streams and creeks were divided into groups based on the characteristics of these two watersheds.

The first group of creeks/streams was the lowland type streams with geophysical features more typical of the Arkansas River Valley Ecoregion. The second group of creeks/streams displayed features more characteristic of upland type streams like the Boston Mountain Ecoregion. The information provided through this analysis characterizes benthic macro invertebrate communities, fish community assemblages, ancillary water quality data, and qualitative habitat potential.

Sampling was performed with electrical current generation or pedal down time. Each of the nine streams was sampled between June 3 and June 6, 2003. During this time, 1,848 fish were caught, comprised of 5 dominant family groups, and an overall average of 14 taxa collected (GBMc 2003).

A 2017 aquatic life survey very similar to the 2003 survey was conducted by GBMc as well. The same locations were surveyed in this study as was in the 2003 study. This study also divided the streams into two groups. Streams that drain into the Arkansas River, reflect the geomorphic conditions low land, low flow streams. The second group of streams that drain into the Bayou Meto are more upland stream characteristics, resembling those of the Boston Mountains region. The biotic communities here are dependent on the availability of wet habitat. The seasonal period leading up to this survey was drier than on average and likely limited the collection of many species. In conclusion the number of fish at each site was much lower than previous collections made by GBMc in 2004/2005, even at the same study sites. In this study Shannon’s diversity range was less than 200, the biota index was relatively low indicating more sensitive communities. This is unlikely a result in change in water quality and more likely a difference due to season. More studies on this are needed and will be planned as funding allows.

In 2017 and 2022 Arkansas game and fish commission conducted fish surveys on the cantonment lakes via electrofishing. AGFC recommends this survey to be done every five years, therefore, we plan to schedule another survey on the cantonment lakes in 2027.

In 2017, AGFC sampled Hunter lake on May 3rd, and Jeweitt and Lower Engineer lake on May 10th. Two sites were sampled in Jewitt and Hunter, and one site in Lower Engineer. There was a equipment malfunction on May 10th due to low conductivity of the water in Jewitt and Engineer so catch rates were lower in these lakes than in Hunter. However, they were still able to collect enough fish to assess the balance of each lake. Each fish collected was measured and weighed then returned to the lake. There were 8 species found in Jewitt, 7 species in Hunter, and 6 species in L. Engineer. The species collected include: Largemouth Bass, Bluegill, Redear Sunfish, Warmouth, Longear Sunfish, Green Sunfish, Orange Spotted Sunfish, and Channel Catfish. With the data collected AGFC reports that:

Jewett lake- is a Largemouth Bass crowded lake. Individuals were overly small which shows that competition for food is too high. However, a side effect of this is this lake is an excellent Bluegill fishery.

Hunter Lake- is a good balanced fishery with healthy populations of LM Bass and Bream. Channel Catfish were not collected at all in this lake so it is possible to stock for Catfish at up to 100 fish/acre.

Lower Engineer- Also appears to be LM Bass crowded with small individuals and large Bream. It is recommended to harvest 35lbs/acre/year of Largemouth Bass until populations start to improve.

This sampling event was repeated in 2022 by AGFC, this time sampling two sites on Jewitt and Lower Engineer, and three sites on Hunter lake. The methods of this survey are the same as in 2017. The data collected in this survey found 5 species in Jewitt, 7 species in Hunter, and 5 species in Lower engineer. The species found were relatively the same with the addition of Black Crappie in Jewitt and L. Engineer. Reports from Game and Fish for 2022 state that:

Jewett Lake-still appears to be in a Largemouth Bass crowded state. There are plenty of small Largemouth Bass (less than 12 inches) that have overcrowded and they are eating lots of bream. The bream that do survive have little competition and are able to grow to a large size. This condition has led to the larger sized Bluegill and Redear Sunfish. If larger Largemouth Bass are desired, harvest should be focused on these small Largemouth Bass (AGFC, 2022).

Hunter Lake- is still fairly balanced despite the lack of larger Largemouth Bass in our sample. The Bluegill and Redear Sunfish populations were not as skewed toward only large fish as we normally see in a Largemouth Bass crowded situation (AGFC, 2022).

Lower Engineer- appears to be a shallow, unproductive lake with a relatively poor fish population comprised of mostly small individuals. Draining and renovating the lake would improve the fish population in the long run. However, if that is not a feasible solution, focusing fish management efforts on Hunter and Jewett lakes would be a more productive use of time (AGFC, 2022).

For specific information and graphs, the reports to this study are available through the DCSEN-E office. We will continue to stock as recommended as funds allow and focus on managing the upper lakes until plans and funds allow for renovation of lower engineer.

K.2.5 Aquatic Invertebrates

Aquatic macroinvertebrates were sampled in connection with the water quality studies conducted by Rickett (1995), Harris and Rickett (1996), and Rickett (1996).

Seine and dip net sampling methods collected aquatic invertebrates representing 108 genera in 71 families. Seven taxa were found at all sites, while 4 taxa were found at 7 of the 8 sites. Nineteen taxa were found in all four streams, while 20 taxa were found in 3 of the 4 streams. Seven taxa were collected during all sampling periods, while 56 were collected during only one series. Forty-seven taxa were collected from only one stream, and 42 taxa were from only one site.
"The aquatic macroinvertebrates were surprisingly diverse but not especially abundant, except for the occasional dense pockets of animals at certain times during their annual growth cycles. Stream intermittency theoretically would not affect macroinvertebrates as much as fishes because of the shorter generation times and multiple reproductive efforts during the warmer months by macroinvertebrates." (Rickett 1996, p. 15). ,

Although one of the nine streams demonstrated biotic diversity and taxonomic assemblage greater than the other eight streams, it was found that the benthic and fish communities were generally limited. Although limited, these species were still present so long as water was available. Within the biotic community of the streams, 28 taxa were found. The highest composition was recorded in Jim Creek. The macroinvertebrate community was dominated by the nymphs of dragonflies/damselflies (Odonata) and larvae of beetles (Coleoptera). The complete list of benthic macroinvertebrate species collected in all streams (study reaches) consisted of approximately 1,000 taxa collected (GBMc 2003).

K.2.6 Terrestrial Invertebrates

The terrestrial invertebrates have not been extensively studied on RMTC. In the summer months of 1998, OBS established 64 plots to determine if the endangered American Burying B-eetle (*Nicrophorus americanus*) was present on the installation. No individuals of *N. americanus* were observed or trapped during this study. However, OBS documented four other *Nicrophorus* species on the installation: *N. orbicollis*, *N. tomentosus*, *N. pustulatas*, and *N. marginatus*.

In 2002, Parsons began a project to establish a baseline database of terrestrial invertebrate families that occur on RMTC. At this time, Coleoptera and Hymenoptera were the featured species. The sample sites selected for this project were chosen from previous RTLA surveys. Forty-six sites were chosen in a variety of vegetative communities at RMTC. At these locations, a variety of traps were distributed in five of the broadest vegetative communities. These included post oak/blackjack oak, mixed oak/ hickory, bottomland oak (cypress/tupelo), shortleaf pine/oak, and little bluestem/winged sumac. The sampling periods were for two weeks each in June, July, and August. During trapping, 11,666 Coleoptera were captured in three types of traps. Sixty-eight families were represented with four being the most dominate.

The second trapping period resulted in the capture of 637 Hymenoptera. Three trap types were responsible for the capture of 36 families within the Hymenoptera order. Four families dominated the survey sites (Parsons 2003).

A Terrestrial Insect Survey conducted by GBMc from May-August 2005 developed a broad family-level characterization of thirteen insect orders. Ninety-one families were identified from over 38,000 individual captures.
As terrestrial invertebrates encompass a substantial part of most ecosystems and serve as excellent indicators of function, health, and overall biodiversity, it is imperative to identify, categorize, and classify them to best extent possible. As several of the previous efforts focused, in most cases, on delineating habitat affinity based on identification of individuals to family taxa, future efforts should concentrate on identification to the lowest possible taxonomic level. This is the only way to ensure a robust and thorough baseline Faunal PLS from which future monitoring and updates can occur. This will also further facilitate management planning and efforts by indicating the presence of any invertebrate SOCCs and helping to identify potential PCSs (or further describe and delineate existing PCSs). Additionally, limited volunteer "citizen-scientist" based efforts are underway to supplement the lack of current resources toward this effort (Raney et al. 2010).

| Scientific Name | Common Name | Conservation Status | Reference |
|---|---|---|---|
| Vascular Plants | | | |
| *Callirhoe bushii* | Bush's Poppymallow | G3 S3 | ANHC 2012 |
| *Eupatorium hyssopifolium var. hyssopifolium* | Hyssop-leaved Boneset | G5T5 S3 | ANHC 2012 |
| *Gymnopogon brevifolius* | Shortleaf Skeletongrass | G5 S2 | ANHC 2012 |
| *Krigia occidentalis* | Western Dwarf Dandelion | G5 S3 | Getz 1994 |
| *Nemastylis nuttallii* | Nuttall's Pleatleaf | G4 S2 | ANHC 2012 |
| *Piluria americana* | American Pillwort | G5 S2 | Getz 1994 |
| *Platanthera flava* | Southern Tubercled Orchid | G4 S2S3 | Getz 1994 |
| *Scleria pauciflora* | Fewflower Nutsedge | G5 S3 | ANHC 2012 |
| Vertebrate Animals | | | |
| *Accipiter cooperii* | Cooper's Hawk | G5 S1B, S3N | Wiedenfeld et al. 1999 |
| *Accipiter striatus* | Sharp-shinned Hawk | G5 S1S2B | Lohraff 1996 |
| *!Peucaea aestivalis* | Bachman's Sparrow | G3 S3B | Lohraff 1996 |
| **Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 S3 | Pitts 1988 |
| *#Setophaga virens* | Black-throated Green Warbler | G5 S2B, S5N | Lohraff 1996 |
| *#Haliaeetus leucocephalus* | Bald Eagle | G4 S2B, S4N | Lohraff 1996 |

| | | | |
|---|---|---|---|
| *Macrochelys temminckii* | Alligator Snapping Turtle | G3G4 S3 | DCSEN-E 2012 |
| *Pandion halieaetus* | Osprey | G5 S1B, S4N | Lohraff 1996 |
| Invertebrate Animals | | | |
| *Problema byssus* | Byssus Skipper | G3G4 S1 | Raney et al. 2010 |
| *Utterbackia imbecillis* | Paper Pondshell | G5 S3 | ASU 2003 |
| *Somatochlora ozarkensis* | Ozark Emerald | G3 S1 | Rickett 1995 |
| *Speyeria diana* | Diana Fritillary Butterfly | G3G4 S2S3 | Moran, Baldridge 2002 |

| Scientific Name | Common Name | Conservation Status | Reference |
|---|---|---|---|
| GLOBAL RANK DEFINITIONS Basic Rank: G1 = Critically imperiled globally G2 = Imperiled globally G3 = Rare or uncommon G4 = Widespread, abundant, and apparently secure, but with cause for long-term concern G5 = Demonstrably widespread, abundant, and secure G#G# = Numeric range rank: A range between two of the ranks that denotes a range of uncertainty about the exact rarity of the species Sub rank: T = Taxonomic subdivision (trinomial) REFERENCES See Appendix A in Robinson Maneuver Training Center Integrated Natural Resource Management Plan. | | STATE (SUBNATION) RANK DEFINITIONS<br>S1 = Critically imperiled<br>S2 = Imperiled in the state<br>S3 = Rare or uncommon<br>S4 = Widespread, abundant, and apparently secure, but with cause for long-term concern<br>S5 = Demonstrably widespread, abundant, and secure<br>S#S# = Numeric range rank: A range between two of the ranks that denotes a range of uncertainty about the exact rarity of the species<br>SU = Possibly imperiled in the state, but status uncertain SX = Extirpated, or nonbreeding in state.<br>S#B = Rank for avian species in breeding status<br>S#N = Rank for avian species in non-breeding status<br><br>! *P. aestivalis* has been observed on several occasions but has not been observed at RMTC since 2003.<br><br>* One *C. rafinesquii* was collected by Pitts and placed in the UALR museum; subsequent inventories have not recorded this species.<br><br># *H. leucocephalus* and *S. virens* have been observed on RMTC on several occasion but nests/nesting behavior have not been observed for these species. | |

Table K.2.6.-1 Species of Conservation Concern (SOCCs) at RMTC.

K.3 Planned Future Projects

There are new faunal surveys planned for the upcoming years provided funding is available. These projects can be found on the INRMP implementation table in appendix B.
There are three surveys planned for FY24. Additional surveys are also in the works to add to the planned projects as funding allows.

A bat survey, which will determine bat species presence on RMTC. It will focus on bat species present on RMTC and locating their maternal colonies. Additionally, a project is

pending funding to acquire and mount bat boxes around the installation to provide shelter for bat species. Currently there are no listed bat species on RMTC, the last time the NLEB was detected was during the 2006 survey.

Other FY24 surveys planned include a Monarch butterfly and Diana Fritillary survey. This project will survey for concentrated host plant locations and high-quality foraging sites to determine priority conservation and restoration sites.

Another project for FY 24 is scheduled to survey for Wild Turkey. This project was approved funding for FY 23 with end of year funds. RMTC currently has Harbor Environmental inc. contracted to conduct this survey.

There is also a faunal survey project planned for FY25-26. This project will focus on observing the abundance, distribution, and habitat associations of Northern Bobwhite Quail and grassland birds. With the data collected from this survey, environmental staff on RMTC can utilize better management techniques to help preserve habitat for quail and grassland birds.

# Appendix L: Endangered Species Management

## L.1 Overview and Management Goal

Management of species of conservation concern will benefit RMTC by studying the presence, and absence of species and reducing the likelihood that the presence of these species or their habitat could limit military training. (WRT the Sikes Act)

## L.2 Laws, Regulations, and Policies

As amended, the Endangered Species Act (ESA) of 1973 provides federal protection for threatened and endangered (T&E) species and the ecosystems upon which they depend or critical habitat. An endangered species is defined as one that "is in danger of extinction throughout all or a significant portion of its range," and a threatened species is defined as one that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range," and critical habitat is defined as "specific areas that the species may or may not currently occupy but contain certain physical or biological features essential to the conservation of the species, and which may require special management considerations or protection" (ESA, 1973). The ESA directs that all federal agencies use their existing authorities to conserve threatened and endangered species and ensure that their actions do not directly or indirectly jeopardize the survival of listed species or destroy or adversely modify designated critical habitats.

The ESA requires the U.S. Fish and Wildlife Service (USFWS) to be consulted if a current or proposed activity may adversely affect a currently listed or proposed listing species or its critical habitat. Federal agencies are required to consult when they determine that a proposed or ongoing action “may affect” a listed species. Formal consultation is required if the effects are likely adverse or there is concern with jeopardizing proposed species or adversely modifying proposed critical habitat. The USFWS and the National Marine Fisheries Service (NMFS) enforce the ESA and determine federally listed species and their respective critical habitat (50 CFR Part 17). The USFWS Ecological Services Field Office's Information, Planning, and Conservation (IPaC) system website (http://ecos.fws.gov.ipac/) provides an online consultation tool and up-to-date listing of federally listed species, their designated critical habitat, and migratory birds or other natural resources that occur in or may be affected by actions associated with proposed projects. Although we are a state owned facility, each time we submit a REC on an area we also run it through the IPaC system website and follow the consultation tool to see if the proposed activity may have an adverse effect on a listed or proposed species.

Notably, an ESA provision grants DoD services an exemption from Critical Habitat designation when an INRMP benefits listed species, such as positive management and or enhancement of suitable habitat for such species. To prevent the assignment of Critical Habitat on-site and land-use restrictions from newly listed species, RMTC needs to address the management and conservation of such species in the INRMP; this should be done before the species becomes listed or listed while the species is still categorized as Candidate or Proposed. For species newly listed under the ESA or not otherwise included in the current INRMP, a supplement may be added to the current INRMP to manage those species and avoid

Critical Habitat designation. The appendix must benefit the applicable species and be signed by the ARARNG TAG, ARNG I&E, AGFC, ANHC, and the USFWS.

Additional supporting laws, regulations, and policies that support or offer other protections include but may not be limited to The Sikes Act, as amended, Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), Army Regulation 200-1 Environmental Quality: Environmental Protection and Enhancement (AR 200-1), and DoD INSTRUCTION: Natural Resources Conservation Program and DoD MANUAL: Integrated Natural Resources Management Plan (INRMP) Implementation (DoDI 4715.03 and DoDM 4715.03, respectively).

## L.3 Federally listed Species in Central Arkansas

The USFWS Environmental Conservation Online System (ECOS) website (https://ecos.fws.gov/ecp/) provides up-to-date information on Federally listed species, critical habitat, and Section 7 consultation issued Biological Opinions. ECOS identifies 17 listed species believed to or known to occur in Pulaski and Faulkner counties (the counties in which RMTC is located); see Table L.3.1.

The USFWS Arkansas Field Office works to protect and monitor wildlife and their habitats in Arkansas, most notably through its Candidate Conservation Program. This program relies on the aid of experts and external partnerships to perform species assessments to capture species conservation needs adequately. The Arkansas Field Office tracks and updates the 32 Arkansas T&E species, distinctive from the state's SOCC species.
Through the CCP program, the USFWS bridges the non-regulatory and regulatory approaches to species conservation through two key elements that include:

- Identifying species most in need of protection provided by the Endangered Species Act (ESA) and the activities that threaten them.
- Working through partnerships to conserve these species by improving habitat and removing threats.

