FINAL

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

for the

MISSOURI ARMY NATIONAL GUARD

JULY 2022

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Agency Coordination and Concurrence

This updated Integrated Natural Resource Management Plan meets the requirements as specified in the Sikes Act, as amended (16 United States Code §670a *et seq.*), and contributes to the conservation and rehabilitation of natural resources on military installations. It has set appropriate and adequate guidelines for conserving and protecting the natural resources of the following Missouri Army National Guard properties: Camp Crowder Training Site, Camp Clark Training Site, Macon Training Site, Truman Training Area, and Wappapello Training Site.

Per the Sikes Act, cooperative preparation and approval of the Integrated Natural Resource Management Plan is required. Cooperation between the Missouri Army National Guard, the National Guard Bureau, the United States Fish and Wildlife Service, and Missouri Department of Conservation is imperative for successful implementation of this plan. The signature of the before mentioned agencies' approving officials signifies their approval of and concurrence with this Integrated Natural Resource Management Plan, and indicates a mutual agreement between the Missouri Army National Guard and the agencies to manage the natural resources present on the respective Missouri Army National Guard properties.

Missouri Army National Guard Concurrence

The below signature signifies approval of and concurrence with this Integrated Natural Resource Management Plan, and indicates a mutual agreement between the Missouri Army National Guard and the National Guard Bureau, the United States Fish and Wildlife Service, and Missouri Department of Conservation to manage the natural resources present on the respective Missouri Army National Guard properties.

LEVON E CUMPTON
Major General (MO), MONG
The Adjutant General

Date: 11 July 22

National Guard Bureau

The below signature signifies approval of and concurrence with this Integrated Natural Resource Management Plan, and indicates a mutual agreement between the Missouri Army National Guard and the National Guard Bureau to manage the natural resources present on the respective Missouri Army National Guard properties.

HAMMETT.ANTHONY.SCOTT.1116575562

Digitally signed by HAMMETT.ANTHONY.SCOTT.1116575562
Date: 2022.05.23 13:37:08 -04'00'

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

Date: 23 May 2022

United States Fish and Wildlife Service Concurrence

The below signature signifies approval of and concurrence with this Integrated Natural Resource Management Plan, and indicates a mutual agreement between the Missouri Army National Guard and the United States Fish and Wildlife Service to manage the natural resources present on the respective Missouri Army National Guard properties.

KAREN HERRINGTON Digitally signed by KAREN HERRINGTON
Date: 2022.04.07 17:01:51 -05'00'

KAREN HERRINGTON
Field Supervisor
Missouri Ecological Services Field Office
United States Fish and Wildlife Services

Date: _____

Missouri Department of Conservation Concurrence

The below signature signifies approval of and concurrence with this Integrated Natural Resource Management Plan for the respective Missouri Army National Guard properties.

STUART MILLER
Policy Coordinator
Missouri Department of Conservation

Date: 6/10/22

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Acronyms and Abbreviations

AIRFA	American Indian Religious Freedom Act
AMSL	Above Mean Sea Level
AOC	Administrative Order of Consent
AR	Army Regulation
ARNG	Army National Guard
ARNG-IE	Army National Guard Installations and Environment
AVCRAD	Aviation Classification Repair Activity Depot
BME	Burns and McDonnell Engineering
BMP	Best Management Practice
CCL	Camp Clark Training Site
CCR	Camp Crowder Training Site
CERL	Construction Engineering Research Laboratory
CFR	Code of Federal Regulations
CRM	Cultural Resource Manager
CSG	Cool Season Grass
CSR	Code of State Regulations
CTRE	Center for Transportation Research and Education
CWA	Clean Water Act
DA	Department of the Army
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
ECP	Entry Control Point
EIS	Environmental Impact Statement
EO	Executive Order
EPW	Enemy Prisoner of War
ESA	Endangered Species Act
Equip	Environmental Quality Universal Information Portal
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
FM	Field Manual
FSI	Forest Stand Improvement
FY	Fiscal Year
GIS	Geographic Information Systems
GKO	Guard Knowledge Online
HEL	Highly Erodible Soil
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
ITAM	Integrated Training Area Management
IWFMP	Integrated Wildland Fire Management Plan
JLUS	Joint Land Use Study
JR ROTC	Junior Reserve Officer Training Corps
KD	Known Distance
LRAM	Land Rehabilitation and Maintenance
LWSC	Low Water Stream Crossing
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
MILES	Multiple Integrated Laser Engagement System
MOARNG	Missouri Army National Guard
MoDNR	Missouri Department of Natural Resources
MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
MTA	Maneuver Training Areas
MTNF	Mark Twain National Forest
MTS	Macon Training Site
NAGPRA	Native American Graves Protection and Repatriation Act
NBC	Nuclear, Biological, and Chemical
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NGMO-EM	Missouri Army National Guard Environmental Management Office
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PAO	Public Affairs Office

PBA	Programmatic Biological Assessment
PEM	Palustrine Emergent
PHEL	Potentially Highly Erodible
PLS	Planning Level Survey
POC	Point of Contact
POW	Prisoner of War
PSS	Palustrine Shrub/Scrub
REC	Record of Environmental Consideration
RETS	Remote Engagement Target System
ROTC	Army Reserve Officer Training Corps
RTLA	Range and Training Land Assessment
RTLP	Range and Training Land Program
SAIA	Sikes Act Improvement Act
SHPO	State Historic Preservation Office
SOP	Standard Operation Procedure
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
STEP	Status Tool for the Environmental Program
T&E	Threatened and Endangered
TA	Training Area
TAG	The Adjutant General
TCE	Trichloroethylene
TNC	The Nature Conservancy
TREC	Training Record of Environmental Considerations
TRI	Training Requirements Integration
TRM	Turf Reinforcement Mat
TTA	Truman Training Area
TTB	Tactical Training Base
USACE	United State Army Corps of Engineers
USAR	United States Army Reserve
USC	United States Code
USDA	United State Department of Agriculture
USDA-SCS	United States Department of Agriculture-Soil Conservation Service
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGLO	United States General Land Survey Office
USGS	United State Geological Survey
WPZ	Watercourse Protection Zones
WSG	Warm Season Grass
WTS	Wappapello Training Site
WWII	World War II

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EXECUTIVE SUMMARY

Missouri Army National Guard (MOARNG) 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 met in a way that (1) provides for sustainable, healthy ecosystems; (2) complies with all applicable environmental laws and regulations; and (3) 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.

The MOARNG has adopted the concept of integrating ecosystem management with its mission and mission activities. The MOARNG recognizes that its on-going and proposed training activities can potentially use or consume the natural resources on military land and that successful execution of their mission is dependent on optimum maintenance of their environment in a mode of sustainable use. The MOARNG 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 their care are sustained in a healthy condition for scientific research, education, and other compatible uses by future generations.

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

1.1 PURPOSE AND SCOPE

This INRMP is an update of the 2016 INRMPs. This INRMP has been developed for use by the National Guard Bureau (NGB) and the MOARNG as the primary tool for managing natural resources at Camp Crowder Training Site (CCR), Camp Clark Training Site (CCL), Macon Training Site (MTS), Truman Training Area (TTA), and Wappapello Training Site (WTS). The reasons for the INRMP update include (1) combining five site INRMPs into one document; (2) collecting updated resource information and Army National Guard (ARNG) guidance; and (3) remaining in compliance with the Sikes Act.

MOARNG's natural resources management philosophies and existing programs have not changed. However, this update, unlike past updates, has combined five individual site INRMPs into one plan. This structure will allow the MOARNG INRMP to be a working document, which will reflect the military mission and natural resource management implementation and will enable INRMP update and review requirements to be met more effectively and efficiently.

1.2 AUTHORITIES

This INRMP is intended to be consistent with the SAIA, as well as Army Regulation (AR) 200-1, Environmental Protection and Enhancement; 32 Code of Federal Regulations (CFR) 651, Environmental Analysis of Army Actions; Department of Defense Instruction (DoDI) 4715.03, Environmental Conservation Program; and NGB policy. An overview of the laws, regulations, and directives that this INRMP is pursuant to are listed below in Table 1.

The Sikes Act Improvement Act (SAIA) of 1997, 16 United States Code (USC) §670a et seq., as amended, requires military installations with adequate wildlife habitat to develop a long-range INRMP and implement cooperative agreements with other agencies.

Table 1. Laws, Regulations, Directives, Guidance, and Policies Applicable to INRMP Development

Requirement	Title
Law	SAIA - Requires federal military installations with adequate wildlife habitat to develop long-range INRMPs and implement cooperative agreements with other agencies. Natural resources are to be managed for multipurpose uses and provide public access consistent with the military mission. The act also sets guidelines for collecting fees for using natural resources such as hunting and fishing.
Policy	Army National Guard Installations and Environment Directorate Policy for Integrated Natural Resource Management Plans, 20 March 2019
DoDI	DoDI 4715.03, Natural Resources Conservation Program
	DoDI 5525.17 Conservation Law Enforcement Program
	DoD Manual 4715.03, INRMP Implementation Manual
Army Regulation	AR 200-1, Environmental Protection and Enhancement, 28 August 2007
	AR 350-19, Army Sustainable Range Program, 30 August 2005
Code of Federal Regulations (CFR)	32 CFR 651, Environmental Analysis of Army Actions
	32 CFR 190, Appendix - Integrated Natural Resources Management
Note: Not all applicable federal and state laws, regulations, and Executive Orders (EO) are listed in this table, but are incorporated by reference through the listed documents.	

The National Defense Authorization Act (NDAA) of 2004 made a significant revision to the Endangered Species Act of 1973 (ESA). NDAA stated, "The Secretary [of the Interior and Commerce] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an integrated natural resource management plan prepared under section 101 of the Sikes Act (16 USC 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation." Therefore, if an Army Guard installation has federally listed threatened or endangered species, proposed federally listed threatened or endangered species, and/or candidate species on the installation, or unoccupied habitat for a listed species where critical habitat may be designated, the INRMP must specifically address in the document the benefits of managing these actions for these species or habitats. The benefit should be clearly identified in the document and included in the table of content. This INRMP is intended to provide a benefit to the following listed species, which are known to occur on one or more MOARNG sites: gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), the Northern long-eared bat (*Myotis septentrionalis*), and Ozark cavefish (*Troglichthys rosae*). To date, no critical habitat has been designated or proposed at any of the MOARNG Training Sites. If critical habitat for these or other species is proposed in the future, the INRMP would be used to gain an exemption from such a designation.

1.2.1 ANTI-DEFICIENCY ACT

Formal adoption of this INRMP by the National Guard constitutes a commitment to seek funding and execute projects, subject to the availability of funding, resources, and command priorities. All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under federal and state law. Nothing in this INRMP is intended to be, nor shall be, construed to be a violation of the Anti-Deficiency Act, 31 USC § 1341.

GENERAL INFORMATION

1.1 RESPONSIBILITIES

G-9 – The G-9 (Installations & Environment Directorate) is responsible for advising the Missouri Army National Guard Environmental Management Office (NGMO-EM) at the MOARNG before formally submitting the plan to the United States Fish and Wildlife Service (USFWS), the Missouri Department of Conservation (MDC), and other agencies. The Chief of Environmental Programs ensures operational readiness by sustaining environmental quality and promoting the environmental ethic, and is responsible for tracking projects, providing technical assistance, quality assurance, execution of funds and approving the INRMP.

The Adjutant General (TAG) - TAG is ultimately responsible for the operation and maintenance of the MOARNG training sites, which includes implementation of this INRMP. TAG determines what the state's force structure (types and number of units, types of equipment, training events, etc.) will be at MOARNG facilities. TAG ensures all installation land users are aware of, and comply with procedures, requirements, and applicable laws and regulations that accomplish the objectives of the INRMP. TAG also ensures coordination of projects and construction among environmental, training, and engineering staffs. The TAG office is located at the MOARNG's headquarters in Jefferson City, Missouri.

Plans, Operations, and Training Office – The Plans, Operations, and Training Office have primary responsibility to schedule military training and ensure personnel safety during training exercises at MOARNG facilities. The Plans, Operations, and Training Office determine training capacity based on the force structure determined by TAG. The Plans, Operations, and Training Office ensure the INRMP supports MOARNG training requirements.

Base Operations – The base operations develops a baseline of current and projected MOARNG training requirements, troops utilization data, and determines the week-to-week training capacity of the training site. The base operations and NGMO-EM coordinate to ensure natural resource management aligns with training requirements.

MOARNG Public Affairs Officer (PAO) – The PAO serves as a liaison with the public for public review, in public meetings, and in community educational events. The PAO gives assistance to the NGMO-EM in National Environmental Policy Act (NEPA) public review efforts.

NGMO-EM – The NGMO-EM is assigned day-to-day responsibility for development and implementation of the INRMP. The NGMO-EM is also responsible for identifying compliance requirements; providing guidance and technical assistance to Base Operations Supervisors, Individual Training Site Supervisors, and training site personnel to develop projects and secure required permits; conducting field studies; providing Sustainable Range Awareness (SRA) materials; directing the NEPA process; and managing the development, updates, and annual reviews of the INRMP.

1.2 MANAGEMENT PHILOSOPHY

The MOARNG's overall policies and philosophy of land management are derived from AR 200-1, 32 CFR 651, and the SAIA. These policies and regulations are based on the concept that natural resources management is an integral component of the primary mission of military use. The MOARNG must train; therefore, the MOARNG will manage the training sites to preserve valuable training resources, including the natural environment. Management of natural resources at the ecosystem level ensures sustainable use of training lands while considering effects on the surrounding environment and public concern.

This INRMP describes baseline natural resource conditions, and provides management programs and guidance for successful military training that conserves renewable natural resources, preserves rare and unique resources, and provides long-term resource sustainability. Specific plan expectations are listed in Table 2.

Table 2. Plan Expectations for Integrated Natural Resource Management

Plan Expectations	
1	Provide a comprehensive plan for the MOARNG to carry out its mission while promoting ecosystem health and biodiversity at MOARNG training sites and the surrounding regions.
2	Document goals, objectives, guidelines, and future direction for natural resources management.
3	Establish a framework for implementing natural resources programs and ecosystem management.
4	Provide centralized information on the natural resources program status.
5	Identify environmental constraints to land use so military training can be matched to ecosystem carrying capacity.
6	Identify mission-related impacts and options for conflict resolution.
7	Serve as a baseline of existing environmental conditions for defensible future Environmental Assessments (EA) and Environmental Impact Statements (EIS).
8	Ensure installations comply with environmental regulations.
9	Identify, prioritize, and schedule long-term budget requirements.

1.2.1 ECOSYSTEM MANAGEMENT

An ecosystem is the "sum of the plant community, animal community, and environment in a particular region or habitat" (Barbour, 1987). Ecosystem management may be defined as management "to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities" (United State Environmental Protection Agency (USEPA), 1994).

The goal of ecosystem management is "to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity" (DoDI 4715.03). Natural resources at MOARNG training sites will be managed with an ecosystem management approach. Principles and guidelines of ecosystem management, per DoDI 4715.03, are listed in Table 3.

Table 3. DoD Principles of Ecosystem Management

Principle	
1	Guarantee continued access to land, air, and water for realistic military training.
2	Maintain and improve sustainability of native biodiversity of ecosystems.
3	Administer with consideration of ecological units and timeframes.
4	Support sustainable human activities.
5	Develop vision of ecosystem health.
6	Develop priorities and reconcile conflicts.
7	Develop coordinated approaches to work toward ecosystem health.
8	Rely on the best science and data available.
9	Use benchmarks to monitor and evaluate outcomes.
10	Use adaptive management.
11	Implement through installation plans and programs.
Source: DoDI 4715.03	

Biological diversity, or biodiversity, may be defined as "the variety of living organisms considered at all levels of organization, from genetics through species, to higher taxonomic levels, and including the variety of habitats and ecosystems, as well as the processes occurring therein" (Meffe, 1994). The DoD's challenge is "to manage for biodiversity in a way that supports the military mission". The INRMP is identified by DoD as the primary vehicle for conserving biodiversity on military installations (Keystone Center, 1996).

Specific management practices identified in this INRMP have been developed to enhance and maintain biological diversity within the ecosystems present at MOARNG training sites. DoD principles of conserving biodiversity on military lands are listed in Table 4.

Table 4. DoD Principles for Conserving Biodiversity on Military Lands

	Principle
1	Support the military mission.
2	Use joint planning between natural resources managers and military operations personnel.
3	Integrate biodiversity conservation into the INRMP and other planning protocols.
4	Involve internal and external stakeholders up front.
5	Emphasize the regional (ecosystem) context.
6	Concentrate on results.

Source: Keystone Center, 1996

INRMP Implementation and Effectiveness

The NGMO-EM is responsible for directing management of natural resources and for development and implementation of the INRMP. Successful implementation of the INRMP will require:

- Administrative and technical support
- Army National Guard training officer feedback
- Agency cooperation and technical assistance
- Funding
- Priorities and scheduling
- Production of project scopes and budgets
- Ability to amend and revise this document, as necessary

A practical evaluation of INRMP implementation includes reviewing whether planned projects have been accomplished. Where projects identified in the plan are not implemented due to of lack of funding or other compelling circumstances, the installation will review the goals and objectives of the INRMP to determine whether adjustments are necessary.

The primary measure of INRMP effectiveness is whether it aids in the prevention of "no net loss in the capability of military lands to support the military mission". The MOARNG is preserving the training sites' capability to support training through its natural resource management practices. Long-term management effectiveness is also evaluated through periodic inventories of species populations, habitat quantity and quality, and habitat values through recurring PLS. Trends can be used to indicate the degree of success. The MOARNG will evaluate these recurring data as they become available.

1.1 Administrative and Technical Support

The NGMO-EM administers the natural resources program at each training site. Responsibilities of the NGMO-EM include:

- Coordinating with responsible parties to implement this INRMP
- Managing all phases of the training sites' Natural Resources Program with appropriate natural resources management professionals
- Developing and implementing programs to ensure inventory, delineation, classification, and management of all applicable natural resources, including wetlands, scenic areas, endangered and threatened species, sensitive and critical habitats, and other natural resource areas of special interest, are up-to-date
- Maintaining management records (such as prescribed burns, forest stand improvements (FSI), timber harvests, fire break maintenance, etc.)
- Reviewing environmental documents and construction designs and proposals to ensure adequate protection of natural resources, while ensuring technical guidance as presented in this INRMP is adequately considered
- Evaluating impacts of training missions and providing guidance to trainers
- Coordinating with local, state, and federal governmental and civilian conservation organizations relative to the natural resources management program
- Assisting TAG with developing funding priorities for all natural resources program and compliance activities

Training for NGMO-EM staff, as well as others participating in management of natural resources, should be practical and job-related. Training programs should involve, at minimum, a review of legal compliance requirements, applicable DoD/Department of the Army (DA) regulations, pertinent state and local laws, and current scientific and professional standards related to conservation of natural resources. The following annual workshops, professional conferences, and classes are examples of excellent means of obtaining interdisciplinary training for natural resources managers:

- North American Wildlife and Natural Resources Conference
- Defense Environmental Network Information Exchange
- Army Environmental Center training
- Army Training Support Center
- National Military Fish and Wildlife Association
- United States Army Corps of Engineers (USACE) Wetland Delineation Courses
- Locally-available training through the Cooperative Extension Service, universities, professional and trade organizations, state government, and commercial businesses
- Prescribed Fire Management Course and other opportunities offered by The Nature Conservancy (TNC)
- Missouri Natural Resources Conference
- Institute of Botanical Training Workshops

Conferences and workshops will be evaluated for their usefulness and decisions will be made based on appropriateness to ongoing projects and funding availability. Personnel will be trained in related environmental fields as appropriate.

1.2 Agency Cooperation and Technical Assistance

Intra- and inter-agency cooperation, coordination, and communication at the federal, state, and local levels are requisite to the success of the INRMP. The NGMO-EM has a strong relationship with such groups. To adequately manage natural resources, specialized expertise is required. Technical assistance should be sought from federal and state agencies, universities, and special interest groups as appropriate.

1.2.1 Cooperative Agreements

The DoD and subcommand entities have Memorandum of Understanding (MOU), Memoranda of Agreement, and other cooperative agreements with other federal agencies, interest groups, and various state agencies to facilitate natural resources management.

1.2.1.1 Truman Training Area

The MOARNG has a use agreement with the USACE that allows MOARNG to use the TTA for training. The USACE and MOARNG meet when issues arise to make minor revisions and to provide for continuity in carrying out the agreement's provisions. The MOARNG coordinates with the USACE on the TTA environmental management decisions and actions, such as biological surveys, soil conservation projects, and prescribed burns. The use agreement is included in Appendix M.

1.2.1.2 Wappapello Training Site

The MOARNG has a Special Use Permit issued by United States Forest Service (USFS) that allows for use of the WTS for training purposes. The MOARNG coordinates with the USFS for all environmental management decisions and actions at WTS. The Special Use Permit is included in Appendix M.

1.3 FUNDING

Implementation of this INRMP is subject to availability of annual funding. The NGMO-EM requests project validation and funding through the Status Tool for the Environmental Program (STEP). Funding for the NGMO-EM staff and standard supplies comes from direct funding sources.

Funding sources for specific projects can be grouped into three main categories by source: Federal NGB Funds, Other Federal Funds, and Non-Federal Funds. Other funds and non-federal funds may include grants or cooperative agreements. Since these funding sources rely on a variety of programs, award criteria and amounts can change considerably from one year to another. Funding through these programs can occur on a one-time award, annually, or in multiples of years.

1.3.1 FEDERAL NGB FUNDING

Through a master cooperative agreement with the MOARNG, the NGB is the primary source of funding used to support the management of natural resources on MOARNG training sites. The NGB provides funding for natural resource surveys, environmental monitoring projects, and compliance-related projects. This budget is managed by the NGMO-EM.

1.4 PRIORITIES AND SCHEDULING

STEP will be used to validate projects and determine funding priority. Projects need to be funded consistently with timely execution to meet objectives. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest.

Recurring requirements include projects and activities needed to cover the administrative, personnel, and other costs necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential EOs, and DoD policies), or that are in direct support of the military mission. Recurring costs include manpower, training, and supplies; hazardous waste disposal; operating recycling activities; permits and fees; testing, monitoring, and/or sampling and analysis; reporting and recordkeeping; maintaining environmental conservation equipment; and compliance self-assessments.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources
- Planning documents
- Baseline inventories and surveys of natural resources
- Biological assessments, surveys, or habitat protection for a specific listed species
- Mitigation to meet existing regulatory permit conditions or written agreements
- Wetland delineations in support of subsequent jurisdictional determinations and consequent permitting
- Efforts to achieve compliance with requirements with deadlines that have already passed

Maintenance requirements include those projects and activities not currently out of compliance but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Conservation and GIS mapping
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives
- Restoration or enhancement of natural resources to achieve the EO for "no net loss" or to achieve enhancement of existing natural resources
- Education programs that educate the public on the importance of protecting archaeological and natural resources

Lower priority projects include those that enhance conservation resources of the installation mission or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO, and are not of an immediate nature. These projects are generally funded after those of higher priority. Examples include:

- Restoration or enhancement of natural resources when no specific compliance requirement dictates a course or timing of action
- Community outreach activities, such as "Earth Day" and "Historic Preservation Week" activities
- Educational and public awareness projects, such as interpretive displays, oral histories, "Watchable Wildlife" areas, nature trails, wildlife checklists, and conservation teaching materials
- Management and execution of volunteer and partnership programs

Appendix B includes an implementation table, which outlines recurring and future projects.

APPENDIX A. GOALS AND OBJECTIVES

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A.1 MANAGEMENT GOALS AND OBJECTIVES

Goals listed below express the MOARNG's vision of the desired condition of natural resources present at CCR, CCL, MTS, TTA, and WTS. These goals are supported by objectives and projects, which provide management strategies and specific actions to achieve these goals. Appendix B outlines a project implementation table. All projects will be implemented within the framework of the Army policies and regulations and are subject to funding availability.

GOAL 1: Monitor, maintain, and protect fish and wildlife resources in a manner compatible with the military mission and within the limits of the natural habitat.

OBJECTIVE 1.1: Monitor and maintain current species inventory through reoccurring surveys and inventories. Surveys should occur at a minimum of every ten years, or as needed.

OBJECTIVE 1.2: Maintain and update current records and maps of threatened and endangered (T&E) species that occur on the training sites in compliance with state and federal laws on an annual basis.

OBJECTIVE 1.3: Protect and enhance grassland and forest ecosystems that provide favorable fish and wildlife habitat to sustain healthy populations of indigenous and game species by performing habitat improvements and restoration efforts on an annual basis.

GOAL 2: Restore and manage the vegetative communities for the purpose of military training, protection of species, native restoration, soil stabilization, support of ecosystem functions, and for the production of forest products.

OBJECTIVE 2.1: Conduct prescribed burns on 15% of training lands annually, or as needed, to enhance grassland and forested communities and to minimize the threat of wildfires potentially caused by training operations.

OBJECTIVE 2.2: Monitor and maintain current species inventory through reoccurring surveys and inventories. Flora surveys should occur at a minimum of every ten years, or as needed.

OBJECTIVE 2.3: Control woody vegetation via mowing or haying 15% of grasslands annually, or as needed, to enhance the native prairie areas and ensure areas are conducive for troop training.

OBJECTIVE 2.4: Conduct non-native species, invasive species, and nuisance wildlife control efforts on 90% of the training lands.

OBJECTIVE 2.5: Promote and restore healthy, biologically diverse ecosystems by recommending the use of native plant species for all projects and land rehabilitation activities where warranted.

OBJECTIVE 2.6: Manage 15% of forests annually, or as needed, to maximize their usability for training and ecosystem management while favoring desirable trees from unwanted competition, thinning trees to healthy numbers, and removing poor quality and diseased trees by implementing harvesting, FSI, and prescribed burning activities based on the latest forest inventory recommendations.

OBJECTIVE 2.7: Maintain 90% of forest resources in a condition that minimizes threat to safety and human health and improves accessibility of the site for troop training.

GOAL 3: Protect, maintain, and improve soil and water quality on the training sites in accordance with federal and state laws and regulations

OBJECTIVE 3.1: Plan, design, and implement projects in a manner compliant with applicable laws, regulations, standards, and Best Management Practices (BMPs) to minimize soil loss and degradation. Avoid impacts to wetlands and achieve "no net loss" of values and functions of wetlands.

OBJECTIVE 3.2: Inspect soil conservation projects annually, or as needed. Rehabilitate eroded areas using BMPs.

OBJECTIVE 3.3: Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.

OBJECTIVE 3.4: Manage 90% of wetlands annually, or as needed, by controlling invasive species, fluctuating the water levels, disking, and seeding a diverse mix of aquatic flora.

OBJECTIVE 3.5: Manage 90% of floodplains and associated riparian zones annually, or as needed, to protect or enhance their overall value by controlling and reducing runoff and erosion through sound vegetative and land management practices.

OBJECTIVE 3.6: Monitor and maintain current maps of wetlands by conducting surveys or inventories every ten years, or as needed.

GOAL 4: Develop, maintain, and manage data regarding natural resources at the training sites using GIS for efficient data storage, retrieval, analysis, and presentation.

OBJECTIVE 4.1: Collect data throughout the training sites annually, and update and revise the database when current data becomes available and when analysis warrants to provide current, site-specific information.

OBJECTIVE 4.2: Update hardware and software as technology advances and demands for better performance are needed.

OBJECTIVE 4.3: Educate users annually, or as deemed necessary, on new methods to ensure accuracy and relevance of data collection and manipulation.

GOAL 5: Identify and evaluate land impacts from training and prioritize and assess land management activities in order to maximize the capability, accessibility, and availability of the training site land to meet the training mission by implementing the ITAM program.

OBJECTIVE 5.1: Conduct training area monitoring through physical evaluations annually, or as needed.

OBJECTIVE 5.2: Annually address and review After Action Reports to maintain sustainable, realistic terrain for military training to meet the training requirements.

GOAL 6: Provide education and outreach opportunities to training site users and local communities, and develop and maintain partnerships with state, federal, and local agencies.

OBJECTIVE 6.1: Educate training site users regarding the natural resources at the training sites and their part in ensuring sustainable use of the site on an annual basis, or as needed. Update environmental displays as necessary.

OBJECTIVE 6.2: Ensure the MOARNG complies with environmental regulations at the training sites. Update environmental guidance documents annually, or as needed.

OBJECTIVE 6.3: Continue relations with partners and continue to seek new partners interested in stewardship of the training sites' natural resources.

OBJECTIVE 6.4: Host events annually, which enhance recreational opportunities for the surrounding communities.

APPENDIX B. IMPLEMENTATION TABLE

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Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
21	Statewide Revegetation Project	MO000080002	2908, 0	2.5, 3.2	Completed	100 pounds of seed was purchased to help minimize erosion, support already established vegetation stands, and re-establish natives where they do not exist on approximately 150 acres.
21	Forest Management Statewide	MO000080003	2908, 0	1.3, 2.4, 2.6, 3.1	Completed	Forest Stand Improvements were completed on approximately 300 acres of CCR. Treatments focused on opening up the basal area and allowing desirable species to prosper.
21	Statewide Wetland Maintenance	MO000070003	2908, 0	1.3, 2.4, 3.4	Completed	Project completed to control unwanted aquatic vegetation.
21	Native Grassland Restoration Statewide	MO000070004	2908, 0	1.3, 2.4, 3.1	Completed	Approximately 993 acres were managed via contracted projects and the remainder was conducted in house. Project implementation focused on invasive species control. Foliar applications, cut-stump treatments, and basal treatments were used.
21	Wildland Fire Management Statewide	MO0NG140001	2908, 0	2.1, 2.4	Completed	1,102 acres were burned via in-house and contracted work at CCR, CCL, MTS, & TTA during FY21. The completed burns met the objectives of each site. Disk lines were maintained at CCR and MTS, all work was conducted in-house.
21	Endangered Species Management - Ozark Cavefish, CCR	MO155060010	2504, 1	1.3, 2.4, 3.1	Incomplete	No management was required within the project area, therefore project was not implemented.
21	AVCRAD - Conservation Area Maintenance - Ozark Cavefish	MOD00070001	2504, 1	1.3, 2.4, 3.1	Incomplete	No management was required within the project area, therefore project was not implemented.
21	Public Outreach	MO0NG170003	2908, 3	6.3, 6.4	Incomplete	Incomplete due to COVID-19.
21	Fauna PLS, CCR	MO155210002	2901, 1	1.1, 1.2, 4.1	Completed	This project was a continuation of avian surveys, which have been ongoing since 2000s. The purpose of this project was to determine the presence or absence of a variety of avian species at CCR.
21	Fauna PLS, TTA	MOA57210001	2901, 1	1.1, 1.2, 4.1	Completed	This project was a continuation of fauna surveys, which have been ongoing since 1990s. The survey conducted sampling for various terrestrial and aquatic species at TTA.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
21	Flora PLS, CCL	MO505210001	2901, 1	1.2, 2.2, 4.1	Completed	The survey identified all species of flora located on CCL using the Floristic Quality Assessment methodology. This survey was a continuation of flora surveys, which have occurred since 2000s.
21	CCR Hay Lease	N/A	N/A	2.3	Completed	Leasee conducted haying operations on the entirety of the leased ground and in accordance with the lease contract. Lease consists of approximately 108 acres.
Proposed Future Projects						
Recurring	Statewide Revegetation Project	MO000080002	2908, 0	2.5, 3.2	Proposed	This is a recurring action needed to maintain naturally occurring erosion to manage sedimentation, water quality, and to preserve ecosystem integrity. Project will include maintenance of existing projects/structures and encompass new projects/structures that may be needed. Project may include the purchase of equipment, disks, seed, straw, surface inlets, erosion control material, seeders, shovels, rakes, rental of equipment, etc. Project implementation will be carried out via in-house and contracted work.
Recurring	Forest Management Statewide	MO000080003	2908, 0	1.3, 2.4, 2.6, 3.1	Proposed	This is a recurring action used to maintain forest ecosystem integrity and training areas. Management strategies such as forest stand improvements and invasive species control may be used. This project may also cover PPE, such as hard hats, boots, gloves, chaps, hearing\eye protection, and equipment such as chainsaws, prisms, and other forest management supplies. As well as, the maintenance of chainsaws and other forestry equipment. Project implementation will be carried out via in-house and contracted work.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
Recurring	Statewide Wetland Maintenance	MO000070003	2908, 0	1.3, 2.4, 3.4	Proposed	This is a recurring project to control noxious, invasive, and unwanted species in and around aquatic sites, such as wetlands. Wetland control structures will be constructed and maintained to allow for management of wetlands and to build wetlands. This also covers PPE, such as rubber boots and rain gear; equipment such as soil augers, testing equipment, water control structures; and aquatic plants/seeds.
Recurring	Native Grassland Restoration Statewide	MO000070004	2908, 0	1.3, 2.4, 3.1	Proposed	This is a recurring action to maintain training areas for troop use and ecosystem integrity. Chemical and mechanical treatments and prescribed burning are key components to managing these training areas. Project may include the purchase of herbicides, native grass seed, chemical sprayers, seeders, rental of seeding and brush removal equipment, and PPE such as chemical resistant gloves, long sleeve spray shirts, and spray pants. Project implementation will be carried out via in-house and contracted work.
Recurring	Wildland Fire Management Statewide	MO0NG140001	2908, 0	2.1, 2.4	Proposed	This is a recurring project used to conduct annual prescribed burns for the purposes of ecosystem management, T&E management, etc. Burn units will be determined annually and rotated by year and season based on unit specific goals. Site specific burn plans will be completed before any burn is conducted. Firebreaks will be established and maintained in house and through contracts. This project may also cover PPE, such as nomex, burn boots, hard hats, gloves, hearing and eye protection, and first aid kits. Purchases of UTV's, skid-units, drip torches, tools to maintain equipment such as wrenches, hammers, etc., and all other fire equipment. As well as the maintenance of equipment to include fuel. This project may also cover CPR/First Aid/AED training and wildland fire training. Project implementation will be carried out via in-house and contracted work.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
Recurring	Endangered Species Management - Ozark Cavefish, CCR	MO155060010	2504, 1	1.3, 2.4, 3.1	Proposed	This recurring project is used to avoid neglect to the species and to avoid formal consultation by implementing the Endangered Species Management Plan for the Ozark Cavefish. Maintaining this area is crucial to ensure sedimentation is kept to a minimum therefore keeping a clean water supply. Project implementation will be carried out via in-house and contracted work.
Recurring	AVCRAD - Conservation Area Maintenance - Ozark Cavefish	MOD00070001	2504, 1	1.3, 2.4, 3.1	Proposed	This is project is for maintenance of the Ozark Cavefish recharge area at the AVCRAD facility. Maintenance of the recharge area and implementation of BMPs ensures there are no adverse effects to the Ozark Cavefish and that the MOARNG has no need to go into formal consultation. Project implementation will be carried out via in-house and contracted work.
Recurring	Public Outreach	MO0NG170003	2908, 3	6.3, 6.4	Proposed	This specifically falls under the Sikes Act 670c(b)(1): "(b) Access for disabled veterans, military dependents with disabilities, and other persons with disabilities. (1) In developing facilities and conducting programs for public outdoor recreation at military installations, consistent with the primary military mission of the installations, the Secretary of Defense shall ensure, to the extent reasonably practicable, that outdoor recreation opportunities (including fishing, hunting, trapping, wildlife viewing, boating, and camping) made available to the public also provide access for persons described in paragraph b." This project may be used to purchase and maintain Track Chairs and other mobility devices, PPE for hunting and all other outdoor recreation activities, fishing poles, and blinds.
FY19-23	CCR Hay Lease	N/A	N/A	2.3	Ongoing	Current hay lease is valid from FY19 to FY23. Lease consists of conducting haying operations on approximately 108 acres of CCR.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
22	Timber Harvest	N/A	N/A	1.3, 2.6, 2.7	Proposed	Harvest is planned for 343 acres of standing and salvage timber at CCR. A total of 8 species is set to be harvest with white oak as the main species. Harvest will be ran through the reimbursable program. Harvest activities are covered by the programmatic BO and the conservation measures outlined in it.
22	IWFMP Update	N/A	N/A	1.3, 2.1	Ongoing	The existing IWFMP is outdated. An updated IWFMP is currently being developed. The IWFMP will include all MOARNG training sites (CCR, CCL, MTS, TTA, WTS, and ISTS.) Update is scheduled for completion during FY22
22	Fauna PLS, CCL	MO505210002	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of avian surveys, which have been ongoing since 2000s. The purpose of this project is to determine the presence or absence of a variety of avian species at CCL.
22	Fauna PLS, WTS	MOD05210002	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of avian surveys, which have been ongoing since 2000s. The purpose of this project is to determine the presence or absence of a variety of avian species at WTS.
22	T&E Bat PLS, CCL	MO505060008	2505, 1	1.1, 1.2, 4.1	Proposed	Per the March 2019 BO terms and conditions, the MOARNG must perform acoustic T&E bat surveys at CCL on a five-year basis. If the acoustic survey results in the detection of any T&E bats a mist-net survey will follow within two years. Survey will determine the presence/absence of bat species.
23	Fauna PLS, MTS	MOB78210001	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of avian surveys, which have been ongoing since 2000s. The purpose of this project is to determine the presence or absence of a variety of avian species at MTS.
23	Statewide Insect T&E PLS	MO0NG200006	2505, 1	1.1, 1.2, 4.1	Proposed	This is for a baseline survey for potentially occurring T&E and candidate species which may occur at TTA and MTS. The focused species will be the Monarch butterfly but may include other potential T&E invertebrates.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
23	T&E Bat PLS, TTA	MOA57160001	2505, 1	1.1, 1.2, 4.1	Proposed	Surveys are conducted on a 5-year rotation between acoustic and mist net surveys. This will be an acoustic only, and will require approximately 3 acoustic survey sites. A mist nest will be planned for 2028.
23	T&E BAT PLA, CCR	MO155060008	2505, 1	1.1, 1.2, 4.1	Proposed	Per the March 2019 BO terms and conditions, the MOARNG must mist net T&E bat surveys at CCR on a five-year basis. Survey will determine the presence/absence of bat species.
24	T&E Bat PLS, CCL	MO505060008	2505, 1	1.1, 1.2, 4.1	Proposed	Per the March 2019 BO terms and conditions, the MOARNG must perform acoustic T&E bat surveys at CCL on a five-year basis. If the acoustic survey results in the detection of any T&E bats a mist-net survey will follow within two years. Survey will determine the presence/absence of bat species.
26	Flora PLS, MTS	MOB78210002	2901, 1	1.2, 2.2, 4.1	Proposed	The survey will identify all species of flora located at MTS using the Floristic Quality Assessment methodology. This survey is a continuation of flora surveys, which have occurred since 1990s.
26	Fauna PLS, TTA	MOA57210001	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of avian surveys, which have been ongoing since 2000s. The purpose of this project is to determine the presence or absence of a variety of avian species at TTA.
26	Fauna PLS, CCR	MO155210002	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of fauna surveys, which have been ongoing since 1990s. The survey will conduct sampling for various terrestrial and aquatic species at CCR.
27	Fauna PLS, WTS	MOD05210002	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of fauna surveys, which have been ongoing since 2000s. The survey will conduct sampling for various terrestrial and aquatic species at WTS.
27	Fauna PLS, CCL	MO505210002	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of fauna surveys, which have been ongoing since 2000s. The survey will conduct sampling for various terrestrial and aquatic species at CCL.
27	Wetlands Survey, Camp CCR	MO155060011	2901, 1	3.6, 4.1	Proposed	This project is a continuation of wetland PLS, to provide a comprehensive inventory of wetlands present on CCR.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
27	Wetlands Survey, Camp CCL	MO505060009	2901, 1	3.6, 4.1	Proposed	This project is a continuation of wetland PLS, to provide a comprehensive inventory of wetlands present on CCL.
28	Flora PLS, WTS	MOD05210001	2901, 1	1.2, 2.2, 4.1	Proposed	The survey will identify all species of flora located at WTS using the Floristic Quality Assessment methodology. This survey is a continuation of flora surveys, which have occurred since 2000s.
28	Flora PLS, TTA	MOA57210002	2901, 1	1.2, 2.2, 4.1	Proposed	The survey will identify all species of flora located at TTA using the Floristic Quality Assessment methodology. This survey is a continuation of flora surveys, which have occurred since 1990s.
28	Flora PLS, CCR	MO155210001	2901, 1	1.2, 2.2, 4.1	Proposed	The survey will identify all species of flora located at CCR using the Floristic Quality Assessment methodology. This survey is a continuation of flora surveys, which have occurred since 2000s.
28	Fauna PLS, MTS	MOB78210001	2901, 1	1.1, 1.2, 4.1	Proposed	This project is a continuation of fauna surveys, which have been ongoing since 2000s. The survey will conduct sampling for various terrestrial and aquatic species at MTS.
28	Wetlands Survey, Camp TTA	MOA57060008	2901, 1	3.6, 4.1	Proposed	This project is a continuation of wetland PLS, to provide a comprehensive inventory of wetlands present on TTA.
28	Wetlands Survey, Camp MTS	MOB78060009	2901, 1	3.6, 4.1	Proposed	This project is a continuation of wetland PLS, to provide a comprehensive inventory of wetlands present on MTS.
28	Wetlands Survey, Camp WTS	MOD05060009	2914, 1	3.6, 4.1	Proposed	This project is a continuation of wetland PLS, to provide a comprehensive inventory of wetlands present on WTS.
28	T&E Bat PLS, CCL	MO505060008	2505, 1	1.1, 1.2, 4.1	Proposed	Per the March 2019 BO terms and conditions, the MOARNG must perform acoustic T&E bat surveys at CCL on a five-year basis. If the acoustic survey results in the detection of any T&E bats a mist-net survey will follow within two years. Survey will determine the presence/absence of bat species.
28	T&E Bat PLS, TTA	MOA57160001	2505, 1	1.1, 1.2, 4.1	Proposed	Surveys are conducted on a 5-year rotation between acoustic and mist net surveys. This will be a mist-net survey only.

Table 5. Implementation Table						
Fiscal Year	**Project Name**	**Project Number**	**STEP Catalog & Class**	**INRMP Goal & Objective**	**Project Status/ Goal Met***	**Project Description/Notes**
28	T&E BAT PLA, CCR	MO155060008	2505, 1	1.1, 1.2, 4.1	Proposed	Per the March 2019 BO terms and conditions, the MOARNG must mist net T&E bat surveys at CCR on a five-year basis. Survey will determine the presence/absence of bat species.
29	Statewide Insect T&E PLS	MO0NG200006	2505, 1	1.1, 1.2, 4.1	Proposed	This is for a baseline survey for potentially occurring T&E and candidate species which may occur at TTA and MTS. The focused species will be the Monarch butterfly but may include other potential T&E invertebrates.

*Green = goal and objective met; Orange = goal and objective partially met; Red = goal and objective not met

APPENDIX C. SITE OVERVIEWS

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C.1 CAMP CROWDER TRAINING SITE

C.1.1 LOCATION AND AREA

The CCR encompasses 4,300 acres of federally owned land (Appendix Q, Figure 1). CCR is located within southwest Missouri in an area characterized by prairies and deeply dissected forested valleys and streams.

During pre-settlement times, the site was comprised of prairies and savannas on the relatively level areas, chert forest on the steep slopes, and bottomland forest along the creek in the southern half of CCR. Before the DoD owned CCR, farmers had cleared the floodplains for cropland and pasture, and loggers had removed most of the timber. Despite the disturbance, some areas are similar to pre-settlement times. Bottomland forests converted into crop fields are now cool season grasslands. Other disturbed areas consist of woody growth and mowed grasslands.

C.1.2 SURROUNDING COMMUNITIES AND LAND USE

CCR is located approximately three miles south of the City of Neosho in Newton County. Crowder College is located to the east of the CCR Cantonment Area (Appendix Q, Figure 1). The Community College, founded in 1963, was named in honor of General Enoch Crowder, a prominent soldier and statesman, and the veterans of World War II (WWII) who received their training at Fort Crowder. The Longwell Museum located at the college provides many displays and artifacts from Fort Crowder. Crowder College has achieved worldwide recognition for its innovative Alternative Energy program. The college designed and built the first solar powered vehicle to successfully complete a coast-to-coast journey across the U.S. in 1984 (Crowder College, 2006).

In addition to Crowder College, the Neosho Memorial Airport, Opal Food's Farm, a sewage treatment plant, a landfill, an industrial park, and the Newton County Fairgrounds are all found within one mile of CCR Cantonment Area. The North Post of CCR is bordered mainly by the industrial park, Bicentennial Conservation Area, Neosho School District School Farm, and Country Products, Inc. The South Post is mainly surrounded by rural land use; however, portions of this land along the eastern boundary of CCR is being subdivided and sold for development. Several streams (Elm Spring Branch, Harrison Branch, Buffalo Creek, and Bullskin Creek) occur within the vicinity of CCR. An unnamed tributary to Bullskin Creek runs through the southern portion of CCR and drains the majority of the site.

C.1.3 INSTALLATION HISTORY

The U.S. Federal Court granted permission to establish CCR as a Signal Corps Replacement Training Center in 1941. The U.S. government purchased the land from subsistence farmers and acquired 66,000 acres by 1945. During WWII, the DoD conducted intensive military training and constructed military facilities at CCR. They built more than 600 structures. The construction of CCR, one of the largest army installations in the Midwest, doubled the population of Neosho in a matter of weeks. The camp flooded Neosho with an average population of 40,000 uniformed men and women. Toward the end of WWII, Fort Crowder served as a German prisoner of war (POW) camp.

In March 1946, the federal government closed the Fort. Most of the land was sold, and most of the buildings were demolished. The NGB received 3,020 acres for use as a firing range. CCR now consists of 4,300 acres of federally owned land administered by the USACE and licensed to the MOARNG.

The impact of CCR's establishment on Neosho was only matched by the impact of its closure. The millions of dollars spent locally by the government and soldiers disappeared almost entirely when WWII ended.

Using the many facilities left at the old campsite, business, and industry rose where barracks and mess halls once stood. Later, Crowder College was formed and moved in where the army had moved out.

From the WWII era until approximately 1973, U.S. Air Force contractors tested liquid-fuel rocket engines and rocket engine components at a facility in the northern part of CCR. This area was referred to as Air Force Plant No. 65 (Global Security.org, 2006).

C.1.4 LAND USE

The land within CCR is divided into maneuver training areas (MTAs), a range complex area, and a Cantonment Area. The majority of permanent building structures are found within the Cantonment Area or in its vicinity. (Appendix Q, Figure 6)

C.1.4.1 TRAINING AREAS

CCR is comprised of eight MTAs and multiple sub-Training Areas (TAs). Within the TAs is a field fortification area, land mine warfare, mechanized bivouac site, Nuclear, Biological, and Chemical (NBC) chamber, north and south land navigation courses, obstacle/confidence course, parade/drill field, POW compound, simulation building, Tactical Training Base (TTB), as well as multiple bivouac sites.

C.1.4.2 RANGE COMPLEX

The Range Complex Area is located south of the Cantonment Area. A summary of CCR ranges is provided in the table below.

Table 6. Camp Crowder Range Complex
600 Meter Known Distance (KD)
M203 Grenade Launcher (Plastic only)
Nonstandard Small Arms
Light Anti-armor Weapons (LAW/AT-4)
Auto Combat Pistol Qualification Course
Machine Gun Transition
Basic 10/25 Meter Zero
Automated Record Fire (ARF)
Hand Grenade Qualification (Non-Fire)
Light Demolition
Military Operations in Urban Terrain (MOUT) Site

C.1.4.3 CANTONMENT AREA

The Cantonment Area is approximately 226 acres. The main entrance to CCR is located within this area along the western property boundary. Several permanent structures, including administrative buildings, classrooms, maintenance buildings, storage buildings, dining facilities, and troop housing are found in the

Cantonment Area. CCR parking lots (Unit Motor Pool and Battalion Motor Pool), the Rappel Tower, Bivouac Area 5, two above ground water tanks, and a wash rack are also located here.

C.1.4.4 Helipads, Refueling Facilities, and Bivouac Areas

Two designated helicopter-landing areas for rotary-wing aircraft are maintained. A Wheeled Vehicle Refueling Point and a Remote Fuel Tanker Containment Pad are located within the Cantonment Area and MTA 5, respectively. There are seven bivouac sites. Approximately 8,000 people use these sites per year. The bivouac areas in the northern portion of CCR (Sites 1, 2, and 3) are used most frequently, approximately twelve weeks per year. Units cannot use the bivouac sites located on South Post when the firing ranges are in use. (Snyder, 2020)

C.1.5 Annual Usage

No changes are planned in the level and types of training at CCR. Military training varies by season and by mission needs. Deployment of MOARNG units resulted in lower training numbers than in past years prior to the war effort. There are currently nine ranges in use at CCR, these are the most frequently used portions of the training site. Approximately 38,000 people use one or more of the CCR ranges annually. The ranges that receive the greatest use are the M4/M16 Zero, M16/M4 Remote Engagement Target System (RETS), Multi-Purpose Machine Gun, and Combat Pistol ranges. Other training areas that get used frequently by units include the field fortification training area, land mine warfare training area, panel bridge sites, combat in the city site, equipment training area, tactical training base, POW compound, rappel tower, obstacle course, simulation building, water supply training area, NBC area, MOUT site, and the land navigation courses. Groups which utilize CCR include the ARNG (Missouri, Kansas, and Arkansas), Navy, Marines, Air Guard, Army Reserve, Army Reserve Officers Training Corps (ROTC), Junior ROTC, Boy Scouts, local law enforcement agencies, and Highway Patrol. (Snyder, 2020)

C.2 Camp Clark Training Site

C.2.1 Location and Area

The CCL is located in Vernon County in southwest Missouri, approximately two miles southeast of the city of Nevada (Appendix Q, Figure 2). CCL encompasses approximately 1,287 acres. The northern half of CCL is state owned, while the southern half is federally owned land administered by the USACE and licensed to the MOARNG.

CCL is located in the Osage Plains Region of Missouri. During pre-settlement times, tallgrass prairie covered approximately 70 percent of the site. Currently, CCL contains a mixture of prairie, savanna, and deciduous forests within the undeveloped portions of the site.

C.2.2 Surrounding Communities and Land Use

As shown in Figure 2 (Appendix Q), Highway US 71 runs north to south just outside the western boundary of CCL. Most of the land surrounding CCL is privately owned, and is row crop fields, tall fescue pastures, and undeveloped wooded areas. CCL is starting to see more encroachment issues. A county road runs along portions of the eastern and northern boundaries, which is providing the opportunity for development of additional residential housing.

CCL is within the boundaries of the Kaysinger Basin Planning Region, which includes Bates, Benton, Cedar, Henry, Hickory, St. Clair, and Vernon Counties. The Kaysinger Basin Region consists of almost 4,700 square

miles of land and 55,600 surface acres of water. Approximately 95,854 people reside in this area (Kaysinger Basin Regional Planning Commission, 2006).

C.2.3 INSTALLATION HISTORY

CCL was named after Brigadier General Harvey C. Clark, who commanded the MOARNG from 1899 until his death in 1921. The MOARNG first used CCL in 1908 as a target range. In 1916 CCL was a troop mobilization point for troops going to the Mexican Border and in 1918 for World War I troops. During WWII, CCL served as a POW camp. Between December 1942 and May 1946, Missouri was home to more than 10,000 German and Italian POWs who lived in 32 camps scattered throughout the state, including at CCL. In 1946, the federal government released ownership of the northern half of CCL to the State of Missouri and retained the southern half. Since, the southern half has been licensed to the MOARNG. CCL originally included 320 acres, but the federal government gradually acquired additional land for a total of 1,260 acres.

The NGB used CCL for storage, equipment maintenance, and weekend training from 1946 to 1963. Since 1963, the MOARNG has improved CCL and has increased its use as a weekend and annual training site.

C.2.4 LAND USE

The land within CCL is divided into MTAs and a Cantonment Area. Land use at CCL is comprised of a Cantonment Area (approximately 113 acres) and an unused dudded area (approximately 54 acres). The remaining acreage includes light maneuver areas. Several live fire and inactive ranges occur throughout the property. The most frequently used portions of CCL are the firing ranges and the field facilities. The majority of permanent building structures are found within the Cantonment Area or in its vicinity. Some small structures also exist within the MTAs (Appendix Q, Figure 7).

C.2.4.1 TRAINING AREAS

CCL is comprised of seven MTAs. Within these MTAs are several sub-TAs, which include the following: obstacle course, wheeled vehicle driving course, NBC chamber, Entry Control Point (ECP), MOUT site, floating bridge training site, water purification site, confidence course, TTB, land navigation course, parade/drill field, leadership reaction course, virtual convoy operations trainer, Firearms Training System, and High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer Simulation Building, as well as several bivouac sites.

C.2.4.2 RANGES

CCL ranges include live fire ranges, inactive ranges, and a hand grenade qualification range. Firing ranges were positioned at CCL to allow field training to occur concurrently with weapons firing. A dudded impact area (approximately 54 acres) is located within the M203 and the old M31 range areas. A summary of CCL ranges is provided in the table below.

Table 7. Camp Clark Ranges
Ranges
Combat Pistol Qualification Course
AT-4 / M2 (Plastic Only)
Non-Standard Small Arms Range
M203 Range - Grenade Launcher (Target Practice Rounds Only)
25 Meter KD
Light Demo Range
Hand Grenade Qualification

C.2.4.3 CANTONMENT AREA

The Cantonment Area is approximately 113 acres. The main entrance to CCL is located within this area along the southwestern property boundary. Several permanent structures, including administrative buildings, classrooms, maintenance buildings, storage buildings, dining facilities, and troop housing are found within this area. Also located within the Cantonment Area are a wash rack, a potable water drop, an ammunition storage point (restricted area), a helipad, and various parking lots.

C.2.4.4 REFUELING FACILITIES AND BIVOUAC SITES

A Wheeled Vehicle Refueling Point and a remote Fuel Tanker Containment Pad are located within MTA - A and MTA - E, respectively. There are six bivouac sites in the eastern portion of the training area. Since firing ranges were positioned at CCL to allow field training to occur concurrently with weapons firing, units can use bivouac sites and light maneuver areas when the firing ranges are in use.

C.2.4.5 LIGHT MANEUVER AREAS

The majority of the land at CCL is available for light maneuver training. Light maneuver training areas are generally used for bivouac sites, base camps, staging activities, field maintenance activities, land navigation (foot traffic, compass orienteering), vehicle movements (dirt road convoys), and engineer training. Light maneuver areas are comprised primarily of forests, prairies, and savannas.

C.2.5 ANNUAL USAGE

On average, approximately 35,000 people train at CCL per year. Approximately 30,000 (85 percent) of these individuals are NGB troops, and the remaining 5,000 (15 percent) include Army Reserve troops and others who use the firing ranges and other training facilities. Due to deployment for the war effort, usage of CCL was greatly reduced during FY 2005, when 16,916 people trained at CCL. Of these, 1,294 people were from civilian agencies. Additionally, 3,077 DoD personnel and 323 civilians were trained on CCL ranges. The most frequently used portions of CCL are the firing ranges and the field facilities (approximately 25,000 people). Because the northern half of CCL is in the range and firing fan, troops use the southern half more frequently for field exercises.

Demolition training has not occurred for several years. The range area still exists, but site maintenance would be required before it could be used again.

Groups who use the site include the Missouri and Kansas ARNG. Other DoD training site users include the Army ROTC, the Naval ROTC, USAR, and the Marines. Civilian groups include Highway Patrol, the local sheriff's office, Boy Scouts of America, the local fire department, Vietnam Vets, American Legion, and Camp Guardian, a program for NGB active duty or other soldier families' disabled children.

C.3 MACON TRAINING SITE

C.3.1 LOCATION AND AREA

The state-owned MTS is located in north central Missouri approximately three miles southwest of the City of Macon in Macon County. The site is comprised of three land parcels, Baker's Acres (1,230 acres), Wooly Acres (609 acres), and South 61 (1,222 acres) for a total of 3,061 non-contiguous acres (Appendix Q, Figure 3).

During pre-settlement times, the topography of Macon County consisted of rolling hills overlaid by prairies, savannas, and forests. Wetlands were also common in this region and were found within forests, prairies, uplands, and bottomlands.

C.3.2 SURROUNDING COMMUNITIES AND LAND USE

Landowners near MTS are mostly farmers. Much of the surrounding land is pasture or grazed timber. Some of the land is idle strip-mined land or timber. Row crops such as corn, soybeans, grain sorghum, and wheat are grown in the river bottoms. Major roadways include US 63 and US 36, which intersect at the north side of Macon.

Long Branch Lake is located just northwest of Macon. Long Branch Dam and the 2,429-acre Long Branch Lake were constructed by the USACE as a multipurpose project to provide flood control, water supply, recreation, fish and wildlife benefits, and downstream water quality enhancement. The East Fork of the Little Chariton River is the major source of water flowing into Long Branch Lake.

Of the almost 1,200 acres directly managed by the USACE at Long Branch, approximately 65 percent is woodland. This predominately oak/hickory forest is in various stages of maturity. Approximately 330 acres of the USACE-managed land is in grass. The USACE conduct seeding and prescribed burning as natural resource management efforts to reestablish native grasses at Long Branch (USACE, 2006).

An additional 2,565 acres are managed by MDC under a license agreement with the USACE. Management objectives for this land include providing habitat diversity for migratory and native species and providing outdoor recreational opportunities such as hunting, hiking, and wildlife observation (USACE, 2006).

Under a license agreement with the USACE, the Missouri Department of Natural Resources (MoDNR) operates Long Branch State Park, which encompasses approximately 1,834 acres. The park includes camping sites, nature trails, boat-launching facilities, and a sand beach along the shoreline (USACE, 2006).

C.3.3 INSTALLATION HISTORY

The State of Missouri received the MTS land parcels in 1989 and 1990 from Associated Electric Cooperative, Inc., which strip-mined the areas for coal in the 1940s-1950s (MOARNG, 1993), and used the coal for fuel to generate electricity.

This activity has drastically changed the topography from rolling hills, characteristic of north central Missouri, to steep walls and strip mine spoil piles. Underground mining has also occurred on Wooly Acres and open mine shafts are still on this area. The majority of the strip-mined area on MTS was revegetated with exotic species. Areas not mined consist of upland and bottomland forest habitat.

Small portions of the MTS contain remnants of upland and bottomland prairies and savanna habitat. Aquatic communities at MTS include lakes, ponds, strip pits, wetlands, intermittent streams, and the East Fork Chariton River. These areas provide habitat to migrating waterfowl and marshland mammals, a diminishing resource.

The MTS was awarded the Army's Natural Resources Conservation Award for installations 10,000 acres or less in 1996. The site was commended for its success in integrating a strong natural resources conservation program into its overall training mission.

C.3.4 Land Use

Facilities and training assets are discussed below for the three MTS tracts, which include Baker's Acres, Wooly Acres, and South 61 (Appendix Q, Figure 8).

C.3.4.1 Baker's Acres

The main entrance to this portion of the MTS is located off of Jaguar Street. The Cantonment Area, on the north side of Baker's Acres, consists of a maintenance building, a shower and latrine building, storage buildings, hazardous waste storage building, a wash rack, wastewater treatment lagoon, a zero escapement baffle KD qualification range, and an above ground fuel tank. In addition to the Cantonment Area, multiple training areas and ranges are located at Baker's Acres. Training areas include a land navigation course, dry support bridge, ECP, floating bridge training area, mechanized bivouac site, leadership reaction course, vehicle recovery pit, and multiple bivouac sites. A 25 meter known distance range and MOUT site, as well as an artillery sighting point, are also located on Baker's Acres. Two landing zones are established in the northern half of the training site. Two refueling pads allow for refueling operations to take place at Baker's Acres.

C.3.4.2 South 61

The main entrance of South 61 is located off of State Route T. South 61 contains two bivouac sites, a vehicle refueling pad, a landing zone, floating bridge site, a land navigation course, Husky/Buffalo course, and wheeled vehicle maneuver trails.

C.3.4.3 Wooly Acres

The entrance to Wooly Acres is through a gate located on the south side of the property off of Skinker Road. The only major training facility on this portion of the MTS is the Counter Mobility TA.

C.3.5 Annual Usage

Military training in support of the military mission varies by season and by MOARNG requirement. The following training sites are utilized at MTS: bivouac sites, float bridge sites, dry support bridge site, mechanized bivouac dig site, ECP, land navigation courses, counter mobility area, leadership reaction course, and a husky and buffalo training area. The MOUT site and a zero escapement baffle KD qualification range are also available for training.

The groups that regularly utilize the site include ARNG units, Air Guard, Army Reserve, Army ROTC, Junior ROTC, civilian DoD, Missouri Highway Patrol, Boy Scouts of America, and MDC education programs. (Vandrunen, 2020)

C.4 TRUMAN TRAINING AREA

C.4.1 LOCATION AND AREA

The TTA encompasses approximately 709 acres, and consists of a mainland peninsula and three small islands. The TTA is located in the Tebo Island Area of the Truman Reservoir (Appendix Q, Figure 4). The mainland portion of the TTA lies on the South Grand Point peninsula, and includes approximately 497 acres. It is located just north of the confluence of the Osage and Grand Rivers. Prior to creation of the Truman Reservoir, Tebo Creek and Little Tebo Creek bound this area. The mainland training area is accessed from the north, and has authorized public access, limited to foot traffic only. The three islands, comprising approximately 212 acres, are known as the Tebo Islands. These islands are located upstream from the mainland area. The TTA is located on federally owned land licensed to the MOARNG from the USACE.

C.4.2 SURROUNDING COMMUNITIES AND LAND USE

The TTA is located approximately ten miles north of Warsaw, Missouri near the Henry-Benton County line. The TTA is located on Truman Reservoir property, as shown in Figure 4 (Appendix Q). The dam consists of an earth and rock embankment, a concrete spillway, and a hydroelectric power plant. The power plant is used to meet peak electrical demands, but the primary purpose of the dam is to provide flood protection for the lower Osage, Missouri, and Mississippi River floodplains. The dam was authorized in 1954 and completed in 1979. The impoundment has a water storage capacity of more than five million acre-feet and encompasses 56,000 acres at normal pool elevation. The USACE owns more than 100,000 acres of project land surrounding the reservoir and leases approximately 58,133 acres to MDC for fish and wildlife management. Private structures, such as residences, are prohibited on USACE property at the Truman Reservoir. The 1,440-acre Harry S. Truman State Park is located on a peninsula opposite the TTA mainland.

The TTA is within the boundaries of the Kaysinger Basin Planning Region. As stated before, the Kaysinger Basin Region consists of almost 4,700 square miles of land and approximately 95,854 people reside in this region (Missouri Census Data Center, 2005).

C.4.3 INSTALLATION HISTORY

During the 1960s, farmers owned much of the land that is now the TTA. They had cleared much of the land for pasture and cattle grazing. The USACE then obtained and created the Truman Reservoir by impounding the Osage River.

The Air Force Reserve began using the TTA during the 1970s for military flight operations. Since then, MOARNG units and Air Force units from Whiteman Air Force Base have been using the site.

C.4.4 LAND USE

The mainland of the TTA is undeveloped except for the maneuver trail network. No Cantonment Area or other structures are present. The Tebo Islands are also undeveloped with no permanent structures or roadways. The islands are used primarily for helicopter training. No established bivouac sites are located

on the islands. The entire TTA land area is available for light maneuver training, such as reconnaissance and land navigation.

C.4.4.1 HELICOPTER LANDING ZONES

Two designated sod-landing areas for rotary-wing aircraft are maintained. The site has no established refueling facility, and is inadequate for major aviation operations. These areas are maintained using mowing and/or prescribed burning as needed.

C.4.5 ANNUAL USAGE

MOARNG units and Air National Guard units from Whiteman Air Force Base use the site for basic soldier skills, tactical training, engineer training, survival training, helicopter training, pre-mission planning, and fire hazard training.

C.5 WAPPAPELLO TRAINING SITE

C.5.1 LOCATION AND AREA

The WTS is located in Butler County in southeast Missouri (Appendix Q, Figure 5). The approximately 2,200-acre training site lies within the Mark Twain National Forest (MTNF) and is owned by the United States Forest Service (USFS). The WTS is approximately two miles south of the Lake Wappapello dam, which impounds a USACE reservoir serving as a recreational facility. The training site includes part of both the Peppermint Creek and Mud Creek watersheds.

The WTS is primarily forested except for approximately 45 acres in the northwestern corner of the property designated for cantonment. No training activities are conducted within the Mud Creek watershed, which was designated by the Missouri Natural Areas Committee as a Natural Area on 20 June 1988.

C.5.2 SURROUNDING COMMUNITIES AND LAND USE

The MTNF is managed by the USFS for multiple uses including timber production, wildlife habitat, and recreation. Other surrounding land is rural, mostly forested, or agricultural north of the training site. The Butler County Sanitary Landfill is adjacent to the southwestern border of the WTS, and a motel and restaurant is located to the west.

C.5.3 INSTALLATION HISTORY

National Guard Units from Missouri and southern Illinois have trained on the ranges and maneuver areas at the WTS since 1968. The USFS retains administrative control of the land, soil, water, products, and improvements, except for structures built by the MOARNG.

C.5.4 LAND USE

The installation is used for relatively low-impact training exercises. Facilities and land use are described below.

C.5.4.1 CANTONMENT AREA AND RANGES

The Cantonment Area comprises approximately 45 acres at the northwestern corner of the WTS (Appendix Q, Figure 10). The MOARNG manages this area. Facilities within the Cantonment Area include: office building, maintenance shop, sleeping quarters, mess hall, latrine and shower facility with self-service laundry, sewage treatment system and lagoons, two structures for range support, two range control towers, and a vehicle refueling pad.

The MOARNG operates two firing ranges adjacent to these facilities. A 25-meter zero range and a combat pistol qualification course. Both ranges have associated control towers (listed above). The MOARNG also operates two other ranges at WTS, including MOUT site.

C.5.4.2 TRAINING AREAS

The following training areas are at WTS: four bivouac sites, mechanized bivouac dig site, ECP, and land navigation course.

C.5.5 ANNUAL USAGE

WTS can accommodate nearly three-hundred military personnel at one time for training exercises. The WTS is used by approximately 25 Guard and Reserve units to conduct small arms qualification and small unit (company and platoon sized) tactical and administrative training. Most users are part of the combat engineer, transportation, military police, and maintenance units from within Missouri.

Approximately one-third of the WTS usage is for Basic Soldier Skills Training. Training activities conducted at the WTS include Weapons Qualification, Administrative Post Support, Small Unit Tactical Army Training and Evaluation Program, Facility Maintenance and Construction, Recruit Training and Cadre, Common Task Training, Field Training Exercises, Overnight Bivouac, Land Navigation, and Construction Activities.

The majority of training usage on WTS is conducted by DoD, including the ARNG, Seabees, USAR, civilians from the Training and Doctrine Command, and other DoD civilians. Civilian users such as Scouts, JR ROTC, and state-sponsored youth and adult programs conduct the remaining training usage. (Woods, 2020)

Training exercises are not normally conducted during the fall firearms deer or spring turkey hunting seasons, per conditions of the Special Use Permit. However, in consultation with the USFS, WTS would be closed to hunting and fishing should the facility be needed during these periods to accomplish the military mission.

APPENDIX D. MILITARY MISSION

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D.1 MILITARY MISSION

Specific military missions and training requirements are fluid and change from time to time with realignments, transformations, and changes in equipment and tactics. This requires establishing basic underlying natural resource management principles and practices that have broad application and can be adapted in multiple situations. Implementation of this INRMP will successfully promote adaptive management that protects and enhances natural resources for multiple uses, sustainable yield, and biological integrity, while supporting the military mission. This INRMP complies with applicable Army and DoD policies, as well as applicable federal, state, and local mandates.

The MOARNG mission includes federal and state components. The primary federal mission 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 or national emergency or when appropriated to augment the active Army. The primary state mission is to support civil authorities in protection of life and property and preservation of peace, order, and public safety under competent orders from Missouri authorities. The MOARNG has training facilities located throughout Missouri to help its units accomplish specific missions and maintain overall military readiness.

D.1.1 CAMP CROWDER TRAINING SITE MILITARY MISSION

CCR's mission is to provide suitable and adequate facilities for tactical, academic, and logistical support for the MOARNG and other military forces in adjacent states, and be prepared to operate as an overflow mobilization station.

D.1.2 CAMP CLARK TRAINING SITE MILITARY MISSION

The mission of CCL is to serve as a training area for the MOARNG and reserve forces based in the west-central region of the state. The primary purpose of CCL is to provide appropriate facilities for tactical training, academic training, and logistical support for the MOARNG and other Reserve forces located in states adjacent to Missouri. CCL is also designated to operate as an overflow mobilization facility in times of need.

The wartime mission of CCL is to command and operate the installation; manage resources; provide training and logistical support to assigned, attached, and tenant units and activities; and prepare to expand and operate as a separate installation upon mobilization.

D.1.3 MACON TRAINING SITE MILITARY MISSION

The MOARNG acquired the MTS to provide training and maintenance support for National Guard and Army Reserve units in northern Missouri. Sixteen ARNG units are located within a 100-mile radius of MTS. The site provides training areas for Engineer Companies, Artillery Batteries, Military Police Units, Headquarters, State Headquarters, Maintenance Battalions, Air Medivac Units, Aviation Groups, and Transportation Companies. Company-sized units utilize the site to conduct individual and collective level training events typically over designated Inactive Duty Training weekend(s) and extended field training exercises.

D.1.4 TRUMAN TRAINING AREA MILITARY MISSION

The primary mission of the TTA is to provide appropriate facilities for military training operations. The ARNG conducts bivouacs, Multiple Integrated Laser Engagement System (MILES) training, and basic

soldier skills training at the TTA. The ARNG also conducts nap-of-the-earth navigation with helicopters. The Air Force conducts land navigation, combat survival training, water survival training, and aviation training at the TTA.

D.1.5 WAPPAPELLO TRAINING SITE MILITARY MISSION

WTS's military mission is as follows: to provide a local training area for Army National Guard units, and other National Guard and Reserve Forces units, located in southeastern Missouri; to provide a training area which will accommodate approximately 300 soldiers for military training exercises; to provide weapons firing ranges for soldiers to qualify annually; and to provide non-firing tactical maneuver areas for Infantry, Engineer, Medical, Aviation, Military Police and other troop units with maximum acreage available for training concurrent with weapons firing (MOARNG, 2001a).

D.2 NATURAL RESOURCES NEEDED TO SUPPORT THE MILITARY MISSION

The MOARNG requires a mixture of open and forested land areas to support military training requirements. Relatively natural, intact landscapes are required for successful and realistic training activities. Damaged training lands, soil erosion, degraded grasslands and forests, and silted streams may prevent sustainable long-term training. Degradation of natural resources results in inadequate training, impaired readiness, and wasted training dollars. Maintaining healthy ecosystems keeps the training land continuously available for soldiers' use. Healthy ecosystems are resilient and can support long-term training needs.

The MOARNG recognizes its on-going and proposed training activities can potentially use or consume natural resources on mission land and that successful mission execution depends on maintaining the environment for sustainable use. The MOARNG 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 their care are sustained in a healthy condition for future users.

D.3 MISSION IMPACTS ON NATURAL RESOURCES

D.3.1 CURRENT POTENTIAL IMPACTS

The MOARNG conducts various types of training at each training site. Types of training include basic solider, tactical, engineer, transportation, military police, maintenance, pre-mission planning, helicopter operations, and field artillery trainings. Training activities that generally have a minimal impact on natural resources require undisturbed cover to conceal movements. As such, the disturbances are no greater than walking through the woods or open areas and, normally, require no extraordinary precautions, limitations, or restrictions. Because minimum impact training has few adverse effects on natural resources these types of training will not be restricted.

Some types of training devices disturb soils, vegetation, or both. Secondary impacts to soil and water resources may affect water quality, fish populations, and wildlife inhabitants. Such disturbances may require corrective actions such as adding soil; seeding; mulching; and/or installing erosion control devices, sedimentation structures, or other management practices.

Surface water impacts are possible when using herbicide during pest management activities. This impact is expected to be minor, as these activities are conducted according to label instruction and the approved Integrated Pest Management Plan (IPMP) for MOARNG facilities (MOARNG, 2020). Clean Water Act,

Section 402: National Pollutant Discharge Elimination System (NPDES), permits may also be required for some pesticide applications near water.

Wetlands can be impacted during land-disturbing activities if personnel are not aware of the wetlands and the requirements for protecting them.

Habitat for rare species can be impacted through training activities and improper land management if personnel are not aware of requirements. Habitat could also be impacted temporarily through normal land management activities, such as forest management.

There is potential for noise from training activities to affect wildlife; however, these impacts are considered minor at all training sites. Examples of noise-producing activities may include tactical vehicle training activities, general light vehicle use, wheeled vehicle convoy, field fortification, small arms live fire ranges, non-live fire exercises, air assault; helicopters, demolition range, land clearance activities, general troop training, and use of authorized, personally owned vehicles. The MOARNG Statewide Installation Compatible Use Zone Study addresses specific issues related to noise generation at CCR, CCL, and MTS.

D.3.2 Potential Future Impacts

The ultimate goal of this INRMP, as well as its subsequent additions or revisions, is to ensure continuous military training capability for the MOARNG, while managing for the mutual sustainability of natural resources. Continuation of the INRMP's active ecosystem management actions will accommodate the MOARNG's training mission, while emphasizing a holistic, adaptive management style that focuses on maintaining biological diversity.

Natural resources and natural resources management will be taken into account during land use planning. Natural resources will be considered prior to implementing land use changes and/or development projects. Plans for new construction will be outlined in respective Training Site Master Plans. The following management strategies will be considered during land use planning.

- New buildings and training facilities should be sited in previously disturbed areas when possible. If new undisturbed areas must be used for development, new facilities should occur adjacent to previously disturbed land.
- Land clearing (with the exception of selected prescribed burning) should not occur within 50 feet of waterbodies or jurisdictional wetlands.
- Impervious surfaces generally increase storm water runoff, and should be minimized in areas of new development. Alternative surfaces such as gravel pathways should be considered to minimize impervious surface area.

D.4 Natural Resources Considerations for Mission Planning and Initiation

Training success is only possible through a supportive, proactive natural resource management program. The MOARNG natural resource management program aims to minimize the impacts of normal training use on natural resources and complements the doctrinally required military training. Proper execution of the INRMP provides sustainable training lands and provides adaptive means of dealing with normal training impacts, thereby protecting natural resources. Many features of this plan contribute to its ability to provide sustainable training lands.

The military mission can affect natural resources by disturbing land, water, flora, and fauna. The MOARNG continually evaluates the potential effects of training on natural resources. Military training varies by

season and by mission needs. The SAIA requires that INRMPs provide for "…no net loss in the capability of military installation lands to support the military mission of the installation" (16 USC §670 et seq). The INRMP enables the installation to meet the requirements of the military mission within the limitations and legal restrictions of the baseline natural resources at each training site.

Military training can have both negative and positive effects on natural resources. Excavation and maneuvering heavy wheeled vehicles across even the best-suited landscapes can damage vegetation and soils. For this reason, soils and vegetation require timely land rehabilitation efforts following such activities. In addition, vegetation (and occasionally soils) can be damaged by regular use on areas such as trails, bivouac sites, and firing points. Soil and vegetation impacts can lead to soil erosion, soil compaction, loss of wildlife habitat, and introduction of unwanted pests. Wildlife populations can also be harmed by field equipment training, small arms firing, or by mission-related wildfires.

Four basic management techniques can be used to minimize military training effects to the soil and vegetation resources: (1) redistribute use; (2) modify kinds of uses; (3) alter the behavior of use; and (4) manipulate the natural resources for increased durability.

Environmental constraints can dictate where and when certain types of training can occur to ensure regulatory compliance and long-term sustainability of training lands (Appendix Q, Figures 11-15). The main natural resource considerations that have the ability to limit activity include soil type and capability, wetlands, vegetation, and threatened and endangered species. These limitations are discussed below:

- Wet soil conditions restrict off-road vehicle usage and bivouacking in certain areas throughout different times of year.
- Activities in and around wetlands are limited because impacts, such as filling, modifying, draining, or construction, could result in CWA violations.
- In order to manage on-site vegetation for long-term sustainability, use of vehicles off road is limited and subject to prior environmental review.
- Any new projects or types of training must be considered for environmental impacts, including potential impacts to rare, threatened, or endangered species prior to implementation.

D.4.1 WAPPAPELLO TRAINING SITE

Restricted areas at WTS include approximately 300 acres within the Mud Creek Designated Natural Area and wet bottomlands within the Peppermint Creek floodplain and 350 acres that make up the safety-danger zone for the small arms firing ranges (MOARNG, 2001a). These areas are restricted to foot traffic only.

APPENDIX E. PHYSICAL ENVIRONMENT

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E.1 CAMP CROWDER TRAINING SITE

E.1.1 PHYSICAL SETTING AND TOPOGRAPHY

CCR is located in the Elk River Section of the Ozark Natural Division of southwestern Missouri (Thom, 1980). This division is a large, unglaciated region of greater relief and elevation than the surrounding regions. The Elk River Section is characterized by steep terrain and deciduous forest mixed with some pine. Construction of reservoirs has created habitat for a few wetland associated breeding birds while inundating habitat for bottomland forest species.

Newton County elevation ranges from 1,360 feet above mean sea level (AMSL) at the Barry County line, to 830 feet AMSL at the bottom of Shoal Creek, where it enters Cherokee County, Kansas. Most of the county is undulating to rolling. All streams in the county drain into the Grand River Drainage system (NRCS, 1989a).

The 4,300-acre training site is located on the Newton-McDonald County line. The central portion of CCR is situated along a nearly flat upland surface, while the northern and southern portions have steeper terrain because of surface water drainages dissecting the landscape. Elevations in the low relief portion of the site range from approximately 1,240 feet AMSL to 1,286 feet AMSL. Minimum elevations in the northern and southern portions of CCR are approximately 1,140 feet AMSL and 1,050 feet AMSL, respectively (Vandike and Brookshire, 1996). The topography of CCR is shown in Figure 16 (Appendix Q).

E.1.2 CLIMATE

CCR is located in a temperate, humid, continental climate characterized by hot summers and moderately cool winters. Average summer temperature is 77 degrees Fahrenheit (°F) and the average daily maximum is 89 °F. The highest recorded temperature at Neosho, which occurred on 14 July 1954, is 122°F. In winter, the average temperature is 39°F and the average daily minimum temperature is 26°F. The lowest temperature on record, which occurred at Neosho on 8 January 1979, is -16°F. Temperature and precipitation are based on data collected during 1952 through 1980.

Rainfall is fairly heavy and well distributed throughout the year. Snow falls almost every year, but only lasts for a few days. Ice storms and tornadoes have also occurred in past years. The total annual precipitation is 40.87 inches, with approximately 60 percent falling between April and September. The average seasonal snowfall is 12.2 inches. The prevailing wind is from the south-southeast (NRCS, 1989a).

E.1.3 GEOLOGY AND SOILS

Kansas, Missouri, and Nebraska are in part of the North American craton, which is an area that has been tectonically stable throughout most of geologic time. CCR is located in southwestern Missouri within the Ozark Plateaus physiographic province. Mississippian rocks crop out in a wide to narrow band that extends from southwestern Missouri to just north of the Missouri River in central Missouri; and as a second, less extensive band in northeastern Missouri parallel to the Mississippi River. Mississippian strata in the CCR region are mostly limestone (commonly cherty), but include some beds of sandstone and shale (Miller and Appel, 1997).

The Mississippian age bedrock at CCR consists of cherty Warsaw Formation and Burlington-Keokuk Limestone. The Burlington-Keokuk formation is about 150 feet thick in the area. Well logs and geologic mapping by Whitfield (1996a, b) show that the Warsaw Formation overlies the Burlington-Keokuk formation beneath much of CCR and is a maximum of 50 feet thick. Surficial materials range from five to

thirty feet of residuum that overlies the bedrock. Colluvium is present along the base of steeper slopes and the valley bottoms contain a few feet of alluvial materials (Vandike and Brookshire, 1996).

The majority of CCR soil types are considered to be potentially highly erodible (PHEL) or highly erodible (HEL) along long, steep slopes. The landscape features at CCR resulted from natural gully erosion and the differing resistance of bedrock to weathering. The interaction of the landscape features, bedrock types, and vegetation types has produced various soils across the landscape. The Soil Survey of Newton County, Missouri identifies 16 soil map units within the CCR property (NRCS, 1989a). Upland map units include Captina, Bado, Gerald, Nixa-Clarksville, Hoberg, and Tonti. Bottomland map units include Claiborne-Peridge, Secesh-Cedargap, and Waben-Cedargap. Soil unit locations and detailed descriptions are presented in Figure 21 (Appendix Q) and the table below. At CCR, upland soils formed in parent material composed of cherty limestone. Cherty soils can be difficult to vegetate after disturbance. The silt loam erodes, leaving a rocky surface with little soil material to nourish seedlings. Most of these soils contain fragipans. Fragipans are loamy, brittle, nonporous subsurface horizons that appear cemented and restrict root penetration. Clarksville soils are the only upland soils on the training site without fragipans (NRCS, 1989a).

Table 8. Soil Units within CCR

Map unit	Soil Unit Name	Total Acreage	Slope (percent)	Description
70012	Hoberg silt loam	19	2 to 5	This soil is deep, gently sloping, and moderately well drained. It occurs on the tops and sides of ridges on uplands and terraces. Permeability is moderate above and below the fragipan. Soil is PHEL.
70022	Tonti silt loam	1,148	3 to 8	This soil is deep, gently sloping, and moderately well drained. It occurs on the tops of ridges and on foot slopes in the uplands. Permeability is moderate above and below the fragipan. Soil is PHEL.
70076	Clarksville-Noark complex	113	3 to 15	This soil is somewhat excessively drained. It occurs on ridges on mountains or deeply dissected plateaus under tree cover and intermixed conifers and hardwoods. Permeability is moderate.
70080	Noark-Clarksville-Crackerneck complex	853	3 to 8	This soil is moderately well drained to somewhat excessively drained. It occurs on sinkholes on divides on plateaus under grass/herbaceous cover and tame pastureland. Permeability is moderate.
70081	Rueter-Goss-Jollymill complex	885	15 to 35	This soil is very deep, somewhat excessively drained. It occurs on steep side slopes and narrow ridgetops. Permeability is moderate.
70093	Bado silt loam	108	0 to 3	This soil is deep, nearly level, and poorly drained. It occurs on flats and in slight depressions on the top of broad upland ridges. Permeability is slow above the fragipan, very slow in the fragipan, and moderate below the fragipan. This soil has severe limitations that pertain to wetness. Soil is PHEL and hydric.
71754	Waben-Cedargap, very cherty silt loams complex	129	0 to 5	This soil complex is deep, very gently sloping, and well drained (Waben) to somewhat excessively drained (Cedargap). It occurs on low terraces and floodplains, commonly near the head of drainage ways. Permeability is moderately rapid. Soil is PHEL.

Table 8. Soil Units within CCR

Map unit	Soil Unit Name	Total Acreage	Slope (percent)	Description
71758	Secesh-Cedargap, silt loams complex	80	0 to 3	This soil complex is deep, nearly level and very gently sloping, and well drained. It occurs along large intermittent streams and small perennial streams. Permeability is moderate above and below the fragipan.
73031	Gerald silt loam	60	0 to 2	This soil is deep, nearly level, and somewhat poorly drained. It occurs on broad ridgetops in the uplands. Permeability is slow within the fragipan and moderate below it. Soil is PHEL.
73059	Pomme silt loam	49	1 to 3	This soil is deep and well drained. It occurs on structural benches, strath terraces, and footslopes. Permeability is moderate.
73114	Captina silt loam	113	1 to 3	This soil is nearly level to moderately sloping, and moderately well drained. It occurs on sloping uplands and stream terraces. Permeability is slow. Soil is PHEL.
73116	Pomme silt loam	27	2 to 5	This soil is deep and well drained. It occurs on structural benches, strath terraces, and footslopes. Permeability is moderate.
73325	Clarksville extremely gravelly silt loam	97	15 to 50	This soil is deep, moderately steep to very steep, and somewhat excessively drained. It occurs on the sides and tops of upland ridges adjacent to floodplains and intermittent drainage ways. Soil is HE.
73352	Jollymill-Bendavis complex	17	3 to 15	This soil is moderately well drained. It occurs on ridges on mountains or deeply dissected plateaus under tree cover and hardwoods. Permeability is slow to moderate.
73480	Nixa very gravelly silt loam	495	3 to 8	This soil is deep, gently sloping and moderately sloping, and moderately well drained. It occurs on the tops and sides of ridges in the uplands. Permeability is moderate above and below the fragipan. Soil is HE.
73485	Nixa-Clarksville, very cherty silt loams complex	64	3 to 20	This soil complex is deep, moderately sloping to moderately steep, and moderately well drained (Nixa) to somewhat excessively drained (Clarksville). It occurs on ridges and side slopes in the uplands near the head of the tributaries that drain into the major streams. Permeability is moderate above and below the fragipan for Nixa soils and moderately rapid for Clarksville soils. Soil is HE.
76758	Secesh-Cedargap silt loams	15	0-3	This soil complex is deep, nearly level and very gently sloping, and well drained. It occurs along large intermittent streams and small perennial streams. Permeability is moderate above and below the fragipan.
Web Soil Survey - Home (usda.gov); NRCS, 1994a; NRCS 2021				

E.1.4 WATER RESOURCES AND QUALITY

E.1.4.1 SURFACE WATERS

Newton County is composed of three watersheds. The northern portion of CCR is located in Spring Watershed (approximately 2,575 square miles in total area). The Cantonment Area and southern portion of CCR are located in Elk Watershed (approximately 1,040 square miles in total area).

Five streams, which include North Indian Creek, Middle Indian Creek, South Indian Creek, Shoal Creek, and Buffalo Creek, are listed by the USEPA as impaired water bodies for Newton County (MoDNR, 2006). High nutrient impairments exist within four of the water bodies because of livestock production in the area, while Shoal Creek is impaired by high fecal coliform as a result of an unknown agricultural source.

CCR straddles a major surface water drainage divide between several streams. Approximately 27 percent of CCR (1.84 square miles) drains to the northeast into Elm Spring Branch or other Hickory Creek tributaries. Hickory Creek is a tributary of Shoal Creek, which drains to the north and enters the Spring River near Joplin, Missouri. Approximately 10 percent of CCR (0.71 square miles) drains to the northwest into Buffalo Creek. The remaining 63 percent of CCR (4.38 square miles) drains to the south and southeast, and enters Bullskin Creek a short distance from the southeast border of CCR. Buffalo, Bullskin, and Indian Creeks are all Elk River tributaries. Water resources at CCR include tributaries of Hickory Creek, Elm Spring Branch, and Bullskin Creek (Appendix Q, Figure 26).

An approximate eight-acre lake is located on South Post of CCR. The lake was constructed in 1992-1993 by CCR staff for float bridge training and recreational use. In addition, there are several human-made ponds constructed throughout the training site for wildlife use, erosion control, and managing runoff from the road system. The ponds also provide a water source for wildlife and habitat for migratory birds.

During spring and fall of 2004, water quality was assessed within ten of the CCR ponds and at two locations within the unnamed tributary to Bullskin Creek. Low dissolved oxygen (1.12 - 3.79 micrograms per liter) was detected within six of the ponds. As dissolved oxygen levels in water drop below five micrograms per liter, aquatic life is put under stress. Oxygen levels that remain below two micrograms per liter for a few hours can result in large fish kills. High water temperatures were also found within these ponds (Cairns et al., 2006). Low dissolved oxygen likely attributed to the dense macrophyte populations observed within these ponds. Oxygen demanding bacteria break down detritus at night, when no photosynthesis occurs, resulting in low dissolved oxygen levels.

Temperatures and dissolved oxygen levels were within healthy ranges within the unnamed tributary to Bullskin Creek, except for one fall sampling location where no water was flowing. Substrate within this stream was comprised of predominately bedrock, cobble, and gravel. In general, habitat was found to be optimal within both sampling locations. Limiting factors identified included a lack of pool substrate and variability in the uppermost portion of the reach, and ephemeral flow conditions within this stream (Cairns et al., 2006).

E.1.4.2 FLOODPLAIN

Based on the Flood Insurance Rate Maps (FIRMs), the 100-year floodplain within the southern portion of CCR consists of a narrow band along an unnamed tributary to Bullskin Creek (FEMA, 1985, b). (Appendix Q, Figure 26)

Additional floodplain acreage may exist in the northwest portion of the site near the CCR Cantonment Area. The detailed floodplain study for the City of Neosho was not conducted within the boundaries of Camp Crowder (FEMA, 1982). Because the study ended at CCR's border, it is not known if, or how far, the 100-year floodplain extends into CCR. However, the floodplain is not likely extensive within this area, because the stream's source is within the Cantonment Area.

E.1.4.3 WETLANDS

Wetland surveys have shown that less than 1 percent of the land at CCR was classified as wetlands (Texas Regional Institute for Environmental Studies [TRIES], 1996). 21 individual palustrine emergent (PEM) wetlands encompassing 6.17 acres have been identified (Appendix Q, Figure 26). The majority of the wetlands were located along or adjacent to established headwater drainages, thus they would not be classified as isolated. Wetlands identified at CCR were generally considered to be low quality in terms of function and value. However, two notable exceptions were Wetlands 3 and 15, which are of moderate quality and provide valuable ecosystem benefits. (Shannon and Wilson, 2013b)

E.1.4.4 GROUNDWATER

Newton County and CCR are within the Ozark Plateaus aquifer system, which underlies most of southern Missouri and a small part of southeastern Kansas. Limestones and dolomites are the major rocks that yield water in this aquifer. Confining units are typically composed of shale or dolomite. The aquifer system contains three aquifers differentiated by two confining units that slope westward. Groundwater typically flows in the direction of topography. Topographic highs serve as recharge areas, while streams are typical aquifer discharge zones. The Ozark system is mainly recharged via precipitation (USGS, 1997).

Groundwater quality within the three aquifers of the Ozark Plateaus aquifer system is suitable for most uses. Dissolved solids concentrations are typically less than 1,000 milligrams per liter. Groundwater is a calcium bicarbonate type that is typically hard to moderately hard (United States Geological Survey [USGS], 2005). Fresh groundwater withdrawals from the aquifer system totaled 330 million gallons per day in 1990. Groundwater use includes approximately 42 percent for agricultural purposes; 27 percent for public supply; and 16 percent for industrial, mining, and thermoelectric power uses. The rest of the water was used for domestic and commercial supplies (USGS, 2005).

The MoDNR conducted a dye trace study at CCR to determine patterns of groundwater drainage at the training site. Water from losing streams at CCR follows underground channels to several springs in the surrounding area. The report on the findings of this study, The Movement of Shallow Groundwater in the Camp Crowder Area, Newton County, Missouri (Vandike and Brookshire, 1996), discusses the geology of CCR in detail.

Subsurface weathering of the limestone has created karst formations such as caves, sinkholes, springs, and losing streams within the Neosho area. Sinkholes and losing streams are karst groundwater recharge features. Sinkholes are uncommon to CCR, while losing streams are more common and result in significant groundwater recharge. Because the losing streams in the CCR area are normally dry, they only provide groundwater recharge during or soon after rainfall events. Groundwater recharged through sinkholes and losing streams rapidly enters conduit or cave-like feeder systems that quickly transport water to the receiving spring(s). Several significant springs occur within a few miles of CCR, including Elm Spring, Bartholic Spring, McMahan Spring, and Hearrell Spring (Vandike and Brookshire, 1996).

The dye tracing study was conducted to determine the physical hydrologic subsurface and surface connections within the CCR area and its vicinity. Dye traces demonstrated that the CCR area provides groundwater recharge to several springs in Hickory Creek and Bullskin Creek watersheds. Approximately 85 percent of CCR (5.69 square miles) is located topographically upstream of one or more of the dye injection sites.

The remaining 15 percent of CCR was not in the drainage area of one of the dye traces. Areas outside the study within the southern or southeastern portions of the site (southeast of CCR Lake) are likely to drain

to springs along Bullskin Creek, and areas in the northern portion are likely to recharge springs along Hickory Creek. Further dye tracing studies would need to be conducted to confirm subsurface water movements in the remaining 15 percent of the site (Vandike and Brookshire, 1996).

E.1.4.5 LOCAL WATER CONTAMINATION

An Administrative Order of Consent (AOC) was signed in December 1998, between the USEPA, MoDNR, and the potentially responsible parties for the Pools Prairie Superfund site. The AOC required a public water system to be developed for residences located in areas contaminated with Trichloroethylene (TCE), south of the city of Neosho. Two hundred thirty-three residences have been connected to the city public water supply system. The Pools Prairie site is a National Priorities List site located in Newton County, outside the city limits of Neosho. Two areas of residential well contamination have been identified. Within this area, 37 residential wells have exceeded the maximum contaminant level for TCE, which is five parts per billion.

In July 1995, bottled water was provided to residences where TCE-contaminated wells exceeded the maximum contaminant level. In 1997, USEPA sampled the soil and groundwater near the 900 Building, and found elevated levels of TCE and other volatile organic compounds. In the spring of 1998, the provision of whole-house water treatment units was enacted as an interim measure.

On 5 May 1999, the USEPA, MoDNR, DoD, and Teledyne Industries, Inc. completed an agreement to address soil and groundwater contamination at an area of the Pools Prairie Superfund site called the Quince Road Area. The Quince Road Area is located near the intersection of U.S. Highway 71 and Quince Road, and includes the 900 Building, which was formerly part of CCR and Air Force Plant 65. Previous operations at the 900 Building include the CCR laundry, warehousing, and jet engine overhaul and testing. The Saberliner Corporation currently owns the building.

Construction of the permanent public water supply system was completed in October 2000. This involved constructing more than 82,000 feet of water main and installing water meters, and connecting 233 residences. The owners of 19 residences opted not to be connected to the public water supply system.

E.2 CAMP CLARK TRAINING SITE

E.2.1 PHYSICAL SETTING AND TOPOGRAPHY

The CCL lies in the Osage Plains Natural Division of western Missouri. The Osage Plains are rolling plains of low relief, carved on sedimentary rocks of Pennsylvanian age that lie south of the glaciated dissected till plains. The site is located just east of the confluence of the Birch Branch and Willow Branch creeks. The West Fork of Clear Creek is to the east. The site is near the upper limits of the Clear Creek drainage system. The western half of the site exhibits a gently sloping topography, where elevations vary from slightly higher than 890 feet AMSL to slightly under 830 feet AMSL. However, the majority of the western half is above an elevation of 850 feet AMSL. The eastern part exhibits steeper slopes and valleys, with elevations ranging from 890 feet AMSL to a low of slightly above 810 feet AMSL. Figure 17 (Appendix Q) shows the topography of CCL.

E.2.2 CLIMATE

CCL is located in a warm continental climate characterized by wide variations in temperatures from season to season with abundant rainfall in both spring and summer. The typical climate includes hot, humid summers and short, moderately cold winters. Temperatures exceeding 100°F have been recorded, but

usually only for durations of a few days. December and January are the coldest months of the year, with subzero temperatures lasting only a few days at a time. Winter weather can linger as late as March. The typical growing season is approximately 185 days. Annual precipitation for the CCL area is approximately 41 inches. Much of the rainfall occurs in the spring, and averages about 30 percent of the year's total. Summer accounts for about 32 percent, while autumn averages 25 percent. Winter is the period of least precipitation, averaging only 13 percent.

The region experiences especially high humidity in September. The lowest levels of humidity occur in March. The highest daily levels usually occur in the early mornings and lower levels occur in the afternoon. Spring is the time for the most severe local storms. Tornadoes have occurred in Vernon County. Dangerous lightning, hail, and strong damaging winds associated with thunderstorms occur almost every year in some part of the county. During July, average winds generally travel from the south-southeast at speeds up to nine miles per hour (mph). In March, the winds pick up to an average of fourteen mph. Winds are generally stronger in the winter.

E.2.3 GEOLOGY AND SOILS

Bedrock beneath the site consists of Pennsylvanian-age sandstone and shale. The sandstone ranges from 0 to 60 feet thick and belongs to the Warner Formation of the Cherokee Group. Riverton Formation shale and sandy shale of 100 to 145 feet thick underlie the sandstone in the hills and is exposed in the valleys. The thick shale bedrock forms an aquitard and lies atop Mississippian-age limestone of the Warsaw Formation (MoDNR, 2007).

The Soil Survey of Vernon County, Missouri (USDA-SCS, 1977) shows fifteen soil map units within CCL boundaries, nine of the soil types are considered to be potentially highly erodible or HEL soils. Upland soil series include Barco, Barden, Bolivar, Hector, and Parsons Soils. Bottomland soils include Dubbs, Cleora, Hepler, Hepler-Radley complexes, and Verdigris soils. The soil survey provides detailed information about the use and management of each soil type. Soil unit locations and detailed descriptions are presented in Figure 22 (Appendix Q) and the table below, respectively.

At CCL, the upland soils formed in weathered shale, sandstone, or interbedded sandstone and shale. Some upland soils formed in a thin mantle of loess (silty wind-deposited material) on top of shale on ridges. The soils that formed over shale have long, nearly level slopes. The soils that formed over sandstone have shorter, steeper slopes. Most upland soils developed under prairie vegetation with deep, fibrous root systems. As the fibrous root system grows, dies, and decays, humus forms in the soil and produces thick, dark surface layers. Some upland soils at CCL developed under hardwood forest. Hector soils are forest soils found on low upland divides. Bolivar soils, generally upslope from Hector soils, are also forest soils. Forest soils have thinner surface layers than prairie soils. Much of the organic matter in forest soils is deposited as leaves on the surface rather than distributed throughout a thick layer of soil, as are grass roots in prairie soils.

Most upland soils are limited in their use by slope and potential for erosion. Several soils, such as the Hector, Barco, and Bolivar series, are limited in use due to their shallow depth to bedrock. Barden and Parsons Series soils have moderately fine to fine textured subsoils. These clayey subsoils cause the soils to have slow permeability, seasonal wetness, and high shrink-swell potentials. Soils derived from sandstone have better drainage and coarser textures, but these sandy soils tend to be droughty, low in natural fertility, and low in water available to plants.

Bottomland soils at CCL formed in alluvium (soil material deposited by streams) or colluvium (material deposited by gravity from upslope). Most of these bottomland soils developed under mixed hardwoods

with an understory of tall prairie grasses. However, Radley soils of the Hepler- Radley complex developed under lowland hardwoods. The potential for flooding limits the use of most bottomland soils at CCL. The potential for erosion limits the use of Dubbs soils. Seasonal wetness, ponding, and occasional flooding limit the use of Hepler soils and Hepler-Radley complexes.

Table 9. Soil Units within CCL

Map Unit	Soil Unit Name	Total Acreage	Slope (Percent)	Description
40034	Barco loam	201	2 to 5	This soil is gently sloping. It has convex knobs, side slopes, and rounded ridge tops. Areas are generally long and moderately wide. This soil has the profile described as representative of the series. Soil is PHEL.
40035	Barco loam (eroded)	1.2	2 to 5	This soil is gently sloping. It is near the slope breaks on convex knobs, ridge tops, and side slopes. The areas are long and narrow. Soil is PHEL.
40037	Barco loam (eroded)	0.8	5 to 9	This soil is moderately sloping. It is on convex breaks and side slopes. Areas are long and narrow. Soil is HEL.
40038	Barden silt loam	157	1 to 5	This soil is gently sloping. It is on convex ridge tops and side slopes. Areas are long and moderately wide. These areas are well shaped for farm operations. This soil has the profile described as representative of the series. Soil is PHEL.
70098	Bolivar fine sandy loam	194	2 to 5	This soil is gently sloping. It is on convex ridge tops, side slopes, and foot slopes. Areas are longer than they are wide. This soil has the profile described as representative of the series. Soil is PHEL.
70100	Bolivar fine sandy loam	106	5 to 9	This soil is moderately sloping. It is on convex side slopes and foot slopes. Areas are long and narrow. This soil has a profile similar to the one described as representative for the series, but depth to sandstone bedrock is generally 24 to 30 inches. Soil is HEL.
70100	Bolivar fine sandy loam (eroded)	43	5 to 9	This soil is moderately sloping. It is on convex side slopes and foot slopes. Areas are long and narrow. This soil has a profile similar to the one described as representative for the series, but the surface layer is about six inches of brown fine sandy loam. Part of the original surface layer has been mixed with part of the subsoil. Depth to sandstone bedrock is generally 20 to 26 inches. Soil is HEL.
99102	Borrow pit (gravel)	22		
71750	Cleora loamy fine sand	18	0 to 2	This soil is nearly level. It is on flood plains of small streams or near the channels of larger streams. The slope is 0 to 2 percent. Areas of this soil are long and narrow.
70052	Arnica loam	45	2 to 5	This soil is gently sloping. It is on convex stream terraces, natural levees, and foot slopes. The soil areas are irregularly shaped.
40100	Hector fine sandy loam	154	5 to 14	Soil is moderately sloping and strongly sloping. It is on convex breaks, narrow ridge tops, and side slopes. The soil areas are long and narrow. Soil has the profile described as representative of the series. Soil is HEL.
46002	Hepler silt loam	16	0 to 2	This soil is level or nearly level. It is on low terraces along the larger streams, or old meanders between uplands and natural levees. The slope is 0 to 2 percent. This soil is in long and

Table 9. Soil Units within CCL				
Map Unit	**Soil Unit Name**	**Total Acreage**	**Slope (Percent)**	**Description**
				generally wide areas. It has the profile described as representative of the series.
46112	Hepler-Radley complex	62	0 to 2	This complex is in the narrow bottoms of upland drainage ways where the slope is 0 to 2 percent. It is about 50 percent Hepler soils, 35 percent Radley soil, and 15 percent other soils. Hepler soil is between the upland and natural levees, and Radley soil is on natural levees. Upstream areas of this complex are generally long, narrow, and dissected by intermittent streams. Downstream areas are wider and better shaped for farming.
40008	Parsons silt loam	168	0 to 1	This soil is level or nearly level. It is on the tops of wide divides. The slope is 0 to 1 percent. The soil areas are generally large. They are well shaped for farming
46101	Verdigris silt loam	38	0 to 2	Soil is level or nearly level. It is on stream bottoms, on flood plains along smaller streams, and on natural levees along larger streams. The slope is 0 to 2 percent. The soil areas are long and narrow.
73373	Bolivar fine sandy loam	112	5 to 9	This soil is moderately sloping. It is on convex side slopes and foot slopes. Areas are long and narrow. This soil has a profile similar to the one described as representative for the series, but depth to sandstone bedrock is generally 24 to 30 inches. Soil is HEL.
Web Soil Survey - Home (usda.gov); NRCS, 1990c				

E.2.4 WATER RESOURCES AND WATER QUALITY

E.2.4.1 SURFACE WATER

There are several human-made ponds throughout the training site, constructed for recreation, troop training, and erosion and sedimentation control (Appendix Q, Figure 27). The ponds also provide a water source for wildlife and habitat for migratory birds. Surface waters at CCL are not used for drinking water. The MOARNG obtains potable water for CCL activities through the Vernon County Consolidated Public Water Supply.

Much of the eastern half of CCL lies within the drainage basin of a small, unnamed tributary of the West Fork of Clear Creek. The floodplain of this tributary dissects the center of the eastern half of the site. Drainage into this system on the southern portions of the site is generally from south to north, while drainage on the northern portion of the site is generally from north to south. Much of the drainage on the site is controlled by human-made structures including sewage disposal ponds, fire control ponds, and the Hasmann and Hasler Recreation Area Lakes.

E.2.4.2 FLOODPLAIN

The 100-year floodplain at CCL is along the unnamed tributary of the West Fork of Clear Creek (Appendix Q, Figure 27).

E.2.4.3 WETLANDS

Figure 27 (Appendix Q) shows the location and type of wetlands at CCL. Fifteen wetlands totaling approximately 23.5 acres and ranging in area from less than 0.03 to 6.87 acres have been identified during wetland surveys. Some of the wetlands are natural, but others have been created by excavation, diking, or impoundment. Most of the wetlands at CCL are associated with unnamed tributaries of the West Fork of Clear Creek. These wetlands extend 20 feet or more from the stream bank and are mostly in forest cover. Such forested wetlands are considered rare in Missouri, since most bottomland timber has been harvested and the area cleared and drained for agriculture. Access to wetlands at CCL is restricted to foot traffic only (MOARNG, 2005a).

The wetlands at CCL vary in their hydrology and vegetative cover. Some wetlands are temporarily or seasonally flooded, while others are semi-permanently flooded. The dominant plants vary from trees to shrubs to emergent vegetation such as cattails, rushes, and sedges. Wetlands at CCL are classified as palustrine, or shallow, freshwater wetlands.

E.2.4.4 GROUNDWATER

Similar to CCR, CCL lies within the Ozark Plateaus aquifer system. According to MoDNR database records, the only drinking water wells within a one-mile radius of CCL are the two that occur on site. These wells are more than 1,000 feet deep and draw water from the confined Ozark Aquifer. Vernon County Public Water Supply District #1 covers the entire area surrounding the site (MoDNR, 2007).

E.3 MACON TRAINING SITE

E.3.1 PHYSICAL SETTING AND TOPOGRAPHY

The MTS is located about 50 miles west of the Mississippi River and about 50 miles north of the Missouri River within a region of dissected glacial till plains. At least two glacial advances have transported and deposited soil and rock materials to north-central Missouri. The glaciers buried previous landforms and graded them into a plain. Rivers and streams dissected the plain and winds deposited loess, a silty material blown in from the west. Level, undissected areas between the streams accumulated thick layers of loess. Through time, the glacial till and loess parent materials produced loam, silt loam, and clay loam soils (Ferguson 1995).

Extensive surface mining throughout the county and within the MTS has altered the topography from gently sloping to strongly sloping. The elevations range from approximately 750 to 850 feet AMSL. Regions with lower elevations occur along the floodplains and strip-mined areas. The topography of the Baker's Acres, Wooly Acres, and South 61 parcels are shown in Figure 18 (Appendix Q). The extent of the surface mining alterations may not be reflected on portions of the topographic maps.

E.3.2 CLIMATE

The climate in Macon County includes cold winters and long, hot summers. The average winter temperature is 28°F. The lowest temperature on record, which occurred at Macon in 1982, is -22°F. In summer, the average temperature is 75°F, with the highest average daily maximum being 86°F. The highest recorded temperature was 112°F in 1954.

Rainfall averages nearly 40 inches per year, with the wettest months in late spring and summer. Typically, 65 percent (26 inches) occurs between April and September. Heaviest rains occur in late spring and early

summer (May – July). Average seasonal snowfall is 24 inches. Tornadoes and severe thunderstorms occur occasionally (Ferguson, 1995).

E.3.3 GEOLOGY AND SOILS

The MTS is located within the Central Lowland Physiographic Province, which is characterized by gently rolling topography except where major rivers and their tributaries are deeply incised. Unconsolidated sand and gravel deposits of the Quaternary age make up the surficial aquifer system in the area. Areas along the Chariton River and its tributaries in Macon County consist of course glacial deposits and stream valley alluvium, while upland areas consist of till, loess, and fine grained glacial lake deposits. The Mississippian aquifer is the uppermost aquifer in the Paleozoic rocks of northern Missouri and is approximately 300 feet thick in the MTS area. The Keokuk, Burlington, Fern Glen, Sedalia, and Chouteau limestones comprise the Mississippian aquifer. The Keokuk and the Burlington formations are the principal water-yielding rocks. This aquifer is overlain by a confining unit of Pennyslvanian shale and sandstone and by a confining unit of Mississippian shale. (Miller and Appel, 1997)

Soils at the MTS show evidence of prairie and forest influences. Most soils at the MTS are alfisols, which develop under deciduous forest and accumulate clay beneath the surface soil. The prairie soils are generally mollisols. They have thick, dark surface layers rich in organic matter. The differences in these soils are due largely to the pattern of organic matter additions to the soils. Historically, the topography and the frequency of fires likely determined whether a particular area was under forest or prairie vegetation.

As part of the overall mining operations, the soils were removed, stockpiled, and later spread over land that had already been strip-mined. Some of the soils remain in spoil piles because they were never reshaped. The geology of the disturbed areas is an approximately 40-foot-deep composite of capstone, disturbed shale, waste coal, and spoil (MOARNG, 2001b). The regraded strip-mined soils are classified as the Lenzburg clay loams with a 9 to 20 percent slope, while the spoil piles are classified as Lenzburg clay loams with a 35 to 70 percent slope.

Most natural soils have been in their current landscape positions for thousands of years, and have developed through gradual weathering in place of bedrock; through glacial till, the rock and debris deposited by the glaciers; or through loess. Plants stabilize natural soils through the centuries with their roots. Organisms that live in the soil bind soil particles together with organic matter, mix the soil, and create soil pores to hold water and air. The strip-mined soils lack the structure, organic matter, and pore space of soils that have developed in place for thousands of years.

Strip-mined soils are unstable for several reasons. The heavy equipment needed to move and shape the soils can compact the soil to an extent that impairs plant growth. The soil bulk density of the strip-mined soils ranges from 1.35 to 1.60 milligrams per cubic meter (mg/m3). Many plants have difficulty growing in such dense soils. These soils also contain little organic matter, and therefore, have low nutrient content, especially nitrogen. Strip-mined soils also tend to be droughty because they lack the pore space and organic matter to hold moisture (Ferguson, 1995).

Upland soils at MTS include Gorin, Gosport, Vanmeter loam, Keswick, Winnegan, Adco, Gifford, and Lenzburg series. All upland soil map units found on MTS are highly erodible with steep slopes. Bottomland soils include Aquents, Blackoar, Bremer, Chequest, Darwin, Excello, Moniteau, Piopolis, Tice, and Wilbur series (Ferguson, 1995). Figure 23 (Appendix Q) shows the locations of soil types in the three tracts, and the table below provides a description of each soil type.

Table 10. Soil Units within MTS

Map Unit	Soil Unit Name	Total Acreage	Slope (percent)	Description	MTS Tract*
30067	Gorin silt loam, eroded	192	3 to 9	This soil is very deep, somewhat poorly drained. It occurs on ridgetops. Permeability is slow. Soil is PHEL.	B,W, S61
60111	Gosport loam	32	14 to 20	This soil is moderately dep moderately well drained. It occurs on convex side slops and escarpment-like areas parallel to major streams.	B, W
60226	Vanmeter loam	174	20 to 40	This soil is moderately deep or deep, moderately well drained. It occurs on side slopes and escarpment-like areas parallel to major stream on uplands. Soil is HEL.	B,W, S61
30095	Keswick clay loam, slope, eroded	72	5 to 9	This soil is very deep, somewhat poorly drained. It occurs on convex summits of interfluves, convex side slopes, shoulders of side slopes on till plains. Soil is HEL.	B,W, S61
30233	Keswick clay loam, slope severely eroded	140	9 to 20	This soil is very deep, somewhat poorly drained. It occurs on convex summits of interfluves, convex side slopes, shoulders of side slopes on till plains. Soil is HEL.	B,W, S61
50001	Armstrong Loam	0.01	5 to 9	This soil is very deep, somewhat poorly drained. It occurs on side slopes and summits of interfluves on till plains. Soil is HEL.	W
50010	Winnegan loam, slope eroded	173	14 to 20	This soil is very deep, moderately well drained, and slowly permeable. It occurs on uplands. Soil is HEL.	B,W, S61
50011	Winnegan loam	456	20 to 35	This soil is very deep, moderately well drained, and slowly permeable. It occurs on uplands. Soil is HEL.	B,W, S61
50013	Adco silt loam	3	1 to 3	This soil is very deep, somewhat poorly drained. It occurs on uplands and high stream terraces. Soil is PHEL.	B
36004	Blackoar silt loam, frequently flooded	0.01	0 to 2	This soil is very deep, poorly drained, and moderately permeable. It occurs in floodplains. Soil is hydric.	S61
36008	Bremer silt loam, rarely flooded	8	0 to 2	This soil is very deep, poorly drained. It occurs on stream	B

Table 10. Soil Units within MTS

Map Unit	Soil Unit Name	Total Acreage	Slope (percent)	Description	MTS Tract*
				terraces in floodplains. Soil is hydric.	
34004	Gifford silt loam	3	2 to 5	This soil is very deep, poorly drained, and very slowly permeable. It occurs on side slopes of benches. Soil is PHEL and hydric.	B, W
34007	Gifford silt loam, eroded	13	5 to 9	This soil is very deep, poorly drained, and very slowly permeable. It occurs on side slopes of benches. Soil is HEL and hydric.	B, W
66000	Moniteau silt loam	18	0 to 3	This soil is very deep, poorly drain. Permeability is slow. It occurs in floodplains. Soil is hydric.	B, W
66024	Wilbur silt loam	26	0 to 2	This soil is very deep, moderately well drained. It occurs in floodplains and floodplain steps. Permeability is moderate.	B
66075	Chequest silty clay loam	0.1	0 to 2	This soil is very deep, poorly drained. It occurs in floodplains. Soil is hydric.	W
66099	Piopolis silty clay loam	38	0 to 2	This soil is very deep, poorly drained. It occurs in floodplains or floodplain steps. Permeability is slow. Soil is hydric.	B
66079	Darwin silty clay, occasionally flooded	15	0 to 2	This soil is very deep, poorly and very poorly drained. It occurs un floodplains of large streams. Permeability is very slow. Soil is hydric.	S61
66091	Excello silt loam, frequently flooded	0.1	0 to 2	This soil is very deep, poorly and somewhat poorly drained. It occurs in floodplains, alluvial fans, and concave toeslopes. Permeability is moderate. Soil is hydric.	S61
60148	Lenzburg clay loam, very stony	942	9 to 20	This soil is very deep, well drained. It occurs in surface-mined areas. Permeability is moderately slow.	B, W, S61
60147	Lenzburg clay loam, very stony	410	35 to 70	This soil is very deep, well drained. It occurs in surface-mined areas. Permeability is moderately slow.	B, W, S61
66134	Tice silty clay loam, frequently flooded	7	0 to 2	This soil is very deep, somewhat poorly drained. It occurs in floodplains. Permeability is moderate. Soil is hydric.	W

Table 10. Soil Units within MTS

Map Unit	Soil Unit Name	Total Acreage	Slope (percent)	Description	MTS Tract*
66064	Bremer loam, occasionally flooded	3	0 to 2	This soil is very deep, poorly drained. It occurs on stream terraces in floodplains.	B
60058	Bethesda channery silt loam	44	20 to 70	This soil is very deep, well drained. It occurs on hillslopes of mine spoils.	S61
66137	Excello silt loam	17	1 to 3	This soil is very deep, poorly and somewhat poorly drained. It occurs in floodplains, alluvial fans, and concave toeslopes. Permeability is moderate. Soil is hydric.	W
67008	Wilbur silt loam	34	1 to 3	This soil is very deep, moderately well drained. It occurs on floodplains and floodplain steps. Permeability is moderate.	
99013	Riverwash	137		This soil is excessively drained and occurs in floodplains.	B, S61
99040	Riverwash	5	1 to 3	This soil is excessively drained and occurs in drainages.	W
---	Bodies of Water	101	---	---	B,W, S61

*Baker's Acres (B), Wooly Acres (W), South 61 (S61)

Web Soil Survey - Home (usda.gov; NRCS 1990b; NRCS 2021

E.3.4 WATER RESOURCES AND WATER QUALITY

E.3.4.1 SURFACE WATER

The MTS is located in the Northern and Western Missouri region, which originally consisted of prairie land. Because of the area's climate, geology, and agricultural practices, surface waters tend to provide poor aquatic habitat.

The training site has numerous surface water features, including streams and impoundments (Appendix Q, Figure 28). The East Fork Little Chariton River, a fifth order stream, is the largest stream on the training site and flows across portions of Baker's Acres. The East Fork and Middle Fork are the major tributaries of the Little Chariton River. The Little Chariton River, formerly a tributary of the Chariton River, now flows into the Missouri River in the southeastern corner of Chariton County (southwest of the MTS). Several thousand acres of strip-mined lands lie within the basins of the East Fork and Middle Fork Little Chariton rivers. Heavily impacted tributaries of East Fork include Sinking, Sugar, Dark, and North Fork Claybank creeks (Cashatt, 2001).

The strip mining operations produced many lakes, ponds, and strip pits in the training area. A total of 88 ponds and lakes have been identified (Shannon & Wilson, 2013a). Most of the lakes are very large, and some are quite deep. Some of the ponds and lakes are in various stages of succession and have some hydrophytic vegetation around the perimeter.

E.3.4.2 FLOODPLAIN

The 100-year floodplain of the East Fork Little Chariton River encompasses portions of the three tracts. The majority of the 100-year floodplain within the MTS boundaries is located in Baker's Acres. Most of the western border of South 61 lies along the edge of the 100-year floodplain. Wooly Acres has only a few acres of land in the 100-year floodplain. Floodplains at the MTS are shown in Figure 28 (Appendix Q).

E.3.4.3 WETLANDS

Figure 28 (Appendix Q) shows the location and type of wetlands at MTS. Approximately 255 acres of wetlands were identified, ranging from 0.06 acres to 40.51 acres in size. The survey identified 68 wetlands during the inventory. (Shannon & Wilson, 2013a)

Most of the larger wetlands are high quality bottomland hardwood systems associated with the East Fork Chariton River. These bottomland systems were evaluated as possibly the highest quality wetlands located on MOARNG land, providing excellent wildlife habitat and water quality benefits. These wetlands would generally be classified as Palustrine Forested with pockets of Palustrine Shrub/Scrub (PSS) and PEM. (MOARNG, 2005b)

Most of the smaller wetlands on MTS are a result of the strip mining activities that occurred at the site such as excavations or impoundments. The hydrology of these excavated or impounded wetlands varies from merely saturated to semi-permanently flooded conditions. These wetlands are classified as pond swamps, pond shrub swamps, and/or pond marshes. These mining wetlands would generally be classified as PSS and PEM. (MOARNG, 2005b)

The MOARNG has constructed four wetlands at MTS as mitigation for wetlands inundated with the construction of the "Engineer Lake" on Baker's Acres. Two of the wetlands occur in the northwest section of Baker's Acres and have structures for manipulating water depth. The third wetland occurs on South 61. Water levels are not manipulated within this wetland. The fourth constructed wetland extends from the southern tip of the large lake on South 61, which contains the Floating Bridge TA. The wetland is a shallow emergent classification approximately one acre in size. Water level in this wetland is regulated by the addition or removal of stoplogs in a standpipe. The wetland drains into a strip pit and is flooded by runoff only.

In addition to the constructed wetlands discussed above, the MoDNR constructed a serpentine wetland on Wooly Acres. Water from the shaft mines is diluted with water from a nearby strip pit and channeled into this wetland to improve water quality before it enters a tributary of the East Fork Little Chariton River. The MoDNR has written a report outlining a remediation plan for solving the problem (MoDNR, 1999). The NGMO-EM and MTS staff will continue to monitor the wetland for signs of contamination such as dead or dying plants or other aquatic or terrestrial organisms.

E.3.4.4 GROUNDWATER

Deep groundwater aquifers in this region of Missouri are not suitable for drinking water because the water has high concentrations of minerals from natural sources. Localized nitrate (approximately 33 percent of private wells) and pesticide (approximately 2 percent of private wells) contamination occurs within this region. Deep aquifers are protected from this contamination by deep layers of clay and shale below the surface (MoDNR, 2002a).

E.4 TRUMAN TRAINING AREA

E.4.1 PHYSICAL SETTING AND TOPOGRAPHY

The TTA is located in the Springfield Plateau Section of the Ozark Natural Division of western Missouri (Thom, 1980). This division is a large, unglaciated region of greater relief and elevation than the surrounding regions. The Springfield Plateau represents the western border of the Ozarks, where the prairies of the Osage Plains grade into the higher elevation forests of the Ozarks. Prairie, deciduous forest, glade, and savanna were characteristic in pre-settlement times. The general slope of the land is to the west. Most of the region is undulating to rolling, with scattered steep slopes and deep ravines. Portions of the area could be considered rugged. Elevations within Benton County range from 659 feet AMSL at the normal water level of the Lake of the Ozarks to 1,150 feet AMSL southeast of Cole Camp.

Maximum elevation on the islands and mainland are approximately 780 feet AMSL and 830 feet AMSL, respectively. Normal lake elevation for Truman Reservoir is 706 feet AMSL. The topography of the TTA is shown on Figure 19 (Appendix Q).

E.4.2 CLIMATE

The typical climate of TTA includes hot, humid summers and short, moderately cold winters. The average annual temperature in Warsaw is 56.3°F. In the summer, the average temperature is 77°F and average daily maximum temperature is 89°F. Temperatures exceeding 100°F have been recorded, but usually only for durations of a few days. The average temperature in the winter is 34°F, and the average minimum temperature is 23°F. Winters often bring subzero temperatures that last for only a few days at a time. Winter weather can linger as late as March. The typical growing season is approximately 180 days.

Annual precipitation in Warsaw is approximately 41 inches. Approximately 65 percent of the annual precipitation falls from April through September. The average seasonal snowfall is approximately 18 inches. Average relative humidity in mid-afternoon is 55 percent. Humidity is higher at night, and the average at dawn is 80 percent. On average, the sun shines 70 percent of the time possible in summer and 50 percent in winter.

E.4.3 GEOLOGY AND SOILS

The TTA is located within the Lower Ozark Natural Division of Missouri. Mississippian and Ordovician bedrock underlie this area, which is less highly dissected than other sections of the Ozarks. The Ordovician Jefferson City-Cotter formation, the oldest bedrock in the reservoir area, is characterized by dolomite, which ranges from medium to finely crystalline to dense and cherty. The Mississippian system consists of narrow fingers and ridges of non-cherty to cherty limestone of the Kinderhookian Series. Very cherty, generally coarsely crystalline, and fossiliferous limestones of the Osagean Series overlie this series. The tilt of the bedrock in Benton County is to the northwest, and the slope of the land is to the west.

Differences in landscape position, parent material, and vegetation have produced varied soils at the TTA. The Soil Survey of Benton County, Missouri (United States Department of Agriculture (USDA) NRCS, 1989b) was published in 1989, and fieldwork was completed in 1985. Thus, soils in the area were described less than six years after Truman Reservoir was filled. The reservoir has changed the hydrology, vegetation, and drainage class of the soils along the shoreline because of the effect of lake inundation. Soils that developed under forest now have wetland plants growing on them. Through the years, the properties of these soils will continue to change due to these conditions.

The survey lists nine soil map units within the boundaries of the TTA. These units include five series: McGirk, Claiborne, Union, Doniphan, Bardley, and Gasconade. These are predominately upland soils, since Truman Reservoir has flooded most bottomland soils. Approximately four percent of the soils within the TTA are classified as prime farmland. Soil unit locations and detailed descriptions are presented in Figure 24 (Appendix Q) and the table below.