After an evaluation is conducted of a species' status, either through the initiative of the USFWS, the candidate conservation assessment process, or in response to a petition received by the USFWS, then a species may be identified for listing under the ESA (Endangered Species Act).

During the review of the petitions, USFW may make a finding that listing is warranted. However, other higher-priority listing actions may take precedence. In this case, the species may be added to the list of candidates and reviewed annually until the species is listed. While higher-priority listing actions move forward, the USFWS works with states, tribes, private landowners, private partners, and other federal agencies to carry out conservation actions for these species to address threats, prevent further decline, and possibly eliminate the need for listing(fws.gov/program/candidate-conservation).

| Group | Scientific Name | Common Name | Federal Status | State Rank |
|---|---|---|---|---|
| Mammals | *Myotis septentrionalis* | Northern Long-eared Bat | Endangered | S1S2 |
| Mammals | *Perimyotis subflavus* | Tricolored Bat | Proposed Endangered | |
| Mammals | *Myotis lucifugus* | Little Brown Bat | Under Review | S3 |
| Mammals | *Myotis sodalis* | Indiana Bat | Endangered | S1 |
| Birds | *Charadrius melodus* | Piping Plover | Threatened | S1N |
| Birds | *Haliaeetus leucocephalus* | Bald Eagle | Recovery | S2B,S4N |
| Birds | *Sterna antillarum* | Interior Least Tern | Recovery | S2 |
| Insects | *Danaus plexippus* | Monarch Butterfly | Candidate | S5B |
| Insects | *Papaipema eryngii* | Rattlesnake-master Borer Moth | Resolved taxon | S1 |
| Mussels | *Lampsilis abrupta* | Pink mucket (pearly mussel) | Endangered | S1 |
| Mussels | *Potamilus capax* | Fat Pocketbook | Endangered | S1 |
| Mussels | *Quadrula cylindrica cylindrica* | Rabbitsfoot | Threatened | S2 |
| Mussels | *Quadrula fragosa* | Winged Mapleleaf | Endangered | S1 |
| Mussels | *Toxolasma lividum* | Purple Lilliput | Resolved taxon | S2 |
| Plants | *Trifolium stoloniferum* | Running Buffalo Clover | Recovery | possibly extirpated |
| Reptiles | *Macrocpelys temminckii* | Alligator Snapping Turtle | Proposed Threatened | |

Table L.3-1 Federally Protected Species Believed to or Known to Occur in Pulaski and Faulkner Counties.

## L.4 State-Monitored Species in Central Arkansas

Arkansas does not recognize any State-listed T&E species nor provide any additional legal protections for any species known to occur beyond those listed and protected under the ESA, MBTA, BGEPA, or other Federal or DoD laws or regulations. However, the AGFC and ANHC work collaboratively to protect and monitor Arkansas flora and fauna populations, communities, and habitats.

The AGFC is responsible for managing and protecting fish and wildlife resources in Arkansas, including rare and endemic species, with an emphasis on game species. The AGFC maintains and updates the rules and regulations for permits to hunt, fish, trap, or collect any wildlife within the state. In compliance with the USFWS's State Wildlife Grant Program 2005, the AGFC developed 'The Arkansas Wildlife Action Plan' (AWAP) (https://www.agfc.com/en/wildlife-management/awap/). This plan provides the framework for wildlife conservation in Arkansas. It allows state and federal agencies and other conservation partners to fulfill individual and coordinated roles in conservation efforts across the state. A primary goal in developing this plan is to monitor, manage, and protect at-risk species not afforded the protections that game or federally-listed species receive. The focus of this plan is on the successful management of Arkansas's native species of greatest conservation need (SGCN). SGCNs are determined based on multiple factors and include 379 species (AWAP 2015). However, it is essential to note that inclusion on this list does not offer any special protections for these species; it is simply a means to identify species and groups of species that will be the focus of programs and projects supported by federal funding under the State Wildlife Grant program.

The ANHC collects, compiles, analyses, and maintains data on Arkansas's rare, threatened, and endangered species. This data is subsequently used to evaluate the status of native species and to delineate high-quality natural habitats, determine management priorities within the state, track changes in species abundance and distribution, and monitor habitat biodiversity and quality to best inform land managers in making conservation decisions.
Species of Special Concern (ANHC)
Arkansas Natural Heritage Commission utilizes a state-wide ranking system to determine Arkansas's species at most significant risk of destruction. The species at the highest risk have been termed species of conservation concern (SOCC) or Species of Greatest Conservation Need (SGCN). The rankings span from S1 to S5: S1 is Critically imperiled, which means the species is of substantial conservation concern. Species ranked S2 are listed as imperiled. The ranks rate down from there to S5 Species, where they are stable and of no conservation concern. The species ranked S1 and S2 are of most concern on RMTC, and if detected, the species and its habitat should be protected as it could become a federally-listed T&E species.

ANHC has identified 39 SOCCs that have been identified on RMTC, have been documented in areas adjacent to RMTC, or may be found on RMTC due to sufficient habitat (See Table 4.1).

Furthermore, RMTC entered a data share agreement with ANHC in 2021.

| ***Scientific Name*** | **Common Name** | **Global Rank** | **State Rank** |
|---|---|---|---|
| **Animals-invertebrates** | | | |

| | | | |
|---|---|---|---|
| *Atrytonopsis hianna* | Dusted Skipper | G4G5 | S2S3 |
| *Chlosyne gorgone* | Gorgone Checkerspot | G5 | S3 |
| *Papaipema eryngii* | Rattlesnake master borer moth | G1G2 | S1 |
| *Somatochlora ozarkensis* | Ozark emerald | G3 | S1 |
| *Speyeria diana* | Diana Fritillary | G2G3 | S2S3 |
| **Animals-vertebrates** | | | |
| *Calcarius pictus* | Smith's Longspur | G4G5 | S2N |
| *Centronyx henslowii* | Henslow's Sparrow | G4G5 | S1B S2N |
| *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 |
| *Haliaeetus leucocephalus* | Bald Eagle | G5 | S3B S4N |
| *Hyla avivoca* | Bird-voiced treefrog | G5 | S3 |
| *Liodytes rigida* | Glossy Swampsnake | G5 | S3 |
| *Myotis lucifugus* | Little Brown Bat | G3 | S1 |
| *Myotis septentrionalis* | Northern Long-eared Bat | G1G2 | S1S2 |
| *Ophisaurus attenuatus* | Slender Glass Lizard | G5 | S3 |
| *Sternula antillarum athalassos* | Interior Least Tern | G4T3Q | S3B |
| *Thryomanes bewickii* | Bewick's Wren | G5 | S1B S1 S2N |
| **Plants-Vascular** | | | |
| *Amorpha ouachitensis* | Ouachita Indigo Brush | G3Q | S3 |
| *Asclepias obovata* | Savannah Milkweed | G5? | S2 |
| *Callirhoe alcaeoides* | Plains Poppy Mallow | G5? | S1? |
| *Callirhoe bushii* | Bush's Poppy Mallow | G3 | S3 |
| *Carex arkansana* | Arkansas Sedge | G4 | S1 |
| *Carex decomposita* | Cypress-knee Sedge | G3G4 | S2 |
| *Carex normalis* | Spreading Oval Sedge | G5 | S1 |
| *Carex Opaca* | Opaque Prairie Sedge | G4 | S2S3 |
| *Cirsium nutallii* | Nuttall's Thistle | G5 | S2? |
| *Dichanthelium arenicoloides* | Rosette Grass | GNR | SNR |
| *Draba aprica* | Open-ground Whitlow Grass | G3 | S2 |
| *Eleocharis wolfii* | Wolf's Spike-rush | G3G5 | S3 |
| *Gymnopogon brevifolius* | Short-leaf Skeleton Grass | G5 | S2 |
| *Hexalectris spicata* | Crested-Coralroot | G5T4T5 | S2 |
| *Lathyrus pusillus* | Low Vetchling | G5? | S2 |
| *Liatrus compacta* | Ouachita Blazing Star | G3 | S3 |
| *Micranthes virginiensis* | Early Saxifrage | G5 | S1S2 |
| *Muhlenbergia glabrifloris* | Inland Muhly | G4? | S1 |
| *Nemastylis nutallii* | Nutall's Pleatleaf | G4 | S2 |
| *Paspalum bifidum* | Pitchfork Paspalum | G5 | SH |
| *Penstemon cobaea* | Showy Beardtongue | G4 | S3 |
| *Platanthera flava* | Rein Orchid | G4? | S2S3 |

| | | | |
|---|---|---|---|
| *Platanthera peramoena* | Purple Fringeless Orchid | G5 | S2 |
| *Polygala incarnata* | Pink Milkwort | G5 | S1S2 |
| *Prenanthes aspera* | Prairie Rattlesnake Root | G4? | S2S3 |
| *Ranunculus flabellaris* | Yellow Water Crowfoot | G5 | S3 |
| *Rhynchospora globularis globularis* | Globe Beaksedge | G5? T5? | S2 |
| *Spiranthes odorata* | Fragrant Ladies Tresses | G5 | S1 |
| *Streptanthus maculatus ssp* | Arkansas Twistflower | G3T3Q | S3 |
| *Trifolium carolinianum* | Carolina Clover | G5 | S1? |
| *Valerianella ozarkana* | Ozark Cornsalad | G3 | S3 |

Table L.4-1 Species of Special Concern in the Vicinity of RMTC

## L.5 Endangered, Threatened, and Rare Species and Species of Conservation Concern on RMTC

### L.5.1 Federally-listed Species

Previously conducted surveys on RMTC have suggested that RMTC does not have sufficient habitat and is unlikely to support most of the federally-listed species known or expected to occur in this area. However, a few currently listed and candidate species have been identified on RMTC, Alligator Snapping Turtle, Monarch Butterfly, and the Bald Eagle, which populations have recovered.

**Northern Long-eared Bat - Myotis septentrionalis**
Northern Long-eared bats appear to prefer heavily forested areas. Their winter hibernacula include mines and caves, known to roost in trees, buildings, mines, and caves during summer (Saugey, 1998). Four bat surveys of various degrees have been conducted on RMTC (Saugey, 1998; Britzke and Redman, 2006, Mitigation Surveying Services, LLC 2020, Mitigation Surveying Services, LLC 2021). While the Northern Long-eared bat was acoustically detected on RMTC during the Britzke and Redman 2006 survey, no individuals have been captured using mist nets across any of the surveys. The NLEB was detected three times in spring and one time in fall. At the time of the 2006 survey the NLEB was not listed, however it is now listed. No other individuals have been detected on the installation in the most recent T&E survey conducted in 2021. An updated bat survey is anticipated in the upcoming years, pending funding approval.

Although these bat species are not currently listed, other bat species have been recorded on RMTC that are currently under review for being Federally-listed. Tricolored bats (Perimyotis subflavus) were captured using mist nets during the Saugey 1998 survey and were acoustically detected during the Britzke and Redman 2006 survey. Little Brown bats (Myotis lucifugus) were acoustically detected during the Britzke and Redman 2006 survey but were not captured in mist nets during any of the surveys. These species are thought to have similar habitat requirements as the Northern long-eared bats (Saugey, 1998).

Accordingly, RMTC may provide a potential summer roosting and foraging habitat for these bat species. The decline of these species in recent years due to White-nose Syndrome may help explain the absence of these species during the surveys conducted in 2020 and 2021.

However, further and more extensive survey efforts are necessary to verify these species' seasonal presence and use of RMTC.

**Alligator Snapping Turtle – (Macrochelys temminckii)**
Alligator snapping turtles can be found in freshwater lakes, rivers, swamps, and bayous. Their habitat preference includes slow-moving or still bodies of water, aquatic vegetation and brush, and a soft, muddy substrate. RMTC does have suitable areas that meet these habitat requirements, and alligator snapping turtles have been documented on the installation.

Alligator Snapping Turtles have recently been listed as federally threatened and have been recorded on the installation in a 2021 survey. (GBMc, 2021). In this survey only two turtles were documented, and further surveys are needed to determine population size, range, and habitat usage.

**Monarch Butterfly – (Danaus plexippus)**
Monarch butterflies can be found in open fields, meadows, and roadside areas that contain milkweed and flowering plants. RMTC includes regions that meet this species' habitat requirements, and monarch butterflies are frequently seen on the installation.
Recently listed as a candidate species, multiple individuals were observed across the installation. Further surveys are required to determine the usage of RMTC.

**Bald Eagle - (Haliaeetus leucocephalus)**
Bald eagles are a former federally threatened species but are still protected under the BGEPA. This act prohibits disturbing eagles or their nesting sites, even if the nest is not utilized. Suitable nesting habitat for bald eagles does exist within the installation at Grassy Lake and on adjacent AGFC property (Camp Robinson Special Use Area (SUA) to the north and Bell Slough Wildlife Management Area (WMA) to the west). It is important to note that Bald Eagles have been occasionally observed flying over and perched in trees on the installation, although they have not been observed nesting on RMTC.

L.5.2 State-Ranked Species of Conservation Concern

GBMc (2021) conducted a T&E species and SOCC survey from 2020-2021 and documented 8 SOCC on RMTC.

In the summary of findings for plants, no federal threatened or endangered plant species were observed on RMTC during the surveys. However, several state-ranked species of concern were detected and positively identified at RMTC and are listed below.

The invertebrate findings showed no federal threatened or endangered invertebrate species were observed on RMTC during the surveys. Invertebrates were surveyed and included 40 survey points between September 2020 and August 2021. One SOCC was documented, a Diana Fritillary ranked S2/S3(GBMc,2021).

The summary of findings for the avian survey also showed no federal threatened or endangered species on RMTC. Fifty-six survey locations were targeted between April and July of 2021. Also, no target SOCCs were heard or documented during this survey.

The Reptile portion of the GBMc survey of 2021 says there were no federally threatened species found. However, they documented that 2 Alligator Snapping Turtles were captured and released. Since the survey, this species has been reviewed to add to the list.

The 2021 survey by GBMc of the amphibians showed no target species. However, RMTC staff observed the Crawfish Frog (Lithobates areolatus) using acoustic recorders; Keloly Irwin, the herpetologist for AGFC, analyzed the data. Additionally, the Natural Resource manager observed one crawfish frog peeking out of a crawfish burrow, but it retreated before a picture could be documented.

For the mammal part of the survey, two bats were caught in mist nets; both were the same species, the Red bat. Acoustic recordings were also used in 2021 and revealed five bat species. The table below shows the SOCC species that GBMc did observe in the 2020-2021 survey.

| Scientific Name | Common Name | State Rank | Latitude | Longitude | Note |
|---|---|---|---|---|---|
| Plant Species | | | | | |
| *Gymnopogon brevifolius* | Short-leaf skeleton grass | S2 | 34.949367°<br>34.932865°<br>34.941303°<br>34.938780°<br>34.941357°<br>34.938712° | -92.309125°<br>-92.323465°<br>-92.321866°<br>-92.315961°<br>-92.318113°<br>-92.312311° | Species found at multiple locations. Coordinates represent approximate areas. |
| *Hexalectris spicata var. spicata* | Crested-coralroot | S2 | 34.951092°<br>34.94133° | -92.357338°<br>-92.30403° | Identified by RMTC personnel. Specimen was collected and is being submitted for record |
| *Nemastylis nuttallii* | Nuttall's pleat-leaf | S2 | 34.940242° | -92.316642° | Identified by RMTC personnel |
| *Platanthera flava* | Rein orchid | S2S3 | 34.922437° | -92.322655° | Multiple flowering plants observed |
| *Polygala incarnata* | Pink milkwort | S1S2 | 34.949083° | -92.307527° | One flowering plant observed |
| Invertebrate Species | | | | | |
| *Speyeria diana* | Diana fritillary | S2S3 | 34.901480° | -92.301203° | Observed several males and females at multiple locations - including pollinator garden, TAs 6, 11, 13, and all along west boundary road. |
| Vertebrate Species | | | | | |
| *Lithobates areolatus* | Crawfish frog | S2 | 34.933922° | -92.322602° | Identified by RMTC personnel |
| *Macrochelys temminckii* | Alligator snapping turtle | S3 | 34.937634° | -92.361605° | Two turtles captured and released |

Table L.5.2-1 Target species identified on RMTC by GBMc 2021

L.5.3 DoD PIF Birds

The Department of Defense Partners in Flight comprises a cooperative network of natural resource managers on military installations throughout the United States. The DOD PIF was established in 1991, and they collaborate with partners across the Americas to conserve migratory and resident birds and their habitats on DOD lands.
DOD Partners in Flight helps to sustain and enhance the military mission through management strategies that maintain healthy landscapes and training lands, as well as using proactive, habitat-based conservation.
This program reaches beyond installation boundaries to create cooperative partnerships, keep the current status of bird populations, and prevent new species of birds from being listed as threatened or endangered.