Soils at the TTA have many limitations. Most of the soils at the TTA are considered to be highly erodible soils. McGirk soils have seasonal wetland limits. Bardley soils have a large number of chert rocks within their surface soil. Bardley and Gasconade soils have a shallow depth to the bedrock. Union soils have a fragipan, which hinders root growth and water movement leading to perched water conditions. Gasconade soils are unsuitable for site development. High shrink-swell potentials, low strength, and potential frost action limit the use of most upland soils. These limitations affect the construction and maintenance of roads. Soil limitations also affect certain types of training at the TTA. For instance, soils that are shallow to bedrock, cherty, or have seasonal wetlands are not desirable for bivouac sites. Soils that are shallow to bedrock or cherty may hinder the use of equipment.

Table 11. Soil Units within TTA

Map Unit	Soil Unit Name	Slope (percent)	Total Acreage		Description
			Island	Mainland	
73976	McGirk silt loam	1 to 3	8	-	This soil is deep and poorly drained. It develops along concave side slopes and foot slopes in materials that were deposited from upslope. Permeability is slow and surface runoff is medium. Soil is PHEL and hydric.
73000	Pomme silt loam	3 to 8	84	-	The Pomme series consists of very deep, well drained soils that formed in a thin mantle of loess or an admixture of loess and colluvium over colluvium or old alluvial sediments. Some pedons have residuum from limestone, dolostone, or sandstone beneath the sediments. These soils are on structural benches, strath terraces, and foot slopes. Slopes range from 1 to 20 percent.
73019	Poynor very gravelly silt loam	1 to 8	-	28	The Poynor series consists of very deep, well drained, moderately permeable soils on uplands. They formed in gravelly colluvium weathered from dolomite or limestone and the underlying clayey residuum weathered from shale. Slopes range from 1 to 60 percent.
73136	Union silt loam	1 to 3	-	17	This soil is deep, moderately sloping, and moderately well drained. It is found on broad ridgetops and along the upper side slopes in the uplands. Permeability is moderate above the fragipan and slow within it, and surface runoff is medium. Soil is PHEL.
73135	Union silt loam	3 to 8	7	-	This soil is deep, gently to moderately sloping, and well drained. It is founded on convex ridgetops and short, uneven side slopes in the uplands. Permeability is moderate and surface runoff is medium. Soil is HEL.
73363	Bardley gravelly silt loam	3 to 8	-	47	This soil is moderately deep, gently to moderately sloping, and well drained. It occurs on convex ridgetops and side slopes in the uplands. Permeability is moderate and surface runoff is rapid. Soil is PHEL.

Table 11. Soil Units within TTA					
Map Unit	**Soil Unit Name**	**Slope (percent)**	**Total Acreage**		**Description**
			Island	**Mainland**	
73365	Bardley very gravelly silt loam	8 to 35	-	247	This soil is moderately deep, strongly sloping to steep, and well drained. It occurs on side slopes in uplands. Permeability is moderate and surface runoff is rapid. Soil is HEL.
73432	Gasconade-Rock outcrop complex	3 to 8	-	17	This soil is shallow, gently to moderately sloping, and somewhat excessively drained. It occurs on isolated ridgetops, in saddles, and on side slopes. Permeability is moderate and surface runoff is rapid. Soil is PHEL.
73429	Gasconade-Rock outcrop complex	8 to 50	70	45	This soil is shallow and somewhat excessively drained. It develops on bluffs and steep areas adjacent to streams. Permeability is moderately slow and surface runoff is rapid. Soil is HEL.
Web Soil Survey - Home (usda.gov); NRCS, 1990a					

E.4.4 WATER RESOURCES AND WATER QUALITY

E.4.4.1 SURFACE WATER

Benton County is composed of six different watersheds. The TTA is located in the South Grand Watershed (approximately 1,200 square miles in total area). Streams and other water bodies within Benton County are considered to have relatively good water quality.

High levels of naturally occurring manganese are found within the lake. The 55,600-acre reservoir is the largest flood control lake in Missouri. Four major rivers and several smaller streams feed into this reservoir, although none are within the TTA boundaries.

No streams are located on the TTA site (Appendix Q, Figure 29). Runoff from the TTA drains directly into Truman Reservoir. The amount of runoff in this area is directly related to total precipitation. On average, Benton County has 9 to 11 inches of annual runoff (MoDNR, 2002a).

Surface waters at the TTA are not used for drinking water. The MOARNG obtains potable water for the TTA activities from off-site sources.

E.4.4.2 FLOODPLAIN

Based on the FIRMs, the TTA islands would be completely covered by floodwaters during a 100-year flood. On the mainland, floodwaters would cover land up to 750 feet AMSL. The 100-year floodplain for the TTA is shown in Figure 29 (Appendix Q). Since Truman Dam functions to control flooding, water levels must fluctuate behind the dam as waters are held back from the Osage River. High water conditions are especially prevalent in spring. Normal pool elevation is approximately 706 feet AMSL and top of flood pool elevation is approximately 740 feet AMSL (USACE, 2005).

E.4.4.3 WETLANDS

The USFWS produced National Wetland Inventory (NWI) maps in 1993. In 1995, the MOARNG through the MDC used the NWI maps as a guide for a wetland PLS (Loring, 1995). Potential wetland sites identified

were described using the 1987 USACE wetlands delineation manual. Ten wetlands were identified on the Tebo islands, with four wetland classifications. One wetland developed along the shoreline of the reservoir where land use was previously classified as a pasture or field. Predominant wetland vegetation included emergent species sedges and cattails (Loring, 1995). Most of the shoreline of the island is considered to be wetland.

In more recent surveys, six wetlands were identified on the mainland of TTA. Five of these sites are small and classified as PEM, having developed around the edges of remnant farm ponds. The ponds are classified as having an unconsolidated bottom. These small wetlands have evident wetland hydrology as evidenced by the presence of standing water, saturated soil, oxidized root channels, and typical wetland vegetation with trees around the edges. The remaining wetland site is a contiguous band on the shoreline of the reservoir and is classified as PSS. This wetland's hydrology is contributed directly from Truman Lake. Vegetation typical of flat, low-lying areas is developing along the sloped banks of the reservoir. Most of the shoreline is forested or was previously forested. Many trees have died because of reservoir construction, changes in reservoir water levels, recent floods, and changes in soil hydrology.

Figure 29 (Appendix Q) shows wetland locations.

E.4.4.4 GROUNDWATER

Similar to CCR and CCL, TTA lies within the Ozark Plateaus aquifer system. No wells are known within the TTA boundaries.

E.5 WAPPAPELLO TRAINING SITE

E.5.1 PHYSICAL SETTING AND TOPOGRAPHY

The WTS is located within the Lower Ozark Natural Division of Missouri (Thom, 1980). Several narrow upland ridges dissected by low to medium gradient drainages that flow to Peppermint Creek and Mud Creek characterize the topography of the training site. A narrow ridge, known as Divide Ridge, extends essentially east and west and divides the Peppermint Creek and Mud Creek watersheds. The elevations range from approximately 360 to 500 feet AMSL. Figure 20 (Appendix Q) shows the topography of the training site. Only foot traffic is permitted south of Divide Ridge, outside the Mud Creek Natural Area.

E.5.2 CLIMATE

The climate of Butler County is characterized by cold winters and hot summers with an average winter temperature of 37°F and average summer temperature of 76°F. Average annual precipitation is approximately 46 inches, including approximately 10 inches of snow. Average annual humidity in mid-afternoon is approximately 60 percent. The growing season is approximately 184 days and the prevailing winds are from the southwest (United States Department of Agriculture-Soil Conservation Service (USDA-SCS), 1983).

E.5.3 GEOLOGY AND SOILS

The WTS is located within the Lower Ozark Natural Division of Missouri (Thom, 1980). The Roubidoux Formation, a fine-grained dolomite limestone (Anderson, 1979) with some chert and quartzite deposits, primarily characterizes the underlying geology of the WTS. Streams have dissected this limestone formation into broad ridges. The ridge tops have loam surface soils; side slopes have cherty loam surfaces; and bottomlands have deep, loamy, alluvial soils. Since the WTS is near the Mississippi Lowlands Natural

Division, the bottomland at the training site represents the far reaches of the Mississippi Lowland hardwood forest. WTS soils developed primarily under forest vegetation and are differentiated by parent material and topographical position. The soil types for the WTS are shown on Figure 25 (Appendix Q).

Upland soil series occurring at WTS include Loring and Clarksville soils. These soils formed in limestone residuum and loess. Residuum is weathered mineral material that accumulated as the bedrock gradually disintegrated. Loess has accumulated mainly on ridge tops.

Loring Silt loams formed on broad ridges in loess. Loring soils are moderately well drained, but are limited in their use by fragipans, which form under forest vegetation. Fragipans tend to hold water above them during wet periods, because they are not as permeable as the soil above them. In Loring soil, the fragipan is approximately 33 inches below the soil surface. The fragipan does not limit planting or harvesting trees in this soil, but wetness and frost action limit use of Loring soil for construction of buildings, roads, and streets (USDA-SCS, 1983).

Clarksville very cherty silt loams formed in cherty dolomite material downslope from Loring soils. They occur on gently to steeply sloping, narrow ridges and side slopes of upland drainage ways. Frost action in these soils limits their use for roads and streets. Grading roads to shed water and constructing adequate side ditches and culverts can help overcome this limitation. Building roads across the slopes or on the contour minimizes cutting and filling. The slope steepness and chert content of these soils limit equipment use. Droughtiness may cause high tree seedling mortality. Low native fertility, low available water capacity, and the frost action also limit use of this soil (USDA-SCS, 1983).

Bottomland soil series include Adler, Dubbs, Midco, Nolin, and Secesh soils. Bottomland soils at the WTS are nearly level. Occasional flooding limits their use. These soils formed in alluvial material of various textures. These lowland soils contain large amounts of available water when compared to upland soils (USDA-SCS, 1983). Overall, permeability is moderate, runoff is slow, fertility is medium, and organic matter content is low.

The bottomland soil adjacent to Peppermint Creek is Adler silt loam. It formed in silty alluvium material deposited by streams. It occurs along large streams in slight depressions in the bottomlands and is subject to flooding. The soil has a seasonal high water table that is within two to three feet of the surface and limits root development of deep-rooted plants (USDA-SCS, 1983). This soil is listed as a hydric soil (USDA, 1994).

Table 12. Soil Units within WTS

Map Unit	Soil Unit Name	Total Acreage	Slope (percent)	Description
66024	Wilbur silt loam, frequently flooded	63	0 to 2	This soil is very deep, moderately well drained. It occurs in floodplains and floodplain steps. Permeability is moderate.
67008	Wilbur silt loam, frequently flooded	102	1 to 3	This soil is very deep, moderately well drained. It occurs in floodplains and floodplain steps. Permeability is moderate.
73014	Clarksville very gravelly silt loam	40	8 to 15	This soil is very deep, somewhat excessively drained. It occurs on steep side slopes and narrow ridgetops. Permeability is moderate. Soil is HEL.
73140	Clarksville-Scholten	957	15 to 45	This soil is very deep, somewhat

Table 12. Soil Units within WTS				
Map Unit	**Soil Unit Name**	**Total Acreage**	**Slope (percent)**	**Description**
	complex, very stony			excessively drained. It occurs on steep side slopes and narrow ridgetops. Permeability is moderate. Soil is HEL.
73395	Clarksville very gravelly silt loam	12	3 to 8	This soil is very deep, somewhat excessively drained. It occurs on steep side slopes and narrow ridgetops. Permeability is moderate. Soil is HEL.
75395	Jamesfin silt loam, occasionally flooded	5	0 to 3	This soil is very deep, well drained. It occurs in floodplains and low stream terraces of major streams and rivers. Permeability is moderate.
76036	Midco very gravelly loam, occasionally flooded	44	1 to 3	This soil is very deep, somewhat excessively drained. It occurs in floodplains. Permeability is moderate.
76046	Secesh silt loam, rarely flooded	31	1 to 3	This soil is very deep, well drained. It occurs in floodplains, stream terraces, and footslopes. Permeability is moderate.
86000	Dubbs silt loam, occasionally flooded	2	0 to 3	This soil is very deep, well drained. It occurs in nearly level to sloping natural levees or low terraces of the Mississippi River and its tributaries. Permeability is moderate. Soil is PHEL.
90007	Loring silt loam, west, upland phase	784	3 to 8	This soil is moderately well drained. It occurs in sloping uplands and stream terraces. Permeability is moderate above the fragipan and moderately slow permeability below the fragipan. Soil is HEL.
90008	Loring silt loam, eroded	5	3 to 8	This soil is moderately well drained. It occurs in sloping uplands and stream terraces. Permeability is moderate above the fragipan and moderately slow permeability below the fragipan. Soil is HEL.
90010	Loring silt loam	0.8	8 to 15	This soil is moderately well drained. It occurs in sloping uplands and stream terraces. Permeability is moderate above the fragipan and moderately slow permeability below the fragipan. Soil is HEL.
99010	Pit-Dumps complex	0.2	0 to 5	Soil is very deep, poorly drained. It occurs in floodplains and basins. Permeability is slow.
Web Soil Survey - Home (usda.gov); NRCS, 1994b; NRCS, 2021				

E.5.4 Water Resources and Water Quality

E.5.4.1 Surface Water

The Peppermint Creek and Mud Creek watersheds are part of the St. Francis River Watershed. Peppermint Creek flows northward across the eastern portion of the site. Mud Creek flows eastward just south of the WTS border. Surface water runoff north of the ridge flows to Peppermint Creek, and surface water runoff south of the ridge flows to Mud Creek. These small streams provide intermittent and semi-permanent habitat for aquatic insects, benthic invertebrates, and amphibians. The lower portion of Peppermint Creek has a perennial flow that supports aquatic insects, benthic invertebrates, amphibians, and fishes. Surface water resources at the WTS include Peppermint Creek and its tributaries as well as tributaries of Mud Creek (Appendix Q, Figure 30).

Wetland PLS identified five non-wetland aquatic areas at WTS. Several of the ponds occur in borrow pits. Others were constructed for erosion control and managing runoff from the road system. Most of these ponds were constructed by the USFS prior to 1968, when the MOARNG began training at WTS, and the hydrology of these ponds ranges from seasonally flooded to permanently flooded. The seasonally flooded ponds do not have fish, but they provide seasonal habitat for amphibians and invertebrates. The ponds also provide a water source for wildlife and habitat for migratory birds. In addition, the MOARNG constructed six small ponds adjacent to roads for erosion control.

E.5.4.2 Floodplain

The 100-year floodplain occurs along Peppermint Creek in the northeast portion of the WTS (FEMA, 1991). (Appendix Q, Figure 30)

E.5.4.3 Wetlands

Figure 30 (Appendix Q) shows the location of surface waters and wetlands at WTS. Approximately 15.77 acres of wetlands were identified, ranging from 0.04 acres to 14.8 acres in area. The wetlands would be classified as PEM and Palustrine Forested according to the Cowardin (1979) system. Some inclusions of PSS also exist. Three of the wetlands are remnant USFS ponds that have silted in and now support wetland vegetation throughout their interiors. These wetlands are most likely isolated hydrologically. The other two wetlands are bottomland systems located along Peppermint Creek. The hydrology of these two wetlands has been substantially enhanced by a roadbed on their east borders, which acts as a drainage barrier and maintains wetland conditions. (Shannon & Wilson, 2013c)

E.5.4.4 Groundwater

The WTS, similar to CCR, CCL, and TTA, also lies within the Ozark Plateaus aquifer system.

APPENDIX F. ECOSYSTEM AND BIOTIC ENVIRONMENT

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F.1 FLORA AND TERRESTRIAL COMMUNITIES

F.1.1 CAMP CROWDER TRAINING SITE

F.1.1.1 HISTORICAL COMMUNITIES

According to available references, pre-settlement natural community conditions at CCR consisted of chert forests, savannas, and prairies. Within the relatively level areas, hardpan prairie graded into savanna and savanna graded into flatwoods. Along steep slopes, dry chert forest dominated with dry to xeric chert forest on the southern and western slopes and mesic to dry chert forest on the northern and eastern slopes (MOARNG, 2006).

During pre-settlement times, lightning strikes and Native Americans burned the prairie periodically (Schroeder, 1982). The topography and prevailing wind direction determined which sites burned. The steeply dissected landscape in the southern portion of CCR remained in timber because the wind direction is predominantly from the south and fires did not burn well in this terrain. The broad, flat plain located in the northern and western portions of CCR was called “Pools Prairie”. The rolling land in the northeast portion of CCR burned more sporadically than the level areas, leaving pockets of trees to produce savannas and forests.

Before the DoD acquired the site, farmers had cleared the floodplains for cropland and pasture, and loggers had removed most of the timber. Logging, tillage, fire suppression, cultivation, and pasturing altered the pre-settlement plant communities, thus an increase in woody species occurred. This increase has been documented by a series of aerial photographs from the 1930s to the present.

F.1.1.2 VEGETATIVE COMMUNITIES

Despite the disturbance, some areas of CCR today appear similar to those described from 1840 to 1848 when the land was surveyed. Vegetation community types at CCR are depicted in Figure 31 (Appendix Q). The relatively natural communities at CCR today include dry chert forest, mesic chert forest, and hardpan prairie. The dry-mesic chert forest is extensive in CCR’s South Post. The Missouri Natural Features Inventory listed 100 acres of it as exceptional and described it as “one of the best forests in the county” (Bicknese, 1988). Some remnant patches of dry chert forest are scattered throughout the northern portion of CCR. Quality hardpan prairie remnants managed with prescribed burns and mowing now exist within both the northern and southern portions of CCR. Structural remnants of an upland flatwoods community cover large portions of the southwest corner of South Post. A degraded limestone glade, overgrown by cedars and leaf litter, occurs along the steep western slopes of South Post. Stream corridors are mainly comprised of dry-mesic bottomland forests, cool season grasslands, and wetlands (MOARNG, 2006).

The mesic bottomland forests that were converted into crop fields are now cool season grasslands. While other relatively disturbed communities include mowed grassland communities of cool and warm season grasses and mixed forest-grassland communities surrounding remnant structures from the WWII era.

F.1.2 CAMP CLARK TRAINING SITE

F.1.2.1 HISTORICAL COMMUNITIES

The Soil Survey of Vernon County lists native vegetation that typically grew on the soils at CCL (USDA-SCS, 1977). These vegetation types included tallgrass prairie, mixed hardwoods, tall prairie grass with scattered

hardwoods (savanna), and mixed hardwoods with a thick understory of grasses. To aid in the sale of land to settlers, the United States General Land Office (USGLO) (1838) surveyed Missouri in the early to mid-1800s. The survey notes from 1838 to 1843 describe the CCL landscape as "prairie", "scattered timber", "land poor and sandy, the timber Post Oak and Black Jack", and "timber pin oak black oak and hickory hazel undergrowth".

Pre-settlement Prairie of Missouri includes a map of Missouri prairies produced from the historical survey notes (Schroeder, 1982). This map shows most of Vernon County to have been prairie. Wooded areas occurred along streams and along steep slopes cut by the streams. The fires that maintained the prairies did not always burn downslope along the streams, leaving trees and shrubs. The map shows the western portion of CCL to have been prairie and the eastern portion of CCL to have been vegetative communities other than prairie. Historical survey notes and current vegetative communities map indicate that the communities at CCL are distributed today much as they were historically.

F.1.2.2 VEGETATIVE COMMUNITIES

Information from the Soil Survey of Vernon County (USDA-SCS, 1977), species found during Range and Training Land Assessment (RTLA) surveys, and information gathered while exploring CCL indicate four terrestrial community types. The communities at CCL are classified using the community descriptions found in The Terrestrial Natural Communities of Missouri (Nelson, 1987). Relatively natural communities at CCL were identified as sandstone savanna, dry-mesic sandstone/shale prairie, wet-mesic bottomland forest, and dry-mesic sandstone forest. Disturbed communities include mixtures of cool and warm season grasses. A small sandstone glade was also identified. The communities at CCL are depicted in Figure 32 (Appendix Q).

RTLA surveys defined five land type units according to overlapping soils and plant communities: cool season successional vegetation, warm season grasses (WSG), savanna, lowland riparian forest, and dry upland forest. These land types correspond to the communities described as disturbed grasslands, sandstone savanna, dry mesic sandstone/shale prairie, wet-mesic bottomland forest, and dry-mesic sandstone forest.

F.1.3 MACON TRAINING SITE

F.1.3.1 HISTORICAL COMMUNITIES

During pre-settlement times, approximately 45 percent of Macon County was prairie (Schroeder 1983). Survey notes from 1817 paint a picture of a rolling landscape with intermingled forest and prairie and evidence of some savannas (USGLO, 1817). Macon County was described as "a region marked by southward draining, closely spaced, subparallel streams resulting in a general pattern of narrow, linear prairie, dividing ridges, and linear, wooded stream valleys" (Schroeder, 1983). The topography of this region helped determine the soil drainage and burn patterns that allowed grasses to predominate in some areas and forest to predominate in others. Wetlands were also common in this region and existed throughout the various vegetation community types.

Tree species mentioned in the historical survey notes (USGLO, 1817) include white oak (*Quercus alba*), black oak (*Quercus velutina*), hickory (*Carya spp*.), bur oak (*Quercus macrocarpa*), elm (*Ulmas spp.*), and black walnut (*Juglans nigra*). Survey notes described the vegetation as prairie, hazel, briars, and vines.

F.1.3.2 VEGETATIVE COMMUNITIES

Vegetative communities at MTS range from relatively natural, undisturbed communities to highly disturbed or human-made communities. The natural communities include dry forest, dry-mesic forest, wet-mesic forest, mesic to dry-mesic prairie/savanna remnants, and freshwater marshes. Reclaimed cool season grassland, spoil pile cool season grassland, spoil pile forest, and reclaimed/disturbed cool season grassland are found on strip-mined land. Figure 33 (Appendix Q) shows the location and type of vegetative communities at MTS.

Dry Mesic Forests cover approximately 850 acres of MTS. The dominant overstory species include white oak, shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), American elm (*Ulmus americana*), hackberry (*Celtis occidentialis*), black walnut, northern red oak (*Quercus rubra*), white ash (*Fraxinus americana*), post oak (*Quercus stellata*), shingle oak (*Quercus imbricaria*), black oak, and pin oak (*Quercus palustris*). Understory species include ironwood (*Eusideroxylon spp.*), eastern redbud (*Cercis canadensis*), black cherry (*Prunus serotina*), eastern red cedar (*Juniperus virginiana*), red mulberry (*Morus rubra*), white ash, fragrant sumac (*Rhus aromatica*), and coralberry (*Symphoricarpos obiculatus*). (Burns and McDonnell Engineering [BME], 1992; Schweiss, 1995)

Wet Mesic Forests cover approximately 100 acres of bottomlands at MTS. Dominant tree and shrub species include slippery elm (*Ulmus rubra*), silver maple (*Acer saccharinum*), pin oak, river birch (*Betula nigra*), bur oak, northern red oak, black willow (*Salix nigra*), and several hickories. Common herbaceous plants include poison ivy (*Toxicodendron radicans*), coral berry, and Virginia wildrye (*Elymus virginicus*). (BME, 1992; BME, 1994)

Spoil Pile Forests cover approximately 300 acres and contain little herbaceous growth. Many woody species are unique to these sites, because they were planted during mine reclamation activities. The mining company planted acid-tolerant, nonnative trees to provide cover on spoil piles at Wooly Acres (BME, 1994). Nonnative trees and shrubs planted include pine (*Pinus spp.*), European black alder (*Alnus glutinosa*), and autumn olive (*Elaeganus umbellata*). Other trees colonizing these sites include black cherry, black oak, shingle oak, slippery elm, pin oak, and white ash. Common understory species on the spoil piles include aromatic sumac, smooth sumac (*Rhus glabra*), blackberry (*Rubus spp.*), poison ivy, Virginia creeper (*Parthenocissus quinquefolia*), and coralberry (Harms, 1996).

Grassland habitats comprise almost half the MTS training land. Approximately 1,280 acres of grassland vegetation communities, consisting of undesirable spoil pile grasslands or cool season grasslands, comprise 88 percent of the total grassland habitat on site. These grasslands exhibit little diversity except in areas where revegetation was unsuccessful. Species such as sunflower (*Helianthus*), goldenrod (*Solidago spp.*), and sweet clover (*Melilotus spp.*) grow in areas where fescue (*Festuca elatior*) was not established. Fescue dominates the reclaimed area that covers most of South 61. Timothy grass (*Phleum pratense*), smooth brome (*Bromus inermis*), wildrye, and broadleaves such as sweet clover, white vervain (*Verbena urticifolia*), clover, aster (*Aster spp.*), goldenrod, and sericea lespedeza (*Lespedeza cuneata*) are also present. The spoil piles at the south end of Baker's Acres are vegetated with fescue, red clover (*Trifolium pratense*), Sericea lespedeza, common mullein (*Verbascum thapsus*), goldenrod, and orchard grass (*Dactylis glomerata*) (BME, 1992).

The remaining grasslands contains native warm season and prairie grasses, which comprise about 175 acres of the site. Only small remnants of the upland and bottomland prairies and savannas remain. Prairie remnants occur mainly along forest edges and roadsides, and patches of prairie cord grass (*Spartina pectinata*) found in the bottomlands are remnants of larger bottomland prairies. Large spreading trees within the forests at MTS may be evidence of former savannas. Two fields of native prairie occur on Wooly

Acres. Big bluestem and Indiangrass grow at these sites. Other areas of the MTS are covered with a mix of shrubs and warm season grasses.

F.1.4 TRUMAN TRAINING AREA

F.1.4.1 HISTORICAL COMMUNITIES

European immigrants altered vegetation communities considerably since pre-settlement times. The area in and around the TTA was a mixture of upland and bottomland forests with savannas and glades interspersed in the upland forest. Landowners logged, pastured, and cultivated the land. They brought in crops and forages they had grown in Europe. They exterminated large predators such as cougars (*Puma concolor*) and wolves (*Canis lupus*), and large herbivores such as elk (*Cervus canadensis*) and buffalo (*Bison bison*). Fire suppression, overgrazing by cattle, and construction of roads decreased the frequency of fires.

F.1.4.2 VEGETATIVE COMMUNITIES

The MDC performed a vegetation community survey at the TTA and classified nine terrestrial communities: dry chert forests, dry-mesic chert forest, dry-mesic limestone forest, early successional mesic forest, limestone/dolomite savanna, dolomite glades, successional fields, bottomland forest, and shoreline (Loring, 1995). The classification system used was from Nelson (1987). Some of these communities are in the early stages of succession due to disturbance. This area was flooded about 25 years ago, so the vegetation is in a state of transition. Figure 34 (Appendix Q) shows the terrestrial communities at the TTA. Communities are described below.

Dry Chert Forests occur on south or west-facing slopes within dry-mesic chert forests. At the TTA, post oak (*Quercus stellata*), black jack oak (*Quercus marilandica*), and black hickory (*Carya texana*) dominate these communities. The canopy ranges from 20 to 60 feet, and the forest floor is sparsely vegetated.

Dry-Mesic Chert Forests cover most of the TTA mainland and portions of the islands. White oak (*Quercus alba*), northern red oak (*Quercus rubra*), and black oak (*Quercus velutina*) dominate the canopy. The canopy is 60 to 90 feet tall, and nearly 100 percent closed. Understory species include redbud (*Cercis Canadensis*) and flowering dogwood (*Cornus florida*). Ground cover includes sumac (*Rhus spp.*), tick trefoil (*Desmodium spp.*), and coral berry (*Symphoricarpos orbiculatus*).

Dry-Mesic Limestone Forests are similar in height and canopy cover to the dry-mesic chert forest. The lack of chert in the soil differentiates it from the dry-mesic chert forest. Dominant species include white oak, sugar maple (*Acer Saccharum*), mockernut hickory (*Carya tomentosa*), and flowering dogwood.

Early Successional Mesic Forests are located on the TTA islands. The forest is 90-100 feet tall and has a closed canopy. Honey locust (*Gleditsia triacanthos*) dominates much of this community. Honey locust grows well in heavily grazed areas, and it appears to withstand inundation better than other tree species.

Limestone/Dolomite Savanna is found on the TTA mainland and to a limited extent on the islands. Chinquapin oak (*Quercus muhlenbergii*), white ash (*Fraxinus Americana*), eastern red cedar (*Juniperus virginiana*), little bluestem (*Schizachyrium scoparium*), and Indian grass (*Sorghastrum nutans*) dominate this community.

Dolomite Glades occur on and around areas of rock outcroppings. Dominant species include grasses such as little bluestem and sideoats grama (*Bouteloua curtipendula*) and eastern red cedar. On TTA, glades occur in small openings within a savanna matrix.

Successional Fields are found on two of the TTA islands and on the mainland. These communities are remnants of the farming activity that occurred on this site from the early to mid-1800s to the 1970s when the USACE obtained the land to construct Truman Reservoir. These areas were in cropland or pasture before the construction of Truman Dam. Weedy annuals, exotics, and native herbaceous species dominate these communities.

Bottomland Forests occur on the floodplains of draws and intermittent streams on the TTA. Level alluvial soil and species such as sycamore (*Platanus occidentalis*), American elm (*Ulmus Americana*), and swamp white oak (*Quercus bicolor*) characterize these sites. Most of these areas were flooded when the USACE completed Truman Dam, thus only small areas of this community type are present.

Shoreline Communities continue to change and develop, as many trees along the shoreline have died due to repeated and prolonged flooding. Hydrophytic vegetation such as sedges (*Carex spp.*) and buttonbush (*Cephalanthus occidentalis*) are invading beneath the standing dead trees.

Flora found at TTA tend to be typical of the Ozarks region in Missouri. Flora surveys have identified species indicative of high quality savannas and glades. These species include: big bluestem (*Andropogon gerardii*), green milkweed (*Asclepias veridiflora*), sideoats grama, heliotrope (*Heliotropium spp.*), purple cliff-brake (*Pellaea atropupurea*), Sampson's snakeroot (*Orbexilum pendunculatum*), scurfy pea (*Psoralea tenuifolia*), and calamint (*Calamintha arkansana*).

Past flora surveys found 405 species of vascular plants. Two state species of conservation concern were found at TTA. No federally listed species were found on TTA. (Thomas, 2019)

F.1.5 Wappapello Training Site

F.1.5.1 Historical Communities

The WTS is part of the lower Ozark Region of Missouri. This region contains the largest contiguous block of forest in Missouri and one of the largest blocks of forest in the Midwest. Today, second growth forests mixed with pasture cover the land (MOARNG, 1997).

Field notes from the U.S. General Land Office survey of 1846 indicate that upland forests and swampy bottomlands dominated the WTS area. Quotes from the survey indicate communities similar to those found at the WTS today. Swampy areas were more prevalent than they are today due to drainage projects in the region. The old survey notes contain little to indicate the presence of savannas in what is now WTS, although some references were made to farmsteads, fields, and timber that had been destroyed by fire. (MOARNG, 1997)

The soil survey (USDA-SCS, 1983) indicates that forest vegetation predominated during development of the soils at the WTS. Alfisols, such as Clarksville, very cherty silt loam develop under humid, temperate forests. The presence of a fragipan in the Loring soils indicates the influence of forest vegetation.

F.1.5.2 Vegetative Communities

Forest communities on WTS include dry chert forest, dry-mesic chert forest, dry-mesic forest, mesic forest, and wet-mesic bottomland forest (Appendix Q, Figure 35).

Oaks and hickories dominate upland forests at the WTS, especially black oak, post oak, white oak, mockernut hickory (*Carya tomentosa*), and black hickory (*Carya texana*). In some areas, southern red oak

(*Quercus falcata*) and northern red oak (*Quercus rubra*) are co-dominant species. In the dry-chert forest, the understory is poorly developed. In the dry-mesic forest and dry-mesic chert forest, understory trees include flowering dogwood (*Cornus florida*), winged elm (*Ulmus alata*), sassafras (*Sassafras albidum*), and black gum (*Nyssa sylvatica*). In disturbed upland woods, dense brambles of greenbrier (*Smilax spp.*), hazelnut (*Corylus americana*), poison ivy (*Toxicodendron radicans*), grapevine (*Vitis spp.*), and Virginia creeper (*Parthenocissus quinquefolia*) are common (Bornstein, 1998).

In the mesic and wet-mesic bottomland forests, the dominant canopy species are red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), sugar maple (*Acer saccharum*), sweetgum (*Liquidambar styraciflua*), and sycamore (*Platanus occidentalis*). Oak and hickory were less common in these sites than in the upland forest, but white oak, pin oak (*Quercus palustris*), bitternut hickory (*Carya cordiformis*), yellow-poplar (*Liriodendron tulipifera*), and slippery elm (*Ulmus rubra*) are not unusual. Common understory trees and shrubs include American hornbeam (*Carpinus caroliniana*), black gum, pawpaw (*Asimina triloba*), spicebush (*Lindera benzoin*), sugarberry (*Celtis laevigata*), and hazelnut. Poison-ivy is the most common shrub or vine (Bornstein, 1998).

Floral inventories have identified approximately 400 plant species at the WTS (Bornstein, 1998). Several rare plant species occur in the WTS bottomland forests including Loesel's twayblade (*Liparis loeselii*), yellow-flowered horse gentian (Trio*steum angustifolium var. eamesii*), netted chain fern (*Woodwardia areolata*), water sedge (*Carex aquatilisvar substricta*), and marsh St. John's wort (*Triadenum tubulosum*). The fact that these unusual plants are part of this forest community indicates this habitat's high quality.

State-listed plants were also found at other areas of the WTS. Slender pondweed (*Potamogeton pusillus var. pusillus*) was found in a small pond in an upland site (Bornstein, 1998). Marsh pink (*Sabatia brachiata*) was identified in the uplands at the WTS (Mohlenbrock, 1992).

F.2 FISH AND WILDLIFE

Fauna surveys have been completed on MOARNG training sites since the 1990s. Currently the MOARNG conducts fauna surveys every ten years or as needed. The following sections list fauna species that have been identified on MOARNG sites through past surveys.

F.2.1 MAMMALS

Table 13. Mammals Identified on MOARNG Training Sites

Common Name	Scientific Name	CCL	CCR	MTS	TTA	WTS
Beaver	*Castor canadensis*	✓	✓	✓	✓	✓
Big Brown Bat	Eptesicus fuscus		✓	✓	✓	✓
Black Bear	*Ursus americanus*		✓			
Bobcat	*Lynx rufus*	✓	✓	✓	✓	✓
Cinereus (Masked) Shrew	*Sorex cinereus*			✓		
Coyote	*Canis latrans*	✓	✓	✓	✓	✓
Deer Mouse	*Peromyscus maniculatus*	✓	✓	✓	✓	
Eastern Chipmunk	*Tamias striatus*	✓	✓		✓	✓
Eastern Cottontail	*Sylvilagus floridanus*	✓	✓	✓	✓	✓
Eastern Mole	*Scalopus aquaticus*	✓	✓	✓	✓	✓
Eastern Woodrat	*Neotoma floridana*		✓		✓	✓
Elliot's Short-tailed Shrew	*Blarina hylophaga*	✓	✓			

Table 13. Mammals Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Evening Bat	Nycticeius humeralis		✓	✓	✓	✓
Fox Squirrel	*Sciurus niger*	✓	✓	✓	✓	✓
Fulvous Harvest Mouse	*Reithrodontomys fulvescens*		✓			
Golden Mouse	*Ochrotomys nuttalli*					✓
Gray Fox	*Urocyon cinereoargenteus*	✓	✓		✓	
Gray Squirrel	*Sciurus carolinensis*	✓	✓	✓	✓	✓
Gray Bat	Myotis *grisescens*		✓		✓	✓
Groundhog	*Marmota max*	✓	✓	✓	✓	✓
Hispid Cotton Rat	*Sigmodon hispidus*	✓	✓		✓	
Hoary Bat	Lasiurus cinereus		✓	✓	✓	✓
House Mouse	*Mus musculus*	✓	✓	✓	✓	✓
Indiana Bat	*Myotis sodalis*		✓	✓	✓	✓
Keen's Myotis	*Myotis keenii*				✓	
Least Shrew	*Cryptotis parva*	✓	✓	✓	✓	
Little brown bat	Myotis lucifugus		✓	✓	✓	✓
Long-tailed Weasel	*Mustela frenata*				✓	
Meadow Jumping Mouse	*Zapus hudsonius*	✓	✓	✓	✓	
Mink	*Mustela vison*	✓	✓	✓	✓	✓
Mountain Lion	*Puma concolor*		✓			
Muskrat	*Ondatra zibethicus*			✓	✓	
Nine-banded Armadillo	*Dasypus novemcinctus*		✓		✓	
Northern Myotis	Myotis septentrionalis	✓	✓	✓	✓	✓
Opossum	*Didelphis virginiana*	✓	✓	✓	✓	✓
Plains Pocket Gopher	*Geomys bursarius*				✓	
Prairie Vole	*Microtus ochrogaster*	✓	✓	✓	✓	✓
Raccoon	*Procyon lotor*	✓	✓	✓	✓	✓
Red Bat	Lasiurus borealis	✓	✓	✓	✓	✓
Red fox	*Vulpes*	✓	✓	✓	✓	✓
River Otter	*Lontra canadensis*			✓	✓	✓
Short-tailed Shrew	*Blarina brevicauda/carolinensis*			✓	✓	✓
Silver-haired Bat	Lasionycteris noctivagans			✓	✓	✓
Southeastern Shrew	*Sorex longirostris*			✓	✓	✓
Southern Bog Lemming	*Synaptomys cooperi*	✓	✓	✓	✓	✓
Southern Flying Squirrel	*Glaucomys volans*	✓	✓	✓	✓	✓
Striped Skunk	*Mephitis*	✓	✓	✓	✓	✓
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	✓	✓		✓	
Tri-colored Bat	Perimyotis subflavus	✓	✓	✓	✓	✓
Western Harvest Mouse	*Reithrodontomys megalotis*	✓	✓	✓	✓	
White-footed Mouse	*Peromyscus leucopus*	✓	✓	✓	✓	✓
White-tailed Deer	*Odocoileus virginianus*	✓	✓	✓	✓	✓
Wild Pig	*Sus scrofa*		✓			✓
Woodchuck	*Marmota monax*	✓	✓	✓	✓	

Table 13. Mammals Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Woodland Vole	*Microtus pinetorum*	✓	✓	✓	✓	✓

F.2.2 BIRDS

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Acadian Flycatcher	*Empidonax virescens*	✓	✓	✓	✓	✓
American Coot	*Fulica americana*		✓	✓		
American Crow	*Corvus brachyrhynchos*	✓	✓	✓	✓	✓
American Goldfinch	*Spinus tristis*	✓	✓	✓	✓	✓
American Kestrel	*Falco sparverius*	✓	✓	✓		
American Pipit	*Anthus rubescens*				✓	
American Redstart	*Setophaga ruticilla*	✓	✓	✓		✓
American Robin	*Turdus migratorius*	✓	✓	✓	✓	✓
American Tree Sparrow	*Spizella arborea*			✓	✓	
American White Pelican	*Pelecanus erythrorhynchos*		✓	✓	✓	
American Wigeon	*Anas americana*	✓		✓		
American Woodcock	*Scolopax minor*	✓		✓		
Baird's Sandpiper	*Calidris bairdii*			✓		
Bald Eagle	*Haliaeetus leucocephalus*	✓	✓	✓	✓	✓
Baltimore Oriole	*Icterus galbula*	✓	✓	✓	✓	✓
Bank Swallow	*Riparia riparia*		✓	✓		
Barn Owl	*Tyto alba*	✓				
Barn Swallow	*Hirundo rustica*	✓	✓	✓		✓
Barred Owl	*Strix varia*	✓	✓	✓	✓	✓
Bell's Vireo	*Vireo bellii*	✓	✓	✓	✓	
Belted Kingfisher	*Ceryle alcyon*	✓	✓	✓		✓
Bewick's Wren	*Thryomanes bewickii*	✓	✓	✓	✓	
Black Vulture	*Coragyps atratus*	✓				
Black-and-white Warbler	*Mniotilta varia*	✓	✓	✓	✓	✓
Black-billed Cuckoo	*Coccyzus erythropthalmus*			✓		✓
Blackburnian Warbler	*Dendroica fusca*			✓		
Black-capped Chickadee	*Parus atricapillus*	✓	✓	✓	✓	
Black-crowned Night Heron	*Nycticorax nycticorax*				✓	
Blackpoll Warbler	*Dendroica striata*			✓		✓
Black-throated Green Warbler	*Dendroica virens*	✓	✓	✓		
Blue Grosbeak	*Guiraca caerulea*	✓	✓	✓	✓	✓
Blue Jay	*Cyanocitta cristata*	✓	✓	✓	✓	✓
Blue-gray Gnatcatcher	*Polioptila caerulea*	✓	✓	✓	✓	✓
Blue-winged Teal	*Anas discors*	✓	✓	✓		
Blue-winged Warbler	*Vermivora pinus*		✓	✓	✓	✓
Bobolink	*Dolichonyx oryzivorus*			✓		
Brewer's Blackbird	*Euphagus cyanocephalus*	✓				

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Broad-winged Hawk	*Buteo platypterus*	✓	✓	✓	✓	✓
Brown Creeper	*Certhia americana*	✓	✓	✓	✓	
Brown Thrasher	*Toxostoma rufum*	✓	✓	✓		✓
Brown-headed Cowbird	*Molothrus ater*	✓	✓	✓	✓	✓
Bufflehead	*Bucephala albeola*	✓		✓	✓	
Canada Goose	*Branta canadensis*	✓	✓	✓	✓	✓
Canada Warbler	*Wilsonia canadensis*	✓		✓		
Canvasback	*Aythya valisineria*			✓		
Carolina Chickadee	*Parus carolinensis*	✓	✓		✓	✓
Carolina Wren	*Thryothorus ludovicianus*	✓	✓	✓	✓	✓
Cattle Egret	*Bubulcus ibis*	✓	✓	✓		
Cedar Waxwing	*Bombycilla cedrorum*	✓	✓	✓		
Cerulean Warbler	*Dendroica cerulea*	✓	✓			
Chestnut-sided Warbler	*Dendroica pensylvanica*	✓	✓	✓		
Chimney Swift	*Chaetura pelagica*	✓	✓	✓		✓
Chipping Sparrow	*Spizella passerina*	✓	✓	✓	✓	✓
Chuck-will's Widow	*Caprimulgus carolinensis*	✓	✓	✓	✓	✓
Clay-colored Sparrow	*Spizella pallida*		✓			
Cliff Swallow	*Hirundo pyrrhonota*			✓	✓	
Common Grackle	*Quiscalus quiscula*	✓	✓	✓	✓	✓
Common Merganser	*Mergus merganser*	✓			✓	
Common Nighthawk	*Chordeiles minor*	✓	✓	✓		✓
Common Redpoll	*Carduelis flammea*			✓		
Common Snipe	*Gallinago gallinago*	✓				
Common Tern	*Sterna hirundo*			✓		
Common Yellowthroat	*Geothlypis trichas*	✓	✓	✓	✓	✓
Cooper's Hawk	*Accipiter cooperii*	✓	✓		✓	✓
Dark-eyed Junco	*Junco hyemalis*	✓	✓	✓	✓	✓
Dickcissel	*Spiza americana*	✓	✓	✓		
Double-crested Cormorant	*Phalacrocorax auritus*		2	✓	✓	
Downy Woodpecker	*Picoides pubescens*	✓	✓	✓	✓	✓
Eared Grebe	*Podiceps nigricollis*			✓		
Eastern Bluebird	*Sialia sialis*	✓	✓	✓	✓	✓
Eastern Kingbird	*Tyrannus tyrannus*	✓	✓	✓	✓	✓
Eastern Meadowlark	*Sturnella magna*	✓	✓	✓		✓
Eastern Phoebe	*Sayornis phoebe*	✓	✓	✓		✓
Eastern Screech-Owl	*Otus asio*	✓	✓	✓		✓
Eastern Towhee	*Piplio erythrophthalmus*	✓	✓	✓	✓	✓
Eastern Tufted Titmouse	*Baeolophus bicolor*	✓	✓	✓	✓	✓
Eastern Wood-Pewee	*Contopus virens*	✓	✓	✓	✓	✓
European Starling	*Sturnus vulgaris*	✓	✓	✓	✓	✓
Field Sparrow	*Spizella pusilla*	✓	✓	✓	✓	✓

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Fish Crow	*Corvus ossifragus*		✓			✓
Forster's Tern	*Sterna forsteri*			✓		
Fox Sparrow	*Passerella iliaca*		✓	✓		
Gadwall	*Anas strepera*	✓	✓	✓		
Golden Winged Warbler	*Vermivora chrysoptera*	✓	✓	✓		
Golden-crowned kinglet	*Regulus satrapa*	✓	✓		✓	
Grasshopper Sparrow	*Ammodramus savannarum*	✓	✓	✓		
Gray Catbird	*Dumetella carolinensis*	✓	✓	✓	✓	✓
Great Blue Heron	*Ardea herodias*	✓	✓	✓	✓	
Great Egret	*Casmerodius albus*			✓		
Great horned Owl	*Bubo virginianus*	✓	✓	✓	✓	✓
Great-crested Flycatcher	*Myiarchus crinitus*	✓	✓	✓	✓	✓
Greater Prairie-Chicken	*Tympanuchus cupido*			✓		
Greater White-fronted Goose	*Anser albifrons*			✓		
Greater Yellowlegs	*Tringa melanoleuca*		✓	✓	✓	
Great-tailed Grackle	*Quiscalus mexicanus*		✓			
Green Heron	*Butorides striatus*	✓		✓	✓	✓
Green-winged Teal	*Anas crecca*	✓		✓		
Grey-cheeked Thrush	*Catharus minimus*	✓	✓			
Hairy Woodpecker	*Picoides villosus*	✓	✓	✓	✓	✓
Henslow's Sparrow	*Ammodramus henslowii*	✓	✓	✓		
Hermit Thrush	*Catharus guttatus*	✓	✓	✓	✓	✓
Hooded Merganser	*Lophodytes cucullatus*	✓		✓	✓	
Hooded Warbler	*Wilsonia citrina*	✓	✓			
Horned Lark	*Eremophila alpestris*	✓	✓	✓		
House Finch	*Carpodacus mexicanus*	✓	✓	✓	✓	✓
House Sparrow	*Passer domesticus*	✓	✓	✓	✓	✓
House Wren	*Troglodytes aedon*	✓	✓	✓		✓
Indigo Bunting	*Passerina cyanea*	✓	✓	✓	✓	✓
Kentucky Warbler	*Oporornis formosus*	✓	✓	✓	✓	✓
Killdeer	*Charadrius vociferus*	✓	✓	✓		✓
King Rail	*Rallus elegans*	✓				
Lark Sparrow	*Chondestes grammacus*	✓	✓	✓		
Least Bittern	*Ixobrychus exilis*			✓		✓
Least Flycatcher	*Empidonax minimus*	✓	✓	✓		✓
Least Sandpiper	*Calidris minutilla*			✓		
LeConte's Sparrow	*Ammodramus leconteii*	✓	✓	✓		
Lesser Scaup	*Aythya affinis*	✓		✓		
Lesser Yellowlegs	*Tringa flavipes*			✓		
Lincoln's Sparrow	*Melospiza lincolnii*	✓	✓	✓		
Little Blue Heron	*Egretta caerulea*	✓	✓			
Loggerhead Shrike	*Lanius ludovicianus*	✓	✓	✓		

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Louisiana Waterthrush	*Parkesia motacilla*	✓	✓	✓		✓
Magnolia Warbler	*Dendroica magnolia*	✓	✓			
Mallard	*Anas platyrhynchos*	✓	✓	✓	✓	
Marsh Wren	*Cistothorus palustris*			✓		
Merlin	*Falco columbarius*			✓		
Moscovy Duck	*Cairina moschata*		✓			
Mourning Dove	*Zenaida macroura*	✓	✓	✓	✓	✓
Mourning Warbler	*Geothlypis philadelphia*	✓		✓		
Nashville Warbler	*Vermivora ruficapilla*	✓	✓	✓		✓
North Rough-winged Swallow	*Stelgidopteryx serripennis*			✓		
Northern Bobwhite	*Colinus virginianus*	✓	✓	✓	✓	✓
Northern Cardinal	*Cardinalis cardinalis*	✓	✓	✓	✓	✓
Northern Flicker	*Colaptes auratus*	✓	✓	✓	✓	✓
Northern Harrier	*Circus cyaneus*	✓	✓	✓	✓	
Northern Mockingbird	*Mimus polyglottos*	✓	✓	✓		✓
Northern Parula	*Parula americana*	✓	✓	✓	✓	✓
Northern Pintail	*Anas acuta*	✓				
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	✓				
Northern Shoveler	*Anas clypeata*	✓	✓	✓		
Northern Waterthrush	*Seiurus noveboracensis*	✓	✓	✓		
Olive-sided Flycatcher	*Contopus borealis*	✓	✓	✓		✓
Orange-crowned Warbler	*Vermivora celata*	✓	✓	✓		✓
Orchard Oriole	*Icterus spurius*	✓	✓	✓		✓
Osprey	*Pandion haliaetus*		✓	✓	✓	
Ovenbird	*Seiurus aurocapillus*	✓	✓	✓	✓	✓
Painted Bunting	*Passerina ciris*	✓	✓			
Palm Warbler	*Dendroica palmarum*	✓	✓	✓		✓
Pectoral Sandpiper	*Calidris melanotos*			✓		
Philadelphia Vireo	*Vireo philadelphicus*	✓	2			
Pied-billed Grebe	*Podilymbus podiceps*		✓	✓	✓	
Pileated Woodpecker	*Dryocopus pileatus*	✓	✓	✓	✓	✓
Pine Siskin	*Carduelis pinus*			✓		
Pine Warbler	*Dendroica pinus*	✓	✓	✓		✓
Pipit (unknown)	*Anthus spp.*			✓		
Prairie Warbler	*Dendroica discolor*	✓	✓			✓
Prothonitary Warbler	*Protonotaria citrea*			✓	✓	✓
Purple Martin	*Progne subis*	✓	✓	✓		
Red-bellied Woodpecker	*Melanerpes carolinus*	✓	✓	✓	✓	✓
Red-breasted Nuthatch	*Sitta canadensis*	✓	✓			✓
Red-eyed Vireo	*Vireo olivaceus*	✓	✓	✓	✓	✓
Redhead	*Aythya americana*	✓				
Red-headed Woodpecker	*Melanerpes erythrocephalus*	✓	✓	✓	✓	✓

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Red-necked Grebe	*Podiceps grisegena*			✓		
Red-Shouldered Hawk	*Buteo lineatus*	✓	✓	✓		✓
Red-tailed Hawk	*Buteo jamaicensis*	✓	✓	✓	✓	✓
Red-winged Blackbird	*Agelaius phoeniceus*	✓	✓	✓	✓	✓
Ring-billed Gull	*Larus delawarensis*			✓	✓	
Ring-necked Duck	*Aythya collaris*	✓		✓	✓	
Ring-necked Pheasant	*Phasianus colchicus*			✓		
Rock Dove	*Columba livia*	✓				
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	✓	✓	✓		
Rough-legged Hawk	*Buteo lagopus*			✓		
Rough-winged Swallow	*Stelgedopteryx spp.*		✓			
Ruby-crowned Kinglet	*Regulus calendula*	✓	✓	✓		
Ruby-throated Hummingbird	*Archilochus colubris*	✓	✓	✓	✓	✓
Rusty Blackbird	*Euphagus carolinus*		✓			
Savannah Sparrow	*Passerculus sandwichensis*	✓	✓	✓	✓	
Scarlet Tanager	*Piranga olivacea*	✓	✓	✓		✓
Scissor-tailed Flycatcher	*Tyrannus forficatus*	✓	✓			
Sedge Wren	*Cistothorus platensis*	✓	✓	✓		
Sharp-shinned Hawk	*Accipiter striatus*	✓	✓	✓	✓	✓
Short-eared Owl	*Asio flammeus*			✓		
Snow Goose	*Chen caerulescens*	✓		✓		✓
Solitary Sandpiper	*Tringa solitaria*			✓		
Solitary Vireo	*Vireo solitarius*	✓	✓	✓		✓
Song Sparrow	*Melospiza melodia*	✓	✓	✓	✓	✓
Sora	*Porzana carolina*	✓	✓	✓		
Spotted Sandpiper	*Actitis macularia*			✓		
Stilt Sandpiper	*Calidris himantopus*			✓		
Summer Tanager	*Piranga rubra*	✓	✓	✓	✓	✓
Swainson's Thrush	*Catharus ustulatus*	✓	✓	✓		
Swainson's Warbler	*Limnothlypis swainsonii*	✓	✓			
Swamp Sparrow	*Melospiza georgiana*	✓	✓	✓	✓	
Tennessee Warbler	*Vermivora peregrina*	✓	✓	✓		
Tree Swallow	*Tachycineta bicolor*	✓	✓	✓	✓	✓
Trumpeter Swan	*Cygnus buccinator*			✓		
Tufted Titmouse	*Parus bicolor*	✓	✓	✓	✓	✓
Turkey Vulture	*Cathartes aura*	✓	✓	✓	✓	✓
Upland Sandpiper	*Bartramia longicauda*	✓	✓	✓		
Veery	*Catharus fuscescens*					✓
Vesper Sparrow	*Pooecetes gramineus*	✓		✓		
Warbling Vireo	*Vireo gilvus*	✓		✓		✓
Western Kingbird	*Tyrannus verticalis*			✓		
Western Meadowlark	*Sturnella neglecta*			✓		

Table 14. Birds Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Whip-poor-will	*Caprimulgus vociferus*	✓	✓	✓	✓	
White-breasted Nuthatch	*Sitta carolinensis*	✓	✓	✓	✓	✓
White-crowned Sparrow	*Zonotrichia leucophrys*	✓	✓	✓		
White-eyed Vireo	*Vireo griseus*		✓	✓	✓	✓
White-rumped Sandpiper	*Calidris fuscicollis*			✓		
White-throated Sparrow	*Zonotrichia albicollis*	✓	✓	✓		
Wild Turkey	*Meleagris gallopavo*	✓	✓	✓	✓	✓
Willow Flycatcher	*Empidonax traillii*	✓		✓		✓
Wilson's Phalarope	*Phalaropus tricolor*			✓		
Wilson's Snipe	*Gallinago delicata*			✓		
Wilson's Warbler	*Wilsonia pusilla*					✓
Winter Wren	*Troglodytes troglodytes*	✓	✓			
Wood Duck	*Aix sponsa*	✓	✓	✓	✓	✓
Wood Thrush	*Hylocichla mustelina*	✓	✓	✓		✓
Worm-eating Warbler	*Helmitheros vermivorus*	✓	✓			✓
Yellow Warbler	*Dendroica petechia*	✓	✓	✓		✓
Yellow-bellied Flycatcher	*Empidonax flaviventris*			✓		✓
Yellow-bellied Sapsucker	*Sphyrapicus varius*	✓	✓	✓	✓	✓
Yellow-billed Cuckoo	*Coccyzus americanus*	✓	✓	✓	✓	✓
Yellow-breasted Chat	*Icteria virens*	✓	✓	✓	✓	✓
Yellow-rumped (Myrtle) Warbler	*Dendroica coronata*	✓	✓	✓	✓	✓
Yellow-throated Vireo	*Vireo flavifrons*	✓	✓	✓	✓	✓
Yellow-throated Warbler	*Dendroica dominica*					✓

F.2.3 REPTILES AND AMPHIBIANS

Table 15. Reptiles and Amphibians Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
American Toad	*Bufo americanus*	✓				
Black Rat Snake	*Elaphe obsoleta*	✓	✓	✓	✓	✓
Blanchard's Cricket Frog	*Acris crepitans blanchardi*	✓	✓	✓	✓	✓
Blotched Water Snake	*Nerodia erythrogaster transversa*	✓	✓			
Boreal Chorus Frog	*Pseudacris maculata*		✓			
Broadhead Skink	*Eumeces laticeps*		✓	✓		✓
Bullfrog	*Rana catesbeiana*	✓	✓	✓		✓
Cave Salamander	*Eurycea lucifuga*		✓			
Central Lined Snake	*Tropidoclonion lineatum lineatum*	✓				
Central Newt	*Notophthalmus viridescens*		✓			
Common Garter Snake	*Thamnophis sirtalis*			✓		
Common Musk Turtle	*Sternotherus odoratus*	✓				✓
Common Snapping Turtle	*Chelydra serpentina*	✓	✓	✓	✓	✓
Dark-sided Salamander	*Eurycea longicauda melanopleura*		✓			
Dwarf American Toad	*Anaxyrus americanus*		✓			

Table 15. Reptiles and Amphibians Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Eastern American Toad	*Bufo americanus americanus*		✓	✓	✓	✓
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*	✓	✓			✓
Eastern Hognose Snake	*Heterodon platyrhinos*	✓		✓		✓
Eastern Narrowmouth Toad	*Gastrophryne carolinensis*	✓	✓		✓	✓
Eastern Spadefoot Toad	*Scaphiopus holbrookii*					✓
Eastern Yellowbelly Racer	*Coluber constrictor*	✓	✓	✓		✓
Five-lined Skink	*Eumeces fasciatus*	✓	✓	✓	✓	✓
Flathead Snake	*Tantilla gracilis*	✓			✓	
Four-toed Salamander	*Hemidactylium scutatum*					✓
Fowler's Toad	*Bufo fowleri*					✓
Grahm's Crayfish Snake	*Regina grahamii*	✓				
Gray Tree Frog	*Hyla versicolor*	✓	✓	✓	✓	✓
Great Plains Skink	*Eumeces obsoletus*			✓		
Green Frog	*Rana clamitans*	✓	✓	✓	✓	✓
Green Treefrog	*Hyla cinerea*					✓
Ground Skink	*Scincella lateralis*	✓	✓		✓	✓
Long-tailed Salamander	*Eurycea longicauda*		✓			✓
Marbled Salamander	*Ambystoma opacum*					✓
Midland Brown Snake	*Storeria dekayi*	✓	✓			
Missouri River Cooter	*Pseudemys concinna*					✓
Mole Salamander	*Ambystoma talpoideum*					✓
Northern Crawfish Frog	*Rana areolata circulosa*				✓	
Northern Fence Lizard	*Sceloporus undulatus*	✓	✓	✓	✓	✓
Northern Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*	✓	✓	✓		✓
Northern Spring Peeper	*Pseudacris crucifer*	✓	✓	✓	✓	✓
Northern Water Snake	*Nerodia sipedon sipedon*	✓		✓		✓
Orange Strip Ribbon Snake	*Thamnophis proximus proximus*		✓			
Ornate Box Turtle	*Terrapene ornata ornata*	✓			✓	
Osage Copperhead	*Agkistrodon contortrix*		✓		✓	✓
Painted Turtle	*Chrysemys picta*	✓			✓	✓
Pickerel Frog	*Rana palustris*		✓	✓	✓	✓
Plains Leopard Frog	*Rana blairi*	✓		✓	✓	
Prairie Kingsnake	*Lampropeltis calligaster*	✓	✓	✓		
Prairie racerunner	*Aspidoscelis sexlineata*					✓
Prairie Ringneck Snake	*Diadophis punctatus*	✓	✓	✓	✓	✓
Red-eared Slider	*Trachemys scripta elegans*	✓	✓	✓	✓	✓
Red-sided Garter Snake	*Thamnophis sirtalis infernalis*			✓		
Ringed Salamander	*Ambystoma annulatum*		✓			
Rough Green Snake	*Opheodrys aestivus*	✓	✓			✓
Six-lined Race Runner	*Cnemidophorus sexlineatus sexlineatus*	✓	✓			✓
Slender Glass Lizard	*Ophisaurus attenuatus*		✓		✓	

Table 15. Reptiles and Amphibians Identified on MOARNG Training Sites						
Common Name	**Scientific Name**	**CCL**	**CCR**	**MTS**	**TTA**	**WTS**
Slimy Salamander	*Plethodon glutinosus*		✓			✓
Smallmouth Salamander	*Ambystoma texanum*	✓	✓	✓		✓
Southern Black Racer	*Coluber constrictor priapus*					✓
Southern Coal Skink	*Eumeces anthracinus*	✓	✓			✓
Southern Leopard Frog	*Lithobates sphenocephalus*	✓	✓	✓	✓	✓
Southern Red-backed Salamander	*Plethodon serratus*					✓
Speckled Kingsnake	*Lampropeltis getulus*	✓	✓			✓
Spotted Salamander	*Ambystoma maculatum*		✓			✓
Texas Ratsnake	*Elaphe obsoleta lindheimeri*		✓			
Three-toed Box Turtle	*Terrapene Carolina triunguis*	✓	✓		✓	✓
Timber Rattlesnake	*Crotalus horridus*					✓
Western Chorus Frog	*Pseudacris triseriata*	✓	✓	✓		
Western Cottonmouth	*Agkistrodon piscivorus*					✓
Western Earth Snake	*Virginia valeriae*				✓	✓
Western Pygmy Rattlesnake	*Sistrurus miliarius streckeri*					✓
Western Ribbon Snake	*Thamnophis proximus*	✓	✓	✓		✓
Western Spiny Softshell	*Apalone spinifera hartwegi*	✓				
Western Worm Snake	*Carphophis amoenus*	✓	✓	✓	✓	✓
Woodhouse's Toad	*Anaxyrus woodhousii*	✓	✓			✓
Yellowbelly Water Snake	*Nerodia erythrogaster*	✓				✓

F.2.4 FISH

Table 16. Fish Identified on MOARNG Training Sites			
Common Name	**Scientific Name**	**CCL**	**CCR**
Banded Sculpin	*Cottus carolinae*		✓
Bigmouth Buffalo	*Ictiobus cyprinellus*	✓	
Black Bullhead	*Ameiurus melas*	✓	
Black Crappie	*Pomoxis nigromaculatus*	✓	
Blackspotted Topminnow	*Fundulus olivaceus*	✓	
Bluegill	*Lepomis macrochirus*	✓	✓
Bluntnose Minnow	*Pimephales notatus*	✓	✓
Brook Silverside	*Labidesthes sicculus*	✓	
Central Stoneroller	*Campostoma anomalum*	✓	✓
Channel Catfish	*Ictalurus punctatus*	✓	✓
Common Carp	*Cyprinus carpio*	✓	
Crappie	*Pomoxis spp.*		✓
Creek Chub	*Semotilus atromaculatus*	✓	✓
Fantail Darter	*Etheostoma flabellare*	✓	✓
Fathead Minnow	*Pimephales promelas*	✓	
Freckled Madtom	*Noturus nocturnus*	✓	
Freshwater Drum	*Aplodinotus grunniens*	✓	
Gizzard Shad	*Dorosoma cepedianum*	✓	
Golden Shiner	*Notemigonus crysoleucas*	✓	✓

Table 16. Fish Identified on MOARNG Training Sites			
Common Name	**Scientific Name**	**CCL**	**CCR**
Grass Carp	*Ctenopharyngodon idella*	✓	
Green Sunfish	*Lepomis cyanellus*	✓	✓
Johnny Darter	*Etheostoma nigrum*	✓	
Largemouth Bass	*Micropterus salmoides*	✓	✓
Longear Sunfish	*Lepomis megalotis*	✓	
Mosquitofish	*Gambusia affinis*	✓	
Ohio Logperch	*Percina caprodes*	✓	
Orangethroat Darter	*Etheostoma spectabile*	✓	✓
Rainbow Trout	*Oncorhynchus mykiss*		✓
Redfin Shiner	*Lythrurus umbratilis*	✓	
Redspot Chub	*Nocomis asper*	✓	✓
Rock Bass	*Ambloplites rupestris*	✓	
Slenderhead Darter	*Percina phoxocephala*	✓	
Southern Redbelly Dace	*Phoxinus erythrogaster*		✓
Spotted Bass	*Micropterus punctulatus*	✓	✓
Spotted Sucker	*Minytrema melanops*	✓	
Striped Shiner	*Luxilus chrysocephalus*		✓
White Crappie	*Pomoxis annularis*	✓	
White Sucker	*Catostomus commersonii*	✓	
Yellow Bullhead	*Ameiurus natalis*	✓	✓

F.2.5 MOLLUSKS

Table 17. Mollusks Identified on MOARNG Training Sites			
Common Name	**Scientific Name**	**CCL**	**CCR**
Amber Snail 1	*Catinella sp. A (oklahomarum?)*		✓
Amber Snail 2	*Catinella sp. B (avara?)*		✓
Amber Snail 3	*Catinella sp. A*	✓	
Amber Snail 4	*Catinella sp. B*	✓	
Armed Snaggletooth	*Gastrocopta armifera*	✓	✓
Blade Vertigo Snail	*Vertigo milium*	✓	
Bottleneck Snaggletooth	*Gastrocopta contracta*	✓	✓
Bronze Pinecone Snail	*Strobilops aeneus*	✓	✓
Carolina Mantleslug	*Philomycus carolinianus*	✓	✓
Compound Coil	*Helicodiscus parallelus*	✓	
Dull Gloss Snail	*Zonitoides limatulus*	✓	
Fine-Ribbed Striate Snail	*Striatura milium*	✓	✓
Grandis Giant Floater	*Anodonta grandis grandis*	✓	
Grey Field Slug	*Deroceras reticulatum*	✓	✓
Honey Vertigo Snail	*Vertigo tridentata*	✓	✓
Lamda Snaggletooth	*Gastrocopta holzingeri*	✓	✓
Land Snail	*Helicina orbiculata*		✓
Liliput Shell	*Toxolasma parvum*	✓	
Maze Pinecone Snail	*Strobilops labyrinthicus*	✓	✓
Median Striate Snail	*Striatura meridionalis*	✓	✓
Minute Gem	*Hawaiia minuscula*		✓

Table 17. Mollusks Identified on MOARNG Training Sites			
Common Name	**Scientific Name**	**CCL**	**CCR**
Obese Thorn Snail	*Carychium exiguum*	✓	
Ovate Vertigo Snail	*Vertigo ovata*	✓	
Ozark Liptooth	*Polygyra jacksoni*		✓
Physa Snail 1	*Physa sp. A*		✓
Physa Snail 2	*Physa sp. B*		✓
Physa Snail 3	*Physa sp. A*	✓	
Physa Snail 4	*Physa sp. B*	✓	
Pond Mussel	*Ligumia subrostrata*	✓	
Pond Snail 1	*Lymnaea sp. A*		✓
Pond Snail 2	*Lymnaea sp. B*	✓	
Pondhorn	*Uniomerus tetralasmus*	✓	
Quick Gloss Snail	*Zonitoides arboreus*	✓	✓
Ram's Horn Snail	*Planorbella trivolvis*		✓
Rough Ram's Horn	*Planorbella subcrenata*		✓
Shagreen	*Inflectarius inflectus*		✓
Silk Hive	*Euconulus trochulus*	✓	✓
Small Spot Snail	*Punctum minutissimum*	✓	✓
Tight Coil	*Helicodiscus notius*	✓	✓
Unknown 1	*Menetus excuus*		✓
Unknown 10	*Stenotrema leai alicia*	✓	
Unknown 2	*Polygyra dorfueilliana*		✓
Unknown 3	*Pupisoma meridionalis*		✓
Unknown 4	*Retinella indentata*		✓
Unknown 5	*Stenotrema leai alicia*		✓
Unknown 6	*Menetus exacuus*	✓	
Unknown 7	*Retinella indentata*	✓	
Unknown 8	*Sphaerium securis*	✓	
Unknown 9	*Sphaerium transversum*	✓	
Western Whitelip	*Triodopsis alleni*	✓	✓
White Snaggletooth	*Gastrocopta tappaniana*	✓	
Whitelip Dagger Snail	*Pupoides albilabris*	✓	✓
White-Lip Globe	*Mesodon thyroidus*	✓	✓
Whitewashed Rabdotus Snail	*Rabdotus dealbatus*		✓
Whorl Snail 1	*Vertigo sp. a (gouldi?)*		✓
Whorl Snail 2	*Vertigo sp. b*		✓
Wing Snaggletooth	*Gastrocopta procera*	✓	
Yellow Globelet	*Mesodon clausus*		✓

F.3 THREATENED AND ENDANGERED SPECIES

F.3.1 FEDERALLY-LISTED SPECIES

In Missouri, the USFWS administers the ESA of 1973 as amended. This law provides federal protection for species designated as federally endangered or threatened. An endangered species is “in danger of extinction throughout all or a significant portion of its range”, and a threatened species “is likely to become an endangered species within the foreseeable future” (USFWS, 1988).

F.3.2 STATE-LISTED SPECIES

The MDC determines the state status of species and assigns a state rank. The MDC publishes the Missouri Species and Communities of Conservation Concern Checklist annually. This checklist lists species and communities deemed vulnerable, and outlines these species' federal and state status, as well as their global and state ranks. (MDC, 2020)

The table below lists state listed, federally listed, and candidate species that are known to occur or may occur on MOARNG sites.

Table 18. State listed, Federally Listed, and Candidate Species

Common Name	Scientific Name	Federal Status	State Status	CCL	CCR	MTS	TTA	WTS
Fish								
Ozark Cavefish*	*Troglichthys rosae*	T	E		✓			
Mussels								
Neosho Mucket	*Lampsilis rafinesqueana*	E	E		X			
Rabbitsfoot	*Quadrula cylindrica cylindrica*	T	E		X			X
Birds								
King Rail	*Rallus elegans*	-	E		✓			
Northern Harrier	*Circus hudsonius*	-	E	✓	✓	✓	✓	
Mammals								
Indiana Bat	*Myotis sodalis*	E	E	X	✓	✓	✓	✓
Gray Bat	*Myotis grisescens*	E	E	X	✓	X	✓	✓
Northern Long-eared Bat	*Myotis septentrionalis*	T	E	✓	✓	✓	✓	✓
Insects								
American Burying Beetle	*Nicrophorus americanus*	T	E	X				
Monarch Butterfly	*Danaus plexippus*	C	-	✓	✓	X		X
Plants								
Mead's Milkweed	*Asclepias meadii*	T	E	X			X	

*CCR Cantonment Area lies within an Ozark Cavefish Groundwater Protection Area

T=Threatened; E=Endangered; C=Candidate

✓ = Known to occur onsite; X = may potentially occur

APPENDIX G. MANAGEMENT ELEMENTS

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G.1 NATURAL RESOURCES PLANNING LEVEL SURVEYS

Natural Resources PLS are inventories used to characterize essential components of a training site or training area natural resources. The kinds, locations, and sensitivity of the resources serve as the foundation for environmental planning, including preparation of the INRMP. PLS include spatial products that can be hard-copy maps, GIS data layers, or both according to training area needs and capabilities. Per AR 200-1 required PLS includes:

- Topography PLS: At a minimum, this is a map that illustrates elevation, elevation contours, and associated data consistent with USGS standards and topographic map products.
- Wetlands PLS: At a minimum, this survey must describe and map the distribution and extent of wetlands on a training area.
- Surface Waters PLS: At a minimum, this survey describes and maps the distribution and extent of surface waters, consistent with USGS standards.
- Soils PLS: At a minimum, this survey must classify, categorize, describe, and map soils by map unit in accordance with current National Cooperative Soil Survey standards and procedures.
- Flora PLS: At a minimum, this is a training area-wide vascular plant survey that produces a list of plant species with verified nomenclature, classification, and annotation compatible with the USDA NRCS's PLANTS (Plant List of Accepted Nomenclature, Taxonomy, and Symbols).
- Vegetation Communities PLS: At a minimum, this survey, including field data, must describe and map the distribution and extent of plant alliances (diagnostic species or group of diagnostic species usually occurring in the dominant and uppermost stratum; similar to cover type characterizes alliances).
- T&E PLS: At a minimum, this survey must produce a map that shows the kinds and known distribution of federally endangered, threatened, proposed, and candidate species occurring on the training area.
- Fauna PLS: At a minimum, this survey, including field data, must describe and map the distribution and extent of sensitive species.

G.2 TERRESTRIAL MANAGEMENT

Terrestrial habitat management involves manipulating various aspects of an ecosystem to benefit certain wildlife species. Management of these habitats is generally focused to benefit indigenous species, particularly T&E species, and game species. In general, the MOARNG will prevent degradation to wildlife habitat through good land stewardship and habitat enhancement projects. The MOARNG is also responsible for maintaining healthy and biologically diverse ecosystems. This is will be accomplished by conserving and protecting natural communities, through the use of environmentally sound management training methods and implementing the ITAM program. Active terrestrial habitat management generally does not threaten the military mission, because activities are scheduled around training activities and mission requirements.

G.2.1 FOREST MANAGEMENT

Forest inventories have been completed for three of the MOARNG training sites: CCR, CCL, and MTS. The inventories divided each respective training site into multiple forest compartments and outlined management objectives for each of these compartments. The inventory reports are kept on file at the NGMO-EM.

When conducting natural resource management projects within forested areas best management plans will be implemented and consultation will be completed when any issues or concerns arise from management activities. NGMO-EM staff conducts inspections of bivouac sites for dead/dying trees and remove those that could be safety hazards to training units.

G.2.1.1 Camp Crowder, Camp Clark, and Macon Training Site

The MOARNG will manage forests at CCR, CCL, MTS, and TTA to maximize the usability of forests for training and monetary worth for the future, while promoting forest sustainability and healthy, high quality habitat. Forest management will be accomplished using several management tactics including, but not limited to, the following:

- Forest Stand Improvements – FSI's will favor desirable trees from unwanted competition by thinning trees to healthy numbers and removing poor quality or diseased trees.
- Timber Harvests – Harvests will occur on an as-needed basis focusing on storm damaged, diseased, or trees at the end of their life cycle.
- Prescribed Burning – Prescribed burns will be implemented within stands on an as-needed basis to promote understory growth and enhance the forest health.
- Invasive Species Management – Invasive species management will take an integrated approach to remove undesirable vegetation, which has encroached portions of forested areas within the training sites and has resulted in a net loss of military training lands and reduced the quality of habitat.

CCR participates in the Conservation Reimbursable and Fee Collection Program (CRFCP) for timber harvest operations. More information regarding this program is available in Appendix K.

G.2.1.2 Wappapello Training Site

The USFS manages the MTNF, including the WTS, in accordance with its Land and Resource Management Plan (Forest Plan). General forest management of the WTS will be accomplished by the USFS to maintain healthy and biologically diverse forests. The MOARNG and WTS staff assists the USFS in forest management by conserving and protecting the forest community.

The MOARNG will manage the trees inside the Cantonment Area. Management will primarily include cutting dead or dying trees as a safety precaution. The MTNF District Manager, in coordination with the NGMO-EM, must approve all tree cutting outside the Cantonment Area. If tree disease is noted, the MOARNG will report to the USFS.

No trees/slash shall be utilized for firewood unless the MTNF District Manager, USPFO, and the Training Site Commander have granted approval.

G.2.2 Grassland Management

Grassland management may include, but is not limited to, the following:

- Prescribed Burns – Burning may be conducted in grasslands on an approximately five-year rotation or as-needed. Burning will control litter accumulation, control encroachment by forests, and encourage native flora and fauna adapted to frequently disturbed grassland communities.

- Mowing/Haying – Mowing or haying portions of the grassland communities to control invasion of woody plants, with the idea in mind that scattered shrub patches and irregular edges are beneficial to many wildlife species.
    - Mowing and haying should take place in late July through mid-August, unless otherwise outlined in agriculture lease contracts. This timeline will avoid disturbing grassland-nesting birds, while still allowing time for some prairie plants to grow back or store energy for the winter. Mowing to a height of less than six inches will be avoided to allow some ground cover to remain for wildlife.
- Invasive Species Management – An integrated approach will be used to remove any unwanted, non-native, and invasive species from grasslands, this includes chemical and mechanical management tactics.
- Woody Vegetation Encroachment Control - Encroachment of forests into grassland communities will be managed by occasionally cutting or mowing trees from the forest edges.
- Cool Season Grass (CSG) Conversion – Converting CSG fields to native forbs and warm season grasses to provide better tactical concealment for training maneuvers and support populations of native grassland birds and other animals.

CCR participates in CRFCP for grassland management operations via a hay lease. A hay lease for CCL is proposed for CCL in 2022. More information regarding this program is available in Appendix K.

G.2.3 GLADE MANAGEMENT

Glade management may include, but is not limited to, the following:

- Restore glade conditions by removing trees, using prescribed burning, and cutting with chainsaws. Burning in the spring will minimize the time the land is bare. If the grasses and forbs do not provide sufficient fuel for the fire to ignite, cut and drop the trees, such as cedars, in place as this may provide fuel for future burns.
- After most trees have been removed and grasses and forbs have been reestablished, burn at different times of the year, such as fall or winter. This will ensure the same plant species are not favored with each burn.

G.3 WATER RESOURCES MANAGEMENT

G.3.1 STORM-WATER

Protection of water resources and aquatic habitats is directly related to natural resources management practices that affect storm-water runoff. Storm-water runoff is produced when rainfall, at any time during a storm, exceeds infiltration capacity of the soil. When this happens, water will accumulate in small depressions and run downslope as overland flow. Storm-water runoff can be a significant source of pollutants and sediment into surface waters, especially in areas where groundcover has been disturbed. Storm-water runoff from impervious surfaces has a higher potential to carry pollutants into wetlands, surface waters, and groundwater. Impervious surfaces on MOARNG installations include roads parking lots, other paved areas, and buildings. Improper storm-water control can potentially lead to CWA violations, possibly resulting in fines and other penalties, which may ultimately compromise the integrity of MOARNG sites as viable training installations.

G.3.2 FLOODPLAINS

Floodplains are generally areas of low, level ground on one or both sides of a stream channel that are subject to either periodic or infrequent inundation by flood waters. Federal, state, and local legislation generally limits floodplain uses to recreation, agriculture, and preservation. When feasible, the MOARNG should avoid development or management practices that could adversely affect the attenuation capacity of floodplains on the training sites.

The Federal Emergency Management Agency (FEMA) regulates floodplains, and by the standards outlined in 44CFR Part 60.3. EO 11988, Floodplain Management, it is required that agencies assess the effects their actions may have on floodplains. It also requires consideration of alternatives to avoid adverse effects and incompatible development on floodplains. Flood-prone areas are identified by FEMA on FIRMs based on historic, meteorological, hydrologic, and hydraulic data. Open space conditions, flood control works, and development are also taken into account in creating the maps. Base flood areas, or the 100-year floodplain, are delineated on the maps. An area within the 100-year floodplain has a 1 percent chance of flooding each year, or a 26 percent chance of flooding over a 30-year period.

G.3.3 WETLAND MANAGEMENT

The USACE and USEPA define wetlands as:

"Those areas that are inundated or saturated by surface or ground water 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."

Wetlands store water and minimize flooding. They filter sediment, excess nutrients, and other impurities from water. The aquatic vegetation found in wetlands protects shorelines from erosion and provides food and cover for wildlife. Wetlands provide habitat for micro and macroinvertebrates that use or breakdown nutrients and contaminants.

For an area to be classified as a wetland, three conditions must be present: (1) wetland hydrology, (2) hydric soil, and (3) hydrophytic vegetation. Wetland hydrology means that water inundates the soils permanently or periodically, or that the soil is saturated to the surface at some time during the growing season. Hydric soils show signs of reduced rather than oxidized soil conditions. Oxidized, well-drained soils are reddish in color and reduced soils are gray or mottled with gray. Soil color is largely from iron. Hydrophytic plants have adapted to areas having hydric soils and inundated or saturated hydrologic conditions. Common hydrophytic plants include cattails, sedges, rushes, and arrowhead.

Protecting wetlands can limit land area for training exercises. However, wetland protection is important to ecological integrity of ecosystems. Non-permitted impacts to wetlands may result in CWA violations, potentially resulting in fines and other penalties.

The following strategies have been developed to protect wetlands on MOARNG Training Sites.

- Prohibit training within wetland areas and provide training units with written guidance for natural resources protection.
- Use signs prohibiting vehicle access around wetlands that are experiencing training encroachment.

- Monitor roads adjacent to wetlands to ensure erosion and sedimentation do not jeopardize the ability of the land to support the training mission.
- Identify wetlands on the Environmental Constraints Map, which is distributed to trainers and other land users.
- Ensure a NEPA review is used to identify potential wetland impacts from planned actions and projects. If necessary, projects with unavoidable wetland impacts should be referred to the USACE to determine if jurisdictional wetlands are implicated and to establish mitigation procedures.
- Avoid disturbance of wetlands to the extent feasible. Disturbance is defined as dredging or discharging fill in a wetland. If disturbance is necessary, the MOARNG will obtain a jurisdictional wetland determination from the USACE and obtain the appropriate permits per CWA Sections 401 and 404.
- Prevent erosion and sedimentation into wetlands by ensuring environmental plans are followed.
- When possible, minimize soil-disturbing activities and mowing near wetlands (i.e., outer edge of wetland vegetation). Mowing within wetlands not only harms wetland plants, but also can result in soil compaction. Wetland vegetation provides food and cover for wildlife and protects shorelines from erosion.
- Allow beavers to build dams and flood areas within the bottomland forest, as long as beaver activity does not negatively impact training or flood roads, to create additional habitat.

If wetland or pond banks are unstable and eroding, use bioengineering techniques to stabilize them. Periodic inspections should be made to assess the success of any corrective action. Some potential techniques include:

- Drive willow stakes and/or poles into the banks at two-foot intervals to establish vegetation to hold the soil.
- Install fascines along the shoreline to form a vegetative terrace.
- Install brush armor by laying willow or cottonwood branches up the banks perpendicular to the shoreline and anchoring the trunks in soil to allow them to sprout.
- Use wetland plants to vegetate banks.

G.3.3.1 MTS Wetland Management

(a) Constructed Wetland Management

Management guidelines for the constructed four wetlands at MTS are described below.

Baker's Acres: Water levels in these two constructed wetlands are regulated by the addition or removal of stoplogs in a standpipe. An inlet pipe connects the two pools. Pool 1 drains into Pool 2 and Pool 2 drains into the East Fork Little Chariton River. Water can be added to Pool 2 by draining water from Pool 1. Pool 1 can be re-flooded by runoff or with water from the nearby catchment pond.

These emergent wetlands should be managed based on the following regime. Begin flooding both pools to an average depth of six to ten inches of water in the shallow areas in early September and maintain water levels until March. Flooding vegetation that has grown over the summer will provide food and shallow water for migrant birds and other wetland wildlife. The flooded vegetation provides seeds and tubers as well as habitat for aquatic invertebrates. In March, gradually lower the level in Pool 2 by

approximately 1 foot. Maintain this water level until May, and then gradually draw down the water levels. The exposed mudflats provide habitat for migrating shorebirds. Alternating the speed of the drawdowns from year to year will create plant diversity in the wetlands.

South 61: A dam regulates this wetland and a standpipe, thus the depth is fairly constant throughout the year. Fluctuations in depth are a result of rainfall variability in the watershed. This wetland, when managed appropriately, will be comprised of 50 percent emergent vegetation and 50 percent open water for best utilization by wildlife. This semi-permanent marsh should be managed based on the following regime. Drain the pool only to remove problem vegetation. Re-flood the constructed marsh with runoff or by pumping water from a nearby pond. Monitor the banks, especially the dam, of this wetland for muskrat or beaver damage. Muskrat and beaver burrows could compromise the stability of the dam. If the damage is extensive, the MOARNG will encourage trapping. As a result of past strip-mining activities, this site consists of disturbed mine spoil. Therefore, revegetation of the banks of this wetland has been slow. In the past, hydroseeding, erosion control fabric, and bioengineering techniques have been used to stabilize the banks. Continue using these techniques, if necessary, to stabilize banks.

The fourth constructed wetland extends from the southern tip of the large lake on South 61, which contains the Floating Bridge TA. This wetland should be managed similarly to those at Baker's Acres.

G.3.4 General Water Resource Protection BMPs

The MOARNG follows existing plans to protect water quality and implements the following BMP strategies when possible:

- Conduct periodic inspections for land based environmental degradation. Survey streambanks, maneuver trails, Cantonment Areas, drainage structures, etc. for gully washes and barren soils; damage to roads, culverts, or other structures; or transport of sediment to sensitive areas such as wetlands.
- Ensure sustainable use of the land through vegetation establishment, retention of sediment onsite, minimizing the use of pesticides, controlling and limiting discharges and sources of pollution to groundwater and surface waters, education, and obtaining appropriate permits as needed.
- Rehabilitate eroded areas by revegetating barren ground as soon as possible, restricting access, conducting site monitoring, and performing borrow site management.
- Maintain low water crossings and build rock crossings, where appropriate, and protect streambanks where erosion may impact roadways.
- Remove tree growth on dams.
- Prevent, contain, and remove spillage during maintenance of vehicles, equipment, and facilities. Vehicle refueling should occur at a minimum of 100 feet (and preferably more) from waterbodies and wetlands to minimize potential release to surface waters.
- Restrict vehicles from within 50 feet of surface water or drainage ways except where established roadways cross. The MDC recommends maintaining at least a 50-foot corridor of trees, preferably 100-foot, on both sides of streams (Turner, 1993).
- Restrict mowing and training activities, when feasible, within 30 feet of the shoreline of impoundments to allow aquatic plants to grow along the banks.
- Evaluate potential adverse effects of proposed training to the floodplain. Alternatives must be considered to avoid adverse effects and incompatible development of the floodplain (EO 11988).

- Minimize the amount of impervious surfaces in newly developed areas, and adhere to BMPs for construction activities described in the Missouri Nonpoint Source Management Program and in USEPA's Storm Water Management for Construction Activities.
- Avoid constructing permanent structures within the 100-year floodplain. If necessary, follow federal and state requirements for construction within a floodplain.
- Evaluate drainage patterns prior to road construction and maintenance and incorporate design elements to avoid changes to existing watersheds.
- Consider mission requirements compatibility with the capability of the land to ensure sustainable use.
- At CCR, protect caves from erosion and sedimentation to avoid impacts to the small cave streams. Restrict digging and other soil disturbance activities within caves and around their entrances. Permission to enter caves must be obtained by the CCR Manager.
- At MTS, avoid disturbing spoil piles.

G.3.5 WTS Watercourse Protection Zones

The existing forested riparian corridor should be maintained along most streams and drainages on WTS. Informal consultation with NGMO-EM is required prior to any disturbance to Watercourse Protection Zones (WPZs). The WPZ extends 100 feet horizontal distance from each side of the stream channel (measured from the upper break of the stream bank or channel edge), or to the break of the adjacent ridge, whichever is closer.

Within a WPZ, the following activities are prohibited (USFS, 2005):

- Fertilization
- New roads, unless no feasible alternative is found
- Timber management unless USFS-approved salvage
- Equipment Servicing
- Temporary roads except at locations approved by USFS and NGMO-EM
- Maintenance of existing or construction of new wildlife food plots or wildlife openings
- Wildlife pond construction
- Log landings
- Use of chemicals unless approved by NGMO-EM and USFS

Within the WPZ, the following activities should be avoided whenever possible:

- Equipment operation
- Construction of sanitation facilities
- Mechanical constructed firelines for prescribed burns or suppression
- Drilling and associated structures
- Stream channel crossings
- Modification of beaver-created impoundments
- New human-made impoundments and water diversion structures
- Consider non-point source pollution abatement in all construction, installation operations, and land management plans and activities

G.4 Soil Management Practices and Concerns

Appropriate soil conservation and erosion control are vital to the military mission. A key element in the SAIA establishment of INRMPs is to ensure "no net loss" of military training capability. Management of soil erosion is necessary to maintain military training areas in usable condition. Threats to the military mission, as characterized by removal of and/or lack of accessibility to available training lands and other resources, such as infrastructure components, include:

- Undermining of roads and maneuver trails
- Loss of topsoil, which would decrease revegetation rates
- Impacts to streams or other aquatic habitats, potentially resulting in CWA implications
- Erosion causing development of washout areas on training lands

Two main types of soil erosion exist - wind erosion and water erosion. Water causes a majority of the erosion on MOARNG training sites. Several factors affect water erosion, including rainfall, slope steepness and length, soil texture or erodibility, cover protecting the soil, and special practices such as terracing or planting on the contour. For example, in general, silty soils tend to erode more than clayey or sandy soils. Water soaks into sandy soils and clayey soil particles stick together. While soils with high concentrations of chert on the surface will erode less than similar soils without chert, because the chert pieces on the soil surface protect the soil beneath them from erosive rains. Slope steepness and length influences the amount of soil erosion more than the other factors, because this factor is more variable within a small area.

To minimize erosion, the MOARNG should maximize the amount of cover on the soil and incorporate practices that reduce runoff, and should utilize BMPs that will control erosion and prevent sedimentation into adjacent wetlands and waterbodies. Section J.4 further outlines erosion prevention tactics and management.

The MOARNG utilizes soil erosion management practices such as institutional, structural, and vegetative practices:

- Institutional practices are procedures, policies, or regulations that ensure operations are conducted in a manner that minimizes their impact.
- Structural practices include permanent construction to install erosion-resistant surfaces, stabilize drainage, and modify slopes to reduce runoff velocity and trap sediments on-site.
- Vegetative practices consist of establishing live plants on erosive or exposed surfaces. Plants stabilize slopes by binding soils with their roots, shielding soils from rainfall impact, interrupting surface runoff by roughening the surface, allowing more water to infiltrate rather than run off over the surface, trapping sediments in runoff, and wicking moisture out of soils by evapotranspiration. In addition, vegetative practices are self-regenerating and relatively maintenance free.

The table below lists institutional, structural, and vegetative practices that may be used to prevent or repair erosion problems. As required by AR 200-1 and 32 CFR 651, the MOARNG may assess potential erodibility during development planning, training, and other land uses.

Table 19. Soil Erosion Control Practices		
Institutional Practices	**Structural Practices**	**Vegetative Practices**
NGMO-EM review of land use changes Storm-water Discharge Permits Borrow Site Permitting Borrow Site Standard Operating Procedures (SOP) Inspection of facilities Training of personnel Limiting vehicle access	Erosion-resistant surfaces Improved/hardened stream crossings Drainage ditches and culverts Silt fence, sediment traps, and sediment ponds Turf reinforcement mats	Seeding Transplants Vegetative Filter Strips

G.5 Fish and Wildlife Management

General fish and wildlife management is accomplished in conjunction with the military mission and training activities. Fish and wildlife management generally does not interfere with the military mission.

In addition to the before mentioned terrestrial and aquatic management strategies, the MOARNG will enhance wildlife habitat by utilizing the strategies listed below when possible:

- Maintain early successional habitat, such as fields, brushy areas, and savannas.
- Allow the edges between forests and the prairie/savanna communities to be uneven and encourage dense vegetation through practices such as edge feathering.
- Convert cool season grasses to a mix of native species. Give first priority to areas with little vegetative cover and areas bordering streams, lakes, and wetlands.
- Use prescribed burning regularly to improve habitat and diversify vegetation. Uneven burns will be used to produce a patchy diverse habitat for species.
- Limit mowing only to areas where it is necessary to implement the training mission. For example, limit mowing around ponds and other waterbodies and follow NGMO-EM Mow Plan.
- Maintain or establish new human-made habitats such as windbreaks, hedgerows, or shelterbelts.
- Maintain herbaceous roadside areas to enhance habitat diversity.
- Establish and maintain food plots focusing on areas along edges or in areas which have been previously disturbed.
- Leave snags and den trees undisturbed unless they are a safety hazard. Snags are standing dead trees, while den trees are live trees with cavities in them.
- Provide improved fish habitat by adding structures such as Christmas trees or other brush to the lakes and ponds.
- Maintain existing wildlife boxes or nesting structures and predator shields on the site and, if desired, install additional structures.

The MOARNG will implement management strategies pertaining to migratory and breeding birds, nuisance wildlife and wildlife diseases, and threatened and endangered species as presented in the following subsections.

G.5.1 Migratory and Breeding Birds

Considerations with regard to migratory bird management are compliance with the Migratory Bird Treaty Act (MBTA); implementation of migratory bird management actions in accordance with EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, and the associated MOU with the USFWS;

and support, contribution, and compatibility with the goals and efforts of numerous regional migratory and game bird conservation programs.

Virtually all birds that occupy MOARNG training sites throughout the year are protected under the MBTA. The MBTA controls many actions that may negatively affect migratory birds, particularly collecting and transporting birds. Special purpose permits may be requested and issued that allow for relocating or transporting migratory birds for management purposes.

It is DoD policy, in accordance with the abovementioned MOU, to promote and support a partnership role in protection and conservation of migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems on DoD lands consistent with the military mission. The MOARNG not only manages for migratory birds directly, but by many indirect benefits of the land management practices. Management includes: monitoring populations via point count surveys, controlling invasive species to improve habitat, avoiding wetland disturbance to maintain habitat integrity, reducing predation pressure (control of feral cats), and utilizing prescribed burns to benefit grassland nesting birds habitat, as well as to promote plant diversity and native insect populations. Forest-nesting birds will greatly benefit because of the restrictions placed on activities during April thru October for the management and conservation of northern long-eared bat.

G.5.2 NUISANCE WILDLIFE AND WILDLIFE DISEASES

Ticks - Ticks have been known to be a serious problem on MOARNG Training Sites. The best means to prevent tick-borne disease transmission to soldiers is to implement personal protective measures, such as body checks, tick avoidance, and tick elimination where practical. Prescribed burning in bivouac areas and other staging areas will be implemented to control the tick problem. Tick testing kits are available at headquarters buildings and should be sent to the United States Army Center for Health Promotion and Preventive Medicine.

Beavers - Beaver activity has interfered with the operation of culverts and ponds on MOARNG properties. At present, periodic inspection and repair as needed is used as a management strategy rather than population control. If these strategies are not sufficient, population control may be required.

Feral Swine – Feral swine are beginning to present a nuisance at MOARNG training sites, specifically at WTS. A feral swine is defined as any swine, including Russian and European wild boar (*Sus scrofa*), that is not conspicuously identified by ear tags or other forms of identification and is roaming freely on public or private lands without the landowner's permission. These swine are descended from free-ranging pigs that have been present in some Missouri counties since the days of open range. In recent years, they have been crossed with Russian or European boar varieties, resulting in a strain that has serious implications for Missouri’s agriculture economy and natural resources. In some instances, the swine escaped from enclosures. In others, they were intentionally released for sport hunting. (MDC, 2006). Feral swine can pose a physical threat to humans, as they can be very aggressive and protective of their young. Additionally, they can be a vector of disease to livestock, wildlife, and humans. Feral swine are non-selective foragers, eating nearly anything from vegetation, to invertebrates, to other livestock, particularly young sheep and goats. They frequently root and wallow, causing significant economic damage to row and forage crops, vineyards, archeological sites, and forest land, and can contribute to soil erosion and sedimentation. Feral swine are efficient predators and have an acute sense of smell. Negative impacts to wildlife populations occur because of direct predation, habitat destruction, and competition for resources. Any active or new issues with feral swine will be managed through coordinating with the MDC and their wildlife damage biologist.

Diseases - Diseases affecting fish and wildlife may occur on the installation. As outlined in AR 200-1, installation natural resources personnel will consult with appropriate Army Veterinary Corps personnel regarding large-scale fish and wildlife deaths and unnatural behavior occurring on the installation.

G.6 PROBLEM SPECIES

Problem species, as used in this INRMP, includes invasive species, exotic or alien species, and noxious weeds. Invasive and exotic species may include plants, insects, or animals. An invasive species is defined as "an alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health". An alien (or exotic) species is defined in EO 13112 as a "species including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem". Many exotic species have the ability to spread rapidly through ecosystems, since their natural predators are often not present. Such species often hinder natural succession and reforestation and generally cause a reduction of biological diversity.

Invasive and exotic species and noxious weeds can form dense strata, which could interfere with on-the-ground training activities. A key element in the Sikes Act establishment of INRMPs is to ensure "no net loss" of military training capability. Management of undesirable species is necessary to maintain military training areas in usable condition. Uncontrolled pests can become health hazards and threaten the military mission.

Controlling invasive and exotic species and noxious weeds is often expensive, lengthy, and risky, because total eradication is required to prevent reestablishment. However, in accordance with laws and regulations pertaining to management of these species, the MOARNG will work to prevent introduction of these species and take measures to manage them in an economically and environmentally sound manner.

G.6.1 GENERAL MANAGEMENT STRATEGIES

The MOARNG uses Integrated Pest Management (IPM) methods and strategies. IPM uses multiple techniques in a compatible manner to avoid damage and minimize adverse environmental effects while obtaining control of target pests. Typically, a combination of the following IPM techniques is required to resolve a problem on a sustained basis:

- Mechanical control - Alters environments in which pests live, traps or removes pests from where they are not wanted, or excludes pests from where they are not wanted.
- Cultural control - Manipulates environmental conditions to suppress or eliminate pests.
- Biological control - Uses predators, parasites, or disease organisms to control pests.
- Chemical control - Relies on pesticides to kill pests and/or undesirable species of plants.

The best control approach for invasive and exotic species and noxious weeds is early detection, isolation of infested areas, and control of individuals with physical, chemical, or mechanical means, depending on the species. Once established, an integrated approach to control will be necessary to minimize the damage.

General management strategies for problem species include:

- Prohibit use of invasive and exotic plants for landscaping or other purposes.
- Implement BMPs to minimize land disturbances that promote invasion and revegetate disturbed areas with native species. Avoidance will remain the preferred control measure.

- Monitor for invasive and exotic species and noxious weeds.
- Inspect equipment thoroughly, and remove any mud, soil, trash, plants, or animals before leaving work area. When possible, rinse equipment thoroughly at wash racks.
- Use pesticides in compliance with the MOARNG Integrated Pest Management Plan.
- Educate MOARNG personnel and site users on identification and avoidance of potential disease vectors and poisonous plants that include, but are not limited to, poisonous snakes, ticks, black widow spiders (*Latrodectus mactans*), brown recluse spiders (*Loxosceles reclusa*), and poison ivy (*Toxicodendron radicans*).
- Manage overgrown vegetation in and around bivouac sites to reduce tick and poison ivy problems.
- Continue to monitor spongy moth populations in accordance with the Missouri Strategic Spongy Moth Plan. Traps should be set in high use areas (for example, bivouac sites and ranges) in the spring and monitored until August.

G.6.2 Problem Plants Species

The NGMO-EM manages the pest management program at all MOARNG training sites and is responsible for pest management record keeping. Species control is conducted in-house and through contracted work. The following mechanical and chemical management methods are used in conjunction to control problem plant species.

- Mechanical:
  - Mowing/Cutting – This method may be performed using a chainsaw, weed-eater, brush hog, forestry mulcher, etc. and requires multiple treatments.
  - Prescribed Burning – When applied responsibly, prescribed burning may be an effective control option for some problem plant species.
- Chemical Application:
  - All chemical applications are completed in accordance with the product label.
  - Only spot spray applications are applied, unless the problem plant infestation is at a very high level.
  - Only products approved for application in the habitat type to be treated are applied.
  - Chemical application methods:
    - Foliar Application – Herbicide mixture is applied directly to foliage of the plant during the growing season, care is taken not to spray non-target species.
    - Basal Treatment – This method is effective throughout the year, as long as the ground is not frozen. 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 good control (NPS, 2004; TNEPPC, 2005).
    - Cut-stump Treatment – Stump treatments can be used as long as the ground is not frozen. For stump treatment, horizontally cut stems at or near ground level and immediately apply herbicide mixture, making sure to cover the outer 20 percent of the stump (TNEPPC, 2005).

G.6.3 Problem Species Best Management Practices

The MDC provides various publications and resources regarding problem species management and control. Listed below are links to MDC's webpage.

- Invasive Plants: Invasive Plants | Missouri Department of Conservation (mo.gov)

- Invasive Animals: Invasive Animals | Missouri Department of Conservation (mo.gov)
- Nuisance Native Plants: Nuisance Native Plants | Missouri Department of Conservation (mo.gov)
- Nuisance and Problem Animals: Nuisance & Problem Species | Missouri Department of Conservation (mo.gov)

G.7 Fire Management

G.7.1 Wildland Fire

Abundant vegetation provides fuel for wildland fires. If not controlled, wildfire has the potential to threaten human health and safety and cause harm to personal property and degradation to military training lands. In addition to damaging facilities, wildfire can destroy vegetation communities essential to a realistic training environment. This degradation can result in increased soil erosion, sedimentation in waterbodies, and long-term reduction in the capacity of training areas.

Army policy requires that an Integrated Wildland Fire Management Plan (IWFMP) be developed for installations with unimproved grounds that present a wildfire hazard and/or installations that use prescribed burns as a land management tool. MOARNG has a Statewide IWFMP, which is on file within the NGMO-EM office. The purpose of the IWFMP is to reduce wildfire potential; protect and enhance valuable natural resources, infrastructure, and facilities; and implement ecosystem management goals and objectives (MOARNG, 2009). The Statewide IWFMP was signed in 2009, an updated IWFMP is scheduled for completion in FY22. Fire protection, prevention, and firefighting equipment maintenance are overall the Training Site Managers' responsibility. The NGMO-EM has responsibility of the prescribed burn program.

G.7.1.1 Wappapello Training Site

The USFS bases wildfire suppression on its forest-wide forest risk assessment. The WTS is part of the MTNF Management Prescription 1.1 and fire management direction is specified in the 2005 Forest Plan. Within Management Prescription 1.1, wildland fire use may be authorized in fire management units with approved plans. Strategies used by the USFS in fire suppression can include perimeter control, area containment and monitoring, use of motorized equipment, and application of aerial retardant, depending on the circumstances. The USFS evaluates each wildfire and performs suppression response as appropriate (USFS, 2005). Fire suppression procedures for troops using the WTS are specified in the MOARNG SOPs.

G.7.2 Prescribed Burning

Prescribed burning is the purposeful application of fire in a controlled, knowledgeable manner that may be used as an effective management tool. The occurrence of fire is a natural component of many ecosystems, and prescribed burning can be a desirable and economically sound management practice. The MOARNG utilizes prescribed burning as a management tool on all training sites, except for WTS. Prescribed fire may be used to accomplish the following:

- Perpetuate fire-dependent species – Prescribed burning may be used to perpetuate many fire-dependent species. However, it is imperative to understand the ecology of the species to know which months would be ideal for a burn (Wade, 1988).
- Improve wildlife habitat – Prescribed burning can improve wildlife habitat and increase forage by keeping vegetation sprouts short, tender, palatable, and abundant.

- Diversifies habitat – Allowing prescribed burns to burn unevenly produces a patchy, diverse habitat for species such as the Bell's vireo, chestnut-sided warbler, and loggerhead shrike.
- Prepare sites for seeding or planting – Prescribed burns often expose adequate mineral soil needed for seeding and planting.
- Manage competing vegetation – Prescribed burning can help control invasive vegetation.
- Control insects and disease – Prescribed burns may be used to control some insects and diseases.
- Reduce hazardous fuels – Periodically burning can significantly decrease the chance of a catastrophic wildfires.
- Enhance appearance – Prescribed burns often enhance recreation and aesthetic values.

G.7.2.1 FIRE SAFETY

Fire safety comes first when planning and conducting prescribed burns. Many factors and management strategies are taken into consideration to determine if a prescribed burn can be implemented safely. Strategies for conducting successful prescribed burns are listed below.

- Develop a burn plan before implementing a prescribed burn. The plan documents:
  - Who was involved,
  - When the burn was done,
  - Characteristics of the planned burn area,
  - Location of fire breaks and special precaution areas
  - Weather conditions,
  - Includes a map of the proposed burn area, and
  - Outlines a contingency plan.
- Burn only when current and near-future weather forecasts are suitable, as listed below. Incoming fronts may produce changing wind directions that can cause fires to escape; therefore, the MOARNG does not burn when an incoming weather front is expected.
  - Burn when wind speeds are between 5 to 15 miles per hour.
  - Burn when the relative humidity is between 30 and 60 percent.
  - Burn when air temperature is between 45 °F and 75 °F.
- Notify all neighbors of the planned burn. Provide dates, times, and locations of the burn.
- Ensure proper personal protective equipment is worn, equipment is in working condition, and first aid kits are readily available.
- Install appropriate firebreaks, as these are an essential management tool for prescribed burning and wildfire prevention.
  - Adequate firebreaks are 12 feet wide or twice the adjacent fuel height. Prepare firebreaks by mowing and/or disking. Stabilize the firebreak by planting species such as winter wheat (*Triticum spp.*), orchard grass (*Dactylis glomerata*), and clover. This planting mixture will provide a green line for firebreak purposes and provide food for wildlife.
  - Wildfires could result from using pyrotechnic devices or tracer fire. In an active effort to confine fires to the smallest area possible, firebreaks should surround active impact areas and ranges where these activities might occur.
- Implement smoke management tactics. Weather conditions and the proximity of the burn to roads and built-up areas are evaluated prior to each burn. The impact of smoke will be minimized by identifying smoke-sensitive areas, using best available control measures, monitoring smoke impacts, and following applicable guidance.

- Avoid burning from April through August to the extent feasible to prevent impacts to ground nesting birds, and from April through October to prevent impacts to nearby roosting bats.
- Conduct a post burn evaluation to review burn objectives, weather conditions, fire behavior, etc.

APPENDIX H. THREATENED AND ENDANGERED SPECIES

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H.1 MOARNG Threatened and Endangered Species

The MOARNG is required to manage federally listed T&E species. Failure to protect federally listed species could lead to an ESA violation, which could negatively impact training land availability. Informal consultation is completed with the USFWS as required. For state listed species, the MDC will serve as the subject matter experts. MOARNG will coordinate with MDC for state listed species concerns. In cases where endangered species management in accordance with the appropriate guidance would conflict with mission activities, consultation with the USFWS and the MDC would be initiated to address any "may affects" on listed species. The MOARNG will manage T&E species and Missouri Species of Conservation Concern primarily by avoiding sensitive areas and following species BMPs when possible.

As mentioned before, the NDAA of 2004 made a significant revision to the ESA of 1973. NDAA stated, "The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an Integrated Natural Resource Management Plan prepared under section 101 of the Sikes Act (16 USC 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation." Under the 2004 NDAA, a military installation may have its INRMP obviate the need for critical habitat designation if the INRMP provides a benefit to listed species, and manages for the long-term conservation of the species. To do so, if an ARNG installation has federally listed threatened or endangered species, proposed federally listed threatened or endangered species, and/or candidate species on the installation, or unoccupied habitat for a listed species where critical habitat may be designated, the INRMP must specifically address in the document the benefits of managing these actions for these species or habitats. The benefit should be clearly identified in the document and included in the table of contents.

This INRMP is intended to provide a benefit to the species listed in Table 18. To date, no critical habitat has been designated or has been proposed at any MOARNG training site. If critical habitat for these or any other species were proposed in the future within MOARNG training site boundaries, the INRMP would be used to gain an exemption from such a designation.

H.2 Threatened and Endangered Species Requirements

H.2.1 Programmatic Biological Assessment

MOARNG and NGB prepared a Programmatic Biological Assessment (PBA) to assess the effects of military training and operational and land management activities at CCR, CCL, and MTS on the federally listed gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), and Ozark cavefish (*Troglichthys rosae*).

H.2.1.1 Conservation Measures for the Programmatic Informal Consultation

Below are conservation measures identified by the USFWS in the PBA, which will allow the MOARNG specifically to avoid, rather than minimize, adverse effects to listed species at these sites. Implementing all of the below measures for any training, operational, or land management activity at CCR, CCL, or MTS results in concurrence from the USFWS that the activities are not likely to affect the gray bat, Indiana bat, northern long-eared bat, and Ozark cavefish. (USFWS, 2019) When the conservation measures cannot be followed consultation with the USFWS will be conducted.

- For All Activities:

  - Activities will not be conducted within 150 feet of known Indiana bat and northern long-eared bat roost trees (both maternity and non-maternity) from April 1 to October 31.
- Land Disturbance:
  - Tree removal consists of less than five acres.
  - Tree clearing will be conducted from November 1 to March 31 to avoid direct impacts to roosting bats.
  - Any Indiana bat or northern long-eared bat known roost trees will be retained.
  - At Camp Crowder, tree clearing will not occur within 100 feet of waterbodies or jurisdictional wetlands.
  - At Camp Crowder, corridors of mature trees between bat caves and waterways will be retained.
  - At Camp Crowder, a forested buffer of at least 100 feet will be maintained along streams and around cave and sinkhole entrances.
  - Missouri Department of Conservation Best Management Practices will be implemented for Construction Projects Affecting Missouri Karst Habitat and for Construction Projects Affecting Missouri Streams and Rivers.
  - At Camp Crowder, cave entrances and sinkholes will not be sealed or altered.
  - At Camp Crowder, all construction debris will be contained to prevent accidental introduction into caves, sinkholes, or springs because of clean-up activities, run-off, flooding, wind, or other natural forces.
  - At Camp Crowder chemicals, toxic waste, garbage, and wash water from trucks will be disposed of in areas designated for such wastes. These sites will be away from caves and sinkholes.
  - At Camp Crowder, temporary roadways will be of low gradient with sufficient roadbed and storm water runoff drains and outlets.
  - Within the Ozark Cavefish Groundwater Protection Area at Camp Crowder, areas where topsoil has been disturbed will be immediately revegetated, and silt fences, mulch, and hydroseeding will be used to control erosion until vegetation is established.
  - Within the Ozark Cavefish Groundwater Protection Area at Camp Crowder, the use of equipment in and around drainage ditches will be limited. Only rubber tracked vehicles will be used in these drainages and only for the purpose of cleaning and maintaining the drainages, when required.
  - Within the Ozark Cavefish Groundwater Protection Area at Camp Crowder, tracked and wheeled vehicles will cross major drainages only at designated low water crossing.
  - Within the Ozark Cavefish Groundwater Protection Area at Camp Crowder, all land disturbing activities will be conducted according to the Camp Crowder NPDES permit.
- Prescribed Burning:
  - Prescribed burning will occur from November 1 to March 31.
- Herbicide Application
  - Only Garlon 3A or Roundup/Rodeo will be applied within the Ozark Cavefish Groundwater Protection Area at Camp Crowder.
  - A 50-foot minimum buffer will be maintained on both sides of drainage ditches (from the top of the bank) within the Ozark Cavefish Groundwater Protection Area at Camp Crowder. The buffer will be maintained by mowing only between July 15 and August 15 and when the drainage ditches are dry.

  - Professional (contractual) insecticide application will be limited to the inside of buildings and outside of buildings not to exceed beyond five feet from the structure.
  - Herbicide will be applied according to label instructions.
- Other
  - When limbing using pole saws and chain saws, the trunks of trees will not be harmed.
  - Limbing using heavy equipment will only be performed from November 1 to March 31.

H.2.1.2 Additional Conservation Measures

- Tree clearing will be conducted between August 15 and May 15 at all 3 installations to avoid the Indiana bat maternity season.
- Known roost trees will be retained until they naturally fall to the ground or no longer exhibit suitable roosting characteristics (cracks, crevices, or exfoliating bark or flaking bark).
- All snags and den trees will be left undisturbed, unless they pose a safety hazard. On average, MOARNG will try to maintain a minimum of 7 snag/den trees per acre. Other trees with characteristics of suitable roosts will be retained wherever possible with regard for public safety and accomplishment of overall resource goals and objectives.
- Roosting habitat will be maintained or enhanced by maintaining an adequate number of senescing trees larger than 12 inches in diameter and by maintaining large live trees (particularly shagbarks) to provide future roosting opportunities.
- Small canopy gaps (and/or opening the mid-story) will be maintained to provide a continual supply of foraging habitat.
- Within areas designated as maternity areas, prescribed burning will only be conducted during the hibernation season (November 1 to March 31).
- Known maternity roost trees will be protected from prescribed burns during all seasons by creating firebreaks around each known roost tree.
- To maintain the integrity of maternity roost areas, a 150-ft buffer will be established around the area containing known roost trees and human disturbance will be limited within the buffer until the colony has left for hibernation.
- To the extent practicable, hazard trees will be identified before they become an imminent threat to safety and will be removed from November 1 to March 31.
- When hazard trees must be removed during the active season (April 1 to October 31), emergence surveys will be conducted when possible.
- Heavy equipment will only be used from November 1 to March 31 to limb trees; pole saws will be used from April 1 to October 31.
- Winter surveys will be conducted at Crowder Cave (located on Camp Crowder) at least every 3 years to determine if Indiana bats or other listed bat species are utilizing the cave.
- When clearing parcels for facilities development, the MOARNG will avoid clearing, or cutting down all trees in large areas whenever possible.
- New buildings and training facilities will be sited in previously-disturbed areas when possible. If new undisturbed areas must be used for development, new facilities will occur adjacent to previously disturbed land to the extent feasible.
- Land clearing (with the exception of selected prescribed burning) will not occur within 50 feet of waterbodies or jurisdictional wetlands.
- Impervious surfaces, which can increase stormwater runoff, will be minimized in areas of new development. Alternative surfaces such as gravel pathways will be considered to minimize impervious surface area at Camp Crowder.

- At Camp Clark and Camp Crowder, the MOARNG will adhere to the following recommendations: Management Recommendations for Construction Projects Affecting Missouri Karst Habitat (MDC 2015a) and Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers (MDC 2015b).

H.2.2 TTA AND WTS

Although TTA and WTS were not assessed within the Programmatic Biological Assessment, the above mentioned conservation measures may be followed when feasible. Consultation with the USFWS will be conducted when required. These steps will allow the MOARNG to minimize and potentially avoid adverse effects to listed species at these sites.

H.3 SPECIES BEST MANAGEMENT PRACTICES

The MDC provides various publications and resources regarding problem species management and control. Listed is a link to MDC's webpage that provides various species BMPs: Species Impact: Best Practices | Missouri Department of Conservation (mo.gov). More information can be found on species management within the species field guide webpage: Field Guide | Missouri Department of Conservation (mo.gov). The MOARNG will reference these BMPs and other similar conservation measures to enhance the conservation of listed species.

APPENDIX I. CLIMATE CHANGE

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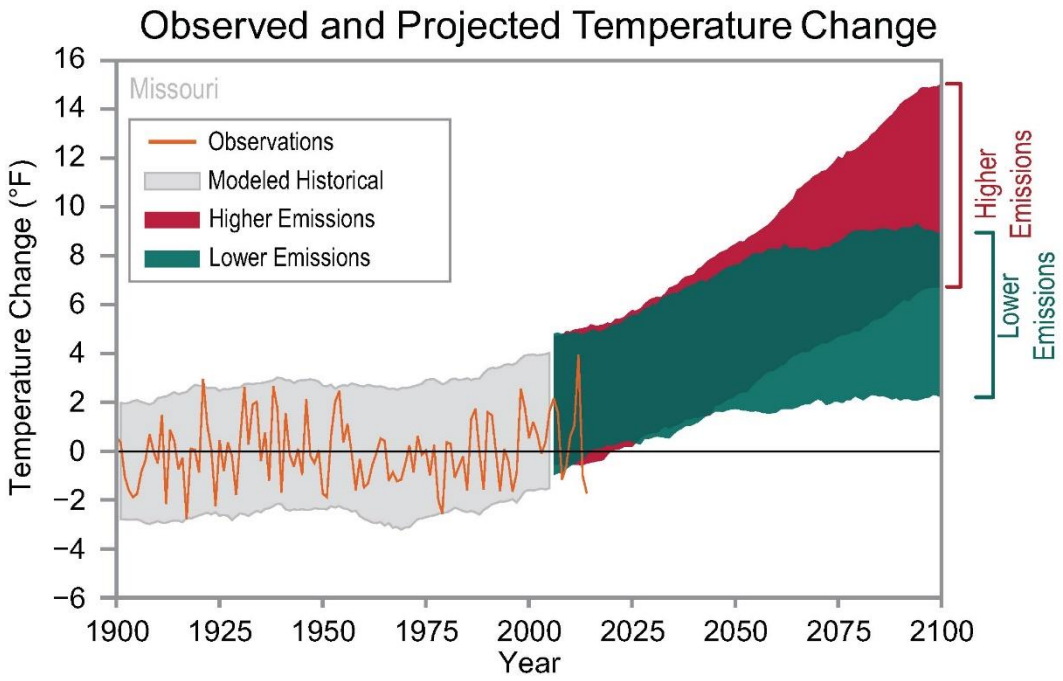
I.1 MISSOURI CLIMATE CHANGE

The Army Climate Assessment Tool was developed by the USACE to assess installation exposure to multiple projected climate impacts. The Assessment Tool factors climate impacts such as flooding, droughts, heat, wildfire, land degradation, and energy demand. (DA, 2020) Currently, none of the MOARNG training sites have been assessed through the tool. Therefore, the following climate assessment information was gathered from the National Oceanic and Atmospheric Administration's National Center for Environmental Information.

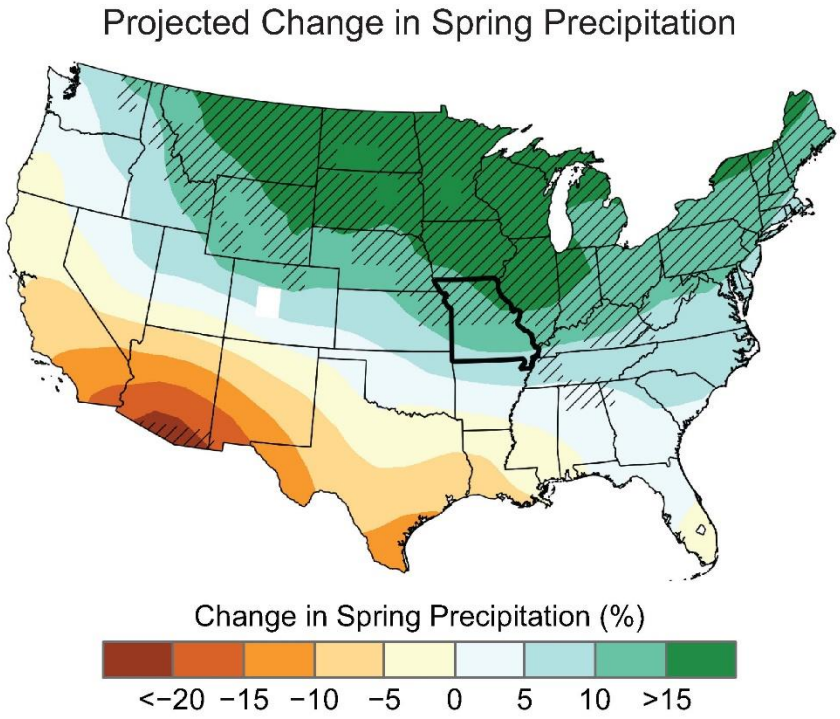
Embedded in the interior of the US, Missouri experiences a wide range of temperatures, which is influenced by cold Artic air masses as well as warm air masses from the Gulf of Mexico. Its location in the lower river basins of large Midwest Rivers makes the state prone to extreme flooding instances.

Temperatures have risen approximately 0.5°F since the start of the 20th century. Thus far, temperatures have continued to rise during the 2000s. The image below depicts historic temperatures and predicted temperatures for the State of Missouri. The image considers two possibilities for future temperatures, one in which greenhouse gas emissions continue to increase and another in which greenhouse gas emissions increase, but at a slower rate.



Along with an increase in temperatures, Missouri has also experienced an increase in the number of heavy rain events. Severe thunderstorms are common throughout the state, and primarily occur during the spring. It is projected for winter and spring precipitation to increase and for summer precipitation to potentially decrease. Although precipitation rates are expected to increase overall, the rising temperatures may increase evaporation rates, which will result in more rapid loss of soil moisture. Therefore, droughts are likely to become more intense than the norm.

The image below illustrates the project change in spring precipitation across the US.



I.2 MOARNG CLIMATE CHANGE OVERVIEW

The MOARNG 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 impact the training areas, promoting noxious weed infestations, or compromising wildlife habitat, such as loss of roosting sites supporting migratory birds. However, the abundance and distribution of species and habitats on MOARNG properties is too small in scale to address comprehensive climate change vulnerabilities. Therefore, MOARNG will look at existing regional plans, partnerships, or other reports that other agencies, universities, or non-profits are conducting in Missouri or nearby states on assessing, developing, and implementing climate change adaptation strategies and incorporate management strategies as appropriate. In general, MOARNG will identify and implement sound natural resources strategies that provide benefits to the ecosystem, regardless of how climate changes occur.

APPENDIX J. RESOURCE PROTECTION GUIDELINES

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J.1 Training Records of Environmental Considerations

A perpetual statewide training site activities TREC is maintained by the NGMO-EM. The statewide TREC addresses and provides guidance for the following training activities:

- Cutting of live plants
- Excavating by equipment
- Excavating by hand (fighting positions)
- Excavating by hand (minefields)
- Field maintenance operations
- Field mess operations
- Field refueling operations
- Generation of noise
- Live fire (ranges/weapons)
- Off-road vehicular activities
- Permanent construction
- Use of bivouac areas
- Use of blank ammunition
- Use of dirt roads
- Use of entry control points
- Use of lasers
- Use of MOUT site
- Use of open camp fires
- Use of paintball weapon systems
- Use of pyrotechnics
- Use of Smoke grenades/pots
- Use of Tactical Training Base
- Work in/near waterways

An additional TREC and environmental review is required if activities are conducted that exceed the TREC's limitations, such as construction, earth disturbance outside of Mechanized Dig Sites or bivouacs, and tree removal. For those activities or any others not addressed above, a unit must complete and forward the current TREC form (found on the Guard Knowledge Online (GKO) NGMO-EM Homepage) to NGMO-EM for review. Units should allow thirty (30) days prior to training activity for review.

J.2 Mow Plan

A statewide mow plan was established to manage all grasslands at each Training Site. This plan outlines three categories of areas to be mowed and provides mowing guidelines for each category. The mow plan is kept on file at the NGMO-EM office. The plan is outlined below. (MOARNG, 2017)

Mow Area Categories:

- Health and Welfare: Areas to be mowed for health and welfare purposes are mainly within the Cantonment Area. This includes mowing around buildings, sidewalks, roadways, parking lots, and other areas of frequent use. These are areas that receive a relatively high amount of traffic and therefore should be frequently mowed.
- Training: Areas to be mowed for training purposes. This includes a 15 foot strip around all training facilities (MOUT, ECP, Forward Operating Base, EPW, Ranges, Bull Pen's, etc.). Mowing within the training facilities will be limited to within its boundary. Bivouac areas will be mowed as needed.
- No Mow: All fields other than Health and Welfare or Training. All mowing in these areas must have NGMO-EM and Training Site Command approval prior to mowing. This also includes any training site hay programs.

Mowing guidelines for the various categories is provided below:

- Health and welfare areas will be mowed once every seven to ten days or as necessary throughout the growing season. Mowing heights will be dependent upon whether it is a lawn or roadway shoulder.
- Training area fields will be mowed only to accommodate training events and must be requested through the units TREC or have prior approval from NGMO-EM.
- No Mow means that fields will not be mowed unless prior approval through NGMO-EM and Training Site Command.

Additional mowing guidelines established within the Training Site Statewide Mow Plan for general maintenance activities:

- Mow a maximum of fifteen feet width along facilities roads and fence rows to a minimum height of six inches.
- Mow a maximum of fifteen feet width along ITAM trails to a minimum height of six inches.
- The tractor/mower operator will avoid damaging trees by striking them with the brush hog.

J.3 CLEAN WATER ACT PERMITTING

The CWA under Sections 404 and 401 regulate physical disturbances to Waters of the U.S. Section 404 gives the USACE primary regulatory responsibility for permitting issues. Most proposed activities (such as filling, dredging, or clearing ditches) require a general or individual permit. The USACE should be consulted prior to any activities that could potentially affect waterbodies to determine permitting requirements.