More specifically, DOD PIF makes possible the development of cooperative agreements for implementing bird conservation programs and projects on military lands and encourages communication and information sharing across geographic and political boundaries.
Participates and provides leadership in PIF committees and working groups and provides Natural resource professionals on military installations with the most up-to-date information on bird conservation.
The Partners in Flight's key components are its

- Local, state, regional, national, and international level partnerships.
- Leadership in implementing ecosystem-based bird conservation planning for installation and regional Integrated Natural Resource Management Plans or INRMPs
- DOD Coordinated Bird Monitoring Plan
- North American Bird Conservation Initiative Projects
- Management of DOD's Important Bird Areas program and the
- Bird/Animal Aircraft Strike Hazard Program (BASH)

The DOD plan offers a coordinated framework for incorporating bird habitat management efforts into the installation INRMP. Partners in Flight, or PIF, is a collaborative effort by government agencies, conservation groups, academic institutions, and everyday citizens dedicated to "keeping common birds common." PIF maintains a bird conservation strategy through a series of Bird Conservation Plans and a PIF Prioritization Scheme, which helps determine which species in each region most need conservation attention. The scheme ranks species based on seven measures of conservation vulnerability: (1) relative abundance (interspecific); (2) size of breeding range; (3) size of non-breeding range; (4) threats to the species on the breeding grounds; (5) threats to the species on the wintering grounds; (6) current known population trends; and (7) relative density (intraspecific) in a given planning unit compared to the maximum reached within its range. This plan is a 124-page document that is updated every ten years, and the most recent version was written in 2016. The next update will be done in 2026. This plan can be accessed using this link (Partners in Flight Landbird Conservation Plan (2016) - Partners in Flight).

In 2001, EO 13186 was signed with regards to migratory bird conservation. Following this executive order, a Memorandum of Understanding (MOU) between the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) was made available in 2012. One of the requirements of EO 13186 is that each Federal agency taking

actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement a MOU with the FWS that shall promote the conservation of migratory bird populations (EO 13186 Section 3(a)). The MOU also provides for strengthening migratory bird conservation by identifying strategies that promote conservation and reduce adverse impacts on migratory birds through enhanced collaboration between NMFS and the FWS. Complete details on this MOU may be found at http://www.fakr.noaa.gov/protectedresources/seabirds/mou/eo13186_nmfs_fws_mou2012.pdf.

Section 3(g) of EO 13186 states that "Each agency shall advise the public of the availability of its MOU through a notice published in the **Federal Register** " (NOAA).

RMTC is implementing measures to minimize impacts on migratory birds by following the MBTA. The MBTA controls many actions that may negatively affect migratory birds, particularly collecting and transporting birds. Special permits may be issued that allow for relocation or transporting migratory birds for management purposes.

It is DOD policy, in accordance with the MOU described by EO 13186, to promote and support a partnership role in protection and conservation of migratory birds and their habitat, protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems on training lands consistent with the military mission. RMTC manages for migratory birds directly as well as providing indirect benefits by other land management practices. Management actions include controlling invasive species to improve habitat, maintaining the integrity of the habitat by avoiding wetland disturbances, implementing air space or flight path restrictions to reduce undue stress and possible BASH issues in specific TAs during Waterfowl migrations, and utilizing prescribed burns to improve habitat, benefit ground nesting birds, and promote plant diversity and native insect populations. Additionally, restrictions on time of year to burn and other activities greatly benefit forest nesting birds as well a bat species that roost in the forest.

### L.5.4 Targeted Species Management on RMTC

RMTC collaborates with these agencies (i.e., USFWS, AGFC, ANHC) to develop and update management plans and goals for these species and their habitats. This approach is accomplished through as-needed requests and the annual review and 5-year update process of this Integrated Natural Resource Management Plan (INRMP) and with reference to the Sikes act. The AGFC and ANHC have assisted in determining management priorities for the RMTC INRMP. ANHC and USFWS staff members have conducted limited surveillance for particular species on the installation; however, they could not document the presence of any federally listed species on RMTC. Management plans will continue to be updated to include the latest guidance and recommendations for managing these species and their habitat. Future survey efforts will continue to monitor these species and attempt to document the occurrence of additional T&E species and SOCC on RMTC. Despite the lack of state-level legal protections for Arkansas SOCC, potential adverse effects of current and proposed projects or activities on these species and their habitats should be assessed, and efforts should be made to mitigate resulting negative impacts. These species are at a greater risk of becoming a T&E species;

and, subsequently, should be taken into consideration and offered additional precautions whenever detected. RMTC staff will continue surveying these species and developing management plans as the situation changes.

L.6. Birds of Conservation Concern or protected under the MBTA or BGEPA

Birds of Conservation Concern: The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973. "Birds of Conservation Concern 2021 (BCC 2021)" is the most recent effort to carry out this mandate.

**American Golden plover, Pluvialis dominica**
American Golden-plovers tend to select open, sparsely vegetated nest habitats, including wet meadows, sedge marshes, and low-lying areas near water bodies. They are frequently found in coastal wetlands, estuaries, mudflats, and sandy beaches with open patches of land.

**American Kestrel, Falco sparverius**
American Kestrels prefer open landscapes, favoring habitats that offer a mix of open grasslands, agricultural fields, meadows, and forest edges. They require open perches with unobstructed views and tend to nest in cavities, so snags and stripped trees may often be found in their habitats. American Kestrels were detected on RMTC between April and July of 1999.

**Bachman's Sparrow, Aimophila aestivalis**
Bachman's Sparrows can be found in the southeastern U.S., in open pine woodlands and other habitats with a grassy, open understory. They are counted as a PIF Priority Species on RMTC. A breeding population of Bachman's Sparrows was first recorded in RMTC on Training Areas 7, 10, 11, 13, 14, 23, and the WMA of RMTC in spring-summer 1999. (Puschock, Wiedenfeld, and Reinking 1999.) Additionally, there was one detection of Bachman's Sparrow in June of 2002 in an Early Successional habitat (Guilfoyle, Michael P., and Fischer, Richard A., 2003).

**Bald Eagle, Haliaeetus leucocephalus**
Bald eagles typically live within two and a half miles of an open body of water and often choose to roost in large, mature trees, cliffs, and rock structures. These raptors "are best obtained through intensive sampling in wetland and open water habitats" (Guilfoyle, Michael P., and Fischer, Richard A., 2003).

**Black-throated Green Warbler, Setophaga virens**
This species predominantly inhabits mature, mixed deciduous, and coniferous forests. They prefer well-developed understory and dense mid-story layers, contributing to a multilayered canopy structure that offers a range of microhabitats. They were detected on RMTC between April and July of 1999. They were also recorded on RMTC during the Spring 2002 migration season. Guilfoyle, Michael P., and Fischer, Richard A., observed the Warbler as a "neotropical migrant species detected during the spring survey…transient that breeds at latitudes north of RMTC, and so was using habitats on the installation as for migratory stopover habitat."

**Brown-headed Nuthatch, Sitta pusilla**
The Brown-headed Nuthatch is a cavity-nesting songbird and primarily inhabits pine-dominated forests, particularly those characterized by mature pine stands. They prefer open pine woodlands, longleaf pine savannas, and pine-oak forests. Suitable nesting sites are typically found in dead or dying pine trees, snags, or hardwood trees with cavities. Thus, they may be found in fire-maintained ecosystems. Brown-headed nuthatches were detected on RMTC between April and July of 1999. During the 2003 Aviation Survey, White-breasted nuthatches were recorded, but not Sitta pusilla.

**Cerulean Warbler, Setophaga cerulea**
The Cerulean Warbler breeds wet-mesic to dry-mesic habits containing mature hardwood trees. One Cerulean Warbler was detected in 1999, and another by Lohraff in 1996, but both individuals were migratory transients. Areas of potential breeding habitat on RMTC, consisting of bottomland hardwood forest along streams and Grassy Lake, are scattered and thus not large enough to support a population. The majority of the habitat is unsuitable for the species. (Puschock, Wiedenfeld, and Reinking 1999). Cerulean Warblers are identified as a PIF Species of Concern.

**Chimney Swift, Chaetura pelagica**
Chimney Swifts prefer man-man structures with vertical spaces and low light, particularly chimneys and tall structures such as smokestacks or old wells. They are specially adapted for clinging to vertical surfaces and utilize these structures to build cupped nests along the walls. In rural areas, they will roost in mature forests, along the sides of cliff faces, and on trees. Chimney Swifts were detected on RMTC between April and July of 1999. They were seen in six transacts across the Camp. They were also detected in the 2003 RMTC Avian Survey between April and October 2002. All neotropical species caught during the fall are potentially in the migration process.

**Cooper's Hawk, Accipiter Cooperii**
Cooper's Hawks can be found in various forested habitats, ranging from mature forests to fragmented woodlands and even urban parks and suburbs. They favor tall trees with dense foliage that cover and conceal their nests. Forest edges are particularly attractive to these hawks as they offer diverse prey species. Nesting sites are typically located high above the ground. They may favor proximity to water sources, as it enhances foraging potential. Cooper's Hawks were observed on RMTC between April and July 1999.

**Eastern Whip-poor-will, Antrostomus vociferus**
Eastern Whip-poor-wills are typically found in forested areas, including mixed woodlands and open deciduous forests. They prefer sites with a dense understory, abundant leaf litter, and fallen branches that provide cover and concealment. The Eastern Whip-poor-will was detected on RMTC between April and July 1999. At the time, it was classified as Caprimulgus vociferus. The Eastern Whip-poor-will was also observed on RMTC between April and May 2002 and again during June 2002. Both times, it was observed in Upland Hardwood, Pine/Hardwood Mix, and Early Successional Habitat areas.

**Henslow's Sparrow, Centronyx henslowii**

This species' preferred habitat is tallgrass prairie or saline glades within pine flatwoods. The AWAP lists this species as critically imperiled.

**Interior Least Tern, Sternula antillarum athalassos**
The species primarily inhabits riverine and floodplain habitats characterized by shifting sandbars, unvegetated islands, and exposed gravel or sandy substrates. Interior Least Terns prefer areas with minimal vegetation, as it provides suitable nesting sites and unobstructed foraging grounds. They consume flying insects, including beetles, dragonflies, and small fish.

**Kentucky Warbler, Oporornis formosus**
The Kentucky Warbler thrives in habitats characterized by dense understory vegetation, high moisture content, and well-drained soils, such as riparian zones and floodplains. This species exhibits a distinct affinity for mature, contiguous deciduous forests, particularly those with a prevalence of oak and maple trees. The presence of these mature trees offers nesting substrates and protection from predators. The Kentucky Warbler was observed at RMTC between May and July 1999 at 15 transects. It was also detected between April and May of 2002 and again during June 2002. It was seen in the Bottomland Hardwood Swamp, Riparian Hardwood, Upland Hardwood, Pine/Hardwood Mix, Early Successional, and Open Grassland Habitat areas.

**Lesser Yellowlegs, Tringa flavipes**
As a species of migratory shorebird, the Lesser Yellowlegs favor wetlands such as marshes, bogs, tidal creeks, flooded fields, and muskegs that provide shallow water, dense vegetation, and proximity to open areas. During the winter, they may occupy coastal mudflats, estuaries, mangroves, and freshwater wetlands in Central and South America. Their favored habitats feature muddy substrates with abundant invertebrate food sources.

**Osprey, Pandion halieaetus**
The Osprey can be found near fresh and saltwater. It may be seen around lakes, reservoirs, rivers, coastal estuaries, and salt marshes. They require elevated locations with good visibility for nesting sites and thus prefer tall trees, cliffs, and artificial structures such as powerlines. Due to their diet, which is almost exclusively composed of fish, Ospreys tend to choose habitats with abundant fish populations and shallow water bodies that support spawning, migration, and concentrated schools. Therefore, shallow river coastlines, river mouths, marshes, and extensive wetland areas may all host this species.

**Prairie Warbler, Dendroica discolor**
The Prairie Warbler prefers early-successional shrubland habitats with a dense understory and scattered distribution of small-to-medium-sized trees. "Prairie Warblers typically use relatively young Oldfield habitats with scattered shrubs and trees." (03 Survey). The Prarie Warbler was detected on RMTC between April and July 1999, between April and May 2002, and again during June 2002. It was seen in Early Successional Habitat areas.

**Prothonotary Warbler, Protonotaria citrea**
The Prothonotary Warbler can be found in wetland habitats, especially swamp forests, bottomland hardwoods, and riparian areas. The species favors sites with ample standing dead trees, snags, or living trees with decayed wood, which provide nesting substrate and serve as protection from predators. Additionally, the Warbler prefers areas with dense understory vegetation. The species is often found near slow-moving or stagnant water bodies, which offer

aquatic insects and invertebrates as the Warbler's primary diet. The Prothonotary Warbler was detected on RMTC during a 1994-1995 survey, between April and July of 1999, between April and May of 2002, and again during June of 2002. It was detected in the Wetland habitat and Bottomland Hardwood Forest/Swamp Habitat area.

**Red-headed Woodpecker, Melanerpes erythrocephalus**
The Red-headed Woodpecker strongly prefers mature woodland habitats, especially those composed of mixed deciduous and open-canopy forests. The species is commonly found in areas with diverse trees, including oak, hickory, beech, and maple trees, which offer suitable nesting cavities and an abundance of insect prey. They favor woodlands with abundant dead or decaying trees, as these serve as prime foresting sites and nesting substrates. Additionally, the availability of snags is essential for providing necessary cavities for nesting and roosting. In their 2003 survey, Guilfoyle, Michael P., and Fischer, Richard A. note that retaining snags and live cavity trees will encourage woodpecker nesting behavior. The species also benefit from open spaces and edge effects, which enhance foresting opportunities. As they rely on nuts and fruits during winter and fall seasons, the species strongly favor mast-producing trees such as oak and hickory. Red-headed woodpeckers were observed on RMTC between May and July of 1999, April and May of 2002, June of 2002, September and October of 2002, and February of 2003. It was detected multiple times in a winter 2003 waterfowl survey on Grassy Lake, RMTC. Its primary detection habitat was Bottomland Hardwood Swamp.

**Sharp-shinned Hawk, Accipiter striatus**
This species will breed mainly in large stands of deciduous, coniferous, and mixed pine-hardwood forests and pine plantations. They feed primarily on small birds. They are frequently documented in and around the area. They are vulnerable in Arkansas and are therefore listed as SGCN in the AWAP, but are secure globally and not listed in the ESA. Sharp-shinned hawks were detected during a fall migration point count survey between September and October 2002.

**Sprague's Pipit, Anthus spragueii**
The Sprague's Pipit can be found in undisturbed native grassland habitats, particularly mixed-grass and shortgrass prairies. The species is often found in areas with prairie grasses like little bluestem, big bluestem, and buffalograss, which offer suitable nesting sites and coverage while still allowing visibility for effective foraging. Sprague's Pipit thrives in landscapes characterized by the diversity of grass heights and benefits from moderate controlled burns to maintain the grassland's structure.

**Wood Thrush, Hylocichla mustelina**
The wood thrush is commonly found in forested habitats, exhibiting a preference for deciduous or mixed forests with thick understory. The species generally favors mesic environments with moderate and consistent moisture levels. Thus, their habitats are typically found near streams, wetlands, or areas with high humidity. The Wood Thrush was observed on RMTC between April and July of 1999, April and May of 2002, June of 2002, and September and October of 2002. It's primary detected habitat area was Upland Hardwood.

**Yellow-crowned Night Heron, Nyctanassa violacea**
Like most heron species, this species of wading bird exhibits a strong preference for wetland habitats. They are commonly found in coastal areas, swamps, bayous, and alongside streams.

They predominantly favor estuarine and mangrove habitats and are often observed in areas with brackish or saltwater. Yellow-crowned Night Herons prefer areas with tall trees, thick canopies, and dense understory vegetation. These Herons were detected on RMTC between April and July 1999 and June 2002.

| Common Name | Scientific name | Source | ESA Status | ANHC SOCC Source | Column1 |
|---|---|---|---|---|---|
| American Golden-plover | Pluvialis dominica | IPaC | Not listed | | |
| American Kestrel | Falco sparverius paulus | IPaC | Not listed | | |
| Bachman's Sparrow | Aimophila aestivalis | IPaC | Not listed | Lohraff 1996 | |
| Bald Eagle | Haliaeetus leucocephalus | NatureSer | Delisted | Lohraff 1996 | |
| Black-throated Green Warb | Setophaga virens | | | Lohraff 1996 | |
| Brown-headed Nuthatch | Sitta pusilla | IPaC | Not listed | | |
| Cerulean warbler | Setophaga cerulea | | Not listed | | |
| Chimney Swift | Chaetura pelagica | IPaC | Not listed | | |
| Cooper's Hawk | Accipiter cooperii | | | Wiedenfeld et al. 1999 | |
| Eastern Whip-poor-will | Antrostomus vociferus | IPaC | Not listed | | |
| Henslow's Sparrow | Centronyx henslowii | IPaC | Not listed | | |
| Interior Least Tern | Sternula antillarum athalass | NatureSer | Delisted | | |
| Kentucky Warbler | Oporornis formosus | IPaC | Not listed | | |
| Lesser Yellowlegs | Tringa flavipes | IPaC | Not listed | | |
| Osprey | Pandion halieaetus | | | Lohraff 1996 | |
| Prairie Warbler | Dendroica discolor | IPaC | Not listed | | |
| Prothonotary Warbler | Protonotaria citrea | IPaC | Not listed | | |
| Red-headed Woodpecker | Melanerpes erythrocephalu | IPaC | Not listed | | |
| Sharp-shinned Hawk | Accipiter striatus | | | Lohraff 1996 | |
| Sprague's Pipit | Anthus spragueii | IPaC | Not listed | | |
| Wood Thrush | Hylocichla mustelina | IPaC | Not listed | | |
| Yellow-crowned Night Hero | Nyctanassa violacea | | | Raney et al. 2014 | |

Table L.6-1 Avian Species of Management for RMTC.