General permits issued by the USACE authorize various types of development projects in Waters of the U.S. Activities authorized under general permits are considered similar in nature, causing minimal adverse effects to the environment. The USACE uses general permits for certain activities to minimize regulatory burdens and administrative costs by allowing landowners to proceed without having to obtain individual permits in advance. One type of general permit is known as a nationwide permit. Nationwide permits authorize certain activities and are valid only if the conditions applicable to the permit are met.

In general, individual permits are required for disturbances that exceed thresholds for disturbances covered by general permits. Permitting requirements vary depending on type, location, and extent of disturbance. A Section 404 individual permit, issued by the USACE, may be required prior to significant impacts. Generally, whenever a Section 404 permit is required, a Section 401 Water Quality Certification issued by the State of Missouri is also required.

In Missouri, when construction or other land-disturbing activity creates a minimum of one acre of soil disturbance, MoDNR must permit the activity with a NPDES construction storm water discharge permit. The NPDES permit requires that a Storm Water Pollution Prevention Plan be in place which describes the project and erosion control practices and establishes inspection requirements.

Construction with the 100-year floodplain requires a permit from the local flood protection authority. Non-permitted construction in a floodplain may result in CWA violations, potentially resulting in fines and other penalties, which may ultimately compromise the integrity of MOARNG training sites as viable training installations.

J.4 EROSION PREVENTION

J.4.1 SOIL PREPARATION

Success in re-vegetating disturbed sites depends on the chemical and physical properties of the soil. Correct pH, phosphorus levels, and nitrogen fertilization are necessary for degraded lands to be re-vegetated. Therefore, soil amendments (lime and fertilizer) should be applied to rehabilitation sites before seeding, if testing indicates they are needed. Application procedures should include soil analysis to determine proper nutrient application levels. Other factors to consider are soil moisture, effects on species, weather patterns, and potential contamination of streams, ponds, and lakes.

Use lime to neutralize acidic soils and raise soil pH to a value that will support the species used for re-vegetation. Quality agricultural limestone is generally the preferred choice. Incorporate the lime into the top three to six inches of soil to allow better rooting of plants and minimize loss to rainfall runoff. Lime should be broadcast on steep slopes. Do not apply lime under wet soil conditions, because it is difficult to incorporate uniformly into wet soil.

Fertilizers consist of three primary plant nutrients: nitrogen (N), available phosphorous (P_2O_5), and water-soluble potash (K_2O). Mixtures of fertilizer materials are commercially available, their grade or content is expressed as a ratio in weight percent as N:P:K. Choose and apply fertilizer according to the soil test results. Fertilizers are also incorporated into the top two to four inches of soil and should not be applied when soils are wet. In wet soils, salt forms from the fertilizer, which can significantly reduce the percentage of seed germination, especially with grasses.

Typical soil amendment rates are listed below. However, requirements for spoil sites may vary and soil should be tested prior to amendment. Soil amendments should be applied to rehabilitate spoil sites before seeding.

Table 20. Soil Amendment Rates

Soil Amendment	Rate of Application
Straw Mulch/Native Warm Season Hay	60 ea. 50-pound (lb.). Bales/acre
Fertilizer for CSG Seed Mix	Nitrogen: 60 lbs./acre, Phosphate: 90 lbs./acre, Potash: 90 lbs./acre or current soil test requirements
Fertilizer for WSG Seed Mix	Nitrogen: 30 lbs./acre, Phosphate: 90 lbs./acre, Potash: 90 lbs./acre or current soil test requirements
Lime	1,500 lbs./acre Effective Neutralizing Material/acre or current soil test requirements

J.4.2 SEEDING GUIDANCE FOR CLEARED AREAS

Seed grasses using a no-till drill or by broadcasting. Use a no-till drill instead of broadcasting to plant prairie grass to minimize the amount of seed needed. Drill the seed no deeper than 1/8-inch deep. The corrective actions needed for disturbed soil vary depending on the size of the disturbed site and the slope on which the disturbance occurred. Using a hydro-seeder on steep slopes or in areas inaccessible with the drill may be necessary.

Reseed cleared areas to protect from erosion and/or to restore native vegetation. Areas cleared within Native WSG prairies shall be seeded with the native WSG seed as specified in the table below. Other

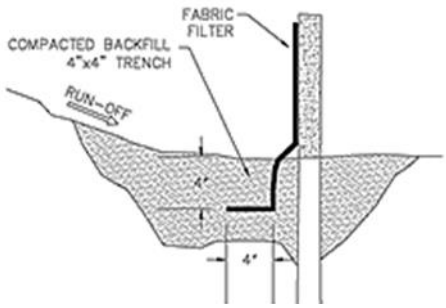
cleared areas may be seeded with the native WSG seed mix, CSG seed mix, or a combination of both. If available and economical, native warm season hay would be the preferred mulch because of the native plant seed it contains. Temporary seeding shall only be done when ground disturbance procedures are finished outside of the specified seeding dates for permanent seeding, or ground disturbance activities are delayed for more than 14 days. A permanent seeding shall be performed once ground disturbance is finished and specified seeding dates occur. All seeding shall be accompanied by a mulch/wheat application. Fertilizer and lime rates will not change due to the seeding date.

Table 21. Revegetation Guidance

Seed Type	Rate of Application	Optimal Seeding Dates	Alternate Seeding Dates
Temporary Seeding with Winter Wheat or Spring Oats	Wheat: 80 lbs./acre Oats: 65 lbs./acre	NA	NA
Permanent Seeding with CSG Seed Mix	Orchardgrass: 8.5 lbs. /acre Ladino Clover: 4.1 lbs. /acre Redtop: 3.5 lbs. /acre Timothy: 6.0 lbs. /acre Wheat or Oats: 20 lbs./acre	3/01 to 5/15	5/15 to 8/15 (increase seed rates by 50 percent) 8/16 to 10/15 (increase seed rates by 25 percent) 12/16 to 2/29 (increase seed rates by 50 percent)
Permanent Seeding with WSG Seed Mix	Big Bluestem: 6.0 lbs. /acre Indiangrass: 4.5 lbs. /acre Little Bluestem: 7.0 lbs. /acre Annual rye: 16 lbs. /acre. Native Forb Mix: 0.25 lbs./acre	4/01 to 6/15	11/16 to 3/31 (increase seed rates by 50 percent)

J.4.3 SILT FENCES

In addition to seeding and mulching disturbed areas, use silt fences to prevent silt from leaving the site. This is a temporary measure for sediment control. A sift fence is used in small drainage areas to detain sediment. These fences are most effective for sediment removal from overland, sheet flow. A silt fence usually consists of woven geotextiles stretched across posts and sometimes supported with wire or plastic mesh (see silt fence diagram). The lower edge of the fence is vertically trenched and covered by backfill. Line the borders from which runoff could occur with silt fences. Install silt fences according to the instructions below.



Silt Fence Diagram

- Place the silt fence at the lowest elevation of the graded area.
- Fasten silt fence securely to each support post or to woven wire, which is in turn attached to the posts.
- Embed silt fence in trench and backfill.
- At each end of the silt fence, turn fence upslope, and extend until ground surface rises.
- Inspect the silt fence frequently, and repair or replace promptly as needed.
- Remove accumulated silt when it reaches a depth of six inches. Dispose of sediment trapped by this practice in an area not prone to erosion.
- Remove silt fence when it has served its usefulness to avoid blocking storm flow or drainage.

J.4.4 TURF REINFORCEMENT MATS

The permanent net structure of a Turf Reinforcement Mat (TRM) reinforces vegetation at the root and stem level, allowing vegetation to be used in areas where flow conditions exceed the limits of natural vegetation. This includes, for example, severe slopes, high-flow ditches, and stream banks where rock riprap and concrete channels have commonly been used. A TRM is typically secured to the soil surface on a predetermined staple pattern using wire soil staples or biodegradable stakes. Advantages to using TRMs in erosion control include:

- Reduces evaporation by trapping moisture on the soil surface
- Moderates temperature fluctuations at the soil surface by "blanketing" the soil
- Holds seed and soil particles in place
- Keeps undesirable seeds from making soil contact and germinating

J.4.5 LOW-WATER CROSSINGS

A low-water stream crossing (LWSC) is a structure that provides access across a stream during normal flow, but is periodically closed due to flooding. LWSC can provide low cost alternatives to bridges or culverts for areas with low traffic volumes such as maneuver trails. They are particularly suitable across streams that are sometimes dry or have low normal depth of flow. Usually, LWSC are designed to provide streambed stabilization as well as access. (Center for Transportation Research and Education [CTRE], 2001). LWSC should not raise the substrate elevation above existing conditions in order to avoid ponding above the crossing, which may cause sediment deposition.

Three common types of LWSC are:

- Unvented Ford - This structure has no culvert pipes and crosses streams that are dry most of the year, or have normal depth less than six inches. An unvented ford can conform to the streambed or it can be raised above the streambed. These crossings are usually constructed of riprap, precast concrete, crushed stone, or articulated concrete. These are most suited for intermittent or ephemeral streams, or wide and shallow perennial streams.
- Vented Ford - This type of LWSC has one or more pipes under the crossing to accommodate low flows without overtopping the road. Water will flow over the crossing during higher water events. The pipes or culverts can be embedded in Portland cement concrete, aggregate, riprap, or earth fill. A vented ford may work where stream depth is deeper than recommended for an unvented ford. However, if there is a high potential for debris that may clog the pipes, this type of crossing is not recommended.
- Low Water Bridge - This flat-slab bridge deck is approximately the elevation of the stream bank. Its smooth cross section allows high water to flow over the structure without damaging it. This type of LWSC is recommended where higher stream flows exceed the capacity of a vented ford, where there is potential for clogging, or where an obstruction in the streambed would not be environmentally acceptable. (CTRE, 2001)

J.4.6 GUIDANCE FOR ROADWAYS AND DITCHES

Provide V-shaped side ditches as shown in Field Manual (FM) 5-35 "Engineer Field Data" (DA, 1987). Size and shape the ditches according to this manual, generally with a 2:1 slope. Slopes should not be too steep to avoid bank sloughing. Provide properly sized and installed culverts according to FM 5-35 to protect

roadways and prevent erosion. In erosive areas, use riprap to stabilize the ditches. On steep erosive slopes, construct V-ditches with geotextile fabric and riprap to add stability.

Shape and crown roads to drain water. Install culverts to improve drainage and minimize shrinking, swelling, and frost damage. Add crushed rock or gravel to prevent road damage caused by low strength.

Use straw bales in sloping areas where road ditches have a tendency to wash:

- Place straw bales end-to-end, perpendicular to the ditch, approximately every 50 feet to completely dam the waterway. The anchored straw bales will slow the flow of water and prevent erosion.
- Place bales in a row with ends tight against adjacent bales.
- Embed each bale in the soil a minimum of four inches, where possible.
- Anchor bales securely with wooden stakes or steel re-bar driven through the bales. Angle the first stake in each bale toward the previously laid bale to force bales together.
- At each end of the row, turn the bale upslope, and extend until ground surface rises 18 inches.
- Seed ditch banks with the recommended grass mixture. After the grass becomes established, remove every other row of bales. Remove additional bales as the grass grows where the removed bales were.
- Inspect bales frequently and repair or replace them promptly as needed
- Inspect and eliminate gullies that form under the straw bales.
- Remove accumulated silt when it is six inches deep to avoid impeding or blocking storm flow or drainage. If the silt is not removed, storm water may cut a new gully around the dike.
- Remove bales when they have served their usefulness. Fill in and smooth the area.

APPENDIX K. RELATED PROGRAMS AND PLANS

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K.1 SUSTAINABLE RANGE PROGRAM

The Sustainable Range Program (SRP) is the Army's overall approach for improving the way it designs, manages, and uses its ranges to ensure long-term sustainability. Requirements for the SRP are set forth in AR 350-19, Army Sustainable Range Program effective August 2005. The SRP is defined by its two core programs, the Range and Training Land Program (RTLP) and the ITAM Program, which focus on the doctrinal capability of the Army's ranges and training land. To ensure accessibility and availability of Army ranges and training land, the SRP core programs are integrated with the facilities management, environmental management, munitions management, and safety program functions supporting the doctrinal capability.

K.1.1 RANGE AND TRAINING LAND PROGRAM

The RTLP provides range operations and modernization capability for central management and prioritization and the planning and programming of live-fire training ranges and maneuver training lands, including design and construction activities associated with them. The RTLP planning process integrates mission support, environmental stewardship, and economic feasibility and defines procedures for determining range projects and training land requirements to support live-fire and maneuver training. The RTLP defines the quality assurance and inspection milestones for range development projects and the SOP to safely operate military training, recreational, or approved civilian ranges under Army control and support, Commanders' Mission Essential Task List, and Army training strategies. RTLP also establishes the procedures and means by which the Army range infrastructure is managed and maintained on a daily basis in support of the training mission.

K.1.2 INTEGRATED TRAINING AREA MANAGEMENT

The ITAM program is the U.S. Army standard for sustaining the capability of installation land units to support military training missions, ensure compliance with existing statutory regulations, and promote sound stewardship of natural resources contained therein. CCR, CCL, MTS, and WTS are ITAM-eligible sites. Per the memo Macon/Ike Skelton Training Center Classification, dated 15 April 2015, MTS and Ike Skelton Training Sites are combined and listed as a Local Training Center. This allowed ISTS to become an ITAM eligible site. The ITAM Coordinator for CCR and CCL is stationed at CCR, while the MTS and WTS coordinator is stationed at Ike Skelton Training Site. The TTA is not a formal ITAM site, although it is eligible for ITAM funding. No ITAM-specific goals, objectives, or projects have been developed or planned at the TTA.

In addition to maintaining key personnel and natural resources data collection efforts, the ITAM work plan budget will fund a number of projects of major importance to maintaining, preserving, and protecting the natural resources. The ITAM subcomponent consists of four proactive subprograms designed to facilitate these processes. The four components of the ITAM program are discussed in the following sections.

(A) RANGE AND TRAINING LAND ASSESSMENT

RTLA, formerly known as the Land Condition Trend Analysis provides for collecting, inventorying, monitoring, managing, and analyzing tabular and spatial data concerning land conditions on an installation. The intent of RTLA is to collect essential natural resources baseline information needed to effectively manage training lands. The Army initiated RTLA in the mid-1980s, and emphasized uniform data collection methodologies to provide regional, Major Command, or national-level land assessments. RTLA plots were established throughout CCR, MTS, and WTS during 1993-1995.

With the adoption of SRP/ITAM by the Training and Operations community, RTLA has evolved into a decentralized, installation-level program. This allows installation-level land managers and range operations staff to determine how they can best collect and use resource data to support short and long-term land management decisions such as training area allocation, training area use, and land rehabilitation. The MOARNG performs visual inspections of the training areas as part of the RTLA program.

(B) Training Requirements Integration

Training Requirements Integration (TRI) is the land degradation prevention component of the ITAM program. The main goal of TRI is scheduling training exercises and other land uses in areas most capable of supporting these activities. TRI relies heavily on RTLA generated data to evaluate land capability to sustain particular training activities with minimal resource impact.

Disturbances produced by training may be minimal and not appear to require restoration efforts. However, even small areas of disturbance can start a gully on sloping lands. Gullies can damage vehicles and structures, cut off access to training areas, degrade wildlife habitat, and deposit soil into streams.

TRI matches a training activity with the most suitable site and includes a rotation schedule for training lands. TRI also incorporates restrictions required to maintain site quality, protect significant natural resources, and minimize land damage while providing a safe training environment. Implementing TRI requires coordination between installation/operations training staff and natural resources management/environmental staff.

TRI allows appropriate allocation of specific training requirements to specific land parcels. The decision-making and allocation process is based on the land's "carrying capacity" with respect to training activities. Possible land use options exercised through TRI are listed in the table below.

Table 22. Land Use Options Exercised Through TRI

	Principle
1	Re-designate the parcel's use to an alternative training, mission, or non-mission activity to permit natural recovery; prolong sustainable use; or allow for rehabilitation, repair, and maintenance.
2	Re-design or reinforce a given parcel to support higher impact training.
3	Alter likely training use of a given parcel by redesigning and reconfiguring the parcel.
4	Accept training-related degradation of a given parcel.
5	Cease training temporarily on a given land parcel to permit rehabilitation, repair, and maintenance.
6	Cease training permanently on a given parcel of land due to severe impacts and initiate restoration of that parcel.

Source: DA, 1999

(C) Land Rehabilitation and Maintenance

Land Rehabilitation and Maintenance (LRAM) is the component of the ITAM Program that provides preventive and corrective land rehabilitation and maintenance to reduce long-term impacts of training on an installation. It includes training area redesign and/or reconfiguration to meet training requirements. Training-damaged lands can be repaired, and land construction technology can be used to avoid future damage.

Projects are specifically designed to maintain quality military training lands, minimize long-term costs associated with land rehabilitation, ensure compliance with environmental laws and regulations, and

reduce erosion. The LRAM process begins with identifying potential LRAM projects, which may be planned and conducted in-house or through contract. RTLA data and GIS technology are typically used to help identify projects. Two common types of LRAM projects are training area rehabilitation and hardened sites.

Training area rehabilitation uses a wide array of techniques to correct erosion features, minimize disturbance, and revegetate denuded areas. Rehabilitation areas may also be temporarily "off limits" or protected through other restrictions. Rehabilitation techniques are specific to each project.

Hardened sites are areas that have been resurfaced with a base material, often overlaid with gravel. Sensitive areas within hardened sites may also be protected using barriers. Hardened sites are created in areas that receive repetitive training within a small area to the point where vegetation is damaged and "realism" is already drastically compromised. Potential locations include bivouac sites, firing points, and troop assembly areas.

(D) Sustainable Range Awareness Program

Awareness is crucial to protecting diverse resources such as sensitive species and wetlands. The SRA is an educational program that promotes environmental stewardship and responsible use of natural resources on military lands. The MOARNG SRA program focuses on all land users including soldiers, leaders, civilians, and the local community. SRA serves to educate the public on the military mission's natural resources needs and impacts.

Military Personnel Awareness - The SRA program particularly focuses on developing and distributing awareness materials, such as soldier's handbooks, leader's handbooks, field cards, training videos, and posters. Site-specific information can be provided to training site users to prevent unnecessary damage to the environment and, in particular, training lands. Through dissemination of information, site users can improve their understanding of the effects of their mission and training activities on natural resources.

Implementing natural resources protection requirements in the field depends on effective communication with military trainers. Awareness materials and briefings are important methods of communicating natural resources concerns to military personnel. SRA materials should be as site-specific as possible, with photographs or drawings illustrating specific or unique on-site natural resources. Materials should be durable for field use. Photographs of rare species and special habitats should be placed in highly visible places to ensure maximum audiences (briefing rooms, billeting common areas, etc.).

The MOARNG issues SOPs to troops using the training site. These SOP address fire protection, hazardous materials spills, restricted areas, pyrotechnics use, and environmental considerations. Trainers are also issued a Natural Resources and Environmental Constraints Map (such as Appendix Q, Figures 11-15). The map identifies restricted areas, unfenced restricted areas, sensitive areas, wetlands, impact areas, wash racks, and refuse collection points. Restricted areas include impact areas and sensitive ecological and cultural resource areas with use restrictions.

Briefings are usually informal and are conducted as needed. For instance, NGMO-EM personnel or the trainer will brief a military unit preparing to bivouac near a sensitive area or a contractor preparing to work near a wetland on environmental requirements. The unit commander will ensure compliance of the troops. Resource awareness training includes: a briefing on wetland locations; rare, threatened, and endangered species locations; cultural resources; restricted areas; pest management; information on dangerous or toxic plants and animals, such as poison ivy, venomous snakes, and ticks; and any other

pertinent information that helps reduce the risk of negative impacts to resources on the site and dangers to personnel at the site.

K.1.3 VALIDATED ITAM WORK PLAN

The ITAM Work Plan is used to channel ITAM funding requests from the MOARNG, through NGB, to the U.S. Army's Office of the Deputy Chief of Staff for Operations. In addition to maintaining key personnel and natural resources data collection efforts, the ITAM work plan budget will fund a number of projects of major importance to maintaining, preserving, and protecting the natural resources. The annual ITAM Work Plan is the basis for identifying installation ITAM resource requirements and for allocating funding to support installation core capabilities.

The terms, conditions, and administrative requirements related to NGB's federal contributions for operations, management, and maintenance of the ARNG Training Support System programs is outlined in Appendix 7 of the Master Cooperative Agreement. The SRP is one of the Training Support System programs covered within the appendix.

ITAM Work Plan projects are submitted through PRIDE Web as a Work Order to obtain environmental guidance and approval.

Table 23. ITAM Work Plan

Fiscal Year	MOARNG Site	Project Title/Item	Project Number	Status	TPO-R Validation Status
FY21	MTA Camp Crowder - Neosho	Training Area Mowing	CRO2021001	Valid	Fully Approved
FY21	MTA Camp Crowder - Neosho	Maintain Bivouac Sites	CRO2021002	Valid	Fully Approved
FY21	MTA Camp Crowder - Neosho	Maintain Wheeled Vehicle Maneuver Trails	CRO2021003	Valid	Fully Approved
FY21	MTA Camp Crowder - Neosho	Repair Low Water Crossings	CRO2021004	Valid	Fully Approved
FY21	MTA Camp Crowder - Neosho	Repair Maneuver Trail Damage	CRO2021005	Valid	Fully Approved
	MTA Camp Crowder - Neosho	15' Brush Hog	CRO2020007	Valid	
	MTA Camp Crowder - Neosho	Tracked Skid Steer	CRO2022006	Valid	
FY21	MTA Camp Clark - Nevada	Training Area Mowing	CLA2021001	Draft	Fully Approved
FY21	MTA Camp Clark - Nevada	Maintain Bivouac Sites	CLA2021002	Valid	Fully Approved
FY21	MTA Camp Clark - Nevada	Maintain Wheeled Vehicle Maneuver Trails	CLA2021003	Valid	Fully Approved
FY21	TS Clark National Forest - Wappapello	Maintain Maneuver Trails	WAPP2021001	Valid	Fully Approved
FY21	TS Clark National Forest - Wappapello	Repair Bivouac Sites	WAPP2021002	Valid	Fully Approved
FY21	Macon Training Site	SRP GIS Data Development	MAC2021005	Draft	Fully Approved
FY21	Macon Training Site	SRP GIS Support for Unit Training	MAC2021006	Draft	Fully Approved
FY21	Macon Training Site	SRP GIS Support to Range Operations	MAC2021007	Draft	Fully Approved
FY21	Macon Training Site	Training Requirements Integration	MAC2021008	Valid	Fully Approved
FY21	Macon Training Site	Decision Support	MAC2021009	Valid	Fully Approved
FY21	Macon Training Site	Training Area Mowing	MAC2021010	Valid	Fully Approved
FY21	Macon Training Site	Repair Maneuver Trails	MAC2021011	Valid	Fully Approved
FY21	Macon Training Site	Reconfigure Observation Points	MAC2021014	Valid	Fully Approved
FY21	Macon Training Site	Repair Bivouac Sites	MAC2021015	Valid	Fully Approved
FY21	Macon Training Site	Maintain Bivouac Sites	MAC2021017	Valid	Fully Approved

Table 23. ITAM Work Plan					
Fiscal Year	**MOARNG Site**	**Project Title/Item**	**Project Number**	**Status**	**TPO-R Validation Status**
FY21	Macon Training Site	Maintain Maneuver Trails	MAC2021018	Valid	Fully Approved
FY21	Macon Training Site	ISTS Maintain Maneuver Trails	MAC2021019	Valid	
FY21	Macon Training Site	Truman Training Area Vegetation Control	MAC2021020	Valid	Fully Approved

K.2 GEOGRAPHIC INFORMATION SYSTEMS

GIS technology is used to manipulate and analyze data. GIS has become an integral part of the natural resources program. MOARNG environmental management program and natural resources personnel maintain natural resources data. Currently, the MOARNG has electronic data files for the following natural resources.

- Soils
- Waterbodies
- Wetlands
- Terrestrial Communities
- FEMA-designated Floodplains
- Threatened and Endangered Species
- Forest Stands

In addition to natural resources GIS data, the MOARNG has electronic data files for the following:

- Installation Boundaries
- Buildings
- Roads and Trails
- Ranges
- Bivouac Sites
- Training Areas

K.3 INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN

The MOARNG completed an Integrated Cultural Resource Management Plan (ICRMP) for its major training lands in 2002. An ICRMP is a 5-year plan required by AR 200-1 for compliance with applicable federal laws and regulations concerning cultural resources. The ICRMP is a component of the installation Master Plan, and functions as a decision document for cultural resources management actions and specific compliance procedures. The plan's purpose is to integrate cultural resources requirements with ongoing mission activities so the availability of mission-essential properties and acreage is maintained and compliance with requirements is achieved. The ICRMP was updated in 2017. (Meyer, 2020)

K.3.1 CAMP CROWDER TRAINING SITE

Cultural resources identified at CCR are culturally important and need to be protected. Consult the NGMO-EM Cultural Resource Manager (CRM) for detailed information and procedures for cultural resources at CCR. Archaeological and architectural assessments have been completed at CCR. Results are summarized in the updated ICRMP (2017-2022). Phase I and Phase II cultural resource surveys have been conducted

for CCR between the years of 1991 through 2020. Twenty-three of the sixty-two archaeological sites identified during surveys were identified as eligible for the National Register of Historic Places (NRHP).

Cultural resources management is provided through implementation of the ICRMP, and Section 106 consultation, when needed, will be addressed per the Cultural Resource Manager.

K.3.2 CAMP CLARK TRAINING SITE

Cultural resources identified at CCL are culturally important and need to be protected. CCL is over a hundred years old. The ICRMP contains SOP for ground disturbance and maintenance activities. These SOP provide for the CRM review of activities on a case-by-case basis prior to implementation to ensure impacts are avoided or mitigated. Consult with the CRM for detailed information and procedures for cultural resources at CCL. The ICRMP was updated in 2017.

All of the buildings identified within CCL have been assessed for the NRHP. CCL was determined a National Historic District in 2010. A Memorandum of Agreement was executed with the Missouri State Historic Preservation Officer (SHPO) for the renovation and demolition of fifty-seven buildings from the historic district. The district was determined not eligible for the NRHP after the renovation and demolition of the eligible buildings. Previous archaeological surveys report six eligible sites for CCL of the seventeen sites surveyed between the years of 1992 through 2020. Meyer, in the MOARNG ICRMP 2002 (2022), identified three historic sites associated with military occupation of this land: a WWII POW camp; WWII POW cemetery; and a 1920s target trench and berm. Two of these three historic sites are eligible for the NRHP, the WWII POW camp and the 1920s target trench and berm.

One cemetery, 1942-1945, is present within the Camp Clark boundary. The cemetery is associated with the WWII POW camp and all of the POWs were removed and reinterred at a different location within the State of Missouri.

Actions potentially affecting cultural resources would be coordinated through the CRM to determine potential effects and compliance with applicable laws, regulations, and policies. The ICRMP contains SOP for ground disturbance and maintenance activities. These SOP provide for the CRM review of activities on a case-by-case basis prior to implementation to ensure impacts are avoided or mitigated.

K.3.3 MACON TRAINING SITE

Cultural resources identified at the MTS are important and need to be protected. Consult the MOARNG ICRMP for detailed information and procedures for cultural resources at the MTS. The ICRMP was updated in 2017. Known previous investigations within the confines of the MTS have spanned the last 25 years. Surveys were performed between the years of 1992 through 2020. Six of the twenty-seven archaeological sites identified during surveys were identified as eligible for listing on the NRHP. No buildings have been identified within the MTS. Thus, no architectural features are eligible for listing to the NRHP (Meyer, 2020).

A historic cemetery with five partially illegible markers dating from the nineteenth century is located onsite. The exact number of burials is unknown.

K.3.4 TRUMAN TRAINING AREA

Cultural resources identified at the TTA are culturally important and need to be protected. Consult the MOARNG ICRMP for detailed information and procedures for cultural resources at the TTA.

The USACE surveyed the area before the impoundment of the Truman Reservoir. Three architectural structures were identified at the TTA. None of the structures is eligible for the NRHP. Several Rock cairns have been identified at the TTA and are of Native American ancestry. There are 180 archaeological sites on the islands and the mainland. All of the sites have been evaluated for NRHP eligibility. Phase II archaeological were conducted between the years of 2002 through 2003. Twenty-one of the archaeological sites identified are eligible for the NRHP.

K.3.5 WAPPAPELLO TRAINING SITE

There are no eligible sites identified at the WTS. Consult the CRM for detailed information and procedures for cultural resources at the WTS. The ICRMP was updated in 2017.

The ICRMP notes that 17 archaeological sites have been identified at the WTS. Of these, 17 were evaluated and determined not to be eligible for the NRHP. Future Section 106 consultation will be addressed per the ICRMP.

K.4 INTEGRATED PEST MANAGEMENT

The statewide Integrated Pest Management Plan describes MOARNG's pest management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the MOARNG IPM program. (MOARNG, 2020) Pests detailed in the plan include unwanted vegetation; insect pests such as mosquitoes and spiders; and vertebrate pests such as mice, skunks, raccoons, and squirrels.

Per AR 200-1, the ARNG pest management program uses IPM to achieve effective pest control with minimal environmental impacts. IPM, as used by the MOARNG, is an approach that utilizes all available techniques in an organized program to suppress pest populations in an effective, economical, and environmentally safe manner. The techniques of IPM include cultural, mechanical, biological, and chemical controls:

- Cultural control - Manipulates environmental conditions to suppress or eliminate pests
- Mechanical control - Alters environments where pests live, traps or removes pests from where they are not wanted, or excludes pests from where they are not wanted
- Biological control - Uses predators, parasites, or disease organisms to control pests
- Chemical control - Relies on pesticides to control/kill pests

IPM strategies depend on surveillance to establish the need for pest control and to monitor the effectiveness of management efforts. Pest control is done by need rather than by schedule with limited use of preventative treatments. Pests are controlled to acceptable levels and not always completely eliminated. (MOARNG, 2020)

NGMO-EM keeps up-to-date pest management information available on the environmental GKO site. Pest specific self-help outlines, the approved pesticide list, and a copy if the IPMP are housed on this site. MOARNG Pest Control Procedures are outlined below.

<u>Requirements:</u>

- Pesticide applicators MUST have state or DOD pesticide certification to apply pesticides on MOARNG property UNLESS the product is part of the Self-Help Program.
- Only pesticides listed on the approved list may be applied on MOARNG property.

Self-Help Pest Management Program:

- Authorizes the use of approved Self-Help products by installation maintenance and MOARNG personnel for the control of pests.
- All Self-Help Pesticides must be on the approved list.

Request Guidance:

- Submit pest management request to NGMO-EM for site visit/assistance if Self-Help is not successful.
- Assessment will be given and if in-house pest services do not suffice, proceed with a contracted pest services.

Contracted Services:

- Obtain approval from NGMO-EM, then contact the applicable Pest Management POC to secure funding for the services.
- NGMO-EM must to review pesticide contract prior to the execution of the pest service.
- Contractor must be state or DOD certified.

Recordkeeping:

- Pest management operations completed on federally owned sites are required to be recorded on the AGMO 200-5 form. This includes pest management actions done in-house, by contractors, and as part of outleases, land management, and forestry programs.
- As a BMP, operations completed as part of the self-help program and operations completed on state owned sites may be recorded on the AGMO 200-5 form, but are not required to be recorded.

K.5 Conservation Reimbursable and Fee Collection Program

The CRFCP consist of three program areas: forestry program, agriculture and grazing outleases, and fish and wildlife conservation fund. The program was established to supplement other natural resource funding sources while supporting the military mission, natural resource management, financial management, real property management, and providing outdoor recreation opportunities. (Horne Engineering Services, 2005)

The MOARNG currently utilizes the forestry program and agriculture outlease program.

K.5.1 Forestry Program

The first US Army forestry program began in 1918, but remained virtually inactive until WWII. The current reimbursable forestry program supports ecosystem management and set forth the following forestry values: support the readiness mission, maintain ecosystem integrity, recognize the potential environmental and economic benefits of carbon sequestration, and optimize the forest resources and its associated forest products and benefits. (Horne Engineering Services, 2005)

K.5.1.1 Camp Crowder Timber Sales

Timber sales are periodically conducted at CCR in accordance with the most up-to-date timber inventory through the CRFCP forestry program. Typically, the timber selected for harvests are old growth trees, which are susceptible to disease and declining in value or salvage trees damaged by a naturally occurring events, such as straight line winds. Timber sales are conducted in a manner which improves the overall forest health and the long-term sustainability of the forest by removing overstocked and mature trees. Logged areas are allowed to regenerate naturally.

Through state entitlements, forty percent of the net proceeds from the timber sales are distributed to the state of Missouri. The state then distributes the funds to Newton County, where the money may be used to build, maintain, and fund roads and schools. Once the entitlement payment is made to the state, the remaining proceeds are transferred to the DoD Forestry Reserve Account. From the Forestry Reserve Account the MOARNG may request funds to complete natural resource projects.

K.5.2 AGRICULTURE OUTLEASES

Agriculture outleases on military lands began during WWII and involves the leasing of such military lands for agricultural uses such as grazing or haying. These programs achieve multiple goals, which are outlined in the 2005 Conservation Reimbursable and Fee Collection Programs Handbook as follows: ensure proper management and use of real property for mission purposes; promote multiple use of Army lands; minimize additional real property acquisition; reduce maintenance and custody costs; dispose of real property interests that are no longer required for Army needs; and reduce Army management responsibilities (Horne Engineering Services, 2005). Agriculture outleases are multifaceted and include many benefits for military land and training, financial management, and natural resource management.

The MOARNG primarily focuses agriculture outleases on the cantonment areas and other areas that are regularly maintained by facilities or training site personnel via mowing.

K.5.2.1 CAMP CROWDER HAY LEASE

The CCR hay lease (Appendix Q, Figure 36) began in 2011. The outlease action is managed through the Department of the Army Reimbursable Agricultural Plan and administered by the Kansas City District of the USACE. The lease runs on a 5-year contract period.

All documents and management plans related to the CCR hay lease are housed within the NGMO-EM office. The lease is intended to benefit troop training, natural resource management, and facilities maintenance; in turn, this is a living program allowing the MOARNG to adjust it on an as-needed basis.

K.5.2.2 CAMP CLARK HAY LEASE

A hay lease was proposed in the fall of 2019 for CCL. This lease would be managed through the Department of the Army Reimbursable Agricultural Plan and administered by the Kansas City District of the USACE.

A lease management plan was drafted and is currently under review. Upon approval of the plan, the lease will be fully implemented. All documents and management plans related to the CCL hay lease are housed within the NGMO-EM office.

K.6 MOARNG OUTREACH

Per the Sikes Act, installations must provide outdoor recreation opportunities to the public and access to persons with disabilities. This is primarily carried out through MOARNG outreach events. Dependent on funding and resource availability, the NGMO-EM organizes and hosts events, including but not limited to, conservation field days with local schools, educational presentations for local clubs, and disabled persons outdoor recreational events.

K.7 SPILL AND POLLUTION PREVENTION PLANS

Spill Prevention, Control, and Countermeasure Plans; Pollution Prevention Plans; and Spill Contingency Plans are maintained for MOARNG training lands and housed in the headquarters building. These plans identify potential sources of pollution, BMPs, and procedures to respond to pollution events.

APPENDIX L. HUNTING AND FISHING GUIDELINES

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L.1 HUNTING AND FISHING

Hunting and fishing is permitted in compliance with state laws. Limited public access is allowed as defined in 11 Code of State Regulations (CSR) 10-2.010, Public Access to Army National Guard Training Sites (Section I.2).

The MOARNG's objective is to enhance recreational opportunities for the surrounding communities while protecting natural resources. The MOARNG will allow limited public access for hunting and fishing per training site guidelines. No hunting or fishing fees are charged on any MOARNG sites.

In addition, individuals who use the site should practice the following provisions.

- Comply with state hunting and fishing regulations.
- Comply with state regulations for public access to MOARNG training sites.
- Unauthorized all-terrain vehicles are not allowed.
- Property boundaries must be adhered to and trespassing is prohibited on private land surrounding training sites.
- All wounded game must be retrieved. If wounded game leaves the MOARNG premises, permission to enter the surrounding landowner's property must be obtained prior to entry.
- Areas marked "Off Limits" or "Sensitive Areas" are to be avoided.
- No open fires are to be started.
- Only the use of portable tree stands is allowed. Care must be taken to not cause harm to the bark of trees. The training site Managers reserve the right to remove any tree stands.
- Cutting vegetation to clear shooting lanes for firing is prohibited.
- All waste must be retrieved prior to leaving the premises.
- Respect all rights of other individuals the respective training site. The training site Managers and their designated representative have the authority to enforce training site regulations.

All infractions of these provisions are to be reported to the training site Base Operations and wildlife law infractions are to be reported to the Conservation Agent for the respective county.

L.2 PUBLIC ACCESS

Public access to MOARNG training sites is defined by 11 CSR 10-2.010, and is outlined below:

"Title 11—DEPARTMENT OF PUBLIC SAFETY; Division 10—Adjutant General; Chapter 2—Public Access to Training Sites

11 CSR 10-2.010 Public Access to Army National Guard Training Areas

PURPOSE: This rule defines public access to Missouri Army National Guard Training Sites.

(1) Camp Clark. Limited public access is allowed. Hunting is allowed during quail season and deer bow hunting season. Hunters must sign in upon arrival and sign out at post headquarters prior to departing post. The post is closed to all public access at any time units are in training.

(2) Camp Crowder. Limited public access is allowed. In accordance with the terms of a Wildlife Management Agreement with the Missouri Conservation Department, access and hunting is allowed in

the portion of the post located south of the range complex during the period October 1 through March 1. The post is closed to all public access at any time units are in training.

(3) Wappapello Training Site. The Wappapello Training Site is located on United Forestry Service land and has unlimited public access with the exception of the administrative area. The administrative area is delineated by locked gates and is limited to military use only.

(4) Macon Training Site. Public access is only authorized by provisions of this policy and on-site postings. The training site is closed during scheduled military training. The National Guard will work to avoid scheduling military training during the spring turkey and the fall firearms deer seasons. Hunting and fishing are permitted in accordance with the Missouri Department of Conservation State Wildlife Code for statewide permits, seasons, methods, and limits, unless otherwise posted. Fishing boats may be used on lakes and ponds, unless otherwise posted. Boat launching is permitted at posted sites only and boats may not be left unattended overnight. Only electric motors are permitted on lakes and ponds. Vehicle and bicycle access is restricted to gravel roads and designated parking areas, unless otherwise posted. Equestrian use is permitted only on gravel roads open to vehicular traffic. An approved training site usage request must be obtained for a group of six (6) equestrian or more. The following are prohibited by the public at all times: the destruction, defacing, or removal of property, digging or other soil disturbance, tree removal, caving, fireworks, and possession of glass containers. The use of private all-terrain/off road vehicles or utility terrain vehicles is prohibited; however, individuals may present the Macon Training Site manager exception requests for the purpose of handicap access. The Macon Training Site consists of three (3) geographically separated training areas – Baker's Acres, South 61, and Wooly Acres. Training area specific access restrictions follow:

(A) Baker's Acres Training Area. Public access is limited to foot traffic only. A designated parking area is available at the entrance gate at Jaguar Street, approximately two (2) miles west of US Highway 63;

(B) South 61 Training Area. Public access is available to foot and vehicle traffic. The training area entrance is on State Highway T approximately two (2) miles west of US Highway 63; and

(C) Wooly Acres Training Area. Public access is available to foot and vehicle traffic. The training area entrance is located on Icicle Road.

(5) Truman Training Site. The Truman Training Area is located on Corps of Engineer Truman Reservoir property. Public access is limited to foot traffic only." (DPS, 2015)

APPENDIX M. LICENSES AND SPECIAL USE PERMITS

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DEPARTMENT OF THE ARMY

LICENSE FOR NATIONAL GUARD PURPOSES

NO. DACA41-3-92-618

The SECRETARY OF THE ARMY hereby grants to the State of Missouri *, hereinafter referred to as the licensee, a license for* ~~a period of five (5) years,~~ an indefinite period *commencing on* 7 August 1992

but revocable at will by the Secretary of the Army, to use and occupy for year-round training and support of the Missouri *National Guard, certain land and improvements comprising a portion of the* Fort Crowder, Missouri *MILITARY RESERVATION,* Neosho, Missouri *, located substantially as shown in red on Exhibit "A,"* ~~attached hereto and made a part hereof~~*, and more particularly described as* ~~follows:~~ shown on Exhibit "B", both attached hereto and by this reference made parts hereof.

THIS LICENSE is granted subject to the following provisions and conditions:

1. That the use and occupancy herein authorized shall be without cost or expense to the Regular Establishment of the Military Departments of the Department of Defense and shall be under the general supervision and subject to the approval of the Secretary of the Army or his duly authorized representative and subject also to such rules and regulations as he may from time to time prescribe.

2. That the licensee shall maintain and keep in good repair and condition the premises herein authorized to be used, and all costs of operation, maintenance and restoration occasioned by reason of the occupancy of the premises by the licensee shall be paid for from funds available to the licensee, or from funds other than those appropriated for the Regular Establishment of the said Departments.

3. That the United States (hereinafter referred to as the Government) reserves the right to use the property included in this license, or any part thereof, including all buildings and improvements situated thereon, for such purposes as the Department of the Army deems necessary in the interest of national defense.

4. That the Government will not be responsible for any injury to persons or damage to property arising out of or incident to the use or occupancy of the licensed property by the licensee, howsoever such injury or damage may be caused, and the licensee shall indemnify and save the Government harmless from any and all claims for any such injury or damage, excepting claims for injury or damage arising from activities of the Government on the said property which are being conducted exclusively for the benefit of the Government. Nothing contained in this condition shall be construed to be in derogation of the rights and remedies afforded aggrieved parties by Federal statute. It is understood that the obligations imposed on the licensee by this condition are limited to those not prohibited from being assumed by the laws of the State.

5. That the licensee shall pay the cost, as determined by the duly authorized representative of the Secretary of the Army, of producing and/or supplying any utilities and other services furnished by the Government or through Government-owned facilities for the use of the licensee, including the licensee's proportionate share of the cost of operation and maintenance of the Government-owned facilities by which such utilities or services are produced or sup-

plied. Payment shall be made in the manner prescribed by said representative upon bills rendered monthly. The Government shall be under no obligation to furnish utilities or services.

6. That no addition to or alteration or improvement of the premises shall be made without prior written authorization from the Secretary of the Army or his duly authorized representative. All additions, alterations and improvements so authorized shall be maintained by the licensee in good repair and condition. Permanent additions, alterations and improvements (which shall be so designated by the Secretary of the Army or his duly authorized representative) shall, upon completion, become and remain the property of the Government.

7. That the facilities included in this license shall not be used for the quartering of personnel engaged in Missouri *National Guard activities except when such personnel are in the Federal service or participating in authorized training.*

8. That as of the date of commencement of this license a joint survey of the property included thereunder, indicating the exact condition thereof, shall be made by the duly authorized representative of the Secretary of the Army (or a representative designated by him) and by a representative of the Adjutant General, State of Missouri.
A written report of said survey shall be attached hereto as Exhibit "C" and become a part hereof as fully as if originally incorporated herein. A like survey and report shall be made upon termination of this license.

9. That this license may be relinquished by the licensee upon giving thirty (30) days notice in writing to the Secretary of the Army through his duly authorized representative.

10. That, on or before the date of expiration of this license or its relinquishment by the licensee, the licensee shall vacate the premises, remove all property of the licensee therefrom (excluding those permanent additions, alterations and improvements which under the provisions of Condition 6 hereof have become the property of the Government), and restore the premises to as good condition as that existing upon the date of commencement of the term of this license, damages beyond the control of the licensee and due to fair wear and tear excepted. If, however, this license is revoked, the licensee shall vacate the premises, remove said property therefrom, and restore the premises as aforesaid within such time as the Secretary of the Army may designate. In either event, if the licensee shall fail or neglect to remove said property and so restore the premises, then at the option of the Secretary of the Army said property shall either become the property of the Government without compensation therefor, or the Secretary of the Army may cause the property to be removed and the premises to be so restored at the expense of the licensee, and no claim for damages against the Government or its officers or agents shall be created by or made on account of such removal and restoration.

11. That the U.S. Army Reserve has the use of the range area (3,040 acres) for firing and multiple drills as required, with mutually acceptable joint use arrangements to be made between the Commanders concerned.

12. The Department of the Army reserves Water Tower 612, together with the right to operate, maintain, replace, or renew the same; and Buildings 1047, 1048, 1049, and 884 in the motor pool and fire station areas are reserved to the licensee.

13. That the licensee may, upon the concurrence of the Director, Army National Guard, issue licenses to non-profit community-service type activities under the same conditions as permitted to active Army installation commanders by existing Army regulations.

14. That the licensee may mutually agree with DOD elements for the temporary or intermittent use of the premises by such elements for joint or individual training purposes, provided such uses do not interfere with National Guard use and upon concurrence of the Director, Army National Guard.

15. The licensee shall be responsible for all measures for safe and efficient application of pesticide and animal damage control on the licensed premises, in accordance with the provisions of the Federal Environmental Pesticide Control Act of 1972, (Public Law 95-516) and the Resource Conservation and Recovery Act of 1976 (Public Law 94-580), to the satisfaction of said officer.

16. The licensee shall comply with the Solid Waste Disposal Act of 1966, as amended, (42 United States Code 6901, et seq.) and Executive Order 12088, Federal Compliance with Pollution Control Standards (1978). The disposal of hazardous waste within the licensed area is specifically **PROHIBITED**. The storage or disposal of non-Department of Defense owned toxic or hazardous materials within the licensed area is specifically **PROHIBITED**.

17. The United States reserves the right to make such connections upon the premises and as the said officer may from time to time consider necessary, and also reserves to itself right-of-way for all purposes across, over and/or under the premises provided, however, that such rights shall be used in a manner that will not create unnecessary interference with the use and enjoyment by the licensee of the premises.

18. The United States reserves the right to construct, use, and maintain electric, telephone, telegraph, water, gas, gasoline, oil, and sewer lines across, over, and/or upon the right-of-way in a manner which does not create any unreasonable interference with the right-of-way.

19. The Licensee shall not discriminate against any person or persons because of race, creed, color, religion, sex, age, handicap, or national origin in the conduct of its operations hereunder. The licensee by acceptance of this license hereby gives assurance that the licensee will comply with the provisions of Title VI of the Civil Rights Act of 1964 as amended (42 United States Code Section 2000d); the Age Discrimination Act of 1975 (42 United States Code Section 6102); the Rehabilitation Act of 1973, as amended (29 United States Code Section 794); and all requirements imposed by or pursuant to the Directive of the Department of Defense (32 Combined Federal Register Part 300) issued as Department of Defense Directive 5500.11, December 28, 1964. This assurance shall be binding on the licensee, the licensee's agents, successors, transferees, sublessees and assignees.

20. The licensee shall comply with all applicable Federal laws and regulations and with all applicable laws, ordinances and regulations of the state, county and municipality wherein the premises are located.

21. "CERCLA NOTICE"

The information contained in this notice is required under the authority of regulations promulgated under section 120(h) of the Comprehensive Environmental Response Liability, and Compensation Act, as amended (CERCLA) 42 U.S.C. 9620(h). The Grantor has made a complete search of its records concerning the property subject to this contract. Those records indicate that the following hazardous substances, as defined below, have been stored for one year or more (S), released (R), or disposed of (D) on the property during the time the property was owned by the United States of America. The transferee should consult the Preliminary Assessment Screening document (PAS) attached hereto as Exhibit "D" for more details, or where indicated:

SUBST	QUANT	CASRN	SYNONYM	RCRA#	DATE	S R D
Asbestos (Friable)	*	1332-21-4	Asbestos (Friable)	NA	1957 to 1973	S
Polychlor-anated Biphenyl contaminated soil	*	11096-82-5	Archlor 1260 (PCB)	NA	1957 to 1992	S R
Trichloro-etylene contaminated soil	*	79-01-6	TCE	U228	1957 to 1973	S R
Methyl Alcohol contaminated soil	*	67-56-1	Methanol	U154	1957 to 1973	S R
Red Fuming Nitric Acid	*	7697-37-2	Nitric Acid	NA	1957 to 1973	S R

"SUBST" shall mean any member of that group of substances defined as hazardous under CERCLA Section 101(14) and appearing at 40 CFR 302.4; **"QUANT"** shall mean the quantity in kilograms and pounds of the hazardous substance; **"CASRN"** shall mean the Chemical Abstracts Services Registry Number (CASRN), where applicable; **"SYNONYM"** shall mean the regulatory synonym for the hazardous substance, as listed in 40 CFR 302.4, where applicable; **"RCRA#"** shall mean the RCRA hazardous waste number specified in 40 CFR

261.30, where applicable; "**DATE**" shall mean the date(s) that such storage release, or disposal took place; "*" shall mean that the information is either not available, is incomplete, or requires further explanation, and the transferee should review the narrative discussion in the Preliminary Assessment Screening document (PAS) found at Exhibit "D" for further details."

22. An initial Preliminary Assessment Screening (PAS) documenting the history of the property with regard to the storage, release or disposal of hazardous substances thereon, is attached hereto and made a part hereof as Exhibit "D". Execution of this instrument by the licensee documents acceptance of the condition of the premises as indicated in Exhibit "D". Upon expiration, revocation or relinquishment of this instrument an exit PAS shall be prepared which will document the environmental condition of the property at that time. A comparison of the two Assessments will assist the Government in determining the environmental restoration requirements of the licensee. If this instrument is renewed by said licensee, by a similar instrument, the exit PAS shall not be required under this contract. The initial PAS from this contract will become the initial PAS of any subsequent contracts.

23. This license supersedes License No. DACA41-3-68-315, which documented use and occupancy, for year-round training purposes, for a 25-year period beginning 7 August 1967 and ending 6 August 1992, and Supplemental Agreements No. 1 through No. 4 thereto.

24. That in the event that this license is renewed by a similar instrument, then numbered Condition 10 hereof will not be applicable.

Prior to the execution of this license, the granting clause and Condition Nos. 7 and 8 were modified and Condition Nos. 11 through 24 were added on pages 2, 3, 4, and 5 which are hereby made a part of this license.

This license is not subject to Title 10, United States Code, Section 2662, as amended.

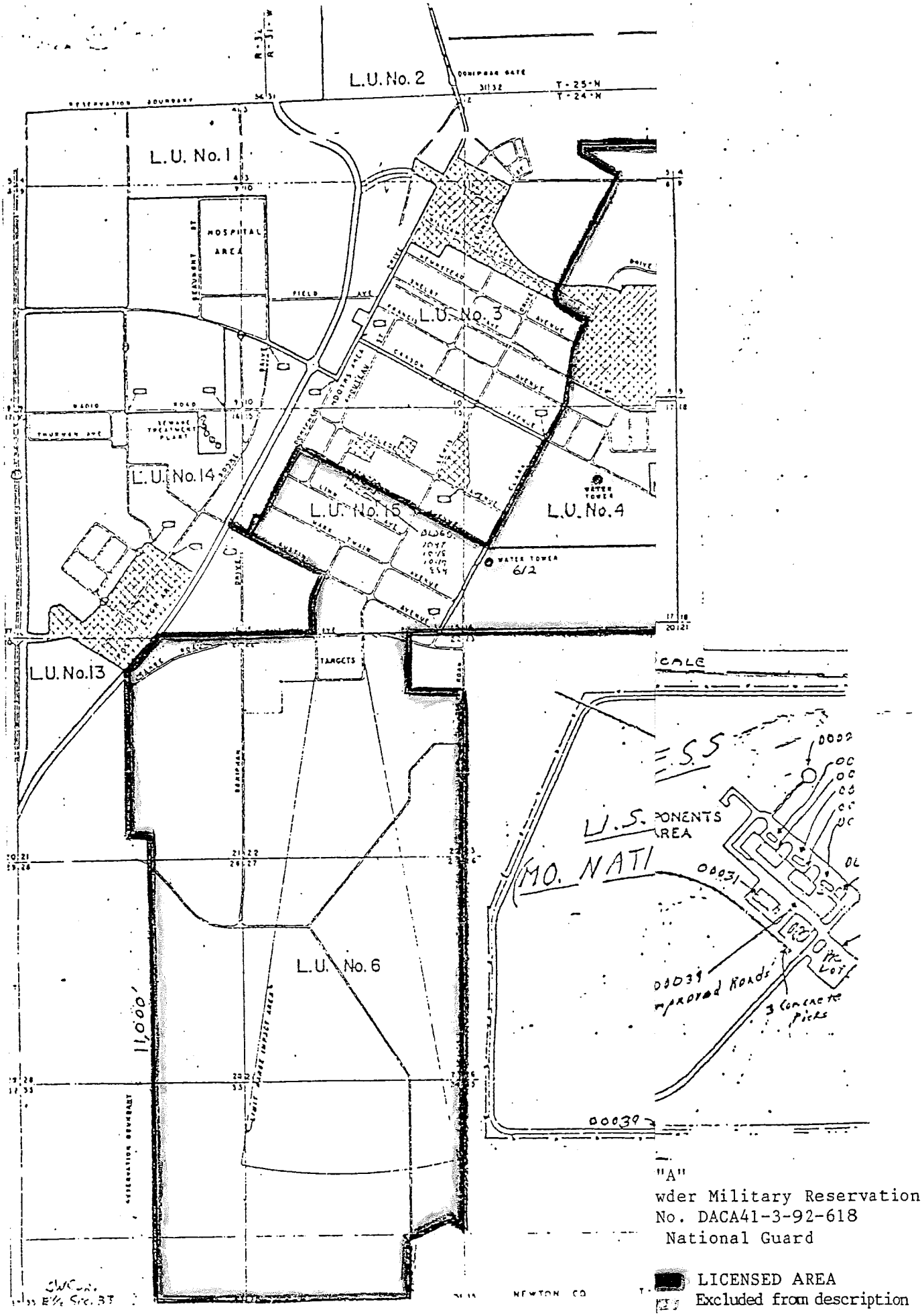
IN WITNESS WHEREOF I have set may hand this 16th day of March, 1993, by direction of the Assistant Secretary of the Army.

JAMES V. SIMMS
Chief, Real Estate Division

The above license, including all the provisions and conditions thereof, is hereby accepted this Second day of March, 1993.

STATE OF MISSOURI

By: RAYMOND L. PENDERGRASS
Name
Major General (MO), MONG
The Adjutant General
Title



"A"
wder Military Reservation
No. DACA41-3-92-618
National Guard

LICENSED AREA
Excluded from description

DESCRIPTION

A tract of land situated in Sections 1 and 2 and 11, 12, 13, and 14, Township 24 North, Range 32 West of the Fifth Principal Meridian, Newton County, Missouri, more particularly described as follows:

Beginning at the point of intersection of the west line of the E1/2 of Fractional Section 2, Township 24 North, Range 32 West, and the north boundary line of the Teledyne-Neosho Plant Area, said point being situated approximately 310.00 feet, south of the center of said Fractional Section 2; thence north 310.00 feet, along the west line of the E1/2 of Fractional Section 2, to the center of Fractional Section 2; thence east approximately 6500.00 feet, along the north line of the S1/2 of Fractional Section 2 and the north line of the S1/2 of Fractional Section 1, to the center of the E1/2 of Fractional Section 1; thence S02°30'41"W, 1237.50 feet, to the northeast corner of the NW1/4NE1/4 of Section 12 and U.S. Government Monument No. 43; thence continuing S02°30'41"W, 2250.00 feet, to an angle point; thence N87°47'44"W, to an angle point, said point being the easterly right-of-way line of Mackay ("A") Avenue extended northerly; thence southerly along the easterly right-of-way line of Mackay ("A") Avenue, extended northerly, to the intersection of the northerly right-of-way line of Road "C" and the easterly right-of-way line of Mackay ("A") Avenue; thence southerly along the easterly right-of-way line of Mackay ("A") Avenue to the southerly right-of-way line of Shaw Avenue (Elm Springs Road); thence easterly along the south right-of-way line of Shaw Avenue (Elm Springs Road) to a point 990.31 feet east of the west line of said Section 13; thence S02°30'41"W to the Government property line, being an angle point; thence N87°47'44"W, 5303.32 feet, to an angle point; thence S33°38'01"W, 600.00 feet, to an iron pin; thence N56°21'59"W, 500.00 feet, to an iron pin; thence N33°24'34"E, 646.87 feet, to an iron pin; thence N30°36'04"E to the north line of said Section 14; thence easterly to a point along the north line of said Section 14, said point being 50 feet westerly and perpendicular to the centerline of Clark Drive; thence in a northerly direction parallel to and maintaining a distance of 50 feet from the centerline of Clark Drive to Monument No. 82 on a line 50.00 feet west of and parallel to the centerline of Clark Drive; thence N30°58'31"E, 620.12 feet, along said parallel line, to Monument No. 81; thence N59°01'44"W, 961.54 feet, along a line 200.00 feet south of and parallel to Williams Avenue, to a point on the east line of the Hale Cemetery Tract; thence N01°28'16"E, 85.20 feet, along said east line to the northeast corner of said cemetery tract; thence N88°23'44"W, 1.25 feet, to the east boundary line of Teledyne-Neosho Main Manufacturing Plant Tract; thence N30°57'16"E, 3360.00 feet, along said east boundary line to the northeast corner of the Teledyne-Neosho Main Manufacturing Plant Tract; thence N59°01'44"W, 1015.00 feet, along the north boundary line of the Teledyne-Neosho Main Manufacturing Plant Tract, to the point of beginning; and

Also, a tract of land lying within the Fort Crowder Military Reservation, situated in Sections 14, 15, 16, 21, 22, 27, 28, 33, and 34, Township 24 North, Range 32 West of the Fifth Principal Meridian, Newton County, Missouri, more particularly described as follows:

Beginning at a point on the south line of said Section 33, said point being 600 feet east of the SW corner of the E1/2 of said Section 33; thence northerly parallel to the west lines of the E1/2 of said Section 33, the E1/2

EXHIBIT "B"

of said Section 28, and the E1/2 of said Section 21, 11,000 feet; thence westerly 600 feet to the west line of the E1/2 of Section 21; thence northerly along the west line of the E1/2 of said Section 21 to the easterly right-of-way line of the Kansas City Southern Railroad: thence in a northeasterly direction along said right-of-way line to the north right-of-way line of Hughes Avenue; thence easterly along said north right-of-way line of Hughes Avenue to the westerly right-of-way line of Mahan street; thence northerly and northeasterly along said westerly right-of-way line of Mahan Street to the southerly right-of-way line of Austin Avenue; thence northwesterly along said southerly right-of-way line of Austin Avenue to the easterly right-of-way line of the Kansas City Southern Railroad; thence in a northeasterly direction along said right-of-way line to the north right-of-way line of Austin Avenue; thence in a southeasterly direction along said north right-of-way line of Austin Avenue to the west right-of-way line of Doniphan Drive; thence in a northeasterly direction along said west right-of-way line of Doniphan Drive to the Department of Air Force Reservation boundary line bearing S59°02'44"E; thence S59°02'44"E along said Department of the Air Force Reservation boundary line to a point on a line parallel to and 100 feet east of the center line of said Doniphan Drive; thence N30°57'16"E, 1750.16 feet; thence S59°02'44"E, 4951.58 feet; thence S33°24'34"W, 646.87 feet; thence S56°21' 59"E, 500.00 feet; thence N33°38'01"E, 600.00 feet; thence S87°47'44"E to the east line of Section 14; thence southerly along said east line of Section 14 to the southeast corner thereof; thence westerly along the south lines of Sections 14 and 15 to the southwest corner of the SE1/4SE1/4 of said Section 15; thence southerly along the west line of the NE1/4NE1/4 of Section 22 to the southwest corner of said NE1/4NE1/4;thence easterly along the south line of said NE1/4NE1/4 to the southeast corner thereof; thence southerly along the east lines of Sections 22, 27, and 34 to a point 412.5 feet north of the southeast corner of the NE1/4SE1/4 of said Section 34; thence N65°30'W, 343.20 feet; thence S26°00'W, 539.22 feet; thence S31°00'W, 552.75 feet to a point of the west line of said NE1/4SE1/4, said point being 175.56 feet north of the southwest corner thereof; thence southerly along the east line of the W1/2SE1/4 of Section 34 to the south line of said Section 34; thence westerly along the south lines of Sections 34 and 33 to the point of beginning; and excepting therefrom the following described parcels:

Parcel A - Water Tower Site

Part of the SW1/4NE1/4 of Section 14, Township 24 North, Range 32 West, described as commencing at a steel bolt at the southeast corner of the NE1/4 of said Section 14; thence N02°19'16"E, 18.34 feet, to an iron pin the centerline of Kit Carson Avenue; thence N59°02'44"W, 2198.58 feet, along the centerline of Kit Carson Avenue, to an iron pin; thence S31°04'16"W, 232.95 feet, to an iron pin and the point of beginning of the parcel of land herein excepted; thence S31°04'16"W, 94.15 feet; thence N58°59'14"W, 107.25 feet, to an iron pin; thence N30°59'16"E, 94.30 feet to an iron pin; thence S58°52'59"E, 107.35 feet, to the point of beginning, containing 0.23 acre, more or less; and

Parcel B - Elevated Water Tower

Part of the NW1/4SW1/4 of Section 14, Township 24 North, Range 32 West, described as commencing at the northwest corner of said Section 14; thence south, 3285.59 feet; thence east, 406.80 feet to an iron pin at the point of intersection of the centerline of Benton Avenue with the centerline of Clark Drive; thence S32°32'04"W, 393.08 feet, to an iron pin; thence S55°13'11"E, 92.35 feet, to an iron pin at the point of beginning of the parcel of land

herein excepted; thence S55°13'11"E, 107.03 feet, to an iron pin; thence N33°08'19"E, 93.97 feet, to an iron pin; thence N55°12'56"W, 106.95 feet, to an iron pin; thence S33°11'34"W, 94.00 feet, to the point of beginning, containing 0.23 acre, more or less.

The above-described tracts of land contain, in the aggregate, 4,358.09 acres, more or less.

FORT CROWDER, MISSOURI
Missouri National Guard
License No. DACA41-3-92-618

MISSOURI ARMY NATIONAL GUARD

LEASE RENEWAL, FORT CROWDER, MISSOURI

PRELIMINARY ASSESSMENT SCREENING

JULY 1992

EXHIBIT "D"
PAS, pg. 1 of 17

FORT CROWDER, MISSOURI
Missouri National Guard
License No. DACA41-3-92-618

MISSOURI ARMY NATIONAL GUARD
LEASE RENEWAL, FORT CROWDER, MISSOURI
PRELIMINARY ASSESSMENT SCREENING, JULY 1992

This real estate action has been reviewed by the project proponent and the MOARNG Environmental Section in accordance with AR 200-1; paragraph 12-5, Real Property Transactions and Appendix B, which requires preparation of a Preliminary Assessment Screening (PAS). The purpose of the PAS process is to determine the Army's potential liabilities associated with the environmental condition of the proposed property transaction.

Based on the recommendation of the PAS, the proponent chooses to proceed with the lease renewal.

PROPONENT: Ted O. Wilson

TED O. WILSON
COL, QM, MOARNG
Facilities Management Officer

CONCURRENCE: Michael E. Winkler

MICHAEL E. WINKLER
CPT, EN, MOARNG
Environmental Protection Specialist

1.0 SCOPE DEFINITION.

1.1 PURPOSE. This Preliminary Assessment Screening (PAS) is being prepared for the area of Fort Crowder currently leased by the Missouri Army National Guard (MOARNG). The first two phases, scope definition and survey, of the PAS are addressed in this document.

1.2 Real Property Transaction Type. The MOARNG desires to renew the license for use of approximately 4300 acres. The property is owned by the United States Government and various portions has been used by the Missouri Army National Guard since 1947. The current area has been used under a 25 year license agreement. The property contains numerous buildings and supporting facilities built and/or maintained by the MOARNG. Approximately 65% of the acreage is woodlands with the remaining sites covered with tall grasses and small wild tree growth or utilized as cantonment or dedicated training sites. There are asphalt roads through the cantonment area, with stabilized roads providing circulation. On the western portion of the former AF Plant 65 Area there are concrete berms with a large concrete test platform, and a drainage pond. See Figure 1 for the general locations.

1.2.1 Original Conveyance. Prior to acquisition of the property by the U.S. Army, the property consisted of small farms of 10 to 15 acres with single family dwellings. The U.S. Army acquired the property in August 1941.

1.2.2 Duration. The MOARNG desires to renew the lease for a period of 25 years.

1.3 Property Category. A portion of the property was operated as Air Force Plant 65 for the development and testing of rocket engines. From waste disposal practices which included use of waste ponds for holding of hazardous waste from the testing procedures, it is obvious that this is a "Type III" property under the PAS Protocol required by AR 200-2. Type III is the designation given to property where there is known environmental contamination or disruption from past or present activities. Operation of various ranges and training activities may also have caused contamination to other parts of the property.

1.4 Parties. The parties to be involved in the lease renewal will be the MOARNG, National Guard Bureau, and the Corps of Engineers.

1.5 Future Uses. This property will be used to continue the training functions which have been performed for the previous term of the lease. Continued upgrading and construction is anticipated.

1.6 Restrictions. Because of the relative remoteness of this property, there are no known or anticipated restrictions for the property.

EXECUTIVE SUMMARY

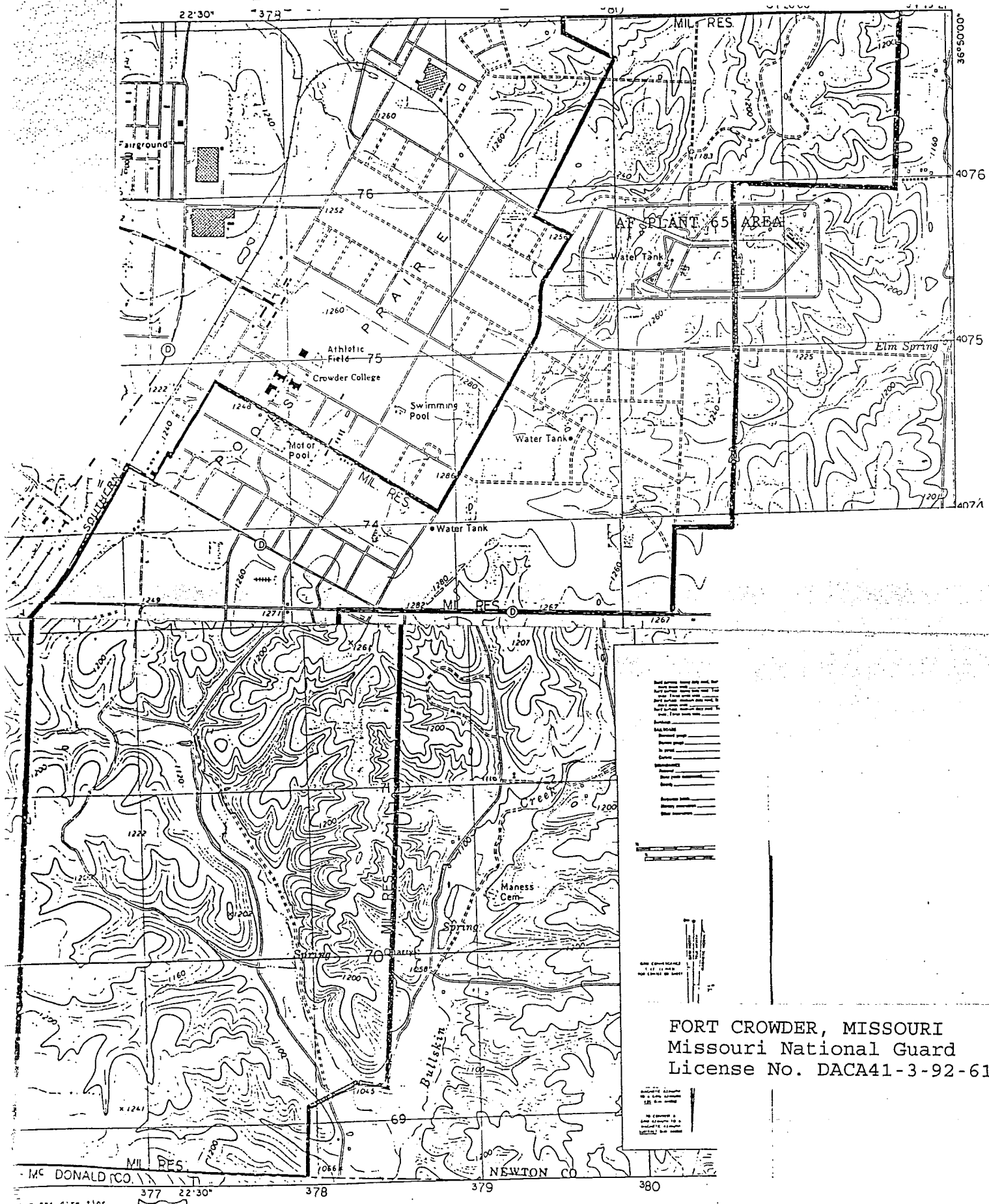
MISSOURI ARMY NATIONAL GUARD
LEASE RENEWAL, FORT CROWDER, MISSOURI
PRELIMINARY ASSESSMENT SCREENING, JULY 1992

DESCRIPTION: This proposed real estate action would renew the current Missouri Army National Guard (MOARNG) lease for the use of 4300 acres of the former Fort Crowder property. The purpose of the lease is to continue use of the property as a MOARNG Training Site.

DISCUSSION: Utilization of a portion of the property by the U.S. Air Force from 1958-1967 included storage and release of hazardous substances on the site. This portion of the property has been the subject of an extensive Preliminary Assessment/Site Investigation, and a remedial project has been approved for funding through the Defense Environmental Restoration Program (DERP). Portions of the property were previously used for small arms range complexes. An Archives Check and Site Visit is being conducted by a contract under the DERP, with any required remediation being funded under DERP. The continuation of the lease will not result in any additional liability or environmental hazards. In accordance with paragraph B-5b, AR 200-1, an extensive amount of data exists due to previous DERP investigations, and study beyond the survey phase of the PAS study is not required.

RECOMMENDATION: That the lease be renewed for the desired period.

FORT CROWDER



FORT CROWDER, MISSOURI
Missouri National Guard
License No. DACA41-3-92-618

CONTOUR INTERVAL 20 FEET

SPHEROID.....CLARKE 1866 HORIZONTAL DATUM.....1927 NORTH AMERICAN
GRID.....1,000 METER, UTM ZONE 15 CONTROL BY.....USGS AND USC&GS
VERTICAL DATUM.....MEAN SEA LEVEL PRINTED BY..THE ADJUTANT GENERAL, MOARNG

...ber the direction.
...Missouri Army
...on City, MO 65101

...01

EXHIBIT "D"
PAS, pg. 5 of 17

1.7 Remediation Responsibilities.

1.7.1 Air Force Plant 65. A PA/SI was conducted for the Air Force Plant 65 area, and a remedial project has been approved for funding through the Defense Environmental Restoration Program (DERP).

1.7.2 Former Range Areas. An Archives Check and Site Visit is being conducted by a contract under the DERP. This will identify any areas which need to be cleaned up under DERP.

1.7.3 Current Range and Training Areas. These areas will be monitored and cleaned up as needed by the MOARNG.

2.0 SURVEY PHASE.

2.1 Purpose. The purpose of the survey phase is to describe the environmental setting and to identify and evaluate all subject areas of environmental quality concern.

2.2 Environmental Setting.

2.2.1 General Information. The information in the Survey Phase section is based upon field visits to Fort Crowder during 1991-1992, a previous PAS for adjacent properties, a PA/SI for Fort Crowder areas previously utilized by the Air Force Plant 65, and EPA Reports of Investigation. In addition, an archives search and site visit is being conducted at present by a firm contracted by the Corps of Engineers to determine the potential for unexploded ordnance and other hazards.

2.2.2 Property Information. The current Fort Crowder property consists of flat areas and gently rolling hills. There are a variety of facilities present on the property, from currently used administrative, training, and maintenance structures, to foundations of abandoned buildings and facilities. The training facilities include current small arms ranges as well as abandoned small arms, grenade, and rocket launcher range areas. Atlas missile engines were tested on the northern portion of the property, Air Force Plant 65, which was transferred from the Army to the Air Force in 1958. The Air Force Plant 65 facilities on the engine test area (ETA) included a control building, a test and assembly shop, fuel storage areas, test stands, and waste storage ponds. See Figure 2.

2.2.2.1 History. The ETA was a testing site utilized for performance testing of newly assembled Atlas Rocket engines by government contractors. Trenches were used to drain excess fuel, cooling waters, and other liquid propellants to unlined storage ponds. Once sufficient quantities of wastes had accumulated in the storage pond, it was burned and the remaining residues in the pond bottom was sold to asphalt contractors. The other areas of Fort Crowder were utilized for training, maintenance, and administrative functions, with no known hazardous substance or waste generation data.

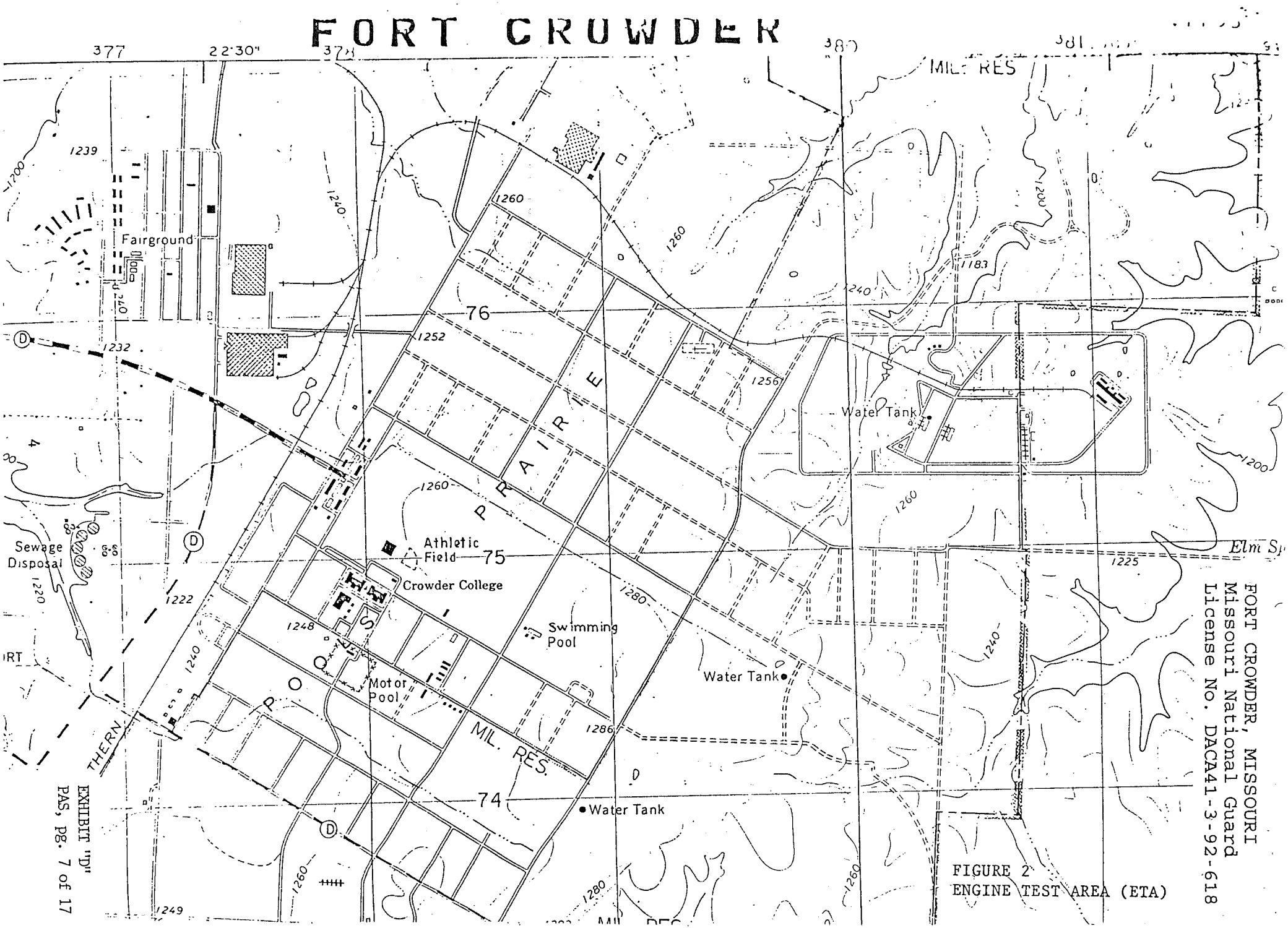


FIGURE 2
ENGINE TEST AREA (ETA)

FORT CROWDER, MISSOURI
Missouri National Guard
License No. DACA41-3-92-618

EXHIBIT "D"
PAS, pg. 7 of 17

2.2.2.1.1 Waste Types and Quantity. Wastes created from the testing activities on the ETA included the following: hydrazine, trichloroethylene, methyl alcohol, RP-1 (a kerosene hydrocarbon fuel combined with liquid oxygen), red fuming nitric acid (HNO_3 + N_2O_5) and various hydraulic and lubricating oils. There are no records to indicate how much waste was generated or disposed of.

2.2.2.1.2 Site Abandonment and Closure. This operational process was conducted from 1957 until approximately 1967. At this time the site was abandoned.

2.2.2.2 Site Location. Fort Crowder is located approximately 3 miles southeast of Neosho, Missouri. Neosho is a small rural community in Newton County, located in the southwestern corner of the state. The current Fort Crowder is located on former Fort Crowder property, and is situated in Sections 1,2,11,12,13,14,15, 16,21,22,27,28,33 and 34 of Township 24 N, Range 32W. The approximate coordinates of the site are 37 degrees, 30 minutes North latitude, 94 degrees, 21 minutes West longitude.

2.2.2.3 Physiography/surface hydrology. No wet receiving streams are present on the property. On the southern portion of the property, there is an unnamed loosing stream which is a tributary to Bullskin Creek. On the northern portion it appears that significant runoff occurs during the rainy season. Direct runoff from the northern area is eventually received by Elm Spring Branch, a surface water course approximately 1/2 mile from the area. Other surface waters in the area are Hickory Creek and Shorl Creek, approximately two miles and five miles from the site, respectively.

2.2.2.4 Soils. The Soil Survey of Newton County as published by the U.S. Department of Agriculture, Soil Conservation Service indicates that the soils consist mainly of the Nixa and Tonti soil series. The Nixa series is a deep, very dark grayish brown, cherty silt soil located on the upland ridgetops and sideslopes of the Ozark Highlands. This well drained soil is moderately sloping (2 to 9%) and is very slowly permeable with very low available water capacity. The Tonti series is a deep moderately sloped (2 to 5%), moderately drained soil with a fragipan. This brown cherty silt loam has a medium available water capacity and has a slow permeability.

2.2.2.5 Geology. Limestone bedrock occurs near the soil surface. This Mississippian formation contains a shallow aquifer about 150 to 200 feet below the ground surface. As in many limestone areas, there are some solution channels, caves and springs in this locale. Highly permeable brecciated areas are also found throughout the region.

2.2.2.6 Hydrogeology. A layer of silty limestone and shale approximately 50 feet thick separates and provides an aquiclude between the shallow Mississippian aquifer and a deeper aquifer in Cambrian and Ordovician sandstone and dolomite formations. The regional groundwater flow is to the west and there are no

known groundwater wells within a one-mile radius of this site. The City of Neosho derives its drinking water from Shoal Creek, although there are some private wells within the city. The U.S. Fish Hatchery located in Neosho derives its water from Elm Spring.

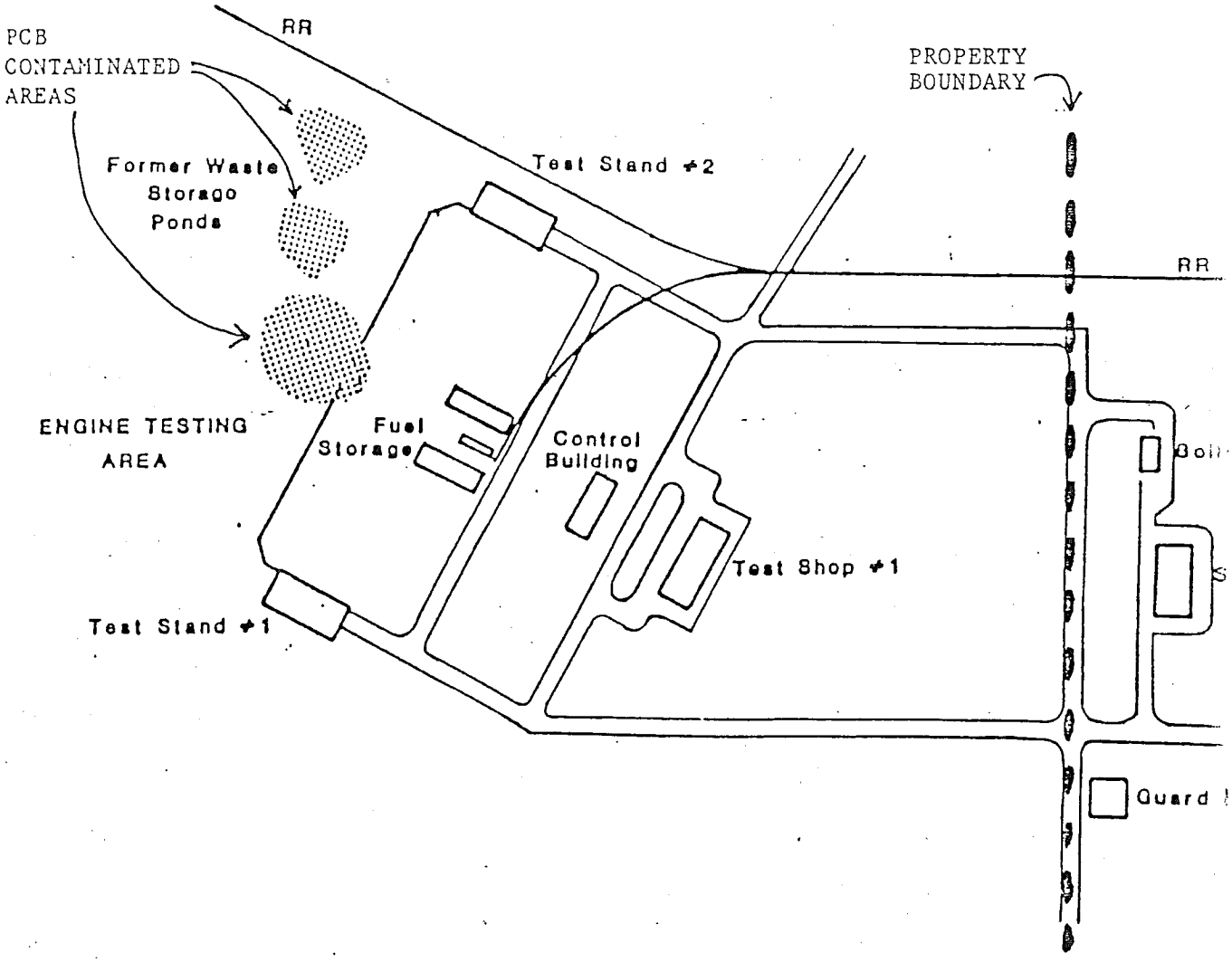
2.2.2.7 Meteorology. The weather patterns of Fort Crowder are probably closest to Tulsa, Oklahoma. It is far enough north to escape the long periods of heat in the summer, yet far enough south to miss the extreme cold of winter. The influence of warm moist air from the Gulf of Mexico is often noted, due to the high humidity, but the climate is essentially continental characterized by rapid changes in temperature. Generally, the winter months are mild. Temperatures occasionally fall below zero but only last a very short time. Temperatures of 100 degrees or higher are often experienced from late July to early September, but are usually accompanied by low relative humidity and a good southerly breeze. The fall season is long with a great number of pleasant, sunny days and cool, bracing nights. Spring is the wettest season, having an abundance of rain in the form of showers and thunderstorms. The greatest amounts of snow are received in January and early March. The snow is usually light and only remains on the ground for brief periods. Normal yearly temperatures range from 49 to 71 degrees. Precipitation in the form of rain averages about 39 inches per year and in the form of snow averages about 13 inches. Prevailing winds are typically from the north in the winter, south-southeast in early fall and spring, and from the south in the summer and late spring. The average wind speed for the year is approximately 10 mph.

2.2.2.8 Contaminated facilities. See Figure 2 for general layout of facilities and Figure 3 for known contaminated areas.

2.2.2.8.1 Structures or buildings. The former waste ponds have a low level of contamination, but are currently scheduled for cleanup through a DERP project. Also, structures on the ETA have various amounts of insulated piping associated with a central steam plant. The structures were constructed in 1957-58 and the pipes are probably insulated with asbestos. The structures are also part of the DERP cleanup project.

2.2.2.9 Noise. Ambient noise levels created by the National Guard in using this property are insignificant. The site is remote and the National Guard has been using the site for 25 years. A request for noise contours has been previously requested from the Army Environmental Hygiene Agency, but the contours have not been received as of the date of this PAS.

2.2.2.10 Unexploded Ordnance There is no known unexploded ordnance on this site. An Archives Check and Site Visit is being conducted by a contract under the DERP to determine if any unexploded ordnance is likely to occur on the site. This will identify any areas which need to be cleaned up under DERP.



CROWDER COLLEGE TEST SITE

Neosho, Missouri

Figure 3

2.2.2.11 Land use patterns. The site is compatible with the proposed continuation of use. Basically, the area is in a remote region with lots of agricultural usage nearby. Crowder College is near to the existing National Guard operations and surfers no negative impact. Further to the west is the Neosho Memorial Airport and the Fairground. Teledyne has a factory located to the north of the ETA. There are less than 200 people within a two mile radius of the ETA portion of the property, according to the Preliminary Assessment by the EPA. The southern portions of the property are located in an area of even less population density.

2.2.2.12 Existing ecological baseline. The area is part of a deciduous oak-hickory forest, consisting mainly of red oak, black walnut and eastern red cedar, interspersed with an open tallgrass prairie, consisting of big and little bluestem, indiangrass, huckleberry, and some fescue. The area supports a diverse wildlife community. A large white-tailed deer population resides here as well as many wild turkey and other game species.

2.2.2.13 Miscellaneous. No additional items are noted.

3.0 POPULATION. The EPA Preliminary Assessment for the ETA dated July 7, 1986 on Form 2070-13 (7-81) indicated that there were 50 people within one mile of the site, 200 people within 2 miles of the site, and 5,000 people within three miles of the site. The nearest inhabited building is approximately 500 feet from Fort Crowder boundary, and the next closest inhabited building is 1/2 mile from the boundary.

4.0 ENVIRONMENTAL COMPLIANCE.

4.1 Current regulatory status. The ETA portion of Fort Crowder is on the EPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) computer listing. The DERP cleanup is anticipated to elevate the status of Fort Crowder to "No Further Action (NFA)".

4.2 Closure requirements. The ETA was abandoned by the Air Force in 1967 without any closure procedure. At the time of the Air Force operations, no environmental discharge permits were required. No records exist which would indicate that the residue in the waste ponds were tested prior to being filled with soil in 1981. No formal plans were submitted for closure of the pond. By current standards, the pond may not meet the technical minimum standards for a closed site.

4.3 Future regulatory status. The site has been placed on the DERP for former Defense sites, No. B07MO013800, and is scheduled for site remediation.

5.0 SURVEY OF SITES OF POTENTIAL ENVIRONMENTAL CONCERN.

5.1 Site Survey summary. During the period of operation for the ETA site, environmental concerns were of limited consequence.

The major priorities were for defense related testing. This was not a result of intended environmental disruption, but rather a lack of overall knowledge in the environmental arena that was prevalent at the time throughout the Department of Defense (DOD) and private sector operations. The manner of operations conducted at this site was normal for military sites and during this period seemed perfectly safe and acceptable.

5.2 Individual site descriptions.

5.2.1 Site type. Waste/burn pits and surrounding upgradient and downgradient drainage (runoff) area for the ETA operations.

5.2.1.1 Site area and site map. The area is north of Test Stand #1, and west of Test Stand #2 and the former fuel storage areas stands. See Figure 3 for location.

5.2.1.2 History. This area received all the waste oils and fuels from testing. Later, after the site was abandoned, the waste pond/burn pit would apparently fill up with runoff drainage.

5.2.1.3 Operating practices. During testing activities at the ETA site the excess fuels were drained from the tested equipment and allowed to drain to the waste/burn pits. Once the waste/burn pits contained enough fuels and other oily wastes, it was ignited and allowed to burn. This occurred for an unknown number of years until the billowing black smoke produced became such a nuisance the Air Force had to eliminate the burning practice. The petroleum residues that remained in the pond bottom were sold to asphalt contractors and pumped out.

5.2.1.4 Materials/wastes used or generated.

5.2.1.4.1 Material wastes summary. Wastes created from the 10 years of testing activities on the ETA included the following: hydrazine, methyl alcohol, RP-1 (a kerosene hydrocarbon fuel combined with liquid oxygen), red fuming nitric acid (HNO_3 + N_2O_5) and various hydraulic and lubricating oils. Substances present are phthalate esters, which can be of natural origin (and are considered by the EPA as not hazardous at the concentrations encountered), and Arochlor 1260, which probably resulted from waste oils disposed of in the waste pits. There are no records to indicate how much waste was generated or disposed of.

5.2.1.4.2 Physical/chemical/toxicological characteristics.

5.2.1.4.2.1 Arochlor 1260. Arochlor 1260 is a polychlorinated bi-phenyl (PCB). PCB's are a class of colorless, stable chemicals. They contain a biphenyl nucleus with two or more substituent chlorine atoms. Technical PCB's are mixed isomers from 10 classes of chlorobiphenyls containing 209 possible isomers. In general, PCB's are insoluble in water and are soluble in many common organic solvents. PCB's are chemically classified as chlorodiphenyl and the exposure limits vary

depending on the percent chlorine incorporated, e.g. 42% and 54%. The higher the chlorine content, the lower the exposure limit and for 54% chlorine the maximum exposure is 0.5 mg/cubic meter as determined by the National Institute for Occupational Safety and Health (NIOSH). The exposure limit for 42% chlorine is 1.0 mg/cubic meter. These chemicals have relatively high molecular weights ranging from 326 to 258 and very low vapor pressures. A determination for an upper or lower exposure limit has not been made. These substances are potential human carcinogens, therefore NIOSH has not established a level for immediate danger to life or health. Symptoms for exposure include: irritation to the eyes and skin; acneform dermatitis or chloracne; jaundice or liver damage; and possibly dark urine. Route of entry can be through inhalation, skin absorption, ingestion, and skin and/or eye contact.

5.2.1.4.3 Migration and dispersal characteristics. Because PCB's have high molecular weights, they are relatively immobile in soils. They display high octanol/water (adsorption) coefficients. They are persistent in the environment and tend to adsorb to organic matter in the soil. Where there is groundwater in the affected area that is exposed to PCB's, the contamination will tend to be in the lower levels of the aquifer or the lower trailing edge of a contamination plume. PCB's can adhere to soil particles and are slow to migrate downward at times, although they can be washed to receiving streams through erosion during rainfall or other runoff producing events.

5.2.1.4.4 Evidence of impact. The EPA's "Preliminary Assessment" reports PCB's detected at the waste ponds at estimated levels of 680 ug/kg to 740 ug/kg. These tested soil samples were made with five (5) aliquots down to a depth of 12 inches.

5.2.2 Site type. Various facility buildings within the Camp Crowder area, including the ETA.

5.2.2.1 Site area and site map. See Figure 4 for building and facility location.

5.2.2.2 History. A former boiler plant is located on the site which apparently produced steam for all of the ETA. Insulation installed during this period around steam lines and boilers was generally asbestos. Several buildings from the WW II era remain which potentially contain asbestos.

5.2.2.3 Operating practices. Steam was used to heat the ETA buildings, test facilities, and perhaps to conduct tests. Asbestos was a common insulating material during WW II construction and may have been used in several buildings still standing on the old Fort Crowder cantonment areas.

5.2.2.4 Materials/wastes used or generated.

5.2.2.4.1 Material waste summary. Asbestos may be contained in the facilities.

5.2.2.4.2 Physical/chemical/toxicological characteristics. Asbestos is a generic term that applies to a number of naturally occurring, hydrated mineral silicates incombustible in air and separable into fragments. The most widely used in industry in the United States is chrysotile, a fibrous form of serpentine. Other types include amosite, crocidolite, tremolite, anthophyllite, and actinolite. The 8-hour time weighted average (TWA) airborne concentration of asbestos fibers to which any worker may be exposed shall not exceed 0.2 fiber, longer than 5 micrometers with a length-to-diameter ratio of at least 3 to 1, per cubic centimeter of air(0.2 fiber/cc), as determined by the membrane filter method at approximately 400X magnification with phase contrast illumination. An "action level" of 0.1 fiber/cc as an 8-hour TWA was established as the level above which employers must initiate compliance activities, such as worker training and medical surveillance. NIOSH considers asbestos a carcinogen. There are no symptoms associated with over exposure to asbestos. However, long term effects may be dyspnea, interstitial fibrosis, restricted pulmonary function, and finger clubbing. Routes of entry may be by inhalation and/or ingestion.

5.2.2.4.3 Migration and dispersal characteristics. For the buildings and structures on Fort Crowder, the dispersal mode would be airborne dust. While the buildings are occupied, restored, or demolished, specific precautions must be taken to have the asbestos handled or removed in a safe manner. Disposal of asbestos must be in a safe and acceptable manner as required by Missouri health and environmental regulations.

5.2.2.4.4 Evidence of impact. The presence of asbestos has not been specifically determined. However, there are several pipes throughout the facilities in the ETA that have a visible, fibrous insulation around them. The insulation has a black, tarred, outer wrap which is common for older asbestos type installation. Other facilities on Fort Crowder were built during a period when asbestos was widely used as a building material.

6. EXPOSURE ASSESSMENT. The ETA has the greatest potential for exposing existing and/or future human populations to an adverse environmental impact. As the site currently exists, i.e., undisturbed, it does not appear to present a hazard to those surrounding areas of private citizens and business. The site investigation by the EPA concluded that due to the rural location of the site and its distance from a population source and drinking water wells, no immediate hazard is foreseen. The ETA is currently off-limits to training activities, and will continue to be until the DERP remediation is completed. At that time, a new determination will be made based on the remediation results. An asbestos survey is planned for other areas of Fort Crowder to determine if an asbestos abatement plan is needed.

7. SUMMARY OF FINDINGS. As described within this study, adequate data is available to adequately assess the health and environmental risks associated with the proposed transaction. The proposed transaction is intra-Army and current operations will continue. Remediation of all known contamination is currently scheduled through the DERP. There is no anticipated negative impacts to the Army or the Army National Guard in this transaction. In accordance with paragraph B-5b, AR 200-1, an extensive amount of data exists, and further phases of the PAS study are not required. It is recommended that the lease be renewed for the desired period.

REFERENCES

1. Environmental Baseline Study, Reserve Forces National Guard Fort Crowder, Missouri, by Mobile District, U.S. Corps of Engineers, September 1989.

2. Site Investigation Report of the Crowder College Test Site, from Ecology and Environment, Inc., Mr. Hubert Wieland to USEPA, Mr. Paul Doherty, dated 7 July 1986

3. USEPA CERCLIS computer list, run dated 6 July 1992.

4. Letter from TCT - St. Louis, Inc., Thomas M. Lachajczyk, to Mr. Keith Braun, Missouri Army National Guard, dated 11 May 1992.

5. Numerous conversations between Sergio Lopez, U.S. Corps of Engineers, and Mr. Keith Braun.

FORT CROWDER, MISSOURI
Missouri National Guard
License No. DACA41-3-92-618

RECORD OF ENVIRONMENTAL CONSIDERATION

1. Title: Lease Renewal, Fort Crowder Training Site, Neosho, Missouri

2. Description of Proposed Action: (include existing environmental setting)

Action consists of renewal of existing lease for 25 years. The property has been utilized as a training area for the Missouri Army National Guard. Renewal of the lease will not result in any change in current operations. The land has been utilized for various military purposes since 1941. Continuation of the lease will not result in degradation of the environment, threatened or endangered species, or archaeological resources. This action is not a major federal action significantly affecting the quality of the human environment.

3. Anticipated Start Date and/or Duration of Proposed Action: August 1992, for a period of 25 years.

4. It has been determined that the action (choose one)

a. Is adequately covered in the existing EA___ EIA___ EIS___ entitled: _____ and dated _____.

XX b. Qualifies for Categorical Exclusion #A-24 Appendix A, AR 200-2.

c. Is exempt from NEPA requirements under the provisions of (cite superseding law).

PROPPONENT: Ted O. Wilson
TED O. WILSON
COL, QM, MOARNG
Facilities Management Officer

DATE: 22 July 1992

Concurrence: Michael E. Winkler
MICHAEL E. WINKLER
CPT, EN, MOARNG
Environmental Protection Specialist

DATE: 22 July 1992

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

February 19, 2004

REPLY TO
ATTENTION OF

MEMORANDUM FOR Commander, Office of the Adjutant General, ATTN: NGMO-FD (LTC Dean Parker), 2302 Militia Drive, Jefferson City, Missouri 65101-1203

SUBJECT: Transmittal of Executed License No. DACW41-3-03-0233, Harry S. Truman Dam and Reservoir, Missouri

1. I am enclosing a copy of executed License designed to grant the Missouri National Guard authority for the training site on Government-owned land (Tract Nos. 310, 311, 312, 317, 331, 2403, 2407, and 2418) at Harry S. Truman Dam and Reservoir, Missouri.

2. Thank you for you cooperation in this matter. If you have any questions, please do not hesitate to write or call Realty Specialist Mr. Joel Semler at (660) 438-7317 extension 1220.

FOR THE COMMANDER:

KARL W. MUELLER
Acting Chief, Civil Branch
Real Estate Division

Enclosure

DEPARTMENT OF THE ARMY
LICENSE FOR
NATIONAL GUARD PURPOSES
HARRY S. TRUMAN DAM AND RESERVOIR
BENTON COUNTY, MISSOURI

THE SECRETARY OF THE ARMY, hereinafter referred to as the Secretary, under the authority of Title 32, United States Code, Section 503, hereby grants to the **State of Missouri**, hereinafter referred to as the licensee, a license to use and occupy for training and support of the **MISSOURI ARMY NATIONAL GUARD** certain land and improvements, hereinafter referred to as the premises, as shown identified in **EXHIBIT "A"**, attached hereto and made a part hereof.

THIS LICENSE is granted subject to the following conditions.

1. TERM

This license is granted for **a term of Twenty-Five (25) years,** beginning **1 October 2002** and ending **30 September 2027**, but revocable at will by the Secretary.

2. SUPERVISION BY THE DISTRICT ENGINEER

The use and occupancy of the premises shall be without cost to the regular establishment of the military departments of the Department of Defense and shall be under the general supervision of the District Engineer, Kansas City District, hereinafter referred to as said officer, and subject to such rules and regulations as may be prescribed from time to time by said officer.

3. APPLICABLE LAWS AND REGULATIONS

The licensee shall comply with all applicable Federal, state, county, and municipal laws, ordinances, and regulations wherein the premises are located.

4. FACILITY MAINTENANCE

The licensee shall maintain and keep the premises in good repair and condition and all costs of operation, maintenance, and restoration shall be paid for from funds available to the licensee, or from funds other than those appropriated for the regular establishment of the military departments.

5. RIGHT TO USE

The United States, hereinafter referred to as the Government, reserves the right to use the premises, or any part thereof, including all buildings and improvements situated thereon, for such purposes as said officer deems necessary in the interest of national defense.

6. COST OF UTILITIES

The licensee shall pay the cost, as determined by the officer having immediate jurisdiction over the premises, of producing and/or supplying any utilities or other services furnished by the Government or through Government-owned facilities for the use of the licensee, including the licensee's proportionate share of the cost of operation and maintenance of the Government-owned facilities by which such utilities or services are produced and supplied. The Government shall be under no obligation to furnish utilities or services. Payment shall be made in the manner prescribed by the officer having such jurisdiction.

7. USE RESTRICTIONS

The buildings and improvements included in this license shall not be used for the quartering of personnel engaged in the National Guard activities except when such personnel are in the Federal service or are participating in authorized training.

8. IMPROVEMENTS AND ALTERATIONS

Additions to or alteration or improvement of the premises shall not be made without prior written approval of the District Engineer. All such additions, alterations or improvements shall be maintained by the licensee in good repair and condition. All such work designated as permanent by said officer shall, upon completion, become property of the Government.

9. CONDITION OF PREMISES

The licensee acknowledges that it has inspected the premises, knows its condition, and understands that the same is granted without any representations or warranties whatsoever and without any obligation on the part of the Government.

10. TERMINATION

This license may be terminated by the licensee at any time by giving the District Engineer at least thirty (30) days notice in writing.

11. RESTORATION

On or before the expiration of this license or its termination by the licensee, the licensee shall vacate the premises, remove its property (except those permanent additions, alterations, and improvements which have become property of the Government under provision of the condition on **IMPROVEMENTS AND ALTERATIONS**) and restore the premises to a condition satisfactory to said officer. If, however, this license is revoked, the licensee shall vacate the premises, remove said property and restore the premises within such time as the said officer may designate. In either event, if the licensee fails to remove said property and restore the premises, then, at the option of said officer, the property shall either become the property of the Government without compensation therefore, or said officer may cause the property to be

removed at the expense of the licensee, and no claim for damages against the Government shall be created on account of such action.

12. USE BY OTHERS

The licensee shall not transfer or assign this license, or any interest in the premises, however, upon concurrence of the Director, **Army** National Guard, National Guard Bureau, the licensee may (1) permit the temporary or intermittent use of the premises by elements of the Department of Defense for joint use or individual training purposes, provided such use will not interfere with the National Guard use; or (2) issue licenses for nonprofit, community service-type activities under the same conditions as those allowed by active installation commanders by existing **Army** regulations.

13. PROTECTION OF PROPERTY

a. The licensee shall keep the premises in good order and in a clean, safe condition by and at the expense of the licensee. The licensee shall be responsible for any damage that may be caused to property of the United States by the activities of the licensee under this license, and shall exercise due diligence in the protection of all property located on the premises against fire or damage from any and all other causes. Any property of the United States damaged or destroyed by the licensee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the licensee to a condition satisfactory to said officer, or at the election of said officer, reimbursement made therefore by the licensee in an amount necessary to restore or replace the property to a condition satisfactory to said officer.

b. Upon termination of the licensee's requirement for the premises, the licensee shall remain responsible to protect and maintain the premises until transfer to and acceptance by another accountability officer is accomplished or in accordance with applicable laws, rules and regulations.

14. ENVIRONMENTAL PROTECTION

a. Within the limits of their respective legal powers, the parties to this license shall protect the premises against pollution of its air, ground and water. The licensee shall comply with any laws, regulations, conditions or instructions affecting the activity hereby authorized if and when issued by the Environmental Protection Agency, or any Federal, state, interstate or local governmental agency having jurisdiction to abate or prevent pollution. The disposal of any toxic or hazardous materials within the premises is specifically prohibited. Such regulations, conditions or instructions in effect or prescribed by said Environmental Protection Agency, or any Federal, state, interstate or local governmental agency are hereby made a condition of this license. The licensee shall not discharge waste or effluent from the premises in such a manner that the discharge will contaminate streams or other bodies of water or otherwise become a public nuisance.

b. The licensee will use all reasonable means available to protect the environment and natural resources, and where damage nonetheless occurs from the licensee's activities, the licensee shall be liable to restore the damaged resources.

15. PRELIMINARY ASSESSMENT SCREENING

A Preliminary Assessment Screening (PAS) documenting the known history of the property with regard to the storage, release or disposal of hazardous substances thereon, is attached hereto and made a part hereof as **EXHIBIT "B".** Upon expiration, revocation or relinquishment of this license, another PAS shall be prepared which will document the environmental condition of the property at that time. A comparison of the two assessments will assist the said officer in determining any environmental restoration requirements. Any such requirements will be completed by the licensee to the satisfaction of the said officer.

16. HISTORICAL PRESERVATION

The licensee shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archeological, architectural, or other cultural artifacts, relics, or objects of antiquity. In the event such items are discovered on the premises, the licensee shall immediately notify said officer and protect the site and material from further disturbance until the said officer gives clearance to proceed.

17. NON-DISCRIMINATION

The licensee shall not discriminate against any person or persons or exclude them from participation in the licensee's operations, programs or activities conducted on the licensed premises because of race, color, religion, sex, age, handicap or national origin. The licensee by acceptance of this license, hereby gives assurance that it will comply with the provisions of Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. Section 2000d); the Age Discrimination Act of 1975 (42 U.S.C. Section 6102); the Rehabilitation Act of 1973 as amended (29 U.S.C. Section 794); and all requirements imposed by or pursuant to the Department of Defense Directive 5500.11 issued May 27, 1971 (32 CFR Part 195).

18. SPECIAL CONDITIONS

a. The Grantee shall establish standard operating procedures to insure that all flight safety precautions are taken.

b. The Grantee will avoid over flights of buildings and livestock wherever possible. Flight lines will be modified to avoid public use areas as they become operational.

c. The Grantee will avoid early morning and late evening low level flights to decrease noise impacts.

d. The Grantee, as a result of emergency landings, will restore any land damaged, back to its natural condition by the most expeditious means possible, said restoration is to be to the satisfaction of the Operations Manager, Harry S. Truman Dam and Reservoir, Warsaw Missouri.

e. Prior to initiating action, the Grantee shall forward plans and maps indicating the location of surface disturbing activities to the **Operations Manager, Harry S. Truman Dam and Reservoir**, Warsaw Missouri. Physical work shall not proceed prior to receipt of written approval from the Secretary of the Army or the duly authorized representative.

f. No excavation or digging will be allowed in historical sites designated as site 23BE816 located in Tract 311, sites 23BE403 and 23BE724/4H located on Tract 2407, and sites 23BE727 and 23BE736 found on Tract 2418. See Exhibit "A" for the approximate location of these sites. All artifacts discovered will be brought to the attention of the Harry S.Truman Lake Cultural Resource Coordinator, Park Ranger Rich Abdoler by calling **(660)-438-7317 ext. 1219.**

g. The rights and privileges herein granted are subject to the terms and conditions of license No. DACW41-3-83-18 granted to the Missouri Conservation Commission for the use and occupancy of approximately 53,853 acres of land and water areas within the boundaries of Harry S. Truman Dam and Reservoir, Warsaw, Missouri, for fish and wildlife management purposes, for a 25 year period beginning January 1, 1983 and ending December 31, 2007, to include subsequent renewals and amendments.

h. This license supersedes License No. DACA41-3-97-213, which was granted for a five (5) year term beginning October 1, 1997 and ending September 30, 2002, which superseded Lease No. DACA41-1-84-368.

THIS LICENSE is not subject to Title 10, United States Code, Section 2662, as amended.

IN WITNESS WHEREOF, I have hereunto set my hand by authority of the Secretary of the **Army**, this 18 day of February, 2004.

GREG G. WILSON
Chief, Real Estate Division

This license is executed by the licensee this 10th day of January, 2004.

MISSOURI ARMY NATIONAL GUARD

BY:

TITLE: The Adjutant General

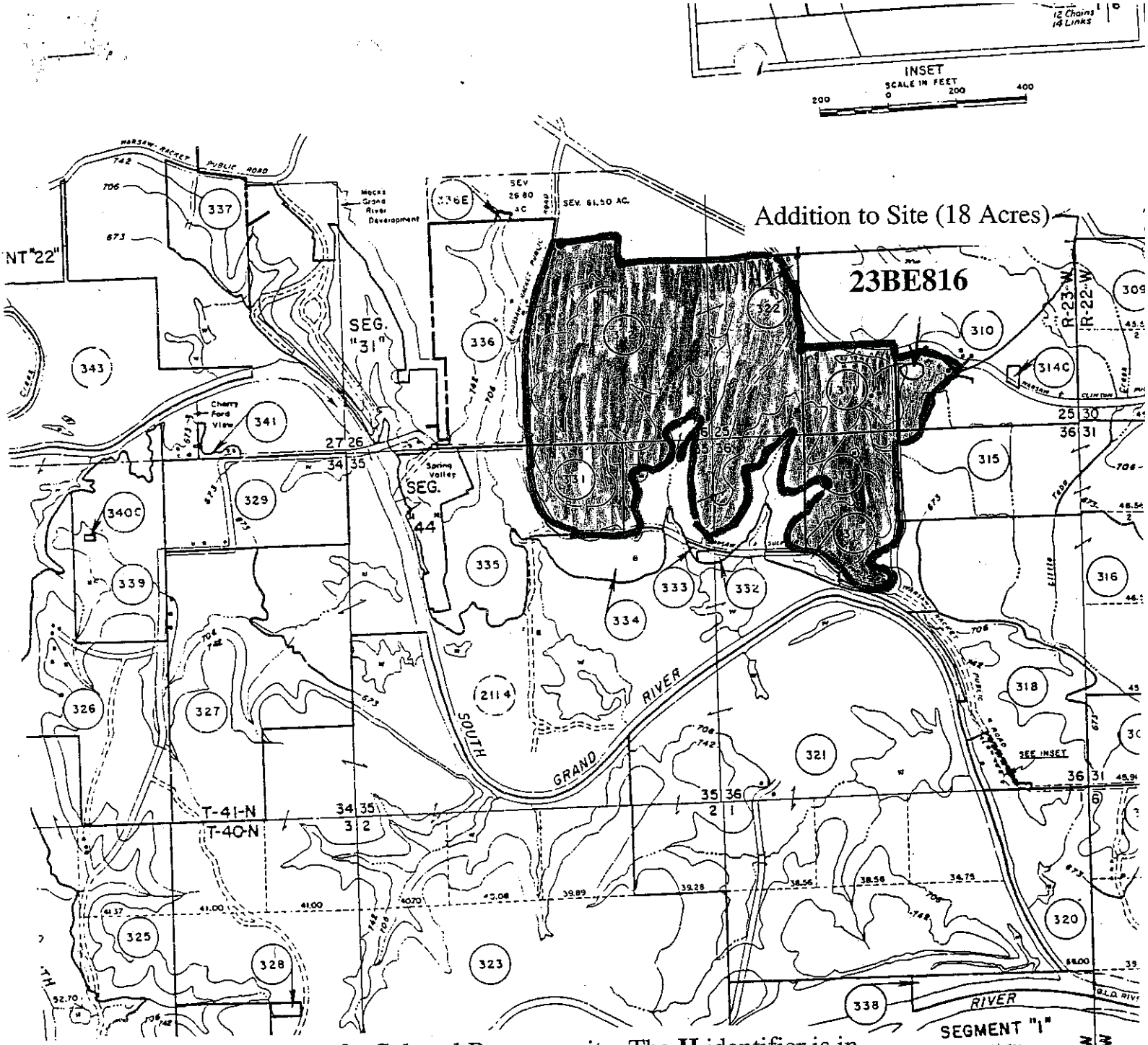
HARRY S TRUMAN DAM AND RESERVOIR

N
W E
S

Consent/License
- DACW41-3-03-0233
- Cultural Resource Site 23B3727
- Cultural Resource Site 23BE403
- Cultural Resource Site 23BE724
- Cultural Resource Site 23BE736
- Cultural Resource Site 23BE816

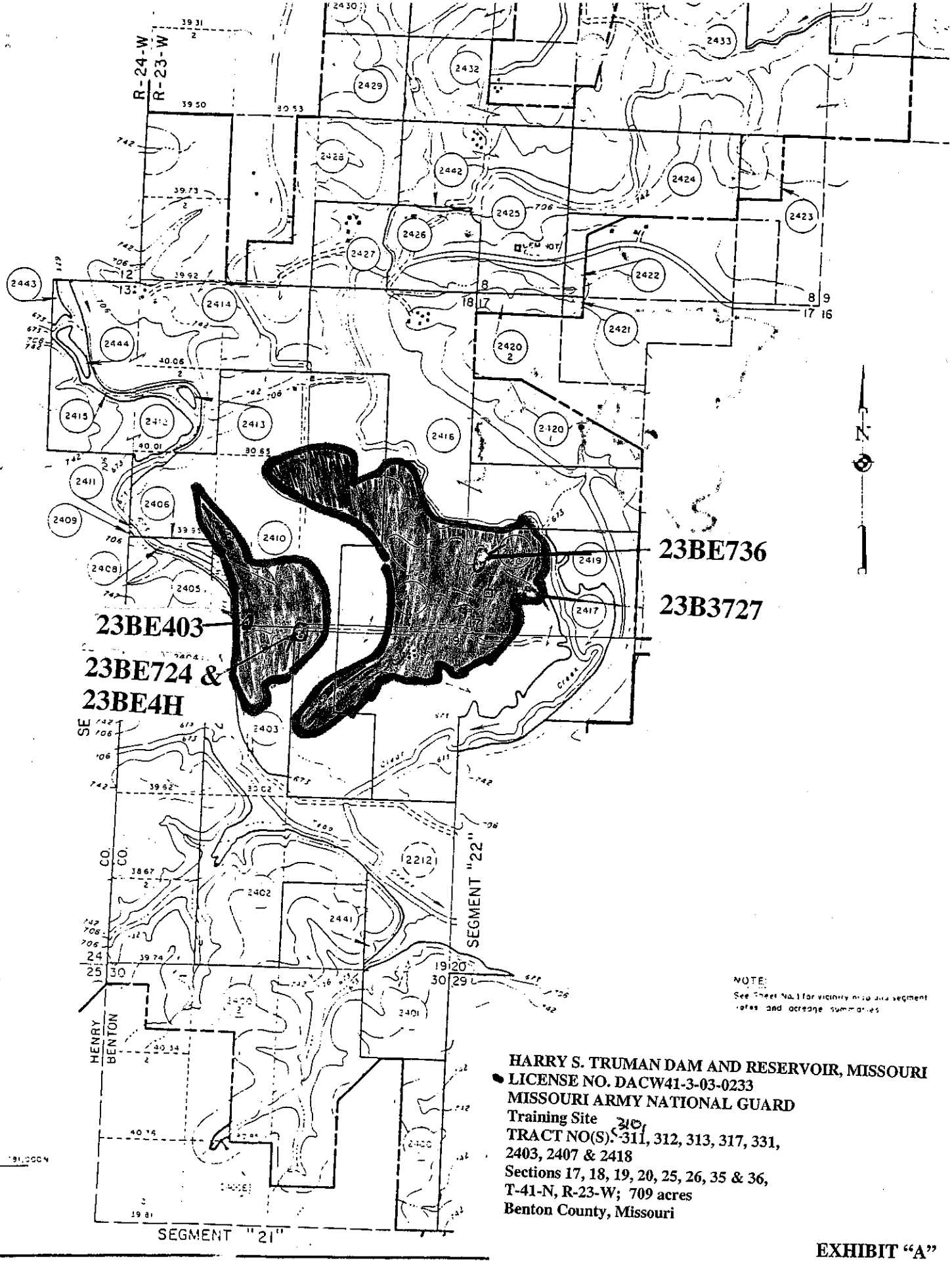
HARRY S TRUMAN DAM AND
RESERVOIR, MISSOURI
LICENSE NO. DACW41-3-03-0233
MISSOURI ARMY NATIONAL GUARD
Training Sites
TRACT NOs. 310, 311, 312, 313,
317, 331, 2403, 2407, & 2418
Sections 17, 18, 19, 20, 25, 26, 35, & 36
T-41-N, R-23-W; 709 acres
Benton County, Missouri

EXHIBIT "A"
Page 1 of 3



23BE816 = Is an example of a Cultural Resource site. The **H** identifier is in reference to a Historical Properties site. All of the sites noted on the aerial photos were previously surveyed and various items collected. Digging, leveling and or any type of excavation is prohibited in these areas. If artifacts are discovered, please contact Park Ranger Rich Abdoler as noted in item (**f**) of the conditions section.

HARRY S. TRUMAN DAM AND RESERVOIR, MISSOURI
LICENSE NO. DACW41-3-03-0233
MISSOURI ARMY NATIONAL GUARD
Training Site
TRACT NO(S). 311, 312, 313, 317, 331, 2403, 2407& 2418
Sections 17, 18, 19, 20, 25, 26, 35 & 36,
T-41-N, R-23-W; 709 acres
Benton County, Missouri



NOTE:
See Sheet No. 1 for victority area and segment notes and acreage summaries

HARRY S. TRUMAN DAM AND RESERVOIR, MISSOURI
LICENSE NO. DACW41-3-03-0233
MISSOURI ARMY NATIONAL GUARD
Training Site
TRACT NO(S). 311, 312, 313, 317, 331, 2403, 2407 & 2418
Sections 17, 18, 19, 20, 25, 26, 35 & 36, T-41-N, R-23-W; 709 acres
Benton County, Missouri

EXHIBIT "A"
Page 3 of 3

U.S. ARMY CORPS OF ENGINEERS, KANSAS CITY DISTRICT
PRELIMINARY ASSESSMENT SCREENING (PAS)
HARRY S. TRUMAN LAKE, MISSOURI

1. Real Property Transaction: Proposed grant of ( ) lease (X) license ( )easement ( ) permit ( ) deed or ( ) sale supplemental agreement for: National Guard training activities on Tracts 311, 312, 313, 322, 331, 2403, 2410, and 2418.

2. Description of Real Property: approx. 691 acres (Tracts 311, 312, 313, 322, and 331 = 479 acres; Tracts 2403, 2410, and 2418 = 212 acres).

3. Search of Truman Lake Project Records: Acquisition, construction, and reference files were searched on 28 April 1997 by Bob Marchi for any history of hazardous substance activity on the site.

(X) The search did not reveal any evidence of hazardous substance release, storage, or disposal exceeding CERCLA* thresholds.
( ) The search or other reason prompts on-site survey, attached.

Prepared By: Bob Marchi
Title: Park Ranger Date: 15 April 1996

4. Search of Records of Construction-Operations Division: [Names of records] were searched on 4/8/98 by John Lucido for any history of hazardous substance activity on the site. (X) The search did not reveal any evidence of hazardous substance release, storage, or disposal exceeding CERCLA thresholds.
( ) The search or other reason prompts on-site survey, attached.
Prepared By: John C Lucido
Title: Biologist Date: 4/8/98

5. Search of Records of Real Estate Division: [Names of records] were searched on 9/97 by ROY SHELTON for any history of hazardous substance activity on the site.
( ) The search did not reveal any evidence of hazardous substance release, storage, or disposal exceeding CERCLA thresholds.
( ) The search or other reason prompts on-site survey, attached.

Prepared By: Roy Shelton
Title: Realty Specialist Date: 4/9/98

HARRY S. TRUMAN DAM AND RESERVOIR, MISSOURI
LICENSE NO. DACW41-3-03-0233
MISSOURI ARMY NATIONAL GUARD
Training Site 310,
TRACT NO(S). 311, 312, 313, 331, 2403, 240 & 2418
Sections 17, 18, 19, 20, 25, 26, 35 & 36,
T-41-N, R-23-W; 709 acres
Benton County, Missouri

6. Conclusion:

(X) PAS indicates no necessity to provide notice under CERCLA nor any environmental conditions to affect the proposed real property transaction.

( ) PAS indicates a positive finding which requires further investigation and reporting.

Note: On-site surveys performed by Project personnel.

* Comprehensive Environmental Response, Compensation, and Liability Act

Attachment 2

HARRY S. TRUMAN DAM AND RESERVOIR, MISSOURI
LICENSE NO. DACW41-3-03-0233
MISSOURI ARMY NATIONAL GUARD
Training Site
TRACT NO(S). 311, 312, 313, 331, 2403, 240 & 2418
Sections 17, 18, 19, 20, 25, 26, 35 & 36,
T-41-N, R-23-W; 709 acres
Benton County, Missouri

EXHIBIT "B"
Page 2 of 2

Authorization ID: PBL103103
Contact ID: PBL103103
Expiration Date: 12/31/2026
Use Code: 431

FS-2700-4 (03/06)
OMB 0596-0082

U.S. DEPARTMENT OF AGRICULTURE
Forest Service
SPECIAL USE PERMIT
AUTHORITY:
ORGANIC ADMINISTRATION ACT June 4, 1897

Joint Force Headquarters-Missouri, Missouri National Guard of The Adjutant General, State of Missouri, 2302 Militia Drive, , JEFFERSON CITY, MO 65101-1207 (hereinafter called the Holder) is hereby authorized to use or occupy National Forest System lands, to use subject to the conditions set out below, on the Mark Twain National Forest or Poplar Bluff unit of the National Forest System.

This permit covers 2200 acres and is described as: T26N, R7E, Sections 13, 14, 15, 16, 21, 22, 23, and 24, Butler County as shown on the location map attached to and made a part of this permit, and is issued for training purposes and includes a cantonment area consisting of an office building, maintenance shop, sleeping quarters, mess hall, rappelling tower, water supply system, latrine and shower facility with self-service laundry, sewage treatment system and lagoons, two structures for range support, and two range control towers.

The above described or defined area shall be referred to herein as the "permit area".

TERMS AND CONDITIONS

I. AUTHORITY AND GENERAL TERMS OF THE PERMIT

A. Authority. This permit is issued pursuant to the authorities enumerated at Title 36, Code of Federal Regulations, Section 251 Subpart B, as amended. This permit, and the activities or use authorized, shall be subject to the terms and conditions of the Secretary's regulations and any subsequent amendment to them.

B. Authorized Officer. The authorized officer is the Forest Supervisor or a delegated subordinate officer.

C. License. This permit is a license for the use of federally owned land and does not grant any permanent, possessory interest in real property, nor shall this permit constitute a contract for purposes of the Contract Disputes Act of 1978 (41 U.S.C. 611). Loss of the privileges granted by this permit by revocation, termination, or suspension is not compensable to the holder.

D. Amendment. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to incorporate new terms, conditions, and stipulations as may be required by law, regulation, land management plans, or other management decisions.

E. Existing Rights. This permit is subject to all valid rights and claims of third parties. The United States is not liable to the holder for the exercise of any such right or claim.

F. Nonexclusive Use and Public Access. Unless expressly provided for in additional terms, use of the permit area is not exclusive. The Forest Service reserves the right to use or allow others to use any part of the permit area, including roads, for any purpose, provided, such use does not materially interfere with the holder's authorized use. A final determination of conflicting uses is reserved to the Forest Service.

G. Forest Service Right of Entry and Inspection. The Forest Service has the right of unrestricted access of the permitted area or facility to ensure compliance with laws, regulations, and ordinances and the terms and conditions of this permit.

H. Assignability. This permit is not assignable or transferable. If the holder through death, voluntary sale or transfer, enforcement of contract, foreclosure, or other valid legal proceeding ceases to be the owner of the improvements, this permit shall terminate.

I. Permit Limitations. Nothing in this permit allows or implies permission to build or maintain any structure or

I. Permit Limitations. Nothing in this permit allows or implies permission to build or maintain any structure or facility, or to conduct any activity unless specifically provided for in this permit. Any use not specifically identified in this permit must be approved by the authorized officer in the form of a new permit or permit amendment.