L.6.1 Species listed under the ESA

**Northern Long-eared Bat, Myotis septentrionalis**

Northern long-eared bats were detected in the spring on RMTC in a 2006 survey by Britzke and Redman. A 2021 summer survey by Mitigation Surveying Services, LLC, did not detect this species acoustically or with mist nets. Individual specimens of this bat have recently been collected from central and east-central Arkansas but not on Camp (Saugey et al., 1993). In winter, this species hibernates in mines and caves, and in summer utilizes a variety of roosts, including trees, buildings, caves, and mines. Most locations where this bat has been collected in Arkansas are heavily forested. Although one specimen has been reported from nearby Saline County, the occurrence of this species from the Camp Robinson area has not been documented (Saugey 1998)

**Tricolored Bat, Perimyotis subflavus**

A 2021 summer survey by Mitigation Surveying Services, LLC, did not detect this species acoustically or with mist nets. Although ESA Proposed Endangered, this species is not listed in the AWAP SGCN Mammals and is secure in the state.

**Gray bat, Myotis grisescens**

RMTC habitat is generally unsuitable for this species. A 2021 summer survey by Mitigation Surveying Services, LLC, did not detect this species acoustically or with mist nets. Suitable habitat is not available for this species at Camp Robinson (Saugey 1998). Optimal habitat is described as caves, mines, sinkholes, and other karst features.

**Little Brown bat, Myotis lucifugus**
The Little Brown Bat is currently under review for the ESA. Little brown bats were detected in the spring on RMTC in a 2006 survey by Britzke and Redman. A 2021 summer survey by Mitigation Surveying Services, LLC, did not detect this species acoustically or with mist nets. Little brown bats utilize caves and mines for hibernation, houses, hollow trees, and other sheltered spots for maternity sites and summer roosts. Winter habitat is not available at RMTC. Although this species could use hollow trees on Post during summer months, records for the central Arkansas area are rare and do not support the widespread occurrence of this bat (Saugey 1998).

**Indiana Bat, Myotis sodalis**
RMTC habitat is generally unsuitable for this species. A 2021 summer survey by Mitigation Surveying Services, LLC, did not detect this species acoustically or with mist nets. The Indiana bat hibernates exclusively in a few cave systems that provide the narrow range of temperature and humidity regimes this species requires. Upon departure from hibernating sites in the cave region of northern Arkansas, Indiana bats travel northward to their summer range, where females form small maternity colonies beneath the exfoliating bark of trees. Maternity sites lie north of Camp Robinson, and hibernation caves are unavailable on Post. (Saugey 1998)

**Eastern Black Rail, Laterallus jamaicensis ssp. jamaicensis**
Although the Eastern Black Rail is believed to occur in Arkansas, no records of its presence in the state or on RMTC could be found. It generally lives in coastal areas in Texas, Florida, or other southeastern states.

**Piping Plover, Charadrius melodus**
The Piping Plover (Charadrius melodus) is a small, migratory shorebird that inhabits coastal areas, including sandy beaches, mudflats, and estuaries. They require nesting habitats that provide suitable conditions for their reproductive success, which include nearby wetlands or shallow pools, either of which can serve as a vital food source for adults and chicks. They nest in shallow depressions in the sand, which leads them to seek dunes or vegetation as protection and camouflage.
Critical habitat was designated in the Great Lakes, Northern Great Plains, and Atlantic Coast regions for the three endemic populations. The species prefers to breed along sparsely vegetated shores and islands of shallow lakes, ponds, rivers, and impoundments, which could apply to the Arkansas River; this leads to the assumption that this species will not occur in RMTC.

**Red Knot, Calidris canutus rufa**
Calidris canutus rufa uses different habitats for breeding, wintering, and migration. Breeding habitats are elevated and sparsely vegetated ridges or slopes. They are often adjacent to wetlands and lake edges for feeding. Wintering and migration habitats are often muddy or sandy coastal areas, such as the mouths of bays and estuaries and tidal flats. Thus, the Red

Knot may appear transient at RMTC during migration season but prefers to reproduce elsewhere.

**Alligator Snapping Turtle, Macrochelys temminckii**
Alligator snapping turtles can be found in freshwater lakes, rivers, swamps, and bayous. Their habitat preference includes slow-moving or still bodies of water, aquatic vegetation and brush, and a soft, muddy substrate.
RMTC does have suitable areas that meet these habitat requirements, and alligator snapping turtles have been documented on the installation. Recently proposed as being listed as federally threatened have been recorded on the installation (GBMc, 2021). Further surveys are needed to determine population size, range, and habitat usage.

**Monarch Butterfly, Danaus plexippus**
Monarch butterflies can be found in open fields, meadows, and roadside areas that contain milkweed and flowering plants. RMTC includes regions that meet this species' habitat requirements, and monarch butterflies are frequently seen on the installation.

**MUSSELS: Pyramid Pigtoe, Pleurobema rubrum, Fat Pocketbook, Potamilus capax, Pink Mucket, Lampsilis abrupta, Arkansas Fatmucket, Lampsilis powellii**

2017 Aquatic Life Report: Native mussel species were not identified at any of the streams examined. Considering the small watershed sizes and the lack of perennial flow, it is unlikely that native mussel species would colonize these stream systems on RMTC.

The Pyramid Pigtoe is a freshwater bivalve mollusk species predominantly found in rivers and streams in the eastern United States. Primarily inhabiting medium to large freshwater systems, this species typically occupies the benthic zone and prefers fast-flowing water with sandy or gravelly coarse-particulate substrate. It may be present in the Arkansas River but does not exist on RMTC.

The Fat Pocketbook generally lives in the Mississippi Alluvial Plain or the Mississippi River, so it will not be found on RMTC.

The Pink Mucket is not found in the Arkansas River and will not be found on RMTC.
The Arkansas Fatmucket prefers to live in the Ouachita and Saline Rivers and could not be found on RMTC.

| Common Name | Scientific name | ESA Listing Status | Group | Source | ANHC 2012 SOCC Source |
|---|---|---|---|---|---|
| Northern Long-eared Bat | Myotis septentrionalis | Endangered | Mammal | IPaC | |
| Tricolored Bat | Perimyotis subflavus | Proposed Endangered | Mammal | IPaC | |
| Eastern Black Rail | Laterallus jamaicensis ssp. jam | Threatened | Birds | IPaC | |
| Piping Plover | Charadrius melodus | Threatened | Birds | IPaC | |
| Red Knot | Calidris canutus rufa | Threatened | Birds | IPaC | |
| Alligator Snapping Turtle | Macrochelys temminckii | Proposed Threatened | Reptiles | IPaC | DCSEN-E 2012 |
| Monarch Butterfly | Danaus plexippus | Candidate | Insects | IPaC | |
| Gray Myotis | Myotis grisescens | Endangered | Mammals | NatureServe | |
| Little Brown Myotis | Myotis lucifugus | Under Review | Mammals | NatureServe | |
| Pyramid Pigtoe | Pleurobema rubrum | Proposed threatened | Clams | NatureServe | |
| Indiana bat | Myotis sodalis | Endangered | Mammals | ECOS | |
| Fat pocketbook | Potamilus capax | Endangered | Clams | ECOS | |
| Rabbitsfoot | Quadrula cylindrica cylindrica | Threatened | Clams | ECOS | |
| Pink mucket (pearlymussel) | Lampsilis abrupta | Endangered | Clams | ECOS | |
| Arkansas fatmucket | Lampsilis powellii | Threatened | Clams | ECOS | |

L.6.1-1 Species of Concern (non-ESA) or Delisted (Animals)

**Rafinesque's Big-eared Bat, Corynorhinus rafinesquii**
A published record of the capture of a single male was reported for RMTC by Pitts (1988). The high maintenance standards for RMTC facilities and the lack of abandoned structures may preclude the occurrence of this species on Post unless hollow trees are used. Based on ten years of research with this species in southern Arkansas, none of the cavity trees observed on upland sites on Post appear large enough to accommodate a maternity colony of this species. (Saugey 1998).

**Bird-voiced Treefrog, Hyla avivoca**

**Strecker's Chorus Frog, Pseudacris streckeri**
AWAP: Inhabits sandy soil prairies of the Arkansas Valley and surrounding uplands. Despite the extensive loss of former alluvial valley prairie habitat, populations persist along the Arkansas River Valley.

MUSSELS: **Paper Pondshell, Utterbackia imbecillis and Purple Liliput, Toxolasma lividum**

2017 Aquatic Life Report by GBMc & Associates: Native mussel species were not identified at any of the streams examined. Considering the small watershed sizes and the lack of perennial flow, it is unlikely that native mussel species would colonize these stream systems on RMTC.

FISH: **Alligator Gar, Atractosteus spatula, American Eel, Anguilla rostrata, Paddlefish, Polyodon spathula**
A 2003 Aquatic Life Survey by GBMc & Associates and Genesis Environmental Consultants did not locate this species at any RMTC waterbody. A 2017 and 2022 AFGC electrofishing survey did not encounter a population in Lake Jewett, Hunter, or Lower Engineers. A 2017 Aquatic Life Report by GBMc & Associates did not detect these species in the lakes at RMTC.

**Byssus Skipper, Problema byssus**
Detected during the 2010 Pulaski and Faulkner Counties Annual Butterfly Count, 27 June 2010.
**Diana Fritillary, Argynnis / Speyeria diana**
Detected during the 2010 Pulaski and Faulkner Counties Annual Butterfly Count, 27 June 2010.
**Northern Cloudywing, Thorybes Pylades**
Detected during the 2010 Pulaski and Faulkner Counties Annual Butterfly Count, 27 June 2010.

**Question Mark, Polygonia interrogationis**

**Bell's Roadside-Skipper, Amblyscirtes belli**

This species is found throughout Arkansas and likely occurs on RMTC, but it has an uncertain rank of S3 in the AWAP because it may be adding a new, more common host plant to its life cycle.

**Dukes' Skipper, Euphyes dukesi**
This skipper occupies a variety of moist habitats with long grass, which includes marshes and ditches, but the primary habitat is patches of sedge in forested swamps. It is a breeding resident of shady swamps, marshes, and ditches. The AWAP lists it as critically imperiled, and its distribution is scattered in the documentation.
Coral Hairstreak, Satyrium titus

**Rattlesnake-master borer moth, Papaipema eryngii**
It is critically imperiled in Arkansas and has been documented four times in 2017 and 2018 on RMTC. Rattlesnake Master, Eryngium yuccifolium, is present on RMTC; therefore, combined with the sightings, this species is present.

**Ozark Emerald, Somatochlora ozarkensis**

| Common Name | Scientific name | Group | ESA Listing Status | Source | ANHC SOCC Source | Column1 |
|---|---|---|---|---|---|---|
| Bird-voiced Treefrog | Hyla avivoca | Amphibians | | | Raney et al. 2013 | |
| Strecker's Chorus Frog | Pseudacris streckeri | Amphibians | | | | |
| Paper Pondshell | Utterbackia imbecillis | Clams | | | ASU 2003 | |
| Purple Liliput | Toxolasma lividum | Clams | Resolved Taxon | ECOS | | |
| Alligator Gar | Atractosteus spatula | Fishes | Not listed | NatureServe | | |
| American Eel | Anguilla rostrata | Fishes | Not listed | NatureServe | | |
| Paddlefish | Polyodon spathula | Fishes | Not listed | NatureServe | | |
| Bell's Roadside-Skipper | Amblyscirtes belli | Insects | | | Raney et al. 2014 | |
| Byssus Skipper | Problema byssus | Insects | | | Raney et al. 2010 | |
| Coral Hairstreak | Satyrium titus | Insects | | | Raney et al. 2013 | |
| Diana Fritillary | Argynnis / Speyeria diana | Insects | Not listed | NatureSer | Moran, Baldridge 2002 | |
| Dukes' Skipper | Euphyes dukesi | Insects | | | Raney et al. 2014 | |
| Northern Cloudywing | Thorybes pylades | Insects | | | Raney et al. 2013 | |
| Ozark Emerald | Somatochlora ozarkensis | Insects | Not listed | NatureSer | Rickett 1995 | |
| Question Mark | Polygonia interrogationis | Insects | | | Raney et al. 2013 | |
| Rattlesnake-master borer m | Papaipema eryngii | Insects | Resolved Taxon | ECOS | | |
| Rafinesque's Big-eared Bat | Corynorhinus rafinesquii | Mammals | Not listed | NatureSer | Pitts 1988 | |

Table L.5.1-2 SOCC Delisted

L.6.2 Species of Concern (non-ESA) or Delisted (Plants)
**Alabama Snow-wreath, Neviusia alabamensis**

**American Pillwort, Piluria americana**

**Arkansas Meadowrue, Thalictrum arkansanum**

**Bush's Poppymallow, Callirhoe bushii**

**Bush's Poppy-mallow, Callirhoe bushii**

**Cypress-knee Sedge, Carex decomposita**

**Fewflower Nutsedge, Scleria pauciflora**
Detected in GBMc & Associates 2017 Vascular Plant Survey.

**Hyssop-leaved Boneset, Eupatorium hyssopifolium var. hyssopifolium**
Detected in the 2017 Vascular Plant Survey.

**Nuttall's Pleatleaf, Nemastylis nuttallii**

**Open-ground Whitlow-grass, Draba aprica**

**Ouachita Blazingstar, Liatris squarrosa var. compacta**
Related sp., not variant, Detected in the 2017 Vascular Plant Survey.

**Ouachita Leadplant, Amorpha ouachitensis**

**Ozark Cornsalad, Valerianella ozarkana**

**Pink Milkwort, Polygala incarnata**

**Running buffalo clover, Trifolium stoloniferum**

**Shortleaf Skeletongrass, Gymnopogon brevifolius**

**Southern Tubercled Orchid, Platanthera flava**
Detected in the 2017 Vascular Plant Survey.

**Western Dwarf Dandelion, Krigia occidentalis**
Detected in the 2017 Vascular Plant Survey.

# Appendix M: Invasive Species Management

## M.1 Introduction

According to EO 13112, an invasive species is "an alien species whose introduction causes or likely causes economic or environmental harm or harm to human health." These can be plants, animals, fungi, or pathogens and may directly or indirectly impact individual native species or entire ecosystems. Invasive species possess characteristics that allow them to survive and thrive once introduced. They can quickly adapt to their new environment, survive in a variety of conditions, exploit broad ecological niches, are better able to exploit disturbances, reproduce rapidly, spread aggressively, and lack natural predators, competitors, or other biological controls. In addition to threatening the natural environment, these species can adversely affect the economy, public safety, infrastructure, agriculture, silviculture, cultural resources, and military training.

Department of Defense (DoD) lands are significant because the military manages over 30 million acres, which is often restricted. Subsequently, these undisturbed areas have become havens for many rare and unique species and habitats. DoD lands have higher levels of biological diversity and more sensitive species per acre than other Federal lands (NatureServe 2015). This further illustrates the importance and responsibility of the military to assist in preventing, managing, and controlling the spread of invasive species to help reduce their widespread, various, and costly impacts on the environment, our economy, and public health.

### M.1.1 Transportation, Introduction, and Establishment.

Invasive species are typically introduced by human activity, often unintentionally or unknowingly, of the long-term damage that can be done. There are many routes of introduction of these species. Common methods of introduction of non-native and invasive species include:

- Accidentally transporting them via commercial trade or recreation, such as transporting stowaways and contaminated or infested materials or not decontaminating recreational equipment and gear.
- Purposely introducing them to help control another species that is considered a nuisance, to provide a service such as pollination of crops, or as a food source.
- Planting or seeding them to serve a purpose, such as erosion control, livestock food source, recreational food plots, or agriculture.
- Importing ornamental plants for landscaping purposes.
- Importing exotic animals for the pet trade and then accidentally or intentionally introducing them into the wild.

It is complicated, expensive, and tedious to eradicate an invasive species once it becomes established. Consequently, vigilant efforts must be made to avoid introducing, establishing, and spreading invasive species to prevent or minimize the detrimental impacts. Therefore, effective and practical strategies should be implemented to prevent the further introducing and spreading of non-native species. If an invasive species does become established, early detection, surveying, monitoring, and control efforts are of the utmost importance to minimize the adverse impacts and to reduce the overall cost of control and the resulting damages.

## M.2 Impacts of Invasive Species

### M.2.1 Environmental and Ecological Impacts

The introduction and establishment of these alien species have the potential to decrease native species' fitness, reduce biodiversity, and impact the overall health of the ecosystem. Different invasive species can impact the ecosystems in which they are introduced. These effects may include habitat degradation by altering the structure and composition of the habitat or by changing the natural cycles. Invasive species reduce habitat quality for native species by limiting plant communities and densities, soil nutrient composition, and carbon and nitrogen cycles, increasing soil erosion, degrading water quality, reducing carbon sequestration capabilities, and altering historical fire regimes. Increased fuel loading, flammability, and connectivity change the natural fire regime and increase the risk of significant and severe wildfires.