II. TENURE AND ISSUANCE OF A NEW PERMIT

A. Expiration at the End of the Authorized Period. This permit will expire at midnight on 12/31/2026. Expiration shall occur by operation of law and shall not require notice, any decision document, or any environmental analysis or other documentation.

B. Minimum Use or Occupancy of the Permit Area. Use or occupancy of the permit area shall be exercised at least 365 days each year, unless otherwise authorized in writing under additional terms of this permit.

C. Notification to Authorized Officer. If the holder desires issuance of a new permit after expiration, the holder shall notify the authorized officer in writing not less than six (6) months prior to the expiration date of this permit.

D. Conditions for Issuance of a New Permit. At the expiration or termination of an existing permit, a new permit may be issued to the holder of the previous permit or to a new holder subject to the following conditions:

1. The authorized use is compatible with the land use allocation in the Forest Land and Resource Management Plan.
2. The permit area is being used for the purposes previously authorized.
3. The permit area is being operated and maintained in accordance with the provisions of the permit.
4. The holder has shown previous good faith compliance with the terms and conditions of all prior or other existing permits, and has not engaged in any activity or transaction contrary to Federal contracts, permits laws, or regulations.

E. Discretion of Forest Service. Notwithstanding any provisions of any prior or other permit, the authorized officer may prescribe new terms, conditions, and stipulations when a new permit is issued. The decision whether to issue a new permit to a holder or successor in interest is at the absolute discretion of the Forest Service.

F. Construction. Any construction authorized by this permit may commence by N/A and shall be completed by N/A. If construction is not completed within the prescribed time, this permit may be revoked or suspended.

III. RESPONSIBILITIES OF THE HOLDER

A. Compliance with Laws, Regulations, and other Legal Requirements. The holder shall comply with all applicable Federal, State, and local laws, regulations, and standards, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq., the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. C. 9601 et seq., and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, and maintenance of any facility, improvement, or equipment on the property.

B. Plans. Plans for development, layout, construction, reconstruction, or alteration of improvements on the permit area, as well as revisions of such plans, must be prepared by a qualified individual acceptable to the authorized officer and shall be approved in writing prior to commencement of work. The holder may be required to furnish as-built plans, maps, or surveys, or other similar information, upon completion of construction.

C. Maintenance. The holder shall maintain the improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this authorization. If requested, the holder shall comply with inspection requirements deemed appropriate by the authorized officer.

D. Hazard Analysis. The holder has a continuing responsibility to identify all hazardous conditions on the

permit area which would affect the improvements, resources, or pose a risk of injury to individuals. Any non-emergency actions to abate such hazards shall be performed after consultation with the authorized officer. In emergency situations, the holder shall notify the authorized officer of its actions as soon as possible, but not more than 48 hours, after such actions have been taken.

E. Change of Address. The holder shall immediately notify the authorized officer of a change in address.

F. Change in Ownership. This permit is not assignable and terminates upon change of ownership of the improvements or control of the business entity. The holder shall immediately notify the authorized officer when a change in ownership or control of business entity is pending. Notification by the present holder and potential owner shall be executed using Form SF-299 Application for Transportation and Utility Systems and Facilities of Federal Lands, or Form FS-2700-3a, Holder Initiated Revocation of Existing Authorization, Request for a Special Use Permit. Upon receipt of the proper documentation, the authorized officer may issue a permit to the party who acquires ownership of, or a controlling interest in, the improvements or business entity.

IV. LIABILITY

For purposes of this section, "holder" includes the holder's heirs, assigns, agents, employees, and contractors.

A. The holder assumes all risk of loss to the authorized improvements.

B. Damage to National Forest Interests, Property, or Resources. The holder, as an agency of the United States, is limited by Federal law as to the assumption of liability for its acts or omissions. The holder does agree, within its legal limitations, and limitations of appropriations, to be responsible for all costs of damages and injury to persons, personal property, and land caused by its operations and activities under the terms of this permit. The holder further agrees, to the extent legally permissible, to use its appropriations and resources as required to pay any awards or claims, and to repair damages to the land within the permit area. It is the intent of this provision that the appropriations of the Forest Service be shielded from burdens, other than administrative costs, which may occur as a result of the activities by the holder under the terms of this permit.

C. With respect to roads, the holder shall be proportionally liable for damages to all roads and trails of the United States open to public use caused by the holder's use to the same extent as provided above, except that liability shall not include reasonable and ordinary wear and tear.

D. The Forest Service has no duty to inspect the permit area or to warn of hazards and, if the Forest Service does inspect the permit area, it shall incur no additional duty nor liability for identified or non-identified hazards. This covenant may be enforced by the United States in a court of competent jurisdiction.

V. TERMINATION, REVOCATION, AND SUSPENSION

A. General. For purposes of this permit, "termination", "revocation", and "suspension" refer to the cessation of uses and privileges under the permit.

"Termination" refers to the cessation of the permit under its own terms without the necessity for any decision or action by the authorized officer. Termination occurs automatically when, by the terms of the permit, a fixed or agreed upon condition, event, or time occurs. For example, the permit terminates at expiration. Terminations are not appealable.

"Revocation" refers to an action by the authorized officer to end the permit because of noncompliance with any of the prescribed terms, or for reasons in the public interest. Revocations are appealable.

"Suspension" refers to a revocation which is temporary and the privileges may be restored upon the occurrence of prescribed actions or conditions. Suspensions are appealable.

B. Revocation or Suspension. The Forest Service may suspend or revoke this permit in whole or part for:

1. Noncompliance with Federal, State, or local laws and regulations.
2. Noncompliance with the terms and conditions of this permit.
3. Reasons in the public interest.

4. Abandonment or other failure of the holder to otherwise exercise the privileges granted.

C. Opportunity to Take Corrective Action. Prior to revocation or suspension for cause pursuant to Section V (B), the authorized officer shall give the holder written notice of the grounds for each action and a reasonable time, not to exceed 90 days, to complete the corrective action prescribed by the authorized officer.

D. Removal of Improvements. Prior to abandonment of the improvements or within a reasonable time following revocation or termination of this authorization, the holder shall prepare, for approval by the authorized officer, an abandonment plan for the permit area. The abandonment plan shall address removal of improvements and restoration of the permit area and prescribed time frames for these actions. If the holder fails to remove the improvements or restore the site within the prescribed time period, they become the property of the United States and may be sold, destroyed or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all cost associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site.

VI. FEES

A. Termination for Nonpayment. This permit shall automatically terminate without the necessity of prior notice when land use rental fees are 90 calendar days from the due date in arrears.

B. Fees for this use have been exempted or waived in full pursuant to 36 CFR 251.57, or revisions thereto, and direction in FSH 2709.11, chapter 30.

VII. OTHER PROVISIONS

A. Members of Congress. No Member of or Delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except when the authorized use provides a general benefit to a corporation.

B. Appeals and Remedies. Any discretionary decisions or determinations by the authorized officer are subject to the appeal regulations at 36 CFR 251, Subpart C, or revisions thereto.

C. Superior Clauses. In the event of any conflict between any of the preceding printed clauses or any provision thereof and any of the following clauses or any provision thereof, the preceding printed clauses shall control.

D. Explosives (B29).

1. Only exploding bridgewire (EBWs) shall be used for blasting except for hand charging of snow release zones.

2. In the use of explosives, the holder shall exercise the utmost care not to endanger life or property and shall comply with the requirements of the Forest Service. The holder shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions that will prevent damage to surrounding objects. The holder shall furnish and erect special signs to warn the public of blasting operations. Such signs shall be placed and maintained so as to be clearly evident to the public during all critical periods of the blasting operations, and shall include a warning statement to have radio transmitters turned off.

3. All storage places for explosives shall be marked "DANGEROUS-EXPLOSIVES." The method of storing and handling explosives shall conform to procedures contained in the "Blasters Guide EM-7100-14," and Title 27, Code of Federal Regulations, parts 1 to 199, Alcohol, Tobacco Products, and Firearms (Bureau of Alcohol, Tobacco and Firearms (BATF)).

4. When using explosives, the holder shall adopt precautions which will prevent damage to landscape features and other surrounding objects. When directed by the Forest officer in charge, trees within an area designated to be cleared shall be left as a protective screen for surrounding vegetation during blasting

operations. Trees so left shall be removed and disposed of after blasting has been completed. When necessary, and at any point of special danger, the holder shall use suitable mats or some other approved method to smother blasts.

E. Site Development Schedule (C1). The holder shall prepare by December 31st a schedule for the progressive development and installation of facilities on the permitted site. This schedule shall be made a part of this authorization. The holder may accelerate the scheduled date for installation of any improvement authorized, provided the other scheduled priorities are met and that all priority installations authorized are completed to the satisfaction of the Forest Service and ready for public use prior to the scheduled due date.

All required plans and specifications for site improvements, and structures included in the development schedule shall be properly certified and submitted to the Forest Service at least forty-five (45) days before the construction date stipulated in the development schedule.

F. Site Plan (C2). The holder shall prepare site plans to show the location of all buildings, service areas, roads, and structures. Such plans shall be on a scale of 1:100 with 20 foot contour intervals. The holder is encouraged to consult with the authorized officer during the preparation of the site plan to ensure that it is adequate. No construction shall be undertaken by the holder prior to site plan approval.

G. Master Development Plan (C7). The holder agrees to prepare and submit changes in the Master Development Plan encompassing the entire resort presently envisioned for development in connection with the National Forest lands permitted by this authorization, and in a form acceptable to the Forest Service. Additional construction beyond maintenance of existing improvements shall not be authorized until this plan has been amended. Planning should encompass all the area for use by this authorization. The accepted Master Development Plan shall become a part of this authorization. For planning purposes, a capacity for the area in people-at-one time shall be established in the Master Development Plan and appropriate National Environmental Policy Act (NEPA) document. The overall development shall not exceed that capacity without further environmental analysis documentation through the appropriate NEPA process.

H. Operating Plan (C8). The holder shall provide an Operating Plan and revise the plan every 2 years. The plan shall be prepared in consultation with the authorized officer or designated representative and cover operation and maintenance of facilities, dates or season of operations, and other information required by the authorized officer to manage and evaluate the occupation and/or use of National Forest System lands. The provisions of the Operating Plan and the annual revisions shall become a part of this authorization and shall be submitted by the holder and approved by the authorized officer or their designated representative(s). This Operating Plan is hereby made a part of the authorization.

I. Surveys, Land Corners (D4). The holder shall protect, in place, all public land survey monuments, private property corners, and Forest boundary markers. In the event that any such land markers or monuments are destroyed in the exercise of the privileges permitted by this authorization, depending on the type of monument destroyed, the holder shall see that they are reestablished or referenced in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service.

Further, the holder shall cause such official survey records as are affected to be amended as provided by law. Nothing in this clause shall relieve the holder's liability for the willful destruction or modification of any Government survey marker as provided at 18 U.S.C. 1858.

J. Removal and Planting of Vegetation and Other Resources (D5). The holder shall obtain prior written approval from the authorized officer before removing or altering vegetation or other resources. The holder shall obtain prior written approval from the authorized officer before planting trees, shrubs, or other vegetation within the authorized area.

K. Revegetation of Ground Cover and Surface Restoration (D9). The holder shall be responsible for prevention and control of soil erosion and gullying on lands covered by this authorization and adjacent thereto, resulting from construction, operation, maintenance, and termination of the authorized use. The holder shall so

construct permitted improvements to avoid the accumulation of excessive heads of water and to avoid encroachment on streams. The holder shall revegetate or otherwise stabilize all ground where the soil has been exposed as a result of the holder's construction, maintenance, operation, or termination of the authorized use and shall construct and maintain necessary preventive measures to supplement the vegetation.

L. Pesticide Use (D23). Pesticides may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash fish, etc., without the prior written approval of the Forest Service. A request for approval of planned uses of pesticides will be submitted annually by the holder on the due date established by the authorized officer. The report will cover a 12-month period of planned use beginning 3 months after the reporting date. Information essential for review will be provided in the form specified. Exceptions to this schedule may be allowed, subject to emergency request and approval, only when unexpected outbreaks of pests require control measures which were not anticipated at the time an annual report was submitted.

Only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned will be considered for use on National Forest System lands. Label instructions will be strictly followed in the application of pesticides and disposal of excess materials and containers.

M. Protection of Habitat of Endangered, Threatened, and Sensitive Species (X8). Location of areas needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act of 1973, as amended, or as sensitive by the Regional Forester under authority of FSM 2670, derived from ESA Section 7 consultation, may be shown on a separate map, hereby made a part of this authorization, or identified on the ground. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the authorization holder.

If protection measures prove inadequate, if other such areas are discovered, or if new species are listed as Federally threatened or endangered or as sensitive by the Regional Forester, the authorized officer may specify additional protection regardless of when such facts become known. Discovery of such areas by either party shall be promptly reported to the other party.

N. Archaeological-Paleontological Discoveries (X17). The holder shall immediately notify the authorized officer of any and all antiquities or other objects of historic or scientific interest. These include, but are not limited to, historic or prehistoric ruins, fossils, or artifacts discovered as the result of operations under this authorization, and shall leave such discoveries intact until authorized to proceed by the authorized officer. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the holder.

This permit is accepted subject to the conditions set out above.

HOLDER NAME: Joint Force Headquarters-Missouri, Missouri National Guard

By: _____
(Holder Signature)

By: _____
(Holder Signature)

Date: 21 DEC 2006

U.S. DEPARTMENT OF AGRICULTURE
Forest Service

By: _____
Ronnie Raum

Title: _____
Forest Supervisor

Date: 1/03/07

APPENDIX N. NATIONAL ENVIRONMENTAL POLICY ACT

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N.1 NEPA REQUIREMENTS

This INRMP is covered under the environmental assessment of the revised 2009 INRMP. Per the SAIA and the DoD Supplemental SAIA Guidance, the 2009 final revised INRMP, final EA, and draft Finding of No Significant Impact were made available for public comment. There are no public notice requirements for this update; however, the public may obtain information on the status and progress of the Proposed Action through the MOARNG PAO. A Record of Environmental Consideration (REC) tiering off that EA was completed for this update and follows.

Enviro Tracking #:	ARNG ENVIRONMENTAL CHECKLIST	State ARNG
21-02	**Enter information in the yellow shaded areas.**	**MOARNG**

PART A - PROJECT INFORMATION

1. PROJECT NAME:

Integrated Natural Resources Management Plan (INRMP) for the Missouri Army National Guard - Update

2. PROJECT NUMBER: (MILCON if applicable)

3. DATE PREPARED:
6/29/2021

4. DESCRIPTION AND LOCATION OF THE PROJECT/PROPOSED ACTION:

a. Location (Include a detailed map, if applicable):

Camp Crowder Training Site (CCR) in Neosho, Missouri; Camp Clark Training Site (CCL) in Nevada, Missouri; Macon Training Site (MTS) in Macon, Missouri; Truman Training Area (TTA) near Warsaw, Missouri; and Wappapello Training Site (WTS) in Wappapello, Missouri.

b. Description:

This project consists of updating the 2016 INRMPs for CCR, CCL, MTS, TTA, and WTS. The reasons for the INRMP update include (1) combining five separate site INRMPS into one document; (2) collecting updated resource information and Army National Guard (ARNG) guidance; and (3) remaining in compliance with the Sikes Act. The INRMP is covered under the environmental assessment (EA) of the revised 2009 INRMP, therefore this update will be treated as a tiering action off of the EA.

CCR: 4,300 acres; CCL: 1,287 acres; MTS: 3,152 acres; TTA: 719 acres; WTS: 2,200 acres

c. The proposed action will involve (check all that apply):

- ☐ Training activities/areas
- ☐ Maintenance/repair/rehabilitation
- ☐ Innovative readiness training project
- ☐ Other (Explain):
- ☐ Construction
- ☐ Real estate action
- ☐ Natural resource management
- ☑ Environmental plans/surveys

d. Project size (acres): Total acreage: 11,658 (if applicable)

Acres of new surface disturbance (proposed): (if applicable)

5. START DATE of PROPOSED ACTION (dd-mmm-yy): 10/Aug/2021 Note: This must be a future date.

6. PROGRAMMED FISCAL YEAR (if applicable): FY21

7. END DATE (if applicable): 10/Aug/2026

PART B - DECISION ANALYSIS GUIDE

To use a categorical exclusion, the project must satisfy the following three screening criteria: no segmentation, no exceptional circumstances and a qualifying categorical exclusion that covers the project. The following decision tree will guide the application and documentation of these three screening criteria. The criteria were extracted from 32 CFR Section 651.29 and represent the most common screening conditions experienced in the ARNG. NOTE: Each question in Part B must have an applicable block checked for concurrence with REC.

1. Is this action segmented (the scope of the action must include the consideration of connected, cumulative, and similar actions)? ☐ YES (go to #30) ☑ NO (go to #2)

2. Is there reasonable likelihood of significant environmental effects (direct, indirect,and cumulative)? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.
☑ YES (go to #30) ☑ NO (go to #3)

3. Is there a reasonable likelihood of significant effects on public health, safety or the environment? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.
☐ YES (go to #30) ☑ NO (go to #4)

4. Is there an imposition of uncertain or unique environmental risks? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.
☐ YES (go to #30) ☑ NO (go to #5)

5. Is the project of greater scope or size than is normal for the category of action? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.
☐ YES (go to #30) ☑ NO (go to #6)

6. Does the project introduce or employ unproven technology? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.
☐ YES (go to #30) ☑ NO (go to #7)

PART B - DECISION ANALYSIS (continued)

7. Will there be reportable releases of hazardous or toxic substances as specified in 40 CFR Part 302? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ☑ NO (go to #8)

8. If proposed action is in a non-attainment or maintenance area, will air emissions exceed de minimus levels or otherwise require a formal Clean Air Act (CAA) conformity determination? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ☐ NO (go to #9) ☑ N/A (go to #9)

9. Will the project have effects on the quality of the environment that are likely to be highly controversial? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ☑ NO (go to #10)

10. Will the project establish a precedent (or make decisions in principle) for future or subsequent actions that are reasonably likely to have future significant effects? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ☑ NO (go to #11)

11. Has federal funding been secured for the Innovative Readiness Training (IRT) project?

☑ N/A (go to #13) ☐ YES (go to #13) ☐ NO (go to #12)

12. NOTE: IRT projects not currently funded can secure approved NEPA documentation. However, once funding is secured State ARNG is required to coordinate with ARNG-ILE-T to complete natural and cultural surveys via proponent funding.

☐ CONFIRMED (go to #27)

13. Do you have a species list from the U.S. Fish and Wildlife Service that is less than 90 days old?

☑ YES (go to #14) Date of List: 7/15/2021 ☐ NO (update species list return to #13)

14. In reviewing the species list, what determination was made by the State ARNG?

☐ No species present (go to #16)
☑ No affect (go to #16)
☐ May affect but not likely to adversely affect (go to #16) Date of USFWS concurrence:
☐ May affect likely to adversely affect (go to #15)

15. Does an existing Biological Opinion cover the action?

☐ YES (go to #16) Date of BO: ☐ NO (go to #30)

16. Have the Endangered Species Act, Section 7 requirements completed?

☑ YES (go to #17) Date of Documentation: 7/15/2021 ☐ NO (complete documentation, return to #16)

17. Does the project involve an undertaking to a building or structure that is 50 years of age or older?

☐ YES (go to #18) ☑ NO (go to #20)

18. Has the building or structure been surveyed for the National Register of Historic Places?

☐ YES (go to #19) ☐ NO (complete inventory, return to #18)

19. Is the building or structure eligible for or listed on the National Register of Historic Places?

☐ YES (go to #20) ☐ NO (go to #20)

20. Does the action involve ground disturbing activities?

☐ YES (go to #21) ☑ NO (go to #22)

21. Has an archaeological inventory or research been completed to determine if there are any archeological resources present?

☐ YES (go to #22) ☐ NO (complete inventory or conduct research, return to #21)

22. In reviewing the undertaking, under the National Historic Preservation Act (NHPA) (for both above and below ground resources), what determination was made by the State ARNG?

☑ No 106 undertaking; no additional consultation required under NHPA (go to question #27)
☐ No properties affected (go to #24) Date of SHPO Concurrence:
☐ No adverse effect (go to #24) Date of SHPO Concurrence:
☐ Adverse effect (go to #23)

23. Has the State ARNG addressed the adverse effect?

☐ YES (place date of MOA or existing PA and explanation of mitigation in box below, go to #24) ☐ NO (go to #30)

23a.

PART B - DECISION ANALYSIS (continued)

24. Per DoDI 4710.02 did the state ARNG determine that tribal consultation was necessary for this project?

☐ YES (go to #25)

☐ NO (Provide reason in this block 24a, go to #27)

24a.

25. Did the Tribes express an interest or respond with concerns about the project?

☐ YES (go to #26) ☐ NO (go to #27) Date of Documentation:

26. Has the State ARNG addressed the Tribal concerns?

☐ YES (place date of MOU or explanation of how State ARNG addressed tribal concerns in box below, go to #27)

☐ NO (address concerns, return to #26)

Complete only if additional documentation is required in question #26

26a.

27. Does the project involve an unresolved effect on areas having special designation or recognition such as those listed below? For any yes responses go to #30 otherwise go to #28. If any No response is a result of negotiated and/or previously resolved effects please describe resolution in box 27a below.

TYPE	Unresolved Effects?	TYPE	Unresolved Effects?
a. Prime/Unique Farmland	No	e. Wild/Scenic River	No
b. Wilderness Area/National Park	No	f. Coastal Zones	No
c. Sole-Source Aquifer	No	g. 100-year Floodplains	No
d. Wetlands	No	h. National Wildlife Refuges	No

27a.

28. Is this project addressed in a separate EA or EIS review?

☑ YES (complete table below; go to Part C, Determination) ☐ NO (go to #29)

Document Title:	Environmental Assessment of the Revised Integrated Natural Resources Management Plan for the MOARNG
Lead Agency:	Missouri Army National Guard
Date of Decision Document:	September 2008

29. Does the project meet at least one of the categorical exclusions listed in 32 CFR 651 App B?

☐ YES (complete table below; go to Part C, Determination) ☐ NO (go to #30)

List primary CAT EX code	
Descibe why CAT EX applies	

30. At this time your project has not met all the qualifications for using a categorical exclusion under 32 CFR 651. Unless the scope of the project is changed, it will require an Environmental Assessment or possibly an Environmental Impact Statement. If you feel this is in error, please call your NEPA Regional Manager to discuss. If needed, go to Part C Determination.

Additional Information (if needed):

PART C - DETERMINATION

On the basis of this initial evaluation, the following is appropriate:

- ☐ IAW 32 CFR 651 Appendix B, the proposed action qualifies for a Categorical Exclusion (CX) that does not require a Record of Environmental Consideration.
- ☑ A Record of Environmental Consideration (REC).
- ☐ An Environmental Assessment (EA).
- ☐ A Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS).

Timothy W. Schulte Digitally signed by SCHULTE.TIMOTHY.WAYNE.1280981660 Date: 2021.10.13 12:50:57 -05'00'	Jody L. McCall Digitally signed by MCCALL.JODY.LEMONT.1144716732 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=MCCALL.JODY.LEMONT.1144716732 Date: 2021.10.13 12:57:51 -05'00'
Signature of Proponent (Requester)	Environmental Program Manager
Timothy W. Schulte	Jody L. McCall
Printed Name of Proponent (Requester)	Printed Name of Env. Program Manager

Other concurrence (as needed):

Signature	Signature
Printed Name	Printed Name
Signature	Signature
Printed Name	Printed Name
Signature	Signature
Printed Name	Printed Name

Enviro Tracking #:	ARNG Record of Environmental Consideration	State ARNG
21-02	Enter information in the yellow shaded areas.	MOARNG

1. PROJECT NAME:
Integrated Natural Resources Management Plan (INRMP) for the Missouri Army National Guard - Update

2. PROJECT NUMBER: (MILCON if applicable)

3. DATE PREPARED:
6/29/2021

4. START DATE of PROPOSED ACTION (dd-mmm-yy): 10/Aug/2021 Note: This must be a future date

5. PROGRAMMED FISCAL YEAR: FY21

6. END DATE (if applicable): 10/Aug/2026

7. DESCRIPTION AND LOCATION OF THE PROPOSED ACTION:
a. Location (Include a detailed map, if applicable):

Camp Crowder Training Site (CCR) in Neosho, Missouri; Camp Clark Training Site (CCL) in Nevada, Missouri; Macon

b. Description:

This project consists of updating the 2016 INRMPs for CCR, CCL, MTS, TTA, and WTS. The reasons for the INRMP update include (1) combining five separate site INRMPS into one document; (2) collecting updated resource information and Army National Guard (ARNG) guidance; and (3) remaining in compliance with the Sikes Act. The INRMP is covered under the environmental assessment (EA) of the revised 2009 INRMP, therefore this update will be treated as a tiering action off of the EA.

CCR: 4,300 acres; CCL: 1,287 acres; MTS: 3,152 acres; TTA: 719 acres; WTS: 2,200 acres

8. CHOOSE **ONE** OF THE FOLLOWING:

- [x] An existing environmental assessment* adequately covers the scope of this project. Attach FNSI if EA was completed by another federal agency (non-ARNG).
  EA Date (dd-mmm-yy): 11/Sep/08 Lead Agency: Missouri Army National Guard
- [ ] An existing environmental impact statement* adequately covers the scope of this project.
  EIS Date (dd-mmm-yy): Lead Agency:
- [ ] After reviewing the screening criteria and completing the ARNG environmental checklist, this project qualifies for a **Categorical Exclusion** (select below).
  Categorical Exclusion Code:
  See 32 CFR 651 App. B
  Categorical Exclusion Code:
  See 32 CFR 651 App. B
  Categorical Exclusion Code:
  See 32 CFR 651 App. B
- [ ] This project is exempt from NEPA requirements under the provisions of:
  Cite superseding law:

*Copies of the referenced EA or EIS can be found in the ARNG Environmental Office within each state.

9. REMARKS:

Timothy W. Schulte
Digitally signed by SCHULTE.TIMOTHY.WAYNE.1280981660
Date: 2021.10.13 12:52:06 -05'00'

Signature of Proponent

(Requester) Timothy W. Schulte

Printed Name of Proponent (Requester)

Jody L. McCall
Digitally signed by MCCALL.JODY.LEMONT.1144716732
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=MCCALL.JODY.LEMONT.1144716732
Date: 2021.10.13 12:58:11 -05'00'

Environmental Program Manager

Jody L. McCall

Printed Name of Env. Program Manager

Proponent Information:

10. Proponent: Timothy W. Schulte

11. Address: 2303 Militia Drive, Jefferson City, Missouri 65101

12. POC: Jody L. McCall

13. Comm. Voice: 573-638-9514

14. Proponent POC e-mail: jody.l.mccall.mil@mail.mil

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: January 21, 2022
Consultation Code: 03E14000-2022-SLI-0799
Event Code: 03E14000-2022-E-02502
Project Name: CCR INRMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. N**ote that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features – particularly within stream corridors, riparian areas, or associated upland woodlots –gray bats could be affected.

Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the hibernation season is considered to be November 1 to March 31. During the active season in Missouri (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches diameter at breast height (dbh) for Indiana bat, and ≥3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website.

3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
b. Any activity in or near the entrance to a cave or mine;
c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
d. Construction of one or more wind turbines; or
e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area

please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

Project Summary

Consultation Code: 03E14000-2022-SLI-0799
Event Code: Some(03E14000-2022-E-02502)
Project Name: CCR INRMP
Project Type: ** OTHER **
Project Description: Project covers all information provided in the Integrated Natural Resources Management Plan for CCR.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.795431699999995,-94.37392814902226,14z

Counties: McDonald and Newton counties, Missouri

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/project/CMZW5WC2BFCJDKQVRM3MX7JFKU/documents/generated/6868.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/project/CMZW5WC2BFCJDKQVRM3MX7JFKU/documents/generated/6868.pdf	Threatened

Fishes

NAME	STATUS
Ozark Cavefish *Amblyopsis rosae* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6490	Threatened

Clams

NAME	STATUS
Neosho Mucket *Lampsilis rafinesqueana*	Endangered
There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3788	
Rabbitsfoot *Quadrula cylindrica cylindrica*	Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5165	

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: January 21, 2022
Consultation Code: 03E14000-2022-SLI-0800
Event Code: 03E14000-2022-E-02505
Project Name: CCL INRMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

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New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. N**ote that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

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Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website.

3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
b. Any activity in or near the entrance to a cave or mine;
c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
d. Construction of one or more wind turbines; or
e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area

please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

Project Summary

Consultation Code: 03E14000-2022-SLI-0800
Event Code: Some(03E14000-2022-E-02505)
Project Name: CCL INRMP
Project Type: ** OTHER **
Project Description: Project covers all information provided in the Integrated Natural Resources Management Plan for CCL.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.8202934,-94.29154180336668,14z

Counties: Vernon County, Missouri

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/project/Q4NAR3R6MNBX7HYXLZD42VSJNQ/documents/generated/6868.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/project/Q4NAR3R6MNBX7HYXLZD42VSJNQ/documents/generated/6868.pdf	Threatened

Insects

NAME	STATUS
American Burying Beetle *Nicrophorus americanus*	Threatened
Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/66	
Monarch Butterfly *Danaus plexippus*	Candidate
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	

Flowering Plants

NAME	STATUS
Mead's Milkweed *Asclepias meadii*	Threatened
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8204	

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: January 24, 2022
Consultation Code: 03E14000-2022-SLI-0811
Event Code: 03E14000-2022-E-02546
Project Name: MTS INRMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. N**ote that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features – particularly within stream corridors, riparian areas, or associated upland woodlots –gray bats could be affected.

Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the hibernation season is considered to be November 1 to March 31. During the active season in Missouri (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches diameter at breast height (dbh) for Indiana bat, and ≥3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website.

3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
b. Any activity in or near the entrance to a cave or mine;
c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
d. Construction of one or more wind turbines; or
e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area

please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

Project Summary

Consultation Code: 03E14000-2022-SLI-0811
Event Code: Some(03E14000-2022-E-02546)
Project Name: MTS INRMP
Project Type: ** OTHER **
Project Description: Project covers all information provided in the Integrated Natural Resources Management Plan for MTS.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.67619945,-92.50827326912132,14z

Counties: Macon County, Missouri

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/project/QACHNQLJ2NFU7PUSYJN4GFJVRU/documents/generated/6868.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/project/QACHNQLJ2NFU7PUSYJN4GFJVRU/documents/generated/6868.pdf	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: January 21, 2022
Consultation Code: 03E14000-2022-SLI-0801
Event Code: 03E14000-2022-E-02507
Project Name: TTA INRMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. N**ote that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features – particularly within stream corridors, riparian areas, or associated upland woodlots –gray bats could be affected.

Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the hibernation season is considered to be November 1 to March 31. During the active season in Missouri (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches diameter at breast height (dbh) for Indiana bat, and ≥3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website.

3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
b. Any activity in or near the entrance to a cave or mine;
c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
d. Construction of one or more wind turbines; or
e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area

please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

Project Summary

Consultation Code: 03E14000-2022-SLI-0801
Event Code: Some(03E14000-2022-E-02507)
Project Name: TTA INRMP
Project Type: ** OTHER **
Project Description: Project covers all information provided in the Integrated Natural Resources Management Plan for TTA.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.29903865,-93.42228834565914,14z

Counties: Benton County, Missouri

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/project/MQTK2SWJJNH2DDZVAPKLAXLSP4/documents/generated/6868.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/project/MQTK2SWJJNH2DDZVAPKLAXLSP4/documents/generated/6868.pdf	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Mead's Milkweed *Asclepias meadii*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/8204

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

In Reply Refer To: January 21, 2022
Consultation Code: 03E14000-2022-SLI-0804
Event Code: 03E14000-2022-E-02521
Project Name: WTS INRMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. N**ote that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features – particularly within stream corridors, riparian areas, or associated upland woodlots –gray bats could be affected.

Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the hibernation season is considered to be November 1 to March 31. During the active season in Missouri (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches diameter at breast height (dbh) for Indiana bat, and ≥3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see #3 below) – then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website.

3. If IPac returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
b. Any activity in or near the entrance to a cave or mine;
c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
d. Construction of one or more wind turbines; or
e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the Range-wide Indiana Bat Summer Survey Guidelines.

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area

please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Missouri Ecological Services Field Office
101 Park Deville Drive
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Columbia, MO 65203-0057
(573) 234-2132

Project Summary

Consultation Code: 03E14000-2022-SLI-0804
Event Code: Some(03E14000-2022-E-02521)
Project Name: WTS INRMP
Project Type: ** OTHER **
Project Description: Project covers all information provided in the Integrated Natural Resources Management Plan for WTS.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.892525899999995,-90.28127823107013,14z

Counties: Butler County, Missouri

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/project/J42SMZSOAFGFDOHGN2AIR5XLQY/documents/generated/6868.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/project/J42SMZSOAFGFDOHGN2AIR5XLQY/documents/generated/6868.pdf	Threatened

Clams

NAME	STATUS
Rabbitsfoot *Quadrula cylindrica cylindrica* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5165	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

APPENDIX O. INRMP REVIEWS

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O.1 ANNUAL REVIEWS AND COORDINATION

Per DoD policy, the MOARNG reviews the INRMP annually in cooperation with the USFWS and MDC. The MOARNG will converse with the agencies annually to determine if changes or issues indicate the need for a meeting. If warranted, a meeting will be held with the USFWS and MDC and be documented by meeting minutes. If a meeting is not necessary, the conversation will be documented via email correspondence or record of conversation.

During the annual review, the need for updates or revisions will be discussed. If minor updates are needed, the requesting party will initiate the updates and, after agreement of all three parties, the updates will be added to the INRMP. If it is determined that major changes are needed, all three parties will provide input, and an INRMP revision and associated NEPA review will be initiated, with the MOARNG acting as the lead coordinating agency. The annual review will be used to help expedite the more formal review for operation and effect and, if all parties agree and document their mutual agreement, it can fulfill the requirement to review the INRMP for operation and effect.

In accordance with the Army Guidance for Implementation of the SAIA, dated 25 May 2006, annual reviews shall at minimum verify that:

- Current information on INRMP conservation metrics as described in Environmental Quality Universal Information Portal (Equip) is available.
- All "must fund" projects and activities have been budgeted for and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate revising the INRMP.
- All required coordination has occurred.
- All significant changes to the installation's mission requirements or its natural resources have been identified.
- The INRMP goals and objectives are still valid.
- No net loss of training capability has occurred due to implementation of the INRMP in accordance with the Sikes Act.

As part of the annual review, the MOARNG will specifically:

- Invite feedback from the USFWS and MDC on the effectiveness of the INRMP.
- Inform the USFWS and MDC which INRMP projects and activities are required to meet current natural resources compliance needs.
- Document INRMP action accomplishments from the previous year.

O.2 REVIEW FOR OPERATION AND EFFECT

Not less than every five years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented to meet the intent of the Sikes Act and contributing to conservation and rehabilitation of natural resources. The review will be conducted by the three cooperating parties to include the commander responsible for the INRMP, the regional director of the USFWS, and director of the MDC. These agencies all have technical representatives who actually do the review.

The review for operation and effect will either conclude the INRMP is meeting the intent of the Sikes Act, can be updated, and implementation can continue; or that it is not effective in meeting the intent of the Sikes Act to conserve natural resources while providing for no net loss in training capability and must be revised. Mutual agreement of the review for operation and effect must be obtained from the regional director of the USFWS and the director of the MDC, or their delegate staff. This may be achieved via a signed letter, a jointly executed memorandum, or in some other way, that reflects mutual agreement.

If only minor updates are needed, they will be done in a manner agreed to by all parties. The updated INRMP will be reviewed by USFWS and MDC. A new NEPA review is not necessary for update and continued implementation of an existing INRMP that has previously undergone NEPA review. In this case, an Environmental Checklist and REC citing the previous NEPA document is needed.

If a review of operation and effect concludes an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and MDC concurrence on the revised INRMP is received. Revisions to the INRMP will go through a more detailed review process similar to development of the initial INRMP to ensure MOARNG military mission, USFWS, and MDC concerns are adequately addressed and the plan meets the intention of the Sikes Act.

O.3 ANNUAL REVIEWS LOG

This page is used to certify that the MOARNG has conducted the required annual review of this INRMP. Memorandums detailing annual reviews are kept on file at the NGMO-EM office.

Table 24. Annual INRMP Reviews

Fiscal Year Review	Completion Date	MOARNG INRMP Coordinator Signature

APPENDIX P. NATURAL RESOURCE PROTECTION AUTHORITIES

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P.1 FEDERAL LAWS, REGULATIONS, AND EXECUTIVE ORDERS

American Indian Religious Freedom Act (42 USC §1196) – Requires the U.S. to protect and preserve religious rights of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Animal Damage Control Act (7 USC §426 et seq.) – Provides broad authority for investigation, demonstrations, and control of mammalian predators, rodents, and birds.

American Antiquities Act of 1906 (16 USC §431-433) – Provides for the protection of items of archeological significance, both historic and prehistoric.

Archeological and Historical Preservation Act of 1974 (16 U.S.C 469 et seq.) – Provides for the preservation of historical and archeological data (including relics and specimens).

Archeological Resources Protection Act of 1979 (16 USC §470 et seq.) – Prohibits the excavation or removal from federal or Indian lands any archeological resources without a permit from the land manager.

Bald Eagle Protection Act (16 USC §668a-d) – Prohibits taking or harming bald or golden eagles, their eggs, nests, or young without appropriate permit.

Clean Air Act, as amended (42 USC §7401 et seq.) – Regulates air emissions from area, stationary, and mobile sources. This law authorizes the USEPA to establish NAAQS to protect public health and the environment.

Clean Water Act (33 USC 1251 et seq.) – Prohibits the discharge of any pollutant from a point source into navigable waters, unless a permit is obtained.

CWA: Section 401 Water Quality Certification, 1986 (33 USC §1341) – Requires state certification of federal permits that result in actions that discharge into navigable waters. Under Section 401, states have authority to review federal permits that may result in a discharge to wetlands or waterbodies under state jurisdiction.

Endangered Species Act of 1973, as amended (16 USC §1531 et seq.) – Provides for the identification and protection of threatened and endangered plants and animals and their critical habitats. Requires federal agencies to conserve T&E species and cooperate with state and local authorities to resolve water resources issues in concert with the conservation of T&E species.

Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870) – Restricts use of chemical toxicants for mammal and bird control.

Federal Compliance with Pollution (EO 12088) - Requires all Federal agencies to be in compliance with environmental laws and fully cooperate with EPA, State, interstate, and local agencies to prevent, control, and abate environmental pollution.

Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136) – Governs the use and application of pesticides in natural resource management programs.

Federal Land Policy and Management Act (43 USC §1701) – Establishes public land policy and guidelines for its administration and provides for the management, protection, development, and enhancement of the public lands.

Federal Noxious Weed Act of 1974 (7 USC §2801 et seq.) – Establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.

Federal Water Pollution Control Act as amended by the CWA of 1977 (33 USC §1251) – Regulates dredging and filling of wetlands and waterbodies and establishes procedures for identifying and regulating non-point sources of pollutants, including turbidity, into waterways.

Federal Water Pollution Control Act: Section 404, as amended by the CWA of 1977 (33 USC §1251) – Prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from USACE. Activities in wetlands that require federal permits include, but are not limited to: placement of fill material; ditching activities when the excavated material is sidecast; mechanized land clearing; land leveling; and most road construction.

Fish and Wildlife Conservation Act (16 USC §2901) – Provides for protection of non- game fish and wildlife.

Fish and Wildlife Coordination Act (16 USC §661 et seq.) – Provides mechanism for wildlife conservation to receive equal consideration and be coordinated with water- resource development programs.

Floodplain Management (EO 11988) – Requires agencies to assess the effects that their actions may have on floodplains and to consider alternatives to avoid adverse effects and incompatible development on floodplains.

Forest and Rangeland Renewable Resources Planning Act (16 USC §1601 et seq.) – Requires and inventory of potential renewable resources and an evaluation of opportunities for improving their yield on goods and services. Agencies must provide an opportunity for public involvement and consultation with other agencies in establishing policies for multiple use and sustained yield.

Greening the Government through Leadership in Environmental Management (EO 13148) – This EO (Section 207, Environmentally and Economically Beneficial Landscaping) states that “each agency shall strive to promote the sustainable management of federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.”

Hunting and Fishing on Federal Lands (10 USC §2671 et seq.) – Establishes requirements for regulating hunting, fishing, and trapping on military lands.

Indian Sacred Sites (EO 13007) – Provides for protection of and access to Indian sacred sites.

Invasive Species (EO 13112) – Requires federal agencies to: “prevent the introduction of invasive species”; “detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner”; “monitor invasive species populations accurately and reliably, provide for restoration of native species and habitat conditions in ecosystems that have been invaded”; “conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species”; and “promote public education on invasive species and the means to address them.”

Land and Water Conservation Act of 1965 (16 USC §4601 et seq.) – Assists in preserving, developing, and assuring accessibility to outdoor recreation resources.

Legacy Resource Protection Program Act (P.L. 101-511) – Established a program for the stewardship of biological, geophysical, cultural, and historic resources on DoD lands.

Migratory Bird Conservation Act (16 USC §715 et seq.) – Establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act, as amended (16 USC §703-712) – Prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.

National Environmental Policy Act of 1969, as amended (42 USC §4321) – Provides a national charter for protection of the environment and requires federal agencies to prepare a statement of environmental impact in advance of each major action that may significantly affect the quality of the human environment.

National Historic Preservation Act of 1966 (16 USC §470 et seq.) – Provides for the preservation of historic properties throughout the U.S.

Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C 4701 et seq.) – Established a program to prevent the introduction of and to control the spread of introduced aquatic nuisance species and the brown tree snake.

Off Road Vehicle Use on Public Lands (EO 11989) – Limits the use of off-road vehicles on federal lands soil, water, or natural resources could be adversely affected.

Oil Pollution Prevention Act of 1990, Public Law 101-380 – Redefines the requirements of the National Contingency Plan to include planning for, rescue of, minimization of injury to, and assessment of damages for injury to fish and wildlife resources.

Outleasing for Grazing and Agriculture on Military Lands (10 USC §2667) – Provides for the outleasing of public lands.

Plant Protection Act (7 USC § 7711) – Regulates the movement of plant pests.

Protection and Enhancement of Environmental Quality (EO 11514) – Provides for environmental protection of federal lands and enforces requirements of NEPA.

Protection and Enhancement of the Cultural Environment (EO 11593) – Supports previous laws and provides for additional protection of cultural resources.

Protection of Wetlands (EO 11990) – Requires agencies to take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands.

Recreational Fisheries (EO 12962) – Requires federal agencies, to the extent practicable and where permitted by law, "to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities”.

Rivers and Harbors Act of 1899 - Prohibits the construction of any bridge, dam, dike, or causeway over or in navigable waterways of the U.S. without Congressional approval.

Sale of Certain Interests in Land, Logs (10 USC §2665) – Authorizes the sale of forest products and the reimbursement of the costs of managing forest resources for timber production.

Sikes Act "Conservation Programs on Military Reservations" (16 USC §670a et seq.) – Requires federal military installations with adequate wildlife habitat to implement cooperative agreements with other agencies and develop long-range integrated natural resources management plans. Thereby, it is appropriate to manage natural resources for multipurpose uses and provide the public access to those uses to the extent consistent with the military mission. The act also sets guidelines for the collection of fees for the use of natural resources such as hunting and fishing.

Soil Conservation Act (16 USC §590a et seq.) – Provides for soil conservation practices on federal lands.

P.2 DoD Regulations and Guidance

32 CFR 651	Environmental Effects of Army Actions
50 CFR 17	Endangered and Threatened Wildlife and Plants
50 CFR 402	Interagency Cooperation
50 CFR 424	Listing Endangered and Threatened Species and Designating Critical Habitat
AR 200-1	Environmental Protection and Enhancement
AR 200-3	Natural Resources Management
AR 200-4	Cultural Resources Management
AR 200-5	Pest Management
AR 210-9	Use of Off-Road Vehicles on Army Lands
AR 405-80	Granting Use of Real Estate
AR 420-40	Historic Preservation
DoDI 4150.7M	DoD Pest Management Training and Certification
DoDI 4150.7P	DoD Plan for the Certification of Pesticide Applicators
DoDI 4710.02	DoD Interactions with Federally Recognized Tribes
DoDI 4715.03	Natural Resources Conservation Program
DoDI 4715.3	Environmental Conservation Program
TC 25-1	Training Land
TM 5-630	Land Management
TM 5-631	Forest Management
TM 5-633	Fish and Wildlife Management

P.3 State of Missouri

P.3.1 Missouri Revised Statutes

254.010 to 254.399	"The State Forestry Law"
252.002 to 252.033	"The Wildlife and Forestry Law"
260	"Environmental Control"
263.010 to 263.180	"The Missouri Plant Law"
281.010 - 281.115	"Missouri Pesticide Use Act"
537.354	"Prescribed Burning Act"

P.3.2 MISSOURI CODE OF STATE REGULATIONS

TITLE 3 – DEPARTMENT OF CONSERVATION

Division 10 – Conservation Commission
- Chapter 4 - Wildlife Code: General Provisions
- Chapter 5 - Wildlife Code: Permits
- Chapter 6 - Wildlife Code: Sport Fishing: Seasons, Methods, Limits
- Chapter 7 - Wildlife Code: Hunting: Seasons, Methods, Limits
- Chapter 8 - Wildlife Code: Trapping: Seasons, Methods
- Chapter 9 - Wildlife Code: Confined Wildlife: Privileges, Permits, Standards
- Chapter 10 - Wildlife Code: Commercial Permits: Seasons, Methods, Limits
- Chapter 11 - Wildlife Code: Special Regulations for Department Areas
- Chapter 12 - Wildlife Code: Special Regulations for Areas Owned by Other Entities
- Chapter 20 - Wildlife Code: Definitions

TITLE 10 – DEPARTMENT OF NATURAL RESOURCES

Division 10 - Air Conservation Commission
- Chapter 3 Air Pollution Control Rules Specific to the Outstate Missouri Area
- Chapter 6 - Air Quality Standards, Definitions, Sampling and Reference Methods and Air Pollution Control Regulations for the Entire State of Missouri

Division 20 - Clean Water Commission
- Chapter 1 - Organization
- Chapter 2 - Definitions
- Chapter 3 - Enforcement
- Chapter 4 - Grants
- Chapter 5 - Emergencies
- Chapter 6 - Permits
- Chapter 7 - Water Quality
- Chapter 8 - Design Guides
- Chapter 9 - Treatment Plant Operations
- Chapter 10 - Underground Storage Tanks - Technical Regulations
- Chapter 11 - Underground Storage Tanks - Financial Responsibility
- Chapter 12 - State Underground Storage Tank Insurance Fund
- Chapter 13 - State Underground Storage Tanks - Administrative Penalties
- Chapter 14 - Concentrated Animal Feeding Operation Waste Management System
- Chapter 15 - Aboveground Storage Tanks-Release Response

Division 24 - Hazardous Substance Emergency Response Office
- Chapter 1 - Organization
- Chapter 2 - Definitions
- Chapter 3 - Emergency Notification Procedures
- Chapter 4 - Reporting Procedures
- Chapter 5 - Hazardous Chemical Fees

Division 25 - Hazardous Waste Management Commission
- Chapter 1 - Organization
- Chapter 2 - Commission Procedures

Chapter 3 - Hazardous Waste Management System: General
Chapter 4 - Methods for Identifying Hazardous Waste
Chapter 5 - Rules Applicable to Generators of Hazardous Waste
Chapter 6 - Rules Applicable to Transporters of Hazardous Waste
Chapter 7 - Rules Applicable to Owners/Operators of Hazardous Waste Facilities
Chapter 8 - Public Participation and General Procedural Requirements
Chapter 9 - Resource Recovery
Chapter 10 - Abandoned or Uncontrolled Hazardous Waste Disposal Sites
Chapter 11 - Used Oil
Chapter 12 - Hazardous Waste Fees and Taxes
Chapter 13 - Polychlorinated Biphenyls
Chapter 14 - Administrative Penalties
Chapter 15 - Hazardous Substance Environmental Remediation (Voluntary Cleanup Program)
Chapter 16 - Universal Waste

Division 60 - Public Drinking Water Program
Chapter 1 - Organization
Chapter 2 - Definitions
Chapter 3 - Permits
Chapter 4 - Contaminant Levels and Monitoring
Chapter 5 - Laboratory and Analytical Requirements
Chapter 6 - Enforcement
Chapter 7 - Reporting
Chapter 8 - Public Notification
Chapter 9 - Record Maintenance
Chapter 10 - Plans and Specifications; Siting Requirements; Recreational Use of Impoundments
Chapter 11 - Backflow Prevention
Chapter 12 - Emergency Operations Plan
Chapter 13 - Grants and Loans
Chapter 14 - Operator Certification
Chapter 15 - Lead and Copper
Chapter 16 - Drinking Water Fees

Division 70 - Soil and Water Districts Commission
Chapter 1 - Organization
Chapter 2 - Referendums
Chapter 3 - Formation of Subdistrict
Chapter 4 - Definitions
Chapter 5 - State Funded Cost-Share Program
Chapter 6 - Tax Levy Referendums
Chapter 7 - State Loan Interest-Share Program
Chapter 8 - State Funded Special Area Land Treatment (SALT) Program

Division 80 - Solid Waste Management
Chapter 1 - Organization
Chapter 2 - General Provisions
Chapter 3 - Sanitary Landfill
Chapter 4 - Demolition Landfill

Chapter 5 - Processing Facility
Chapter 6 - Local Solid Waste Management
Chapter 7 - Infectious Waste Management
Chapter 8 - Waste Tires
Chapter 9 - Solid Waste Management Fund
Chapter 10 - Statewide Solid Waste Management
Chapter 11 - Utility Waste Landfill

Division 100 - Petroleum Storage Tank Insurance Fund Board of Trustees
Chapter 1 - General Organization
Chapter 2 - Definitions
Chapter 3 - Transport Load Fee
Chapter 4 - Participation Requirements
Chapter 5 – Claims

TITLE 11 – DEPARTMENT OF PUBLIC SAFETY

Division 10– Adjutant General
Chapter 2 – Public Access to Training Sites

APPENDIX Q. FIGURES

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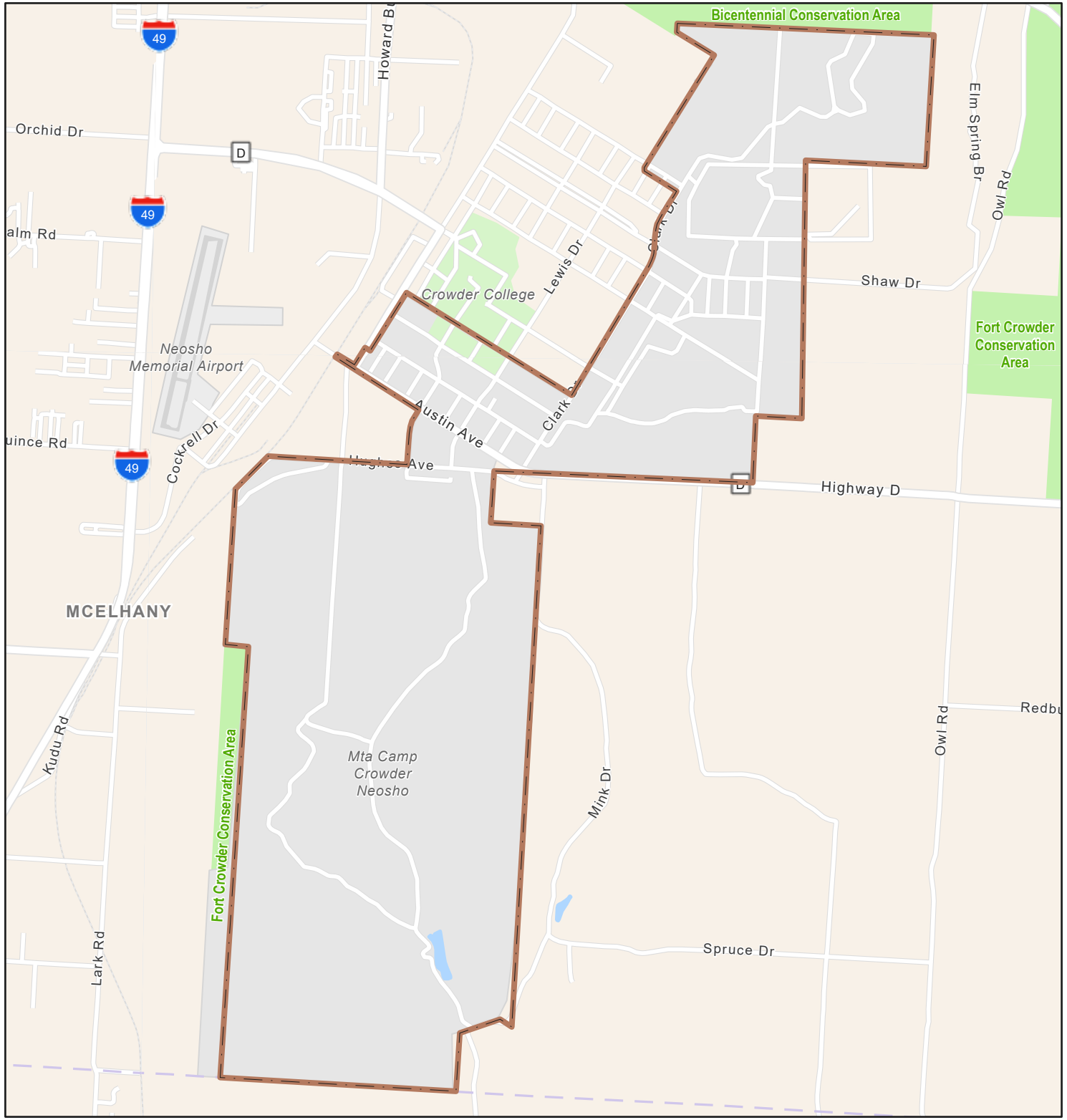


Figure 1
Location Map
Site: 29155 - Camp Crowder

County: Newton | State: MO

Address: 890 Ray A. Carver Ave | Zipcode: 64850

Scale: 1:42,000	1 inch = 3,500 feet

0 — 3,000 — 6,000 Feet

LEGEND

Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 2
Location Map
Site: 29505 - Camp Clark