Invasive species can also adversely affect natives at the species level through competition for resources (e.g., food, water, shelter, territory, breeding grounds, sunlight, space, etc.), or they may directly harm native species (i.e., toxicity, predation, pest species, cause injury or mortality, cause disease or illness, spread disease, etc.). Invasive species also disproportionately affect native threatened and endangered species or may lead to species being listed as threatened or endangered. In particular, those that are rare or endemic or have a small home range, have particular habitat or breeding requirements, are outcompeted by, preyed upon, or directly or indirectly harmed or suppressed by the invasive species.

### M.2.2 Economic, Social, and Public Safety Impacts

The colonization and spread of invasive species have significantly impacted the economy, infrastructure, agriculture, silviculture, cultural resources, and public safety. This invasion has resulted in various and costly impacts across our society through damages and obstructions of our infrastructure (i.e., energy, water, transportation, housing systems, wildfires, etc.). Invasive species that alter flammability and increase the available fuel loads of an area can lead to catastrophic wildfires. Invasive pests, plants, and diseases have also destroyed or injured crops, livestock, timber, and sometimes even the farmlands, rangelands, and forests, resulting in long-term impacts.

They also threaten several native species that serve essential ecological and economic services, such as pollination, food source and habitat for natives, natural pest control, water and air filtration, erosion control, water retention and control, nutrient cycling, and carbon sequestration. If these species were lost, the cost of performing these essential services would heavily burden our economy. It is estimated that invasive species have already cost the North American economy over $1.3 trillion since 1960 and that annual costs have increased from around $2 billion annually to over $26 billion annually in the 2010s (Crystal-Ornela, R. et al. 2021). These costs will continue to rise as they spread and prices increase.

Recreation activities and areas may also be severely and negatively impacted by invasive species, leading to social and economic impacts (i.e., leisure, mental health, tourism, recreational equipment, supplies, etc.). Invasive species may also impact indigenous people by losing native foods, medicines, ceremonial materials, or species with cultural value. In addition to the valuable

use mentioned above, these species and their habitats also have intrinsic and non-use values. Intrinsic value refers to the inherent right to exist regardless of their perceived value to humans, and non-use value refers to their importance to humans even when there is no direct use (Pearson 2016).

Invasive species have also had a significant effect on public safety. Those include but are not limited to biting and stinging insects, aggressive wildlife, pathogens, and animals that may harbor and transmit diseases, leading to injuries, hospitalizations, and potentially endemic or pandemic diseases and illnesses.

### M.2.3 Impacts on Training Lands and Military Mission

In addition to the potential impacts discussed above, the military faces some added and compounded challenges when it comes to preventing, controlling, and managing invasive species. Their global presence, the massive number of vehicles, equipment, soldiers, and supplies that are frequently transported both internationally and regionally, unique land use (i.e., ranges, airfields, etc.), and the immense acreage of land that is owned, utilized, and managed by the DoD has culminated in numerous direct and indirect impacts on the military's mission, soldiers, and lands. Consequently, the surveillance, prevention, management, and control of invasive species are integrated into multiple DoD programs, including operations, training, pest management, natural resources, and morale and welfare; thus, further illustrating the importance and amount of resources that are employed in invasive species management and control efforts by the DoD.

The establishment of invasive species can and has affected training efforts in numerous ways. One way is through altering the landscape to the point in which it no longer meets training requirements or by making it physically impossible or dangerous to train on, such as no longer representing natural conditions, reduced line-of-sight (e.g., navigation, hidden unexploded ordinances (UXO), other concealed hazards), restricted mobility (i.e., dense vegetation or vines), increased wildfire risk, increased tree mortality (i.e., pests or disease) and falling hazard, or by the presence of harmful or dangerous plants and wildlife or an increased risk of contracting disease or illness (e.g., feral hogs, stinging or biting insects, irritating or thorny plants, introduced pathogen or disease, ticks, mosquitoes, serve as a refugium, etc.). The potential impacts of introducing these species will vary depending on several factors (e.g., species, habitat, land use, etc.). Still, they may adversely affect training, safety, soldier health, security, infrastructure, transportation, and ultimately combat readiness.

These introductions and alterations to native habitats can also result in sensitive species becoming federally listed under the Endangered Species Act (ESA) or the declaration of critical habitat. The listing of these species, in addition to the increased risk of wildfires, would also further limit training capabilities and activities that would either further harm or disturb those species and their habitats or that may ignite a wildfire (e.g., limited access to sensitive areas or areas with high fuel loads, restricted use of smoke, obscurants, flares, and tracer rounds, etc.). The occurrence of a wildfire would also suspend current training efforts. It could lead to expensive suppression costs and pose a threat to soldier health, ranges, equipment, vehicles, and infrastructure. Additionally, igniting a wildfire on military training lands or by the military could also threaten public health and property and reflect negatively on the military.

Invasive species may also affect security and infrastructure by obstructing lines of sight, growing on or around fences, or directly or indirectly causing damage to buildings and other structures. Airfields and flight operations could also suffer from the presence of invasives. Introducing some of these species near airfields has resulted in BASH and WASH incidents or has attracted other species to the area that was not previously present, leading to an additional risk of these incidents occurring.

Attempting to control the spread of invasive species has also had considerable and costly impacts on the transportation of military vehicles, equipment, and soldiers. These impacts may include restricted access to infested areas, establishing and operating surveillance and testing sites, and implementing control measures such as inspection and decontamination procedures. These efforts can be tedious, expensive, and delay response or transportation times, but they are essential to protect other public health, infrastructure, the economy, and pristine ecosystems. Furthermore, singular invasive species can have minimal to severe impacts across multiple elements of our society; however, we must also account for the cumulative effects that may result from the spread and establishment of numerous invasive species as well as from their interactions with one another and their environment, especially with a changing climate.

## M.3 Regulations, Policies, and Guidelines

Invasive species and noxious weeds will be managed to ensure compliance with all Federal, State, local, DoD, Army, and National Guard regulations, policies, guidelines, and executive orders (EO). See the following.

- The Sikes Act of 1960
- Endangered Species Act of 1973, as amended 2003
- Federal Noxious Weed Act of 1974
- Sikes Act Improvement Act of 1997
- Executive Order 13112 of February 3, 1999 – Invasive Species
- Plant Protection Act of 2000
- Noxious Weed Control and Eradication Act of 2004
- Executive Order 13751 of December 5, 2016 – Safeguarding the Nation from the Impacts of Invasive Species
- Army Regulation 200-1, Environmental Quality: Environmental Protection and Enhancement, 2007
- DoD Instruction (DoDI) 4715.03 – Natural Resources Conservation Program, revised 2018
- DoD Manual (DoDM) 4715.03 – Integrated Natural Resources Management Plan (INRMP) Implementation Manual
- Arkansas Plant Act of 1917
- Arkansas Emergency Plant Act of 1921
- Arkansas Pesticide Use and Application Act of 1975, as amended
- Arkansas Pesticide Control Act of 1975, as amended
- The Arkansas Regulations on Pesticide Use of 2003, revised 2020
- UAEX MP44 – Arkansas Recommended Chemicals for Weed and Brush Control
- UAEX MP144 – Insecticide Recommendations for Arkansas
- UAEX MP154 – Arkansas Plant Disease Control Products Guide
- Integrated Pest Management Plan (IPMP) for the Arkansas National Guard

A list of Federal and State designated Noxious Weeds can be found at: https://plantsorig.sc.egov.usda.gov/java/noxiousDriver.

M.4 Control Methods

As discussed above, the most effective method for managing invasive species is through prevention and early detection. Once an invasive species becomes established, it then becomes necessary to implement additional control and management techniques. Invasive species will primarily be managed from a landscape-level approach in conjunction with habitat restoration efforts to promote the most efficient and effective control of those species and the use of available resources. If necessary, alternative control methods may be initiated to help control or eradicate invasive species. Such instances may include the introduction or reestablishment of an aggressive, fast-spreading, or otherwise troublesome species, particularly in novel or sensitive areas; an existing invasive becomes increasingly problematic, negatively impacting training efforts, the environment, or posing additional risks or issues; or if a broad-scale treatment effort would be more effective towards controlling or eradicating the targeted invasive species. Every feasible effort should be made to prevent the introduction and further spread of invasive species and noxious weeds on RMTC. The types of controls that are utilized in controlling and potentially eradicating invasive species are:

- Prevention and Early Detection
- Physical or Mechanical Control
- Cultural Control
- Biological Control
- Chemical Control

Effective management plans typically combine these controls for a more successful outcome.

M.4.1 Prevention and Early Detection

Monitoring the landscape is a requirement of the ARARNG as the stewards of the property. Through early detection, species surveys are required, especially in areas of deep concern, such as Cantonment Areas, SOCC Habitats, and Wildland Urban Interfaces (WUI). Methods also discussed in Appendix C assist with prevention by reducing the likelihood of transmission.

M.4.2 Physical or Mechanical Control

It is defined as removing or damaging the species directly on both small (i.e., one colony) and large scales (i.e., One Hectare). Utilizes heavy equipment, machinery, hand tools, traps, manual labor, and prescribed fire to combat invasives directly. This method is often the most labor-intensive and can result in further site disturbance. Mechanical removal through prescribed fire is discussed in more detail in Appendix J but is used at particular times to aid in the natural removal of species.

M.4.3 Cultural Control

Changing human behavior to address the issues of promoting, harboring, attracting, or further spreading invasives. Facilitating equipment sanitization before entering or exiting known protected and infected areas. Ensuring that management such as mowing does not contribute to the spread of noxious weeds.

M.4.4 Biological Control

It controls invasive populations by using another living organism, such as a predator, parasite, pathogen, or consumer. This is often not the first line of defense because of the likelihood of creating another nuisance. Common examples include using hoof stock for grazing an area of known invasive species or introducing native parasites to control the viability of the invasive species.

M.4.5 Chemical Control

Commonly viewed as the last line of defense in eradicating invasive species, chemical control requires the most direct approach while ensuring the method does not contribute to damage in the surrounding area. All chemical control shall be conducted only by individuals licensed through the Arkansas Plant Board. Pesticides, Herbicides, and other chemical control methods will follow the ARARNG Integrated Pest Management Plan.
The ARARNG's IPMP is used to reduce reliance on pesticides, enhance environmental protection, and maximize integrated pest management techniques to eliminate, suppress, or control pests using the judicious use of both chemical and nonchemical control techniques.

The statewide IPMP plan provides a list of pesticides, rodenticides, and herbicides that are approved for purchase and use by ARARNG personnel. Unless specifically approved on the label, no pesticides shall be applied directly to wetlands or water resources. In addition to aquatic habitats, sensitive areas include habitats of endangered, threatened, or rare flora or fauna species and unique geological and other natural features.

ARARNG Pest Control Procedures are outlined below.

Requirements:

- Pesticide applicators MUST have state or DOD pesticide certification to apply pesticides on ARARNG property UNLESS the product is part of the Self-Help Program.
- All herbicide or pesticide applications must be reported to the ARARNG Pest Management Coordinator.
- Certification and Licenses must be provided to the Pest Manager for vetting and approval.
- All pesticide use and storage will comply with the IPMP, permits, labels, and relevant laws and regulations.
- Maximize integrated strategies and minimize pesticide use when possible.
- Use biological control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive. See the ARARNG IPMP for more information.

- Pesticides and herbicides should be applied when they will be most effective against the pest to achieve maximum control for the minimum application. See the IPMP for more information.
- Pesticides must be mixed, stored, and disposed of following Federal, State, and local regulations and with procedures established by the ARARNG.

Chemical Application:

- All chemical applications are completed per the product label.
- Only spot spray applications are applied unless the problem of plant infestation is very high.
- Only products approved in the habitat type to be treated are applied.
- Furnish ARARNG personnel with legible copies of specimen labels and the Material Safety Data Sheets of all pesticides proposed for use.
- Chemical application methods:
    - Foliar Application – Herbicide mixture is applied directly to the plant's foliage during the growing season; care is taken not to spray non-target species.
    - Basal Treatment – This method is effective throughout the year if the ground is not frozen. The herbicide mixture is applied to the basal parts of the plant to a height of 12-15 inches from the ground. Thorough wetting is necessary for reasonable control.
    - Cut-stump Treatment – Stump treatments can be used if the ground is not frozen. For stump treatment, horizontally cut stems at or near ground level and immediately apply herbicide mixture, covering the outer 20 percent of the stump.
- An NPDES permit may be required if pesticides (including herbicides) are applied in or near waters of the U.S. or wetlands.

M.5 Invasive Species on RMTC

Several invasive species have been documented on RMTC and tend to be most prevalent in and around previously disturbed areas. These areas include pre-military homesteads, roadsides, right-of-ways, fields and adjacent edges, streamsides, and cantonment. The most troublesome species include:

- Feral Hogs (*Sus scrofa*)
- Nutria (*Myocastor coypus*)
- Chinese Privet (*Ligustrum sinense*)
- Sericea Lespedeza (*Lespedeza cuneata*)
- Chinese/Japanese Wisteria (*Wisteria sinensis/Wisteria floribunda*)
- Japanese Honeysuckle (*Lonicera japonica*)
- Bradford Pear (*Pyrus calleryana*)
- Mimosa (*Albizia julibrissin*)
- Bermudagrass (*Cynodon dactylon*)
- Johnsongrass (*Sorghum halepense*)
- Dallisgrass (*Paspalum dilatatum*)
- Smooth Crabgrass (*Digitaria ischaemum*)

Exotic and non-native plants often become invasive and replace native plant species. For this reason, any plants to be planted on any site on RMTC should be native to Arkansas or, for

landscaping purposes, species native to the region. Examples of plants that should **NOT** be planted under any circumstance include:

- Bradford/Callery Pear
- Privet
- Mimosa (Silk tree)
- Crepe Myrtle
- Asian Wisterias
- Japanese Honeysuckle
- Nandina
- Sericea Lespedeza
- Non-native Perennial Grasses (Outside of the Cantonment Area)

All plant material planting plans should be reviewed and approved by the DCSEN-E Natural Resources Manager and Forester.

1. Privet (Ligustrum spp.)
2. Japanese Honeysuckle (Lonicera japonica)
3. Autumn olive (Eleagnus umbellate)
4. Chinese tallow (Triadica sebifera)
5. Multiflora rose (Rosa multiflora)
6. Kudzu (Pueraria montana var. lobata)
7. Sericea lespedeza (Lespedeza cuneata)
8. Chinaberry tree (Melia azedarach)
9. Wisteria (Wisteria floribunda and W. sinensis)

Of the documented species on RMTC, 44 are considered non-native to Arkansas. Chinese Privet (Ligustrum sinense) and Sericea Lespedeza (Lespedeza cuneate) appear to be the most problematic species. Invasive species can disrupt ecosystems, degrading habitats so that wildlife cannot utilize them and hinder military training exercises. Controlling these invasive species is costly and can be long and tedious. Chemical and mechanical removal, prescribed fire, and mitigating ground disturbances can help control and prevent the growth of non-native populations. An ongoing project to remove non-native species from RMTC has treated up to 448 acres of Chinese Privet (Ligustrum sinense), Chinese Wisteria (Wisteria sinensis), and Japanese Honeysuckle (Lonicera japonica) since 2016 (GBMc 2020).

All use or application of herbicides or pesticides on RMTC will be performed by qualified individuals and in compliance with the above (see section 4.5) and any additional DoD, State, or ARARNG requirements. Qualified individuals meet the standards outlined in the State IPMP. A summary has been laid out below in this document, but the IPMP shall be reviewed, and the Pest Management Coordinator shall be consulted before any chemical means of control are started or used.

### M.5.1 Invasive Plant Eradication Project

A four-year survey was conducted by GBMc and Associates in which they located Chinese Privet. Chinese wisteria, Japanese Honeysuckle, Saltbrush, and Lespedeza. The eradication efforts focused almost entirely on Chinese privet in TA-03, TA-04, TA-05, TA-06, TA-18, TA-23, Range 26, and Cato Road entrance. Approximately 250 acres were treated, 216 of which were first-time treatments in 2020. All herbicide treatments were contracted out to OMNI

Applications LLC with oversight and monitoring of GBMc. According to the final report from GBMc & associates, areas of prior treatment (2017-2019) needed minimal to no additional follow-up. However, because invasive plants of this nature are highly adaptive, grow aggressively, and reproduce quickly, it is necessary to continue monitoring treated sites. Additional recommendations include:

• Continue monitoring treated sites for early detection and treat as necessary using the same rate of application in the most effective application periods (spring and summer),
• Continue monitoring for these species during winter when they are easily located and manage and monitor adjacent properties that could potentially affect the spread of these invasive plants due to man-made disturbances.
• In the areas previously treated in 2017-2019, it appears that regeneration of native species is occurring. Consider a process of recolonization and site restoration with desired plants.
• Additional surveys are needed in areas of RMTC that have not previously been monitored. These target species will likely be found in non-surveyed areas.

| Invasive Plant Specie(s) | Location(s) | Eradication Project Start Year | Year(s) of Chemical Treatment | Acre(s) Treated |
|---|---|---|---|---|
| Chinese Wisteria (*Wisteria sinensis*) | Cantonment | 2017 | 3rd | 20 |
| Chinese Privet (*Ligustrum sinense*) | Cantonment | 2017 | 3rd | 100 |
| Chinese Privet (*Ligustrum sinense*) | Cantonment, TA-01, 03, 04,05,06,07,09,15,16,17,18,19 | 2018 | 2nd | 100 |
| Saltbush (*Bacharris halimifolia*) | TA-02, TA-21 | 2018/2019 | 2nd | 2 |
| Chinese Wisteria (*Wisteria sinensis*) | TA-07, TA-09 | 2018/2019 | 2nd | 10 |
| Japanese Honeysuckle (*Lonicera japonica*) | TA-15, TA-16, TA-18 | 2019 | 1st | 2 |
| Chinese Privet (*Ligustrum sinense*) | TA-03, TA-23, Cato Rd, Range 26 | 2020 | 1st | 216 |

Table M.5.1-1 GBMc & Associates Invasive Eradication Project Implementation Table.

## M.5.2 Feral Hog Management Program

Feral hogs (Sus scrofa), also known as wild pigs, are mammals native to Europe, Asia, and North Africa. This species includes numerous subspecies, both wild and domesticated. They were brought into North America by humans as long ago as 1650. They have since been reintroduced to North America numerous times, primarily by intentional release for hunting or by accidental escape from domestic pig farms. Feral hogs are habitat generalists that can tolerate various climatic conditions.

Feral hogs have caused many issues on RMTC because of their rooting behavior to dig up plant parts and animals in the soil. Rooting causes severe disturbance to soil and plant communities. Feral hogs consume bird eggs, nuts and seeds, insects, and other small animals. Additionally, feral hogs are prolific breeders, and a single female can give birth to upwards of 25-30 young per year, depending on habitat and climatic conditions.

Feral hogs were once a problem on RMTC; however, most wild hogs have been mostly eradicated from the installation using BMP. Typical management plans to control hogs on RMTC include corral-style trapping and professionally accepted eradication methods. While feral hogs on RMTC were once a big problem, over the last year of 2021, only two hogs were captured and eradicated. While it would seem that populations are down, RMTC environmental

personnel will continue to monitor and set traps to confirm that populations on the installation do not replenish.

### M.5.3 Spongy Moth Monitoring Survey

Each year, in coordination with multiple state agencies, RMTC participates in a Spongy moth detection survey organized with the Arkansas State Plant Board. Spongy moths (*Lymantria dispar*) are invasive and highly destructive. Their larvae are known to defoliate trees completely. Over 300 species of trees and plants are hosts to larvae, including oak, aspen, and elm. In the United States, over 83 million acres of forest have been defoliated by Spongy moths since 1970. Spongy moths were introduced in the northeast United States, typically where infestations occur. However, egg clutches are abundantly laid in campgrounds, on recreation vehicles, large equipment, and boats. The eggs are then transferred to other regions of the United States. The purpose of the detection survey is to find out if there are breeding populations of the Spongy moth on RMTC or if moths that are caught may have hitchhiked as eggs and hatched in a new location. The key is early detection. The best way to stop their spread is to detect and eradicate them before they become a breeding population.

The efforts to detect Spongy moths is an ongoing process. Essentially traps are placed in multiple locations around the installation. All traps will be set out by the end of May and collected after August. It is critical to document the location of each trap. Inside the traps is a female pheromone that can attract males from up to one mile away. The walls of the trap contain an adhesive, so when a moth flies into the trap, it gets stuck to the inside wall of the trap. After traps are collected, they are sent to ASPB for analysis, documentation, and map locations. If Spongy moths are discovered, traps will be set in the exact locations for two consecutive years to monitor whether the particular site may have a breeding population or if the moth found may have just been an isolated incident. To date, no Spongy moths have been detected on RMTC.

### M.5.4 Wisteria eradication project

The environmental department is working on an in-house project to eradicate multiple areas where non-native wisteria has begun growing out of control. Appropriate herbicides are being applied using localized treatment. The project started in September 2022 and will continue as needed in the 2023/24 growing season as it becomes apparent a reduced population of plants will return. This project is in the early detection and eradication stage and will experience ongoing monitoring in treated areas for repopulation.

### M.5.5 Imported Fire Ants

Imported fire ants (Solenopsis invicta, Solenopsis richteri, and their hybrids) are invasive insects accidentally introduced from Argentina and Brazil through the seaport of Mobile, Alabama, in the 1930s. Their venomous sting may cause an allergic reaction in hypersensitive individuals or lead to secondary infections. Fire ants also have a detrimental impact on native species because they are aggressive predators and generalist scavengers. They have been shown to outcompete native ant species to the point of local extirpation. Currently, imported fire ants are treated on RMTC through chemical measures (predominately baits) on an “as needed” basis. Still, BMPs have been created by the USDA, UACES, and ASPB to inform public and private landowners on ways to control current infestations and prevent spread by transferring contaminated soil.

Additionally, ARARNG/MDA has partnered with UA Extension and the Little Air Force Base for a collaborative biological control project examining extant populations of phorid flies (Pseudacteon spp.), which are parasitoids of imported fire ants, and conducting additional releases of phorid flies.

### M.5.6 Nutria Management

Recently, Nutria was discovered on RMTC. While for years, environmental staff on RMTC had been controlling beaver populations and damage to the installation due to dams blocking waterways, Nutria was never observed on the installation. However, at the beginning of 2023, staff trapped the first Nutria ever on RMTC. As of May 2023, nine Nutria have now been trapped in as little as four months.

Nutria are native to South America and were brought to the Southern United States in the late 1800s for their fur. Initially brought to the southeast United States, Nutrias were found in coastal Texas, Louisiana, across the Gulf Coast, and through the Florida panhandle south along Florida's Gulf Coast. They were introduced to Louisiana in the 1930s. When the fur market collapsed in 1940, thousands of nutrias escaped or were released (USDA, 2020). Although they do not typically stray far from their home range, over time have made their way north into Arkansas in the 1960s (Kohl,2020). Nutria has been found now in at least 20 states. Nutria is notorious for damaging native vegetation and crops, banks of rivers, and other bodies of water, and the most detrimental are the permanent damage to wetlands and marshes (USDA, 2020).

Before the findings this year on RMTC, there had only been one other area in Pulaski County and one area in Faulkner County where Nutria was observed, which was in 2012-2014 (University of GA, 2023). To control Nutria populations and keep them from spreading out, RMTC environmental staff will continue to trap Nutria and keep records of the findings.

## M.6 Future Management Efforts

Invasive species are a significant and growing problem and have the potential to interrupt training and cause damage to military equipment and injury to soldiers. As well as affect the military's primary goal to maintain the quality of military lands for training exercises while protecting the quality of natural resources on their land. To help preserve training lands and maintain quality habitat, RMTC environmental staff will continue efforts to:

- Prevent the introduction of new invasive species.
- Detect and rapidly respond to and control populations of such species cost-efficiently.
- Monitor and treat and effectively control populations that have already been established.
- Stay current on research on prevention and more effective ways to treat invasive populations.

# Appendix N: Hunting Fishing and Recreation

## N.1 Overview.

Consistent with the military mission at Camp Joseph T. Robinson Military Training Center (RMTC) and sound ecosystem management principles, the fish and wildlife resource's goal is to manage and maintain year-round fish and wildlife habitat that contributes to the sustained populations of resident species and to provide seasonal habitats for migratory species. Primarily, fish and wildlife resources will be managed for Conservation, and Disease Prevention, secondarily to support the recreational opportunities for the community. Game species management will follow State and Federal Regulations defined in the following sections.

### N.1.1 Non-Consumptive Recreation of all Species.

Camp J.T. Robinson offers recreational usage of military lands for bird watching, helping, botanizing, biking, etc. RMTC contains two areas managed for Recreational use, the Cycling Park and Walking Trails. RMTC Cycling Park is roughly 928 Acres and 46.6 Miles managed by Central Arkansas Trail Alliance (CATA). Trails illustrated in Figure N-1 define the currently open trails; other routes are being added but are not currently available to the public. Walking Trails around the cantonment area lakes shown in Map N-2 include a Tree Hunt teaching the public about the common tree types in Arkansas.

Citizen Science and Public Assistance are planned to expand and assist with Lands Management. Citizen science methodology of using Public Data Collection will result in broader data collection overall on publicly accessible land. Public Assistance with Lands management includes Cycling organizations assisting with clearing storm damage from access trails and landing zones.

### N.1.2 Consumptive Recreation of Game, Rough, and Nuisance Species.

RMTC contains multiple Game Species, including Transient Species and Migratory Waterfowl. Because RMTC is State property, management has been split between an internal organization and a state agency. State lands will be here by referred to as the Camp Robinson Arkansas Game and Fish Wildlife Management Area (CRWMA / WMA) and Camp Robinson Wildlife Management Program (CRWMP / WMP), further described in the following sections.

As defined by the State and Federal Agencies, game species will be divided into the following classes: Large Game, including deer, elk, bear, and alligator. Small game, including multiple species of rabbit, squirrel, and quail., Turkey is their class. Migratory Birds, including various species of Waterfowl, Dove, and Crow. Furbearers such as Badger, Spotted Skunk, Weasel, Beaver, Nutria, Bobcat, Coyote, Gray Fox, Red Fox, Muskrat, Mink, Opossum, Raccoon, Striped Skunk, and River Otter. The state also details feral hogs as detailed in Appendix M.

Large game on RMTC is recognized as Deer and Bear; there have been no records or sightings of Elk or Alligators within the post. There have been very few, less than two sightings of Bear on RMTC; combined with the size of the animal's Home Range, there is no

current plan for management beyond the regulations set forth by the Arkansas State Game and Fish Commission (AGFC). Deer are among the most commonly regulated harvest animals, increasing public involvement. Because of the increase in Public Access, two organizations manage the area with RMTC, described in the following sections.

Small game on RMTC includes various species of Rabbit, Squirrel, and Quail. Rabbit and squirrel species are recorded to be abundant and managed based on recommendations placed by AGFC, including seasons and bag limits. Quail are more of a concern, with only the Northern Bobwhite having a season and limit.

Migratory Birds on RMTC follow the United States Fish and Wildlife Services (USFWS) harvest regulations. Species-specific harvest regulations are the primary management method, except for temperate or resident breeding populations such as Canada Geese. Canada Geese that are defined as “resident” by the U.S. Fish and Wildlife as defined in 50 CFR 20.11 and 21.3 that remain outside the migration schedule must be removed and or depredated by procedures outlined by U.S. Fish and Wildlife, along with special permitting.

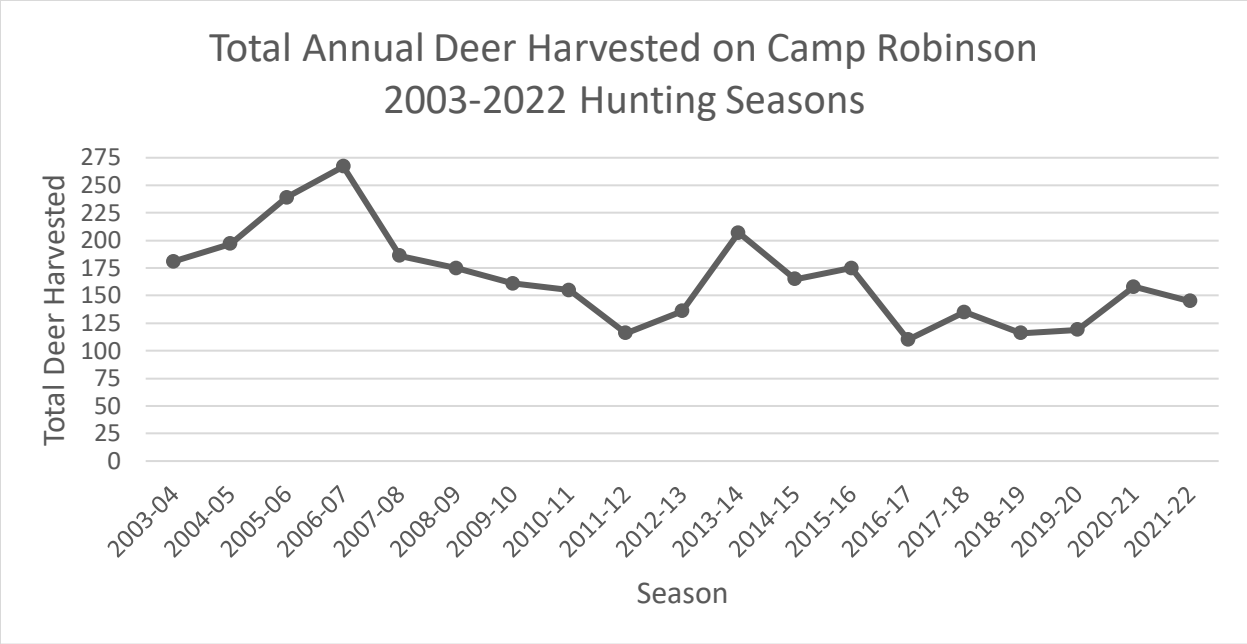
Turkey on RMTC follows the same organizational division as the Big Game for RMTC but has harvest limits set by AGFC zone and bag limits.

Furbearers in RMTC, unless deemed a nuisance species, follow AGFC bag limits. Nuisance species include Beavers, Coyotes, Skunks, Opossums, and Raccoons, posing direct health and safety risks. Management of nuisance species should be carried out under a recognized depredation permit Provided by AGFC to the DCSEN Environmental Division.

Fishing on RMTC includes both Rough Fish and Game Fish. Primary regulations within the Sportsman's Use Permit will default to AGFC regulations on fish bag limits and size regulations.

N.2 Harvest History.

Because of the separation of programs on RMTC, harvest data is segmented and, at times, missing. Comparisons of History will be focused on the most detailed record. Deer harvest data dates beyond 2006 but is most thorough from the 2012/13 season to the current (2021/22) Graph N.2-1. Detailing some of the changes for each program will also factor in the variance in harvest and management results.




Graph N.2-1 Annual Deer Harvest on RMTC

**CRWMA**

The CRWMA area of RMTC included Training Areas (TA); 3N, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, and 19. The total Acreage is ±18683 Ac. Areas not included in the management area were of concern for the public, varying from UXOs to active runways. This remained the publicly accessible area until the 2019/20 Season. As of the 2019/20 Season, public access was reduced to TAs: 10, 11, 12, and 13 for a sum of ±9319 Ac. which remains today.

**CRWMP**

The CRWMP area was created to allow the management of sites off-limits to the public. The original management areas included Cantonment, Small Arms Impact Area, and TA 7. These areas contained hazards such as known UXOs, residential housing, or an active airfield. The original area of the CRWMP as of 2012/13 was ±9804 Ac. After a federal safety review, the Small Arms area was removed from the program during the 2018/19 season, resulting in a reduction to ±6343Ac, for management. During the following 2019/20 season, the area reduced from the WMA was added to the CRWMP for a new total of ±10351Ac. The UXO Research updated to ±11442 Ac. by adding Ta 8 and 9.

N.3 Current Programmatic Design

Camp Joseph T. Robinson has multiple-use policies that dictate the usage of the lands and waterways for the taking of Game Species. RMTC is a restricted ecosystem that follows State regulations for Game Animal Harvests. Users of the Military Lands must follow the primary harvest rules set forth by the Arkansas Game and Fish Commission; secondary harvest rules are defined by programs described as follows.

The primary Policy is the Camp Robinson Sportsman Program (SMP). The RMTC Recreational Use Policy outlines the sportsman program, Appendix O, Inclusion 1. Part of RMTC is reserved as an AGFC Wildlife Management Area (WMA) as described in the

Memorandum of Understanding. Within the Sportsman Program is a Military Managed Internal Program called the Camp Robinson Wildlife Management Program (CRWMP). CRWMP bylaws are included in. With the subdivision of Harvest areas divided between CRWMP and CRWMA, they will be discussed in each following section separately.

N.3.1 RMTC Sportsman Program.
The Sportsman Program (SMP) allows the taking of game species. Users must choose between Hunting, Fishing, and Cycling for their need Access the Pass provides. If the person can pass a simplified background Check, 90-day Sportsman Passes are issued to qualified users (Policy 20201203 Section 5).

Sportspersons using the Pass system experience more access limitations that depend on military usage. Restrictions on the harvest method include firearm limitations to muzzleloader, Rim fire, and Shotgun. All accessible areas are approved for Archery Methods, including Crossbows. Fishing access is limited to non-wake-creating watercraft, Trolling motors, and rods and reels.

The SMP is the basis for all users of the military lands for Game Harvests; users who acquire either the CRWMP or CRWMA access are required to keep a current SMP 90-Day Permit.

N.3.2 CRWMP.

Camp Robinson Wildlife Management Program is a limited enrollment program focusing on "Trusted Users" of military land. "Trusted Users" are limited to; Active National Guard, Retired National Guard, and Current RMTC Employees, including State and Professional Education Center.
The internal Management program was implemented to remove public hunters from “dangerous” areas. With federal regulatory changes, the program was expanded to ensure the proper management of the enclosed population. CRWMP is focused on Small, and Medium Game, including Squirrels, Deer, and other furbearers. The program is managed following AGFC Regulations for Management areas.

N.3.3 CRWMA.

The reserved area of 9319 Acres in the Northwest portion of RMTC has been allocated to public access through the Arkansas Game and Fish Wildlife Management Area Program. Users seeking access must complete the SMP process described above, including the General Use Permit (WMP) through AGFC. Although the land belongs to the state, as part of the Department of the Military, AGFC does not provide land management, just programmatic management for public access. WMP access is limited to archery methods when taking Large Game and Rimfire/Shotgun for other Game groups. AGFC does offer a Raffle for Modern weapons during the typical season to limit harvest numbers. AGFC sets the harvest limits from Zone Data.

N.3.4 Harvest Management.

Large Game Species.
.

Deer – Objectives: 1: Buck/Doe Ratio of 1:3 or better. This ratio is set by AGFC and must be derived from a. Hunter Observation Data, b. Spotlight Counts, c. Motion-detecting camera census, or a combination of all.
2. Lactation rates should be at least 65% or greater for the 2 ½ + age class.
3. Fawn/Doe Ratio should be at least.5 to ensure adequate fawn recruitment. This information will be determined from the Hunter Observation Forms.
4. Fetal Fawn Count (may be collected by AGFC personnel) should be 1.5 for 2 ½ + years old Does. Data may substitute for the Fawn/Doe Ratio.
5. Weight data should fall within the Minimum Acceptable Value set in the Deer Management Plan, 1999. Hog-dressed weight for bucks should be a minimum of 130 pounds and 90 pounds for does.

Small/ Furbearer Species.
AGFC Guidance sets all Non-Nuisance Furbearer species management.

Avian.

USFWS Guidance sets Migratory Bird Management.

AGFC Guidance sets Turkey Management.
Fish.
AGFC Guidance sets all Fish Management.

N.4 Public Access and Management.

Access funds for natural resource management from other state agencies where federal funding cannot be applied. The State of Arkansas Military Department owns RMTC Property. Because of the state ownership, it must allow public access. The increase in Public Access increases the likelihood of improper land use or unauthorized access. The current access program relies heavily on the honor system, public sign-in at the entrance, and must report the area they will use. This is the same process if the public plans to move from one area to another; they must return to the Main Entry Office and write a new entry for a new area. The current Sportsman Policy only allows users to select one Access Type: hunting, fishing, or cycling. Future management should include more granular data management of the Public Access System while reducing unauthorized access and improper land use.

N.4.2 RecAccess.

With better access and management as a goal, one goal is establishing and annually maintaining RecAccess online services for more efficient game species management and improved and increased data collection capabilities on RMTC through a more effective and centralized recreational access solution. Because RMTC is split into two separate hunting and fishing areas, the CRWMP area and the CRWMA, user data is also segmented. Due to safety and security concerns and to better promote our harvest goals, the CRWMP is restricted to State employees and Guardsmen, whereas the WMA is open to the public. The CRWMP also participates in the AGFC's Deer Management Assistance Program (DMAP) for assistance with managing our deer population and collects biodata on all the deer harvested in that area.

The collected biodata has illustrated an ongoing overpopulation issue that we are actively working on trying to control.

Camp Robinson is home to several game species (whitetail deer, Wild Turkey, Bobwhite Quail, squirrel, etc.), with deer being the primary game species. Proper deer herd management is essential to reduce the spread of disease, pests, and inbreeding, combat habitat degradation for various species from overgrazing, and reduce competition for resources and space. Another important and priority game species for us to manage is the Northern Bobwhite Quail, listed as a DoD PIF MSS. We have very little data on their population size and occurrence or harvest rates across the installation, but they are estimated to be more abundant in the WMA. This is also true for the majority of the game species that are harvested across the installation, especially on the WMA. Implementing this service would further assist us in managing the CRWMP and these and other game species by allowing us to track hunting and fishing efforts and locations. It would increase opportunities for collecting harvest data and observation surveys for multiple species throughout the installation. This data would allow us to make better and more informed management decisions so that policies and management techniques can be updated to benefit these species and their habitats.

# Appendix O: NEPA EA, and FONSI

## FINAL

# ENVIRONMENTAL ASSESSMENT

## Implementation Of
## Integrated Natural Resources Management Plan
## Robinson Maneuver Training Area, Arkansas

## SEPTEMBER 2001

# Appendix P: Annual Review Summaries & Five-year Reviews for Operation and Effect

## P.1.0 Annual Reviews and Reporting Requirements

- Arkansas Army National Guard (AR ARNG) will review the Robinson Maneuver Training Center (RMTC) Integrated Natural Resources Management Plan (INRMP) annually, in cooperation with internal (Training, Facilities, etc.) and external (U.S. Fish and Wildlife Service (USFWS), State Wildlife Agencies (Arkansas Game and Fish Commision) partners. The USFWS and the State Wildlife Agencies are required to be invited to the annual review.

- At a minimum, annual reviews will address the considerations in the Annual Review Template (Section 1.1), and will include an update to the Project Implementation Table (Appendix B). The purpose of the annual review is to document progress, maintain the INRMP, and determine if an INRMP Update or Revision is necessary.

- AR ARNG RMTC shall prepare a memorandum for record detailing the annual review (Section 1.2), which shall include the names and offices of all attendees, responses to the Annual Review Template, and whether an Update or Revision is necessary. An updated INRMP Implementation Table does not necessitate an official INRMP Update. Annual review documents shall be kept on file to document compliance with the Sikes Act (Section 1.3).

- AR ARNG RMTC will forward a copy of the annual review memorandum for record and updated Project Implementation Table to ARNG Installations and Environment (I&E) at the end of each fiscal year. Failure to complete an annual review and associated updates to the Project Implementation Table will affect ARNG I&E validation of Natural Resources funding requests.

**P.1.1 Annual Review Template**

# Annual Review
# Robinson Maneuver Training Center INRMP
# Date

| Attendees | | | | |
|---|---|---|---|---|
| **Name** | **Agency** | **Title** | **Phone** | **Email** |
| | *USFWS* | | | |
| | *AGFC* | *Private Lands Biologist* | | |
| | *AGFC* | *WMA Manager* | | |
| | *ANHC* | | | |
| | *AR ARNG* | *Natural Resources Manager* | | |
| | *AR ARNG* | *Environmental Program Manager* | | |
| | *AR ARNG* | *Environmental Deputy Chief* | | |
| | *AR ARNG* | *DPW* | | |
| | *AR ARNG* | *Range Control* | | |
| | *AR ARNG* | *ITAM* | | |
| | *AR ARNG* | *Post Commander* | | |
| | *AR ARNG* | *DAG* | | |
| | *AR ARNG* | *TAG* | | |
| | *AR ARNG* | *Forester* | | |
| | *AR ARNG* | *JAG* | | |
| | *AR ARNG* | | | |
| **Invited – Not in Attendance** | | | | |
| **Name** | **Agency** | **Title** | **Phone** | **Email** |
| | | | | |

**RMTC INRMP Annual Review Date**

**P.2 Question for Review**

**P.2.1 INRMP Project Implementation**

1) Are INRMP projects, including follow-up inventorying and monitoring work, properly identified, developed, and submitted for funding?

2) Has project funding been received, obligated, and expended?

3) What projects have been completed and do they meet expected objectives?

4) What new projects are proposed?

**P.2.2 Federal ESA Listed Species and Critical Habitat**

1) Are conservation efforts effective?

2) Does the INRMP provide conservation benefits necessary to preclude USFWS Critical Habitat designation?

3) Are Species at Risk identified and are steps being undertaken to preclude listing?

**P.2.3 Partnerships Effectiveness**

1) Has the INRMP review team (AR ARNG, USFWS, ARNG I&E, and the State Wildlife Agencies) been effective in ensuring the INRMP's implementation?

2) Are other partnerships needed to meet the INRMP goals?

3) Have other partnerships been effectively used to meet INRMP goals?

4) Are internal stakeholders (training, facilities, etc.) effectively coordinating projects?

**P.2.4 Fish and Wildlife Management and Public Use**

1) Are public recreational opportunities such as hunting, fishing, and wildlife viewing available to soldiers and employees?

2) Are public recreational opportunities such as hunting, fishing, and wildlife viewing available to the public?

3) Does the INRMP and site offer opportunities or facilities for disabled sportsmen?

**P.2.5 Team Adequacy**

1) Is the AR ARNG RMTC's natural resources team adequately resourced to fully implement the INRMP?

2) Is the AR ARNG RMTC's natural resources team adequately trained to fully implement INRMP?

**P.2.6 INRMP Status**

1) Are there any issues or concerns within the INRMP that need to be addressed?

2) Are there any new issues or concerns that are not currently covered in the INRMP?

3) Are there any proposed changes to the current INRMP?

# References

*7 USC Ch. 61: NOXIOUS WEEDS*. (n.d.). Uscode.house.gov. Retrieved March 26, 2024, from https://uscode.house.gov/view.xhtml?path=/prelim@title7/chapter61&edition=prelim

Anslow P. 1994. Draft Proposal for Development of Environmental Awareness Program on Camp Joseph T. Robinson.

(AGFC) Arkansas Game and Fish Commission. 2007. Strategic White-tailed Deer Management Plan. Little Rock, Arkansas.

(AGFC) Arkansas Game and Fish Commission. 2011-2012. Arkansas Hunting Regulations (including Wildlife Management Area Regulations). Little Rock, Arkansas.

(AGFC) Arkansas Game and Fish Commission. 2012 (Spring Season). Arkansas Turkey Hunting Regulations. Little Rock, Arkansas.

(AGFC) Arkansas Game and Fish Commission. 2012. Summary of Arkansas Fishing Regulations. Little Rock, Arkansas.

(AFC) Arkansas Forestry Commission. 2010. Best Management Practices for Water Quality Protection. Little Rock, Arkansas.

(AR ARNG) Arkansas Army National Guard /(MDA) Military Department of Arkansas. 2011. AR ARNG/MDA Range Complex Master Plan for Robinson Maneuver Training Center. North Little Rock Arkansas.

(AR ARNG) Arkansas Army National Guard /(MDA) Military Department of Arkansas. 2011. AR ARNG/MDA Range Complex Master Plan for Robinson Maneuver Training Center. North Little Rock Arkansas.

(AR ARNG) Arkansas Army National Guard /(MDA) Military Department of Arkansas. 2011. AR ARNG/MDA Range Complex Master Plan for Robinson Maneuver Training Center. North Little Rock Arkansas.

(ARNG) Army National Guard. 2019. INRMP Policy.pdf / 2022 Oct./Web

Arkansas Agriculture Department (AAD), cited 2018: Personal communication with Don McBride, Assistant State Forester-Fire Protection

Arkansas State Climatologist. 2014. Arkansas Department of Agriculture, Water Management Division. Climate of Arkansas. https://www.agriculture.arkansas.gov/wp-content/uploads/2020/05/Climate_of_Arkansas_maybe_from_2014.pdf.

(ASU) Arkansas State University Ecotoxicology research Facility and Parsons Engineering Science, Inc.2003. Mussel and Water Conditions on Robinson Maneuver Training Center, Arkansas. Chesterfield, Missouri.

AR (Department of Army Regulation) 200-1. 2007. Environmental Protection and Enhancement.

AR (Department of Army Regulation) 350-19. 2005. The Army Sustainable Range Program.

Bennett, J. 1999. Draft Cultural Resources Management Plan for Camp Robinson (Unpublished). Archeological Assessments, Inc. Nashville, Arkansas.

Boyce, S.G., and W.H. Martin. 1993. The future of the terrestrial communities of the southeastern United States. Pp. 339-366, in Martin, W.H., S.G. Boyce, A.C. Echternacht (eds.). Biodiversity of the Southeastern United States. Upland Terrestrial Communities. John Wiley & Sons, Inc. New York.

Braun, E.L. 1950. Deciduous Forests of Eastern North America. Hafner Publishing Co., New York.

Brimelow, J.C., W.R. Burrows, and J.M. Hanesiak, 2017: The changing hail threat over North America in response to anthropogenic climate change. Nature Climate Change, 7, 516-522, http://doi.org/10.1038/nclimate3321

Britzke, E., and R. Redman. 2006. Threatened and Endangered Bat Species Survey on Robinson Maneuver Training Center (RMTC), Arkansas. Forrest City, Arkansas.

Carter, L. M., J. W. Jones, L. Berry, V. Burkett, J. F. Murley, J. Obeysekera, P. J. Schramm, and D. Wear, 2014: Ch. 17: Southeast and the Caribbean. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 396-417. doi:10.7930/J0N-P22CB.

CH2M HILL. 1994. RCRA Facility Investigation and Confirmation Sampling Work Plan. Submitted to Military Dept. of Arkansas, Camp J.T. Robinson, North Little Rock.

CH2M HILL. 1996a. RCRA Facility Investigation and Confirmation Sampling Report. Prepared for Military Dept. of Arkansas, Camp J.T. Robinson, North Little Rock.

CH2M HILL. 1996b. Workplan for RCRA Facility Investigation at Area of Concern 15 (Former Rifle Range) at Camp Joseph T. Robinson. Phase I of the Human and Ecological Risk Assessment. Submitted to Military Dept. of Arkansas, Camp J.T. Robinson, North Little Rock.

CH2M HILL. 1996c. Cultural and Natural Resources Management Plan. Yakima Training Center. Yakima, Washington.

CH2MHILL. 1998. Phase II RCRA Facility Investigation of Area of Concern 15 (Former Rifle Range) at Camp Joseph T. Robinson. Phase II of the Human Health and Ecological Risk Assessment. Prepared for Military Dept. of Arkansas, Camp J.T. Robinson, North Little Rock.

*Conserving Biodiversity on Military Lands: A Guide for Natural Resource Managers 3rd Edition*. (2022, October 17). Www.denix.osd.mil. https://www.denix.osd.mil/biodiversity/

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Croneis, C. 1930. Geology of the Arkansas Paleozoic Era with Especial Reference to Oil and Gas Possibilities. Arkansas Geological Survey, Little Rock.

Crystal-Ornelas R., E.J. Hudgins, R.N. Cuthbert, et al. 2021. Economic costs of biological invasions within North America. NeoBiota 67:485-510

Dale, V.H., Joyce, L.A., Mcnulty, S., Neilson, R.P., Ayres, M.P., Flannigan, M.D., Hanson, P.J., Irland, L.C., Lugo, A.E., Peterson, C.J., Simberloff, D., Swanson, F.J., Stocks, B.J., and Wotton, B.M. 2001. Climate change and forest disturbances. Bioscience 51: 723-734.

Daniel, T.W. 1998. Land Rehabilitation and Maintenance (LRAM) Project Inventory and

Planning Document. U.S. Army Corps of Engineers, Little Rock District. Little Rock, Arkansas.

Defense Mapping Agency. 1988. Camp Robinson Military Installation Map. V784S, Edition 1 DMA. Hydrographic/Topographic Center, Washington, DC.

(DCSEN-E) Facility Management Office - Environmental Section [Deputy Chief of Staff, Engineering-Environmental]. 1995. Environmental Assessment for Proposed Multiple Construction Activities at Camp Joseph T. Robinson. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental, [RMTC] Integrated Natural Resources Management Plan. 2001a. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. [RMTC] Integrated Natural Resources Management Plan Environmental Assessment and Finding of No Significant Impact. 2001b. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. Integrated Cultural Resources Management Plan. 2009. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. Integrated Pest Management Plan (Draft). 2012a. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. RMTC Forest Resources Management Plan (as Appendix P of INRMP). 2012b. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. RMTC Natural Resource Management Program, Field Observation Summaries and Annual Progress Reports, 2005-2012 (Unpublished). 2012c. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. RMTC White-tailed Deer Management Plan (Unpublished). 2012d. Military Department of Arkansas. North Little Rock, Arkansas.

(DCSEN-E) Deputy Chief of Staff, Engineering-Environmental. RMTC Wildland Fire Management Plan (as Appendix Q of INRMP). 2012e. Military Department of Arkansas. North Little Rock, Arkansas.

DoD Partners in Flight (DoD PIF). (n.d.). Retrieved March 18, 2022, from www.denix.osd.mil website: https://www.denix.osd.mil/dodpif/

(e2M) Engineering environmental Management, Inc. 2002. Stream Sampling and Characterization, Camp Joseph T. Robinson. Fairfax, Virginia.

(e2M) Engineering environmental Management, Inc. 2003. Topographic Survey of Camp Robinson Using GPS Data Collection. Rancho Cordova, California.

(e2M) Engineering environmental Management, Inc. 2007. Wetland Delineation Report for Robinson Maneuver Training Area. Rancho Cordova, California.

Emrick, V., and J. Thompson. 2003. Results of the 2003 Land Condition Trend Analysis for Camp Joseph T. Robinson. Conservation Management Institute, Virginia Polytechnic and State University. Blacksburg, Virginia.

Environmental Analysis of Army Actions, 32 CFR Part §651, September 2022.

EPA Climate Change Impacts, Climate Impacts on Water Resources, https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-waterresources_.html

EPA, August 2016 (EPA 430-F-16-006) What Climate Change Means for Arkansas

ERDC

Ernst, D. 1994. Illegal Dumping of Solid Waste on Camp Robinson (Memorandum for the record, 1994). Camp Robinson Facility Management Office, Environmental Program. North Little Rock, Arkansas.

*FedCenter - DoD Manual 4715.03, Integrated Natural Resources Management Plan (INRMP) Implementation Manual*. (n.d.). Www.fedcenter.gov. Retrieved April 16, 2024, from https://www.fedcenter.gov/Bookmarks/index.cfm?id=24949

FedCenter - DoDI 4715.03 - Natural Resources Conservation Program. (n.d.). Www.fedcenter.gov. Retrieved April 16, 2023, from https://www.fedcenter.gov/Bookmarks/index.cfm?id=17578

Foti, T.L. 1995. The Vegetation of Camp Joe T. Robinson. Arkansas Natural Heritage Commission. Report submitted to CJTR.

Foti, T.L. 1996. Progress Report - Camp J.T. Robinson Faunal Inventory, September 1993 to March 1996.

Foti, T.L., D.E. Culwell, E.M. Getz, and J.T. Rickett. 1995. Floristic biodiversity survey of Camp Joseph T. Robinson, Pulaski and Faulkner counties, Arkansas [Summary]. Including "Checklist of Plants." Little Rock, Arkansas.

Foti, T.L., S.M. Glenn. 1990. The Ouachita Mountain landscape at the time of settlement. Pp. 49-65, in Henderson, D. and L.D. Hedrick (eds.), Restoration of Old Growth Forests in the Interior Highlands of Arkansas and Oklahoma. Conference Proceedings, Winrock International Institute for Agricultural Development, Morrilton, Arkansas.

Fowler, Allison (Ed). 2015. Arkansas Wildlife Action Plan. Arkansas Game and Fish Commission, Little Rock, Arkansas. 1678 pp.

GBMc & Associates and Genesis Environmental Consultants. 2003. Robinson Military Training Area Aquatic Life Survey (Phase I). Little Rock, Arkansas.

GBMc & Associates and Genesis Environmental Consultants. 2005a. Robinson Military Training Area Aquatic Life Survey (Phase II). Little Rock, Arkansas.

GBMc & Associates and Genesis Environmental Consultants. 2005b. Robinson Maneuver Training Area 2005 Breeding Bird Survey. Little Rock, Arkansas.

GBMc & Associates and Genesis Environmental Consultants. 2005c.Tissue and Bed Sediment Assessment. Little Rock, Arkansas.

GBMc & Associates and Genesis Environmental Consultants. 2006. 2005 Terrestrial Invertebrate Survey on Robinson Maneuver Training Center. Little Rock, Arkansas.

GBMc & Associates and Terracon [Genesis] Consulting Engineers & Scientists. 2007. Strategic Ecological & Wildlife Habitat Management Plan. Prepared for the Military Department of Arkansas. Little Rock, Arkansas.

Genesis Environmental Consulting, Inc. 1995. Pollution Prevention Plan, Camp J.T. Robinson. Little Rock, Arkansas.

Gensini, V.A. and H.E. Brooks, 2018: Spatial trends in United States tornado frequency. npj Climate and Atmospheric Science, I:38, https://doi.org/10.1038/s41612-018-0048-2.

Getz, E.M. 1994. Vascular Flora of Camp Joseph T. Robinson Military Base, North Little Rock, Arkansas. Master's Thesis, University of Central Arkansas, Conway.

Guilfoyle, M. P., and R.A. Fischer. 2003. Avian Community Inventories for Camp J.T. Robinson, Arkansas. USACE Engineer Research and Development Center.

Haley, G.J., R. Buckner, D.F. Fetervand. 1975. Soil survey of Pulaski County, Arkansas. U.S.D.A. Soil Conservation Service, in cooperation with Arkansas Agric. Expmt. Station.

Halff Associates, Inc. 1995. Wetland delineation and mapping of portions of Camp J.T. Robinson and State Wildlife Management Area [North Little Rock, Arkansas]. Halff Associates, Inc., Dallas, Texas. For: U.S. Army Corps of Engineers, Little Rock District.
Harris, M.G., and J.D. Rickett 1996. A survey of the fishes of Camp Robinson. Arkansas Academy of Science. Abstracts, p. 15.

Hedrick, Larry D.; Bukenhofer, George A.; Montague, Warren G.; Pell, William F.; Guldin, James M. 2007. Shortleaf pine-bluestem restoration in the Ouachita National Forest. In: Shortleaf pine restoration and ecology in the Ozarks: proceedings of a symposium: 206-213

Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, 35-72, doi: 10.7930/J08S4N35

Holmes, W.C. 1994. Illegal Dumping of Solid Waste on Camp J.T. Robinson (Memorandum to LTC T. Thomas, Training Site Manager, 10 Jan 1996). Camp Robinson Facility Management Office, Environmental Program.

Holmes, W.C. 1996a. Memorandum: Pest Management Plan. Facility Management Officer, Camp J.T. Robinson.

Holmes, W.C. 1996b. Memorandum: Imported Fire Ant (Solenopsis invicta) Migration onto Camp Robinson. Facility Management Officer, Camp J.T. Robinson.

House, W. 1997. DAIM-ED-N (200-3). Memorandum from Department of the Army, Subject: Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and Integrated Natural Resources Management Plan (INRMP).

ITAM Roles in INRMP Developement.pdf

Kaminski, P.G. Department of Defense Instruction 4715.3. 1996. Subject: Environmental Conservation Program.

Kelly, Susan. 2007. Invasive Plant Impacts. Invasive Plant Management: CIPM Online Textbook. Available from: http://www.weedcenter.org/textbook/ (Accessed 26 May 2007).

Kossin, J.P., T. Hall, T. Knutson, K.E. Kunkel, R.J. Trapp, D.E. Waliser, and M.F. Wehner, 2017: Extreme Storms. Climate Science Special Report: Fourth National Climate Assessment,

Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, 257-276, doi: 0.7930/J07S7KXX

Krasting, J.P., A.J. Broccoli, K.W. Dixon, and J.R. Lanzante, 2013: Future Changes in Northern Hemisphere Snowfall. J. Climate, 26, 7813-7828, https://doi.org/10.1175/JCLI-D-12-00832.1

Kunkel, K.E., L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, C.E. Konrad II, C.M. Fuhrman, B.D. Keim, M.C. Kruk, A. Billot, H. Needham, M. Shafer, J.G. Dobson, 2013: Part 2. Climate of the Southeast U.S., Regional Climate Trends and Scenarios for the US. National Climate Assessment, NOAA Technical Report, 103pp, https://scenarios.globalchange.gov/sites/default/files/NOAA_NESDIS_Tech_Report_142-2-Climate_of_the_Southeast_U.S_0.pdf

Masters, R.E.; Skeen, J.E.; Whitehead, J. 1995. Preliminary fire history of McCurtain County Wilderness Area and implications for red-cockaded woodpecker management. In: Kulhavey, D.; Hooper, R.; Costa, R., eds. Red-cockaded woodpecker recovery, ecology, and management. Nacogdoches, TX. : S.F. Autsin State University, College of Forestry, Center for Applied Studies: 290-302.

Memorandum (All States P94-0044). 1994. Environmentally and Economically Beneficial Landscape Practices. National Guard Bureau NGB-ARE (200).

Memorandum for the Adjutant General of All States. 1997. Integrated Natural Resources Management Plans. NGB-ILE-EC (200).

Memorandum from Under Secretary of Defense (DUSD). 2004. Updated Guidance for Implementation of the Sikes Act Improvement Act-Supplemental Guidance Concerning Integrated Natural Resource Management Plan Reviews.

Memorandum from Under Secretary of Defense (DUSD). 2002. Updated Guidance for Implementation of the Sikes Act Improvement Act.

Memorandum from Under Secretary of Defense (DUSD). 1994. Implementation of Ecosystem Management in the DoD. DUSD (ES)/EQ-CO.

Memorandum of Understanding (MOU) between the U.S. Department of Defense, the U.S. Fish and Wildlife Service and the International Association of fish and Wildlife Agencies for a Cooperative Integrated Natural Resource Management Plan on Military Installations. 2006.

Memorandum of Understanding [Camp Robinson Wildlife Management Area]. 1995 (draft). Camp J.T. Robinson (Arkansas Army National Guard) and Arkansas Game and Fish Commission, September 1995 (draft).

Mersiovsky, E.P. 2006. Soil Survey of Camp Joseph T. Robinson, Supplemental Issue. USDANRCS. Little Rock, Arkansas.

Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control Revised . Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93p. https://doi.org/10.2737/SRS-GTR-62.

National Guard Bureau (NGB). 2011. The Army National Guard NEPA Handbook, Guidance on Preparing Environmental Documentation for Army National Guard Actions in Compliance with the National Environmental Policy Act of 1969. Revised 1 October 2011.

National Guard Bureau. 20 March 2019. Army National Guard Installations and Environment Directorate Policy for Integrated Natural Resource Management Plans.

National Weather Service (NWS), cited 2009: National Weather Service Glossary [Available online at w1.weather.gov/glossary/].

NOAA National Centers for Environmental information, Climate at a Glance: U.S. Time Series, Average Temperature, published November 2022, retrieved on November 2022 from http://www.ncdc.noaa.gov/cag

Nuttall, T. 1980. A Journal of Travels Into the Arkansas Territory During the Year 1819. University of Oklahoma Press, Norman, OK.

Office of the Adjutant General. 1991. Camp Robinson Hunting, Fishing, and Natural Resources Conservation. ARARNG Regulation No. 420-2.
Parker, G.R. 1989. Old-growth forests of the Central Hardwood region. Natural Areas Journal. 9(1):5-11.

PARC | Partners in Amphibian and Reptile Conservation. (2017, February 12). Retrieved from https://parcplace.org/

Parsons, 2001, Water Quality Monitoring Study, Camp Robinson, Arkansas, Parsons Engineering Science.

Parsons Engineering Science, Inc. 2003. Terrestrial Invertebrate Survey on Robinson Maneuver Training Area Hymenoptera and Coleoptera. St. Louis, Missouri.

Parsons Engineering Science, Inc. 2003. Wetland Survey Robinson Maneuver Training Area. St. Louis, Missouri.

Pearson RG. Reasons to Conserve Nature. Trends Ecol Evol. 2016;31:366–371. https://doi.org/10.1016/j.tree.2016.02.005.

Penor J.R., A.A. Karlin, and G.A. Heidt. 1996a. Biodiversity of Camp Joseph T. Robinson Military Installation, North Little Rock, Arkansas, 1994-1996. Preliminary report to CJTR.

Pimentel, D., R. Zuniga and D., Morrison. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. Ecological Economics 52: 273–288.

Poland, Therese M.; Patel-Weynand, Toral; Finch, Deborah M.; Ford Miniat, Chelcy; Hayes, Deborah C.; Lopez, Vanessa M., eds. 2021. Invasive Species in Forests and Rangelands of the United States: A Comprehensive Science Synthesis for the United States Forest Sector. Heidelberg, Germany: Springer International Publishing. 455p. https://doi.org/10.1007/978-3-030-45367-1.

Rickett, J.D. 1995. Basic water quality and hydrology survey of Camp Robinson, Arkansas. A report on research conducted from May 1993 to May 1995 on streams draining Camp Robinson Military Preserve. Little Rock, Arkansas.

Rosson, James F., Jr. 2020. Arkansas's Forests, 2019: Annual Update. Resource Update FS-280. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 4 pp.

Runkle, J., K.E. Kunkel, S. Champion, B. Stewart, and D. Easterling, 2017: Arkansas State Summary, 149-AR, https://statesummaries.ncics.org/chapter/ar/.

Saugey, D.A. 1998. Final Report: Bat Survey of Camp Joseph T. Robinson. Nightwing Consulting, Jessieville, Arkansas.

Sealander, J., and G.A. Heidt. 1990. Arkansas Mammals: Their Natural History, Classification, and Distribution. Univ. Arkansas Press. Fayetteville, Arkansas.

SCIPP. 2023. Simple Planning Tool for Arkansas Climate Hazards v 1.7. Southern Climate Impacts Planning Program. Available from Southern US Climate Data to Inform Planning for Severe Weather (southernclimate.org)

SERDP 2016. Strategic Environmental Research and Development Program.

Shafer, M., D. Ojima, J. M. Antle, D. Kluck, R. A. McPherson, S. Petersen, B. Scanlon, and K. Sherman, 2014: Ch. 19: Great Plains. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 441-461, doi:10.7930/J0D798BC

Sikes Act | U.S. Fish & Wildlife Service. (1960, September 15). Retrieved from FWS.gov website: https://www.fws.gov/law/sikes-act

Sikes Act Improvement Act (SAIA). 2012. Updated Guidance for Implementation of the Sikes Act Improvement Act.

Smith, K.G., and J.C. Neal. 1991. Pre-settlement Birds and Mammals of the Interior Highlands. Pp. 77-103, in Henderson, D. and L.D. Hedrick (eds.), Restoration of Old Growth Forests in the Interior Highlands of Arkansas and Oklahoma. Proc. Conf., Winrock Interntl. Inst. for Agric. Development, Morrilton AR.

Spence, P.W.. 1993. NGB-ARE (200-1A) Memorandum for the Deputy Chief of Staff, Engineering/Environmental Program Managers of All States, Subject: The Army National Guard Integrated Training Area Management (ITAM) Program and Integrated Natural Resources Management Plans.

Stein, B. A., D. M. Lawson, P. Glick, C. M. Wolf, and C. Enquist. 2019. Climate Adaptation for DoD Natural Resource Managers: A Guide to Incorporating Climate Considerations into

Integrated Natural Resource Management Plans. Washington, D.C.: National Wildlife Federation.

Stein, Bruce A., Lynn S. Kutner, and Jonathan S. Adams, eds. 2000. Precious Heritage: The Status of Biodiversity in the United States. (New York: Oxford University Press, 2002; The Nature Conservancy and Association for Biological Information.

Stone, C.G., and B. Haley. Geologic Maps of the McAlmont, North Little Rock, Cato, and Olmstead Quadrangles, Arkansas. Arkansas Geological Commission (Unpublished). Little Rock, Arkansas.

Stone, C.G. 1968. The Atoka Formation in North-Central Arkansas. The Arkansas Geological Commission. Little Rock, Arkansas.

University of Arkansas (UA), cited 2022: Arkansas Air Quality Standards. [Available online at https://www.uaex.uada.edu/environment-nature/airquality/standards.aspx]

URS, 2004, 2003 Report of Water Quality of Streams and Lakes - Robinson Maneuver Training Area, URS Corporation.

URS, 2005, 2004 Report of Water Quality of Streams and Lakes - Robinson Maneuver Training Center, URS Corporation.

URS, 2205, 2006 Report of water Quality of Streams and Lakes- Robinson Maneuver Training Area, URS Corporation.

USACE, 1987 Corps of Engineers Wetlands Delineation Manual. Waterways Experiment Station, Vicksburg, MS. Technical Report Y-87-1

(USACE) U.S. Army Corps of Engineers. 1989. Camp Robinson Mobilization Master Plan. Mobilization Master Plan Report, Volume 1. USACE, Little Rock District. Little Rock, Arkansas.

(USACE) U.S. Army Corps of Engineers. 1995. Flood Hazard Evaluation I. Camp J.T. Robinson, North Little Rock, Arkansas: Fivemile Creek and Woodruff Creek. USACE Vicksburg District. Vicksburg Mississippi.

(USACE) U.S. Army Corps of Engineers. 1996a. Flood Hazard Evaluation II. Camp J.T. Robinson, North Little Rock, Arkansas: Kellogg, Leopard, Miles, and Spring Creeks.USACE, Vicksburg District. Vicksburg Mississippi.

(USACE)U.S. Army Corps of Engineers. 1996b. Erosion Inventory and Control Plan. Camp Robinson, Arkansas. USACE, Little Rock District. Little Rock Arkansas.

U.S. Fish and Wildlife Service Guidelines for Coordination on Integrated Natural Resource Management Plans, September 2022.

USDA, NRCS 1997. The PLANTS database. (http://plants.usda.gov). National Plant Data Center. Baton Rouge, Louisiana.

U.S. Fish & Wildlife Service. (1973, December 28). Endangered Species Act | U.S. Fish &

Wildlife Service. Retrieved from www.fws.gov website: https://www.fws.gov/law/endangered-species-act

U.S. Fish & Wildlife Service. (2020). Migratory Bird Treaty Act of 1918 | U.S. Fish & Wildlife Service. Retrieved from www.fws.gov website: https://www.fws.gov/law/migratory-bird-treaty-act-1918

The USFWS Environmental Conservation Online System (ECOS) website (https://ecos.fws.gov/ecp/)

US fish and wildlife. (n.d.). USFWS INRMP guidelines. Retrieved May 1, 2023, from extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.fws.gov/carp/sites/default/files/documents/INRMP-Guidelines-with-Pollinator-Addendum-and-Disclaimer.pdf

Vose, R.S., D.R. Easterling, K.E. Kunkel, A.N. LeGrande, and M.F. Wehner, 2017: Temperature changes in the United States. Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, 185-206, doi:10.7930/J0N29V45.

Walsh, J., D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville, 2014: Appendix 4: Frequently Asked Questions. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 790-820, doi:10.7930/J0G15XS3

Wehner, M.F., J.R. Arnold, T. Knutson, K.E. Kunkel, and A.N. LeGrande, 2017: Droughts, floods, and wildfires. Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program,231-256 doi: 10.7930/J0CJ8BNN

Wuebbles, D.J., D.R. Easterling, K. Hayhoe, T. Knutson, R.E. Kopp, J.P. Kossin, K.E. Kunkel, A.N. LeGrande, C. Mears, W.V. Sweet, P.C. Taylor, R.S. Vose, and M.F. Wehner, 2017a: Our globally changing climate. Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A

*Page Intentionally Blank*