County: Vernon | State: MO

Address: 18159 S K Hwy | Zipcode: 64850

Scale: 1:18,000	1 inch = 1,500 feet

0 1,000 2,000 Feet

N W E S

LEGEND

Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

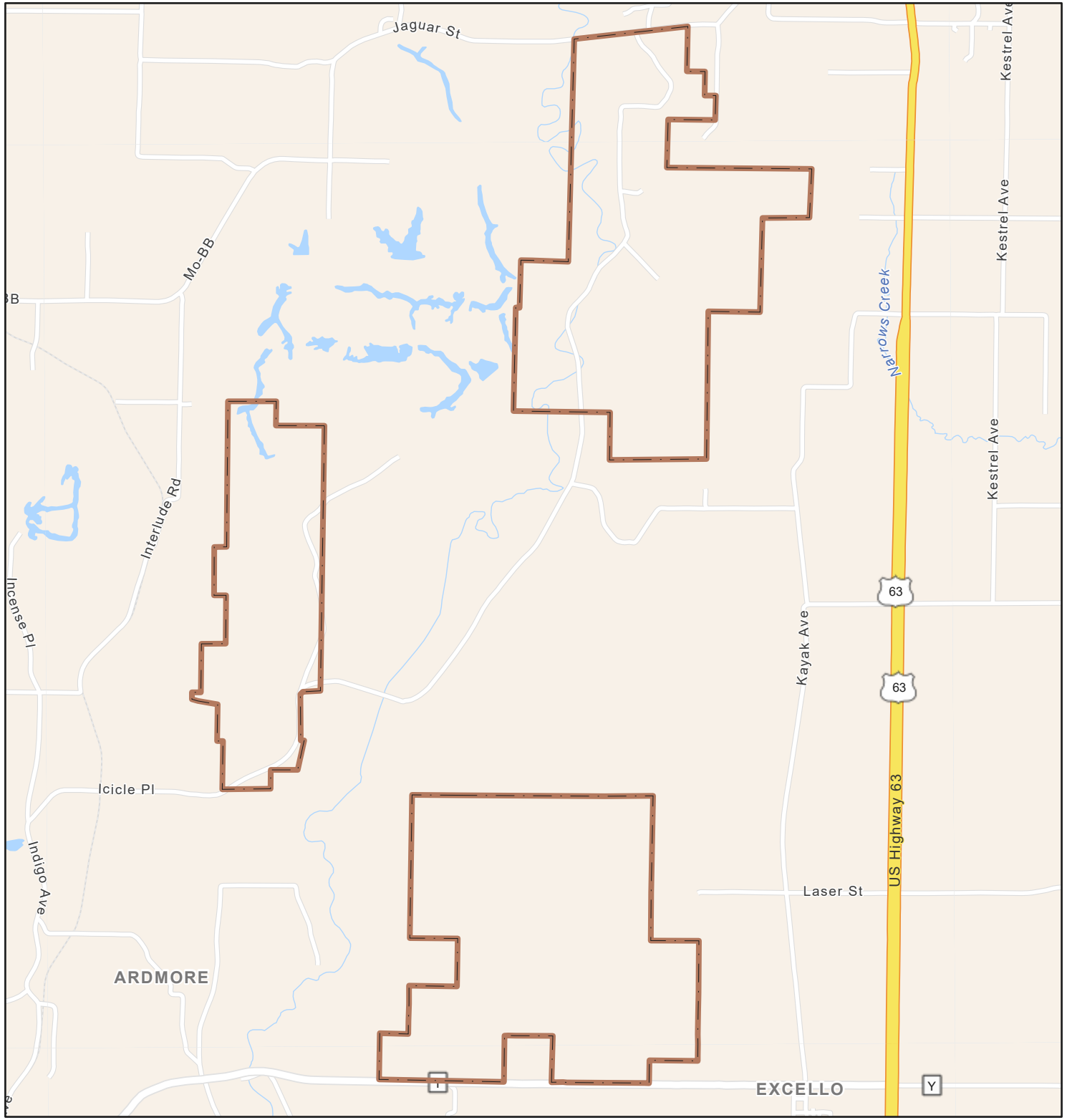


Figure 3
Location Map
Site: 29B78 - Macon Training Site

County: Macon | State: MO
Address: 29614 Jaguar Street | Zipcode: 63552

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

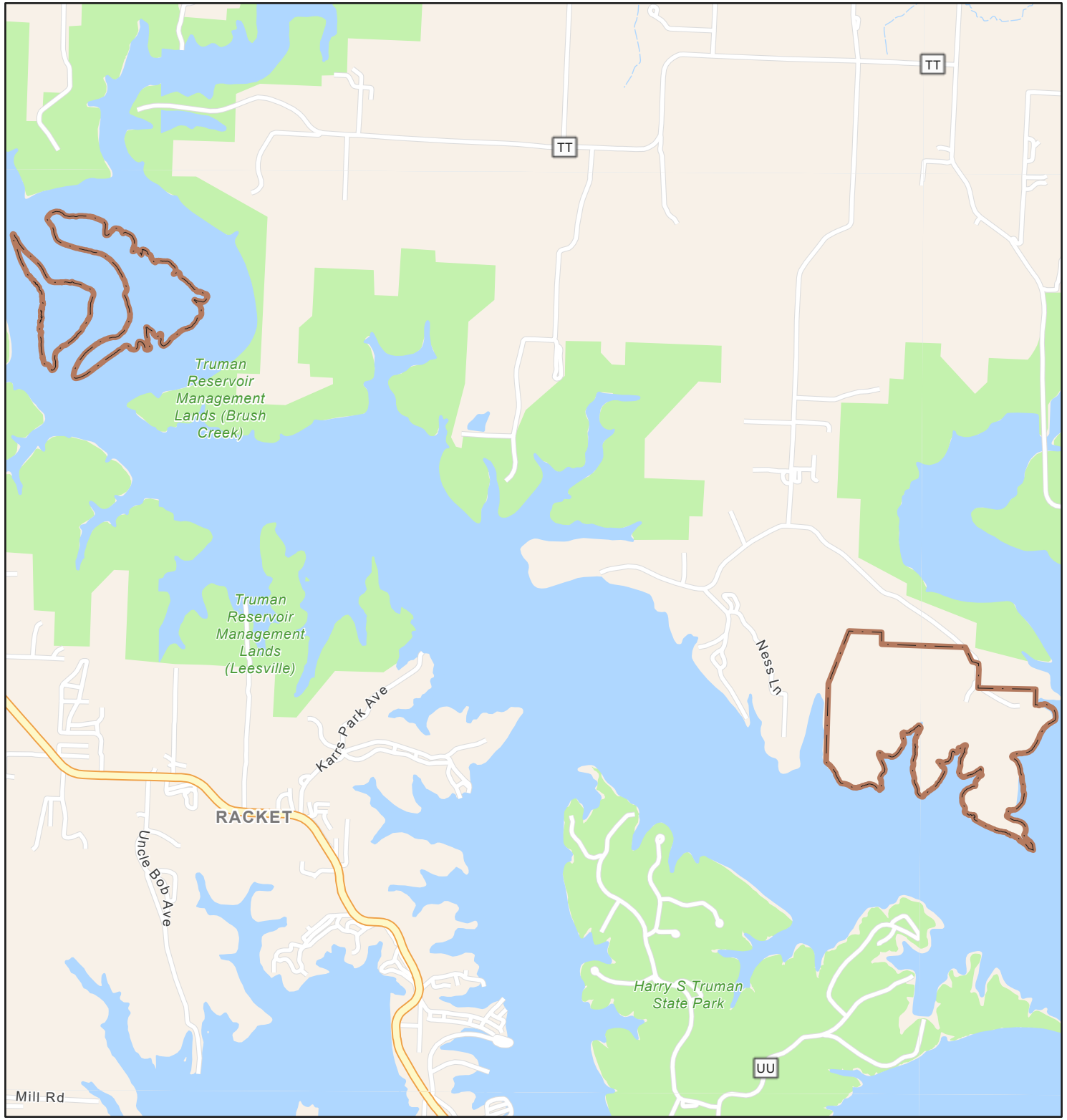


Figure 4
Location Map
Site: 29A57 - Truman Training Area

County: Benton | State: MO
Address: Limestone School Rd | Zipcode: 65355

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

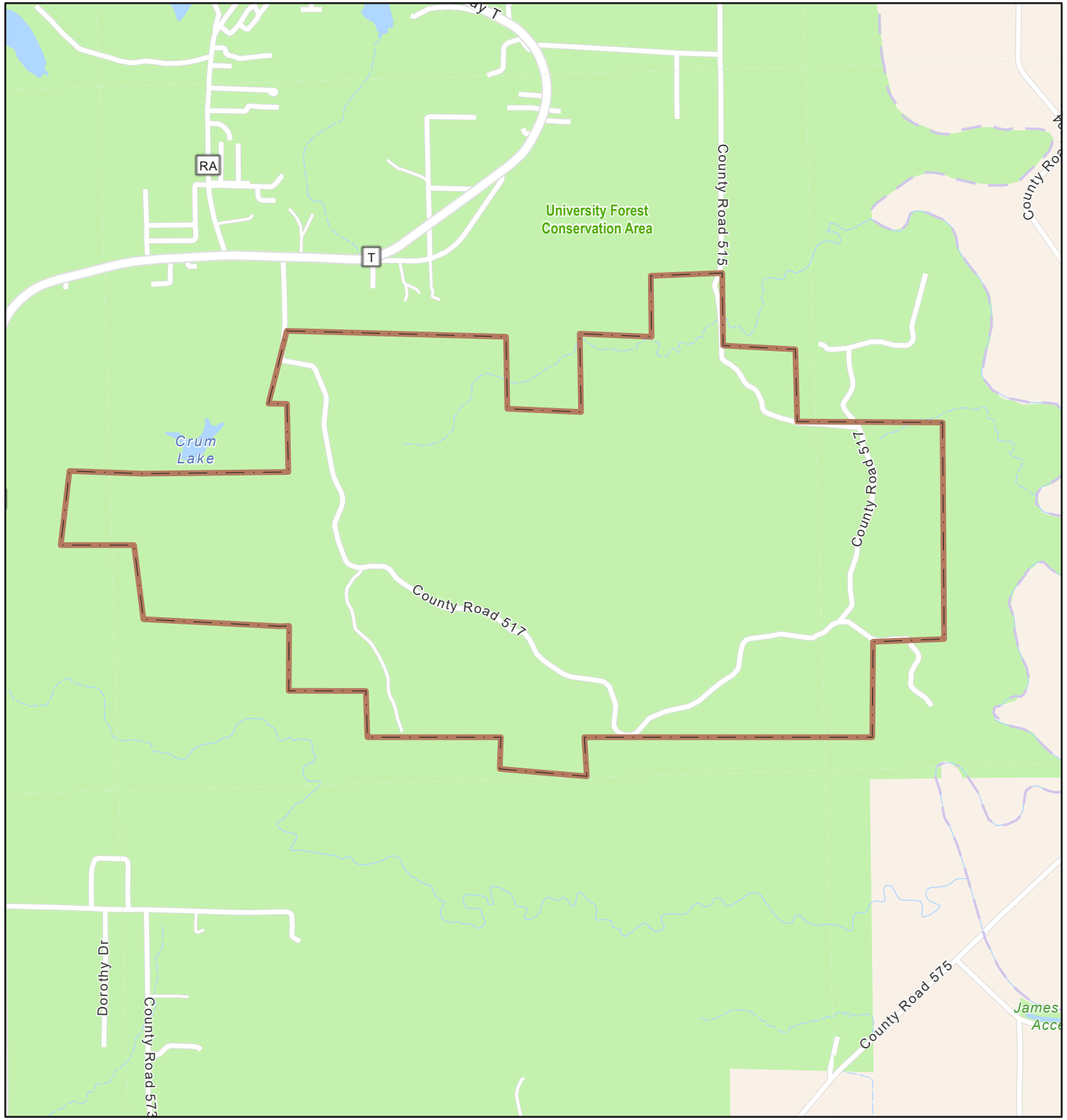


Figure 5
Location Map

Site: 29D05 - Wappapello Training Site

County: Butler | State: MO

Address: 461 Country RD 517 | Zipcode: 63966

Scale: 1:30,000	1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S

LEGEND

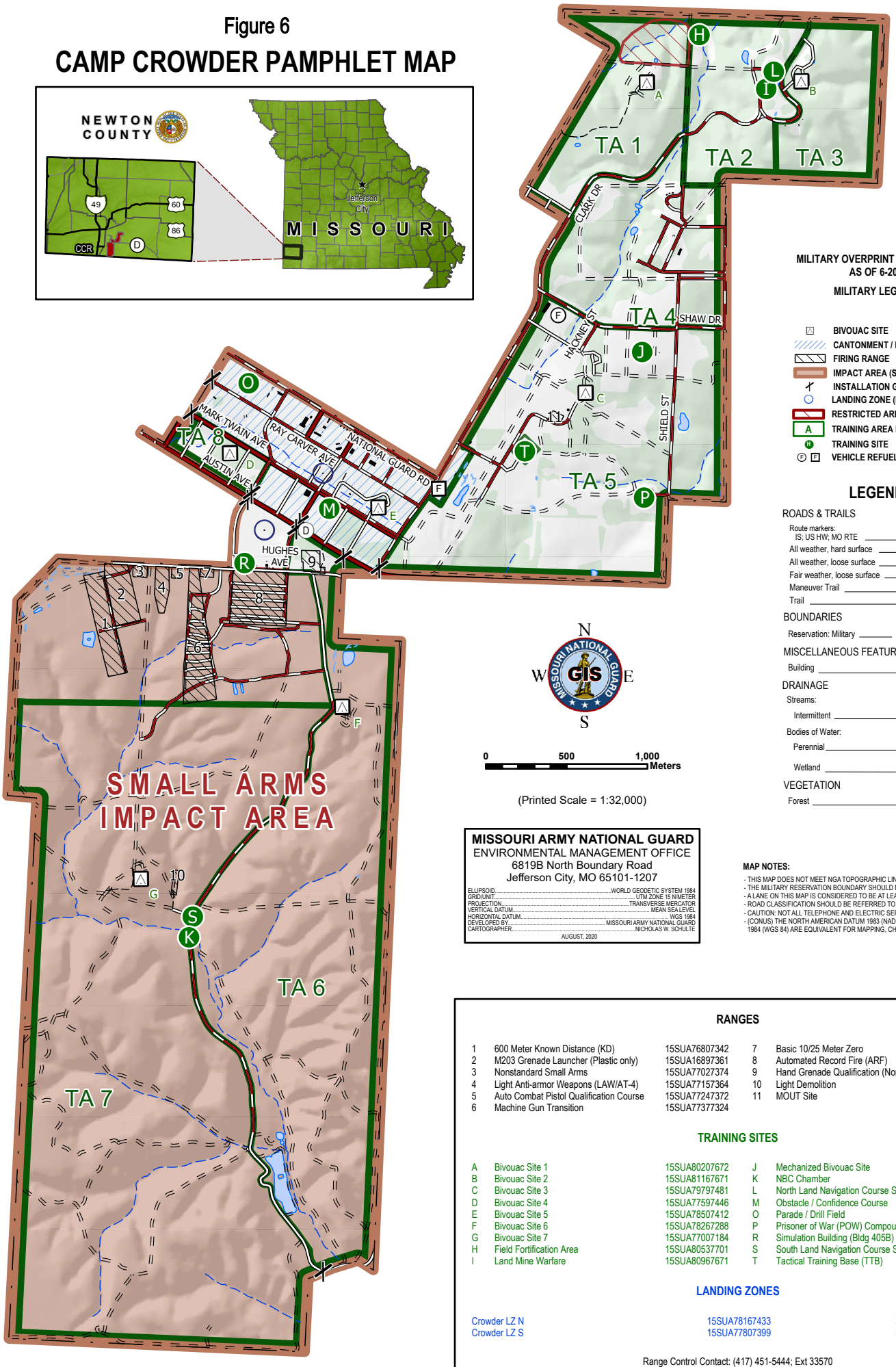
Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 6

CAMP CROWDER PAMPHLET MAP



MILITARY OVERPRINT INFORMATION AS OF 6-2019

MILITARY LEGEND

- BIVOUAC SITE
- CANTONMENT / RECREATION AREA
- FIRING RANGE
- IMPACT AREA (SMALL ARMS)
- INSTALLATION GATE
- LANDING ZONE (LZ)
- RESTRICTED AREA
- TRAINING AREA BOUNDARY
- TRAINING SITE
- VEHICLE REFUELING PAD / FACILITY

LEGEND

ROADS & TRAILS

- Route markers: IS; US HW; MO RTE (49, 60, D)
- All weather, hard surface
- All weather, loose surface
- Fair weather, loose surface
- Maneuver Trail
- Trail

BOUNDARIES

- Reservation: Military

MISCELLANEOUS FEATURES

- Building

DRAINAGE

- Streams:
  - Intermittent
- Bodies of Water:
  - Perennial
  - Wetland

VEGETATION

- Forest

N W GIS E S

0 500 1,000 Meters

(Printed Scale = 1:32,000)

MISSOURI ARMY NATIONAL GUARD
ENVIRONMENTAL MANAGEMENT OFFICE
6819B North Boundary Road
Jefferson City, MO 65101-1207

ELLIPSOID	WORLD GEODETIC SYSTEM 1984
GRID/UNIT	UTM ZONE 15 N/METER
PROJECTION	TRANSVERSE MERCATOR
VERTICAL DATUM	MEAN SEA LEVEL
HORIZONTAL DATUM	WGS 1984
DEVELOPED BY	MISSOURI ARMY NATIONAL GUARD
CARTOGRAPHER	NICHOLAS W. SCHULTE

AUGUST, 2020

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RANGES

1	600 Meter Known Distance (KD)	15SUA76807342	7	Basic 10/25 Meter Zero	15SUA77437372
2	M203 Grenade Launcher (Plastic only)	15SUA16897361	8	Automated Record Fire (ARF)	15SUA77757357
3	Nonstandard Small Arms	15SUA77027374	9	Hand Grenade Qualification (Non-Fire)	15SUA78087378
4	Light Anti-armor Weapons (LAW/AT-4)	15SUA77157364	10	Light Demolition	15SUA77217181
5	Auto Combat Pistol Qualification Course	15SUA77247372	11	MOUT Site	15SUA79607465
6	Machine Gun Transition	15SUA77377324			

TRAINING SITES

A	Bivouac Site 1	15SUA80207672	J	Mechanized Bivouac Site	15SUA80157505
B	Bivouac Site 2	15SUA81167671	K	NBC Chamber	15SUA77317153
C	Bivouac Site 3	15SUA79797481	L	North Land Navigation Course Start	15SUA80987679
D	Bivouac Site 4	15SUA77597446	M	Obstacle / Confidence Course	15SUA78207411
E	Bivouac Site 5	15SUA78507412	O	Parade / Drill Field	15SUA77717490
F	Bivouac Site 6	15SUA78267288	P	Prisoner of War (POW) Compound	15SUA80157415
G	Bivouac Site 7	15SUA77007184	R	Simulation Building (Bldg 405B)	15SUA77677378
H	Field Fortification Area	15SUA80537701	S	South Land Navigation Course Start	15SUA77337158
I	Land Mine Warfare	15SUA80967671	T	Tactical Training Base (TTB)	15SUA79417445

LANDING ZONES

Crowder LZ N	15SUA78167433	36°48'25.2"N 94°21'57.2"W
Crowder LZ S	15SUA77807399	36°48'13.6"N 94°22'11.9"W

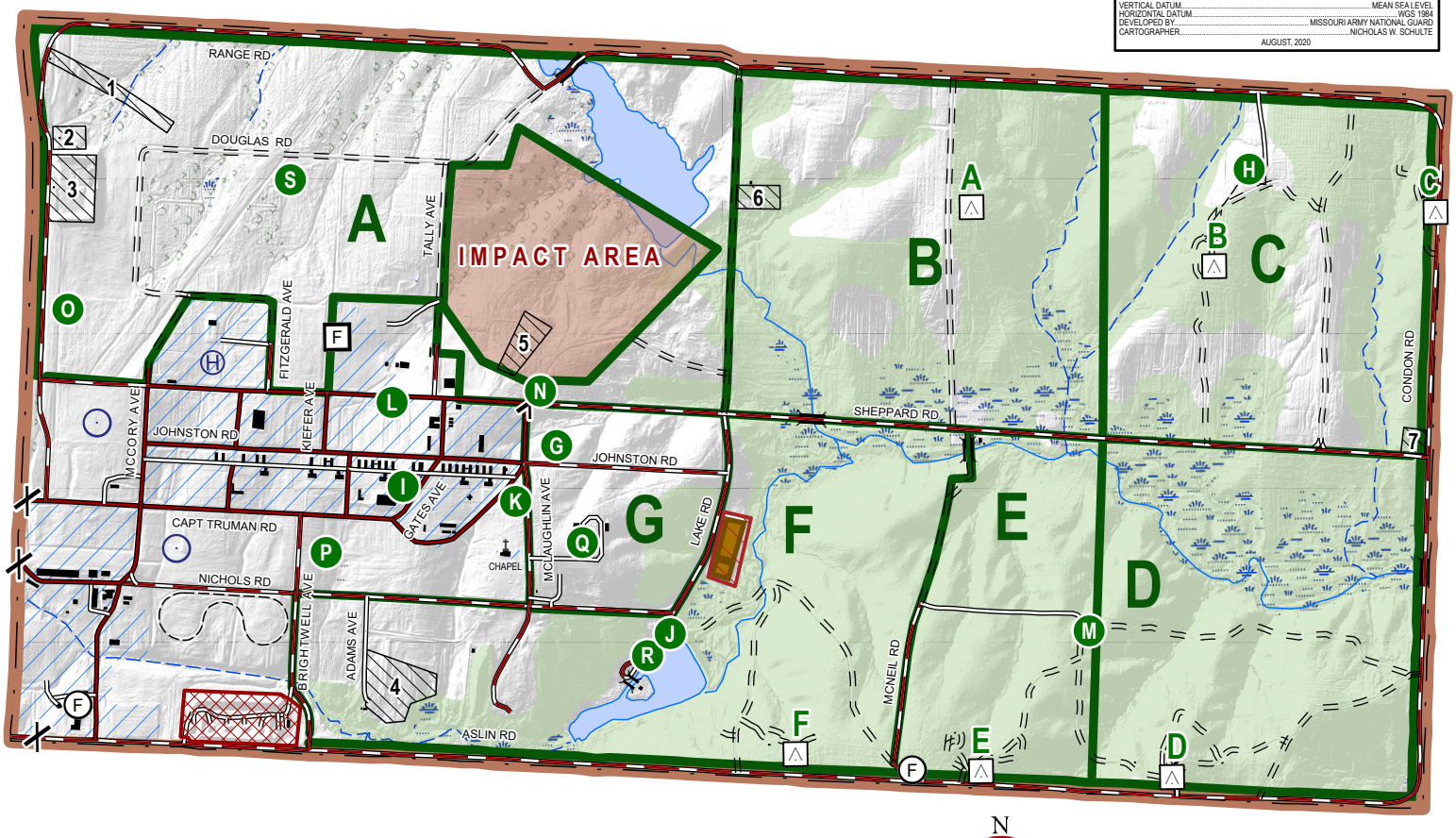
Range Control Contact: (417) 451-5444; Ext 33570

Figure 7

CAMP CLARK PAMPHLET MAP

MISSOURI ARMY NATIONAL GUARD
ENVIRONMENTAL MANAGEMENT OFFICE
6819B North Boundary Road
Jefferson City, MO 65101-1207

ELLIPSOID.....WORLD GEODETIC SYSTEM 1984
GRID/UNIT.....UTM ZONE 15 N/METER
PROJECTION.....TRANSVERSE MERCATOR
VERTICAL DATUM.....MEAN SEA LEVEL
HORIZONTAL DATUM.....WGS 1984
DEVELOPED BY.....MISSOURI ARMY NATIONAL GUARD
CARTOGRAPHER.....NICHOLAS W. SCHULTE
AUGUST, 2020



MAP INFORMATION AS OF 6-2019

LEGEND

ROADS
- Route markers: IS; US HW
- All weather, hard surface
- All weather, loose surface
- Fair weather, loose surface
- Maneuver Trails
- Trail

BRIDGES
- Road; Railway

BOUNDARIES
- Military installation

AERONAUTICAL FEATURES
- Helipad: Non-hospital

DRAINAGE
- Streams: Perennial; Intermittent
- Bodies of Water: Perennial; Wetlands; Lagoon

CULTURAL FEATURES
- Building: point, surface
- Chapel

VEGETATION
- Forest
- Scattered Vegetation

MILITARY OVERPRINT INFORMATION AS OF 6-2019

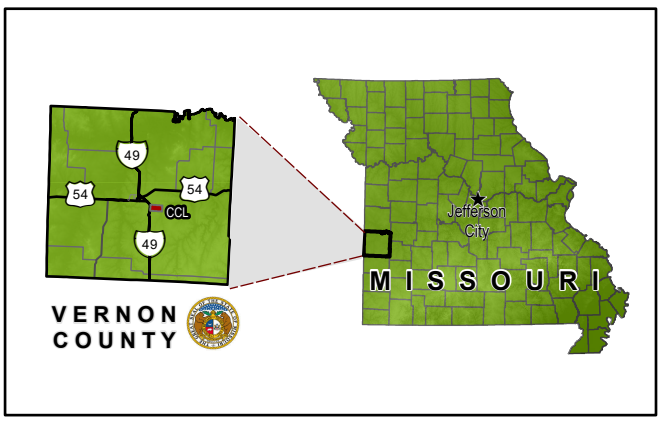
MILITARY LEGEND

- AMMUNITION STORAGE AREA
- BIVOUAC SITE
- CANTONMENT / RECREATION AREA
- FIRING RANGE
- IMPACT AREA (DUDDED)
- INSTALLATION GATE
- LANDING ZONE (LZ)
- RESTRICTED AREA
- TRAINING AREA BOUNDARY
- TRAINING SITE
- VEHICLE REFUELING PAD / FACILITY

N W E S

0 250 500 Meters

(Printed Scale = 1:16,000)



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RANGES

1	AT-4 / M2 (Plastic only)	15SUB84968741
2	Combat Pistol Qualification Course (CPQC)	15SUB84868730
3	25 Meter Known Distance (KD)	15SUB84878719
4	Hand Grenade Qualification Course	15SUB85588606
5	M203 Grenade Launcher (TP Rounds only)	15SUB85888683
6	Light Demolition	15SUB86418715
7	Nonstandard Small Arms	15SUB87878658

TRAINING SITES

A	Bivouac Site B	15SUB85368720
B	Bivouac Site C	15SUB86878714
C	Bivouac Site C1	15SUB87428700
D	Bivouac Site D	15SUB87518719
E	Bivouac Site E	15SUB87918712
F	Bivouac Site F	15SUB85258671
G	Confidence Course	15SUB85278636
H	Entry Control Point (ECP) Training Site	15SUB85578670
I	EST and HEAT Simulation Building	15SUB85658676
J	Floating Bridge Training Site	15SUB85618650
K	Land Navigation Course Start Point	15SUB85918672
L	Leadership Reaction Course (LRC)	15SUB85958660
M	Military Operations Urban Terrain (MOUT)	15SUB85858647
N	NBC Chamber	15SUB86158613
O	Obstacle Course	15SUB86188616
P	Parade / Drill Field	15SUB86488591
Q	Tactical Training Base (TTB)	15SUB86898587
R	Water Purification Site	15SUB87328586
S	Wheeled Vehicle Drivers Course	15SUB86008638

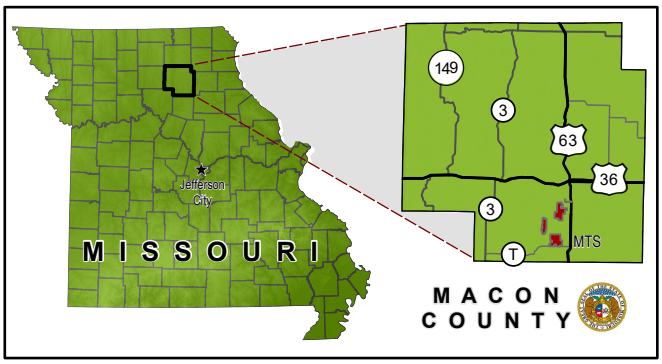
LANDING ZONES / HELIPADS

LZ N	15SUB85108638	37°49'03.4"N 94°18'19.5"W
LZ S	15SUB84928666	37°49'12.5"N 94°18'27.0"W
Cantonment Helipad	15SUB85238680	37°49'17.2"N 94°18'14.5"W

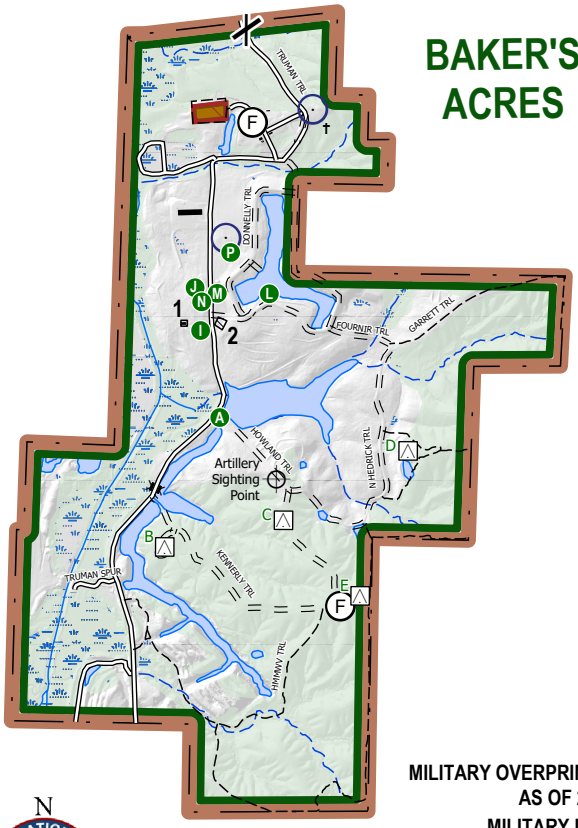
Range Control Contact: (417) 667-2357

Figure 8

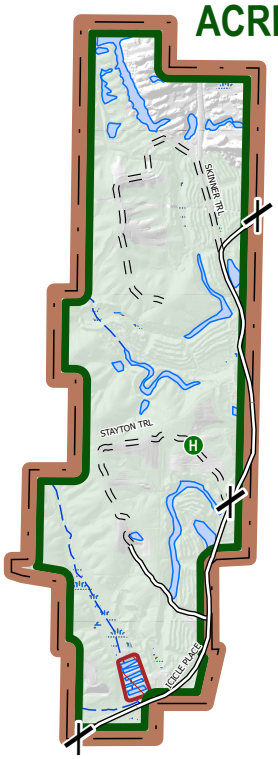
MACON TRAINING SITE PAMPHLET MAP



BAKER'S ACRES



WOOLY ACRES



N
W GIS E
S

0 500 1,000 Meters

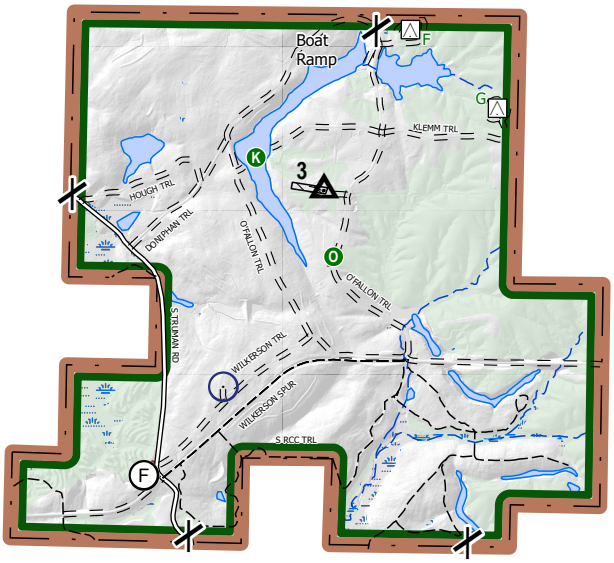
(Printed Scale = 1:34,000)

MISSOURI ARMY NATIONAL GUARD
ENVIRONMENTAL MANAGEMENT OFFICE
6819B North Boundary Road
Jefferson City, MO 65101-1207

ELLIPSOID	WORLD GEODETIC SYSTEM 1984
GRID UNIT	UTM ZONE 15 N/METER
PROJECTION	TRANSVERSE MERCATOR
VERTICAL DATUM	MEAN SEA LEVEL
HORIZONTAL DATUM	WGS 1984
DEVELOPED BY	MISSOURI ARMY NATIONAL GUARD
CARTOGRAPHER	NICHOLAS W. SCHULTE

AUGUST, 2020

SOUTH 61



RANGES

1	Military Operations in Urban Terrain (MOUT)	15SWD43359493
2	25 Meter Known Distance (KD)	15SWD43519494
3	Light Demolition	15SWD42808917

TRAINING SITES

A	Baker's Acres Land Navigation Start Point	15SWD43519451
B	Bivouac Site 1	15SWD43269392
C	Bivouac Site 2	15SWD43809405
D	Bivouac Site 3	15SWD44549433
E	Bivouac Site 4	15SWD44149371
F	Bivouac Site 5	15SWD43258988
G	Bivouac Site 6	15SWD43648953
H	Counter Mobility Area	15SWD40729132
I	Dry Support Bridge	15SWD43419489
J	Entry Control Point Training Site	15SWD33999509
K	Floating Bridge Training Site 1	15SWD42568930
L	Floating Bridge Training Site 2	15SWD43739507
M	Mechanized Bivouac Site	15SWD43499507
N	Leadership Reaction Course	15SWD43429503
O	South 61 Land Navigation Start Point	15SWD42918885
P	Vehicle Recovery Pit	15SWD43559525

LANDING ZONES

Baker's Acres LZ 1	15SWD43929590	39°42'42.5"N	92°29'15.4"W
Baker's Acres LZ 2	15SWD43539531	39°42'23.8"N	92°29'31.8"W
South 61 LZ	15SWD42428827	39°38'35.2"N	92°30'20.2"W

Range Control Contact: (573) 638-9826

MILITARY OVERPRINT INFORMATION AS OF 2017

MILITARY LEGEND

- FIRING RANGE
- RESTRICTED AREA
- SOUTH 61 — TRAINING AREA BOUNDARY
- GATE
- LANDING ZONE (LZ)
- OBSERVATION POINT (OP)
- TRAINING SITE
- VEHICLE REFUELING PAD / FACILITY
- ARTILLERY SIGHTING POINT
- VEHICULAR BRIDGE

LEGEND

ROADS & TRAILS
- Route markers: US HW; MO RTE (63, T)
- Fair weather, Loose surface
- Maneuver Trails
- Trails

BOUNDARIES
- Reservation: Military

MISCELLANEOUS FEATURES
- Building
- Cemetery

DRAINAGE
- Streams: Perennial; Intermittent
- Bodies of Water: Perennial; Wetland; Waste Water Lagoon

VEGETATION
- Forest

MAP NOTES:

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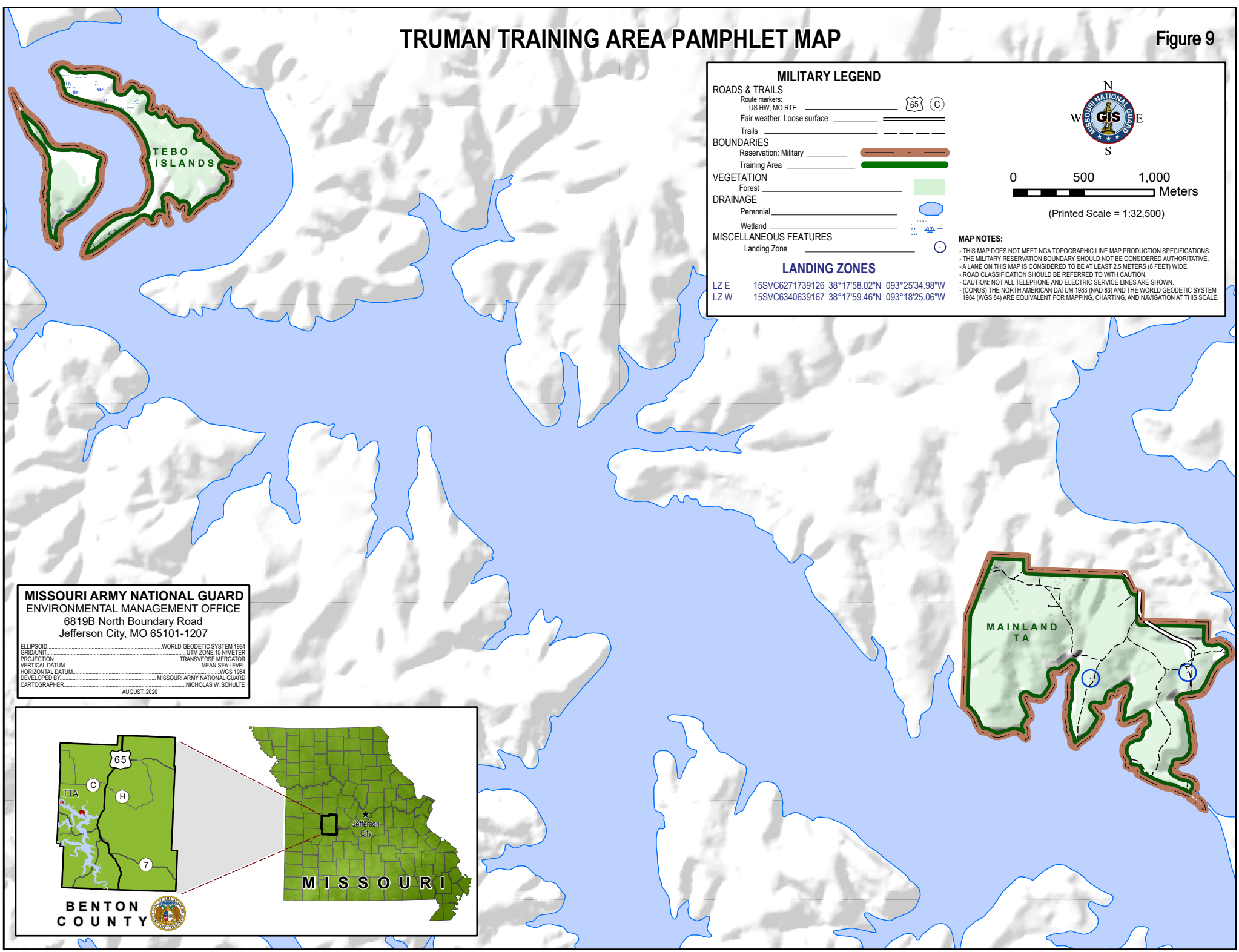
- SHEET MACON TRAINING SITE FALLS WITHIN NJ 1502, 1501A, 1:250,000.

TRUMAN TRAINING AREA PAMPHLET MAP

Figure 9



MILITARY LEGEND

ROADS & TRAILS
- Route markers: US HW; MO RTE — 65 C
- Fair weather, Loose surface
- Trails

BOUNDARIES
- Reservation: Military
- Training Area

VEGETATION
- Forest

DRAINAGE
- Perennial
- Wetland

MISCELLANEOUS FEATURES
- Landing Zone

LANDING ZONES

LZ E	15SVC6271739126	38°17'58.02"N	093°25'34.98"W
LZ W	15SVC6340639167	38°17'59.46"N	093°18'25.06"W

N W GIS E S

0 500 1,000 Meters

(Printed Scale = 1:32,500)

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ENVIRONMENTAL MANAGEMENT OFFICE
6819B North Boundary Road
Jefferson City, MO 65101-1207

ELLIPSOID	WORLD GEODETIC SYSTEM 1984
GRID UNIT	UTM ZONE 15 N/METER
PROJECTION	TRANSVERSE MERCATOR
VERTICAL DATUM	MEAN SEA LEVEL
HORIZONTAL DATUM	WGS 1984
DEVELOPED BY	MISSOURI ARMY NATIONAL GUARD
CARTOGRAPHER	NICHOLAS W. SCHULTE

AUGUST, 2020

Figure 10

WAPPAPELLO TRAINING SITE PAMPHLET MAP

MISSOURI ARMY NATIONAL GUARD
ENVIRONMENTAL MANAGEMENT OFFICE
6819B North Boundary Road
Jefferson City, MO 65101-1207

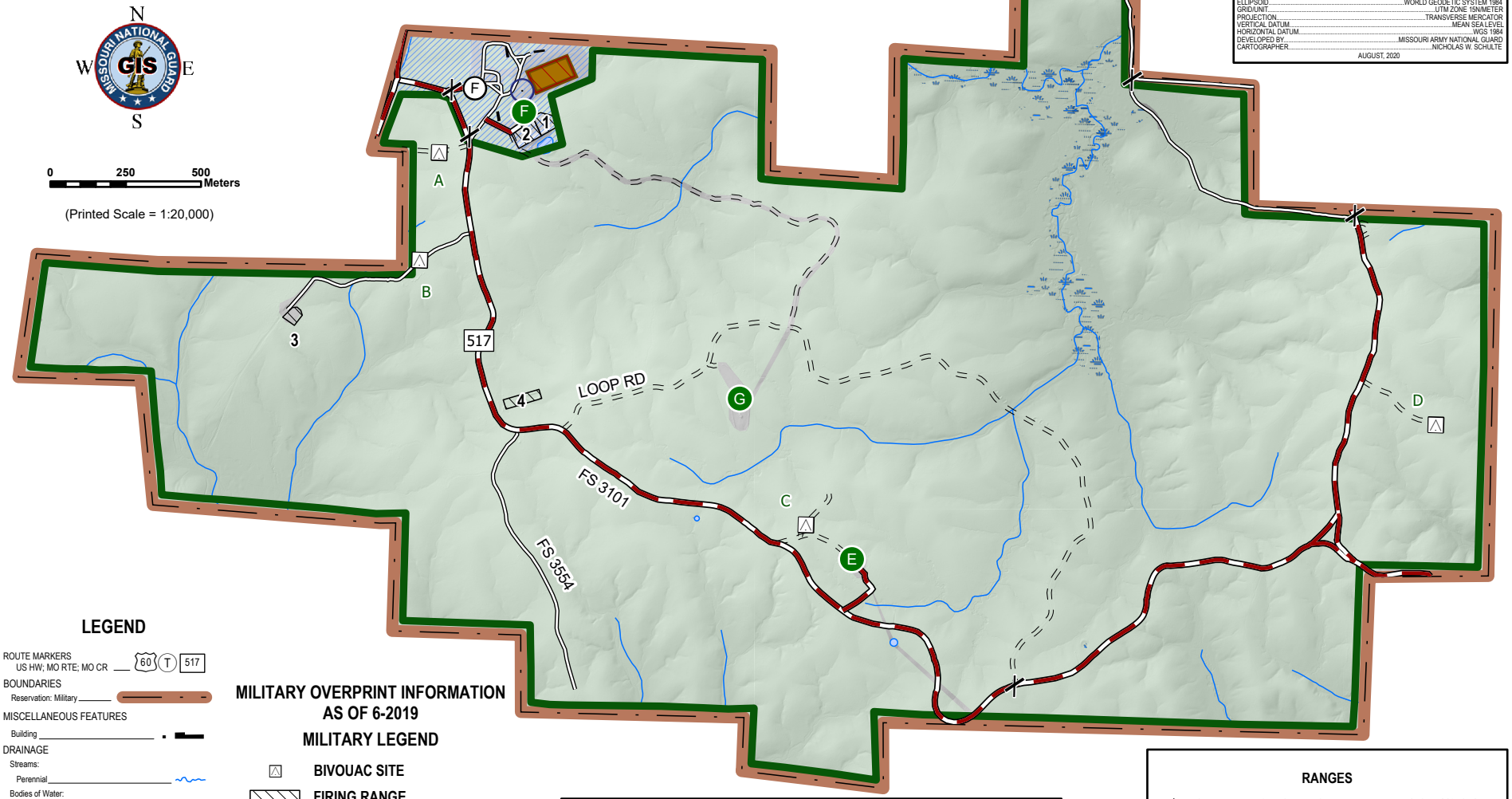
ELLIPSOID	WORLD GEODETIC SYSTEM 1984
GRID/UNIT	UTM ZONE 15N/METER
PROJECTION	TRANSVERSE MERCATOR
VERTICAL DATUM	MEAN SEA LEVEL
HORIZONTAL DATUM	WGS 1984
DEVELOPED BY	MISSOURI ARMY NATIONAL GUARD
CARTOGRAPHER	NICHOLAS W. SCHULTE

AUGUST, 2020

N
W E
S

0 250 500 Meters

(Printed Scale = 1:20,000)



LEGEND

ROUTE MARKERS
US HW; MO RTE; MO CR — 60 T 517

BOUNDARIES
Reservation: Military

MISCELLANEOUS FEATURES
Building

DRAINAGE
Streams:
Perennial
Bodies of Water:
Perennial
Wetlands
Waste Water Lagoon

VEGETATION
Forest

ROADS & TRAILS
All weather, Loose surface
Fair weather, Loose surface
Maneuver Trail

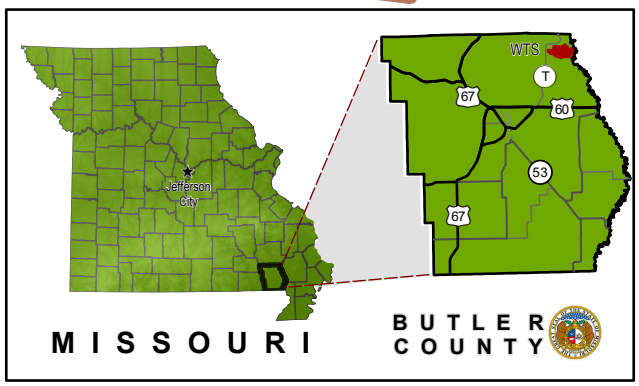
MILITARY OVERPRINT INFORMATION AS OF 6-2019

MILITARY LEGEND

- BIVOUAC SITE
- FIRING RANGE
- GATE
- LANDING ZONE (LZ)
- RESTRICTED AREA
- TRAINING AREA BOUNDARY
- TRAINING SITE
- VEHICLE REFUELING PAD
- CANTONMENT AREA

MAP NOTES:

- THIS MAP DOES NOT MEET NGA TOPOGRAPHIC LINE MAP PRODUCTION SPECIFICATIONS.
- THE MILITARY RESERVATION BOUNDARY SHOULD NOT BE CONSIDERED AUTHORITATIVE.
- A LANE ON THIS MAP IS CONSIDERED TO BE AT LEAST 2.5 METERS (8 FEET) WIDE.
- ROAD CLASSIFICATION SHOULD BE REFERRED TO WITH CAUTION.
- CAUTION: NOT ALL TELEPHONE AND ELECTRIC SERVICE LINES ARE SHOWN.
- (CONUS) THE NORTH AMERICAN DATUM 1983 (NAD 83) AND THE WORLD GEODETIC SYSTEM 1984 (WGS 84) ARE EQUIVALENT FOR MAPPING, CHARTING, AND NAVIGATION AT THIS SCALE.



RANGES

1	Combat Pistol Qualification Course	15SYA41358715
2	25 Meter Zero (M4 Plastic Only)	15SYA41298712
3	Military Operations in Urban Terrain (MOUT)	15SYA40538650
4	Light Demolition	15SYA41348624

TRAINING SITES

A	Bivouac Site A	15SYA41038706
B	Bivouac Site B	15SYA41008669
C	Bivouac Site C	15SYA42338594
D	Bivouac Site D	15SYA44358624
E	Entry Control Point (ECP)	15SYA42428574
F	Land Navigation Start Point	15SYA41248722
G	Mechanized Bivouac Site	15SYA42038626

LANDING ZONE

LZ	15SYA41288726	36°54'1.9"N 90°17'31.4"W

Range Control Contact: (573) 222-8200

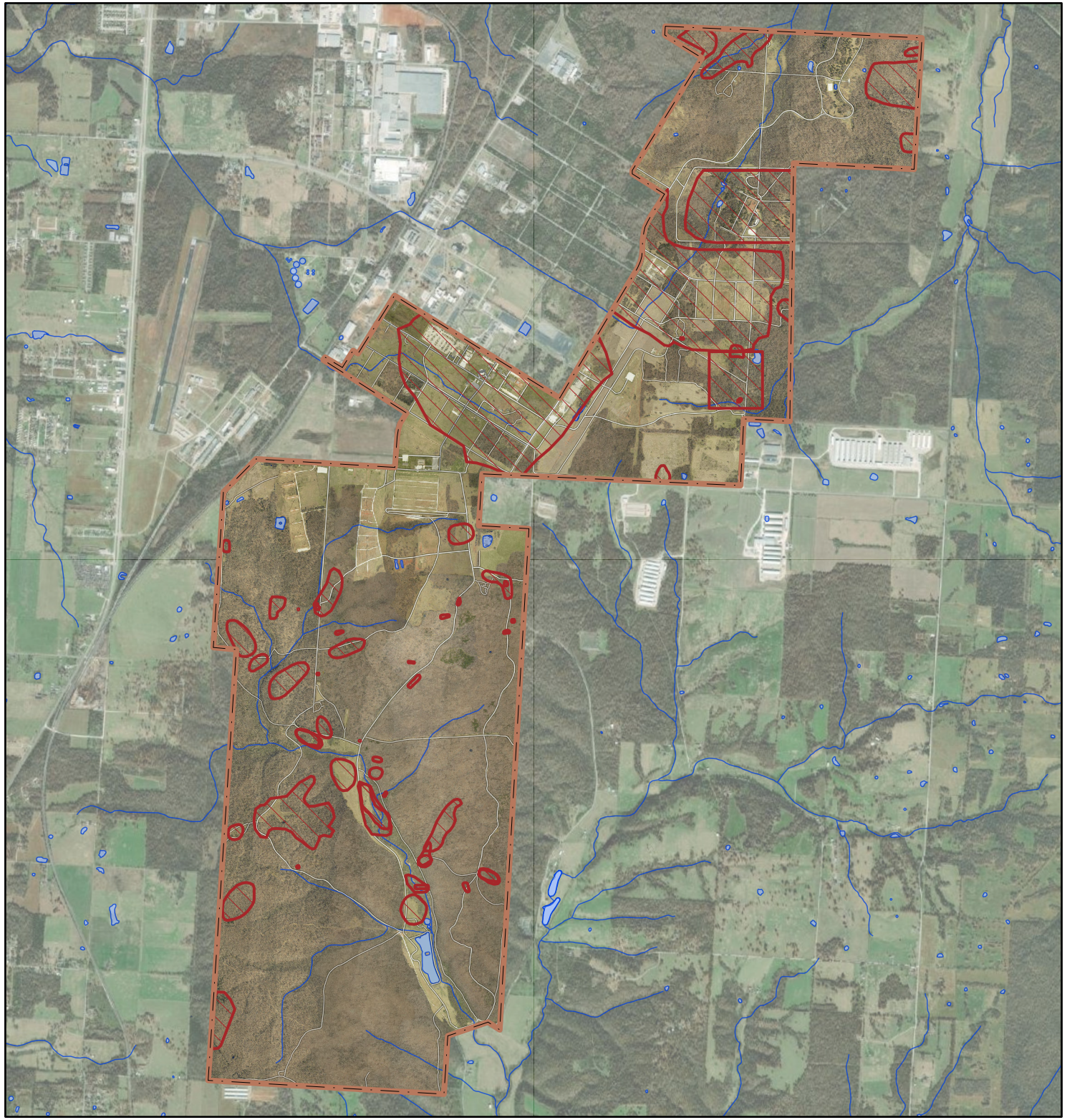


Figure 11
Environmental Constraints
Site: 29155 - Camp Crowder

County: Newton State: MO

Address: 890 Ray A. Carver Ave Zipcode: 64850

Scale: 1:42,000 1 inch = 3,500 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Installation Boundary
- Roads
- Sensitive Areas
- Wetlands
- Streams
- Ponds and Lakes

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

Figure 12
Environmental Constraints
Site: 29505 - Camp Clark

County: Vernon State: MO

Address: 18159 S K Hwy Zipcode: 64850

Scale: 1:18,000 1 inch = 1,500 feet

0 1,000 2,000 Feet

N W E S

LEGEND

- Installation Boundary
- Roads
- Sensitive Areas
- Wetlands
- Streams
- Ponds and Lakes

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

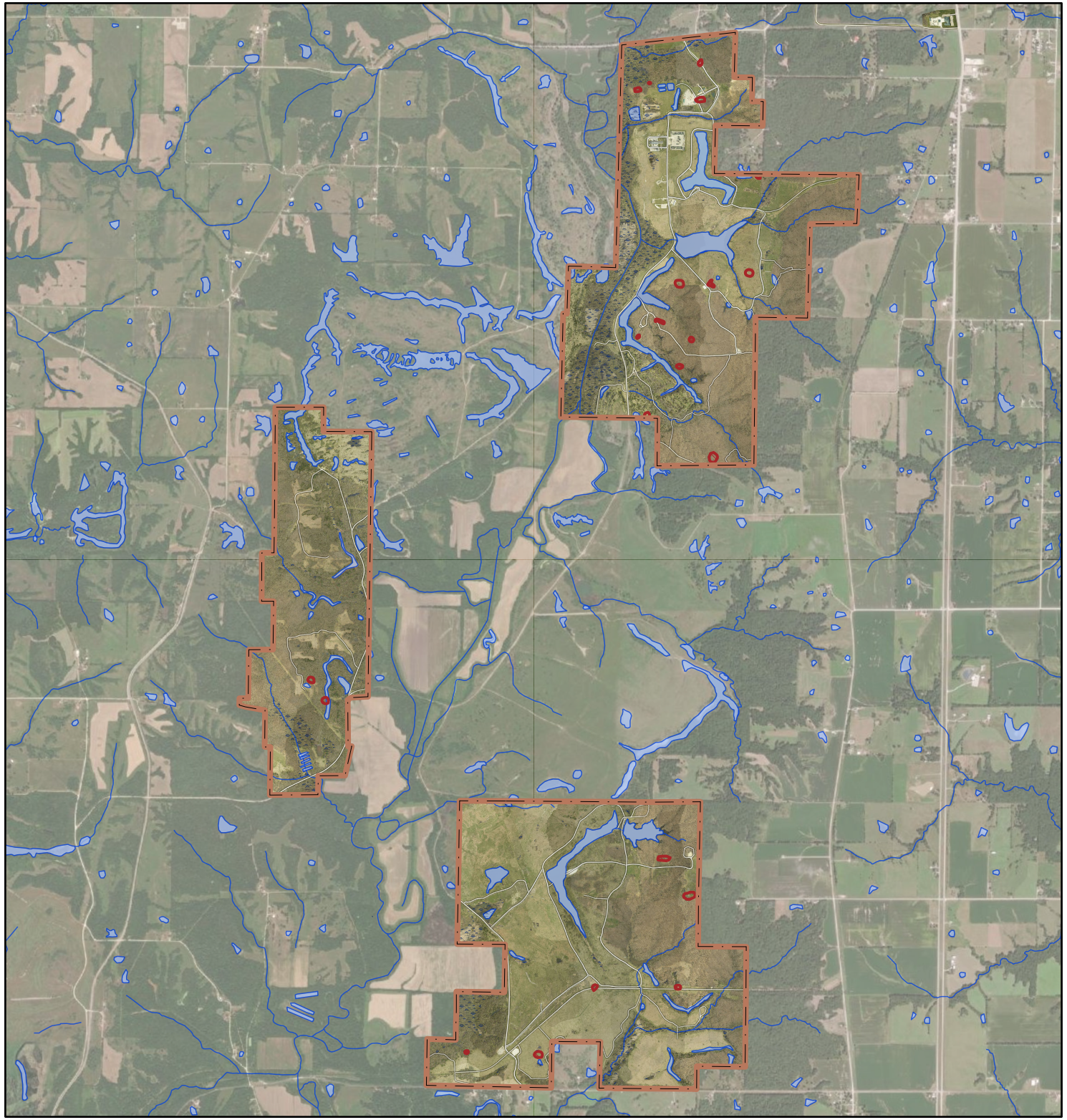


Figure 13
Environmental Constraints
Site: 29B78 - Macon Training Site

County: Macon State: MO

Address: 29614 Jaguar Street Zipcode: 63552

Scale: 1:45,000 1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Installation Boundary
- Roads
- Sensitive Areas
- Wetlands
- Streams
- Ponds and Lakes

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

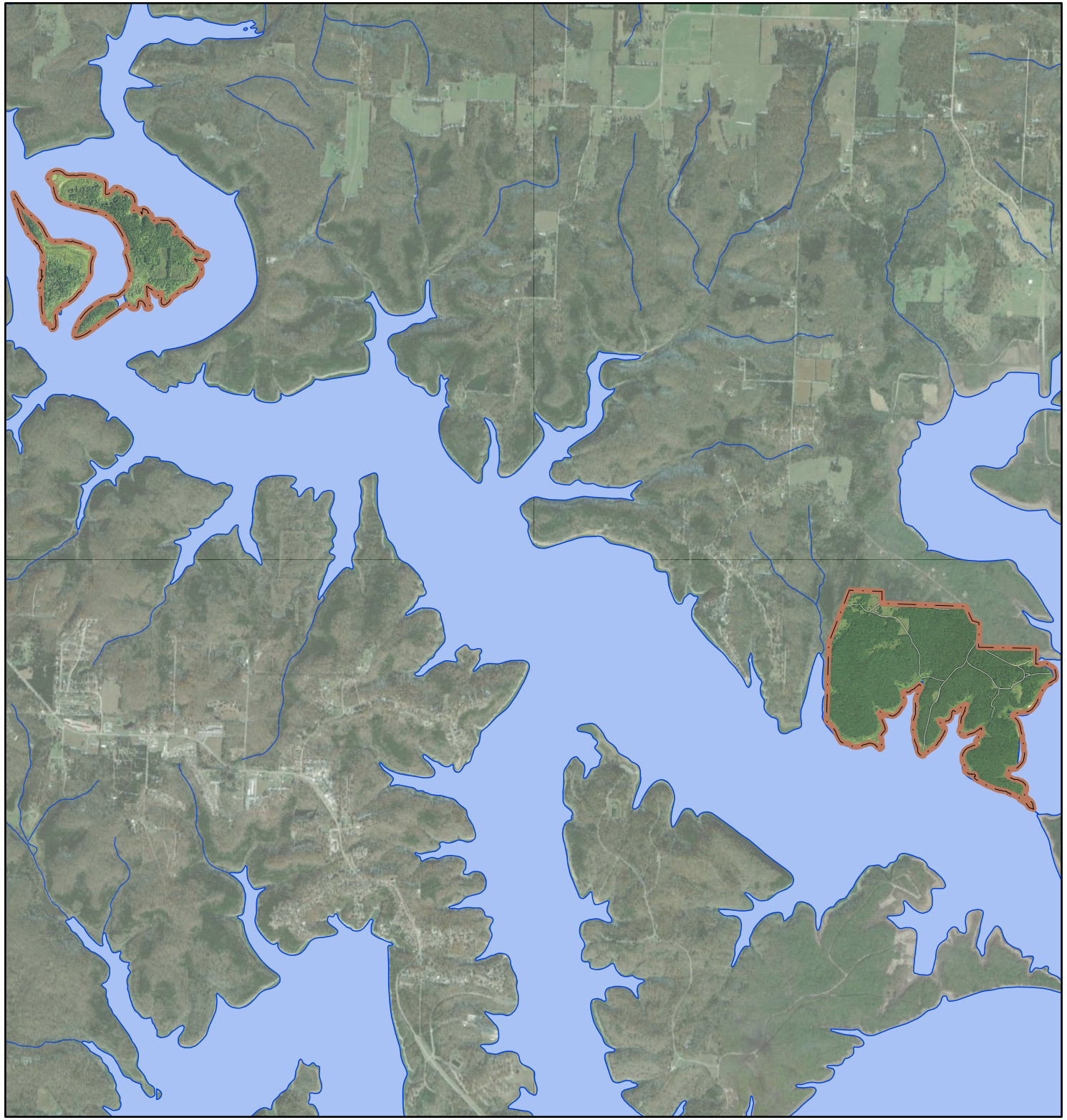


Figure 14
Environmental Constraints
Site: 29A57 - Truman Training Area

County: Benton State: MO

Address: Limestone School Rd Zipcode: 65355

Scale: 1:45,000 1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Installation Boundary
- Roads
- Sensitive Areas
- Wetlands
- Streams
- Ponds and Lakes

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

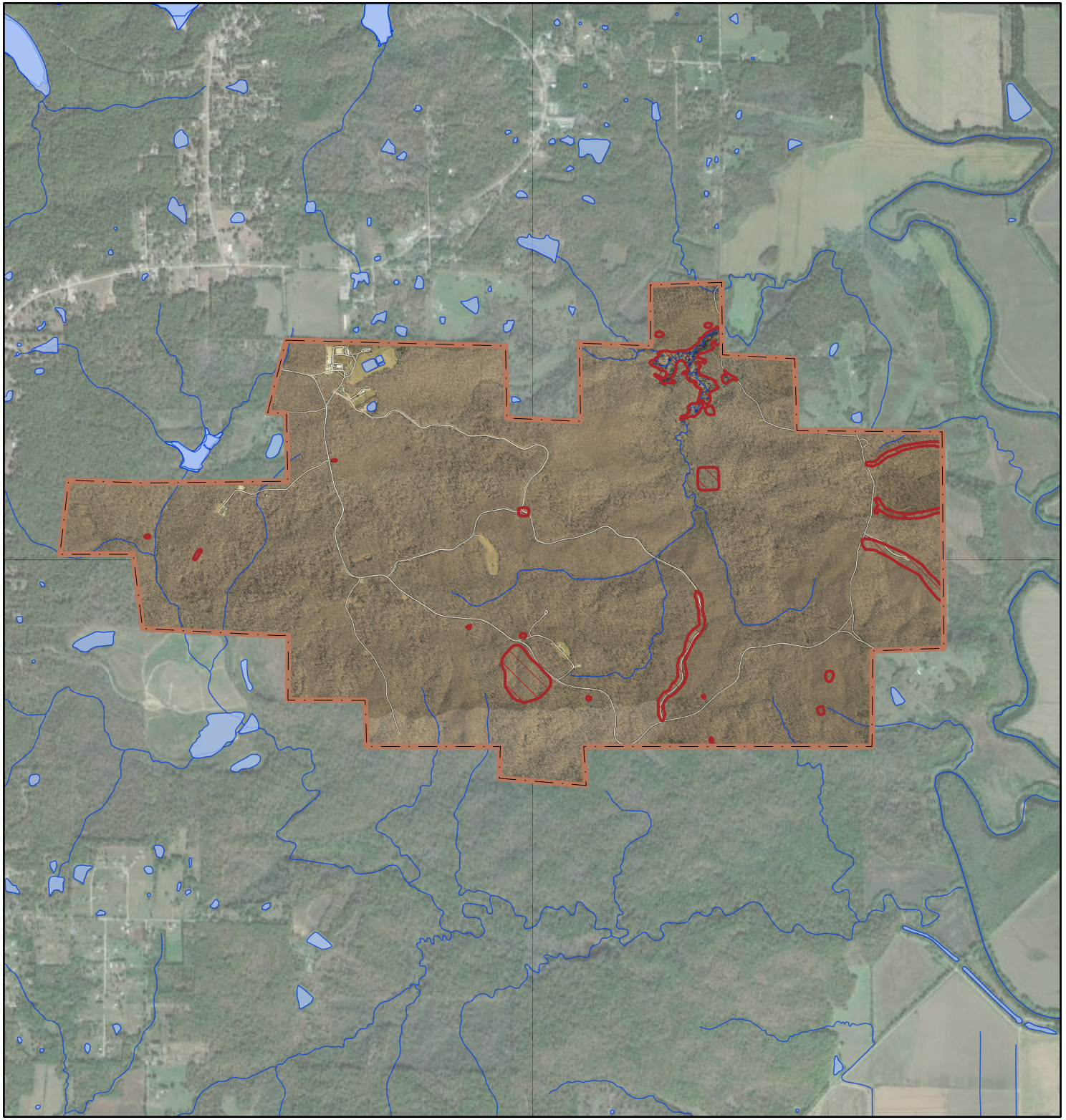


Figure 15
Environmental Constraints

Site: 29D05 - Wappapello Training Site

County: Butler State: MO

Address: 461 Country RD 517 Zipcode: 63966

Scale: 1:30,000 1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S

LEGEND

- Installation Boundary
- Roads
- Sensitive Areas
- Wetlands
- Streams
- Ponds and Lakes

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

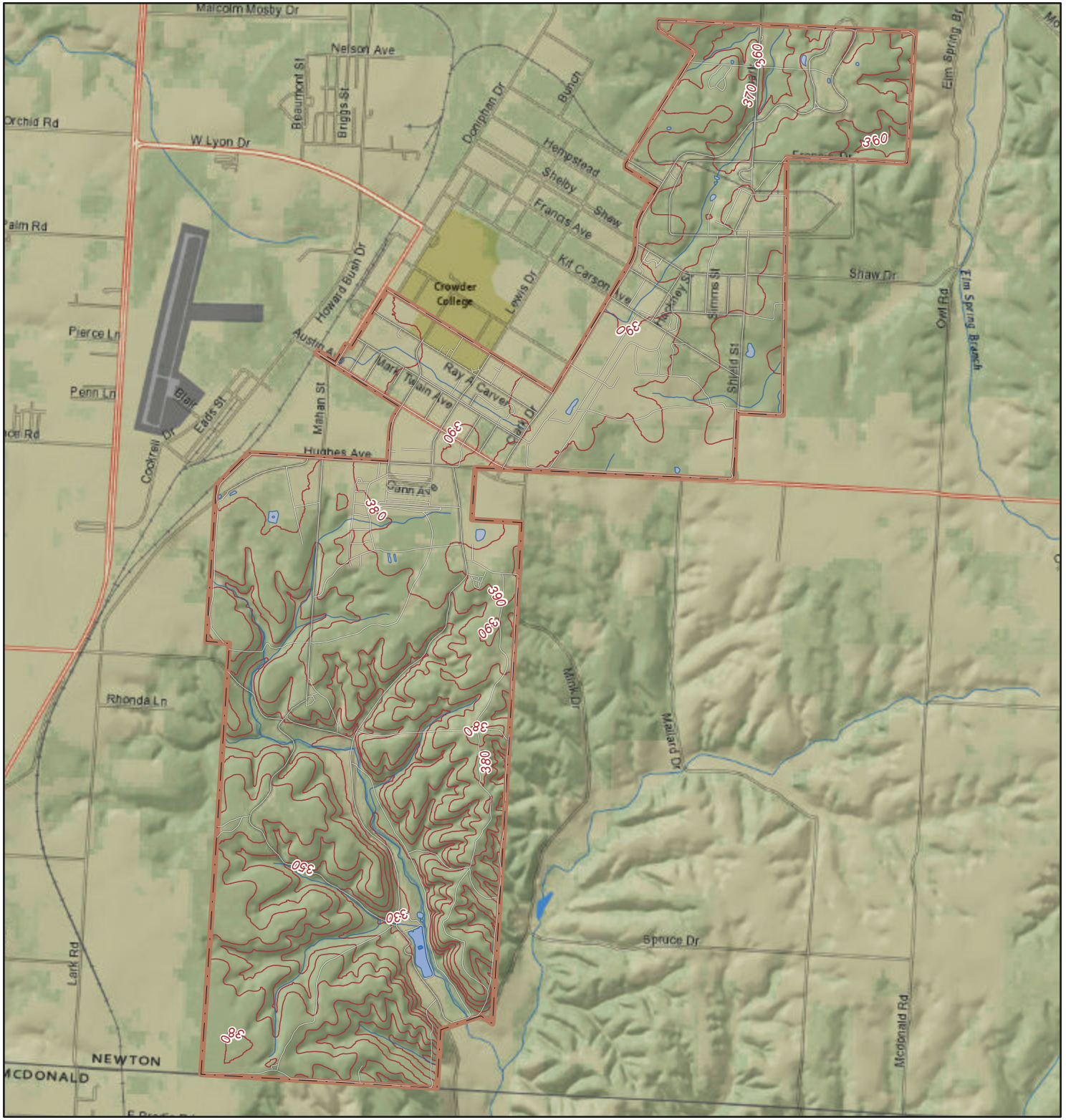


Figure 16

Topography

Site: 29155 - Camp Crowder

County: Newton | State: MO

Address: 890 Ray A. Carver Ave | Zipcode: 64850

Scale: 1:42,000	1 inch = 3,500 feet

0 — 3,000 — 6,000 Feet

N W E S

LEGEND

- Installation Boundary
- 10 Meter Contour
- Roads
- Streams
- Ponds and Lakes

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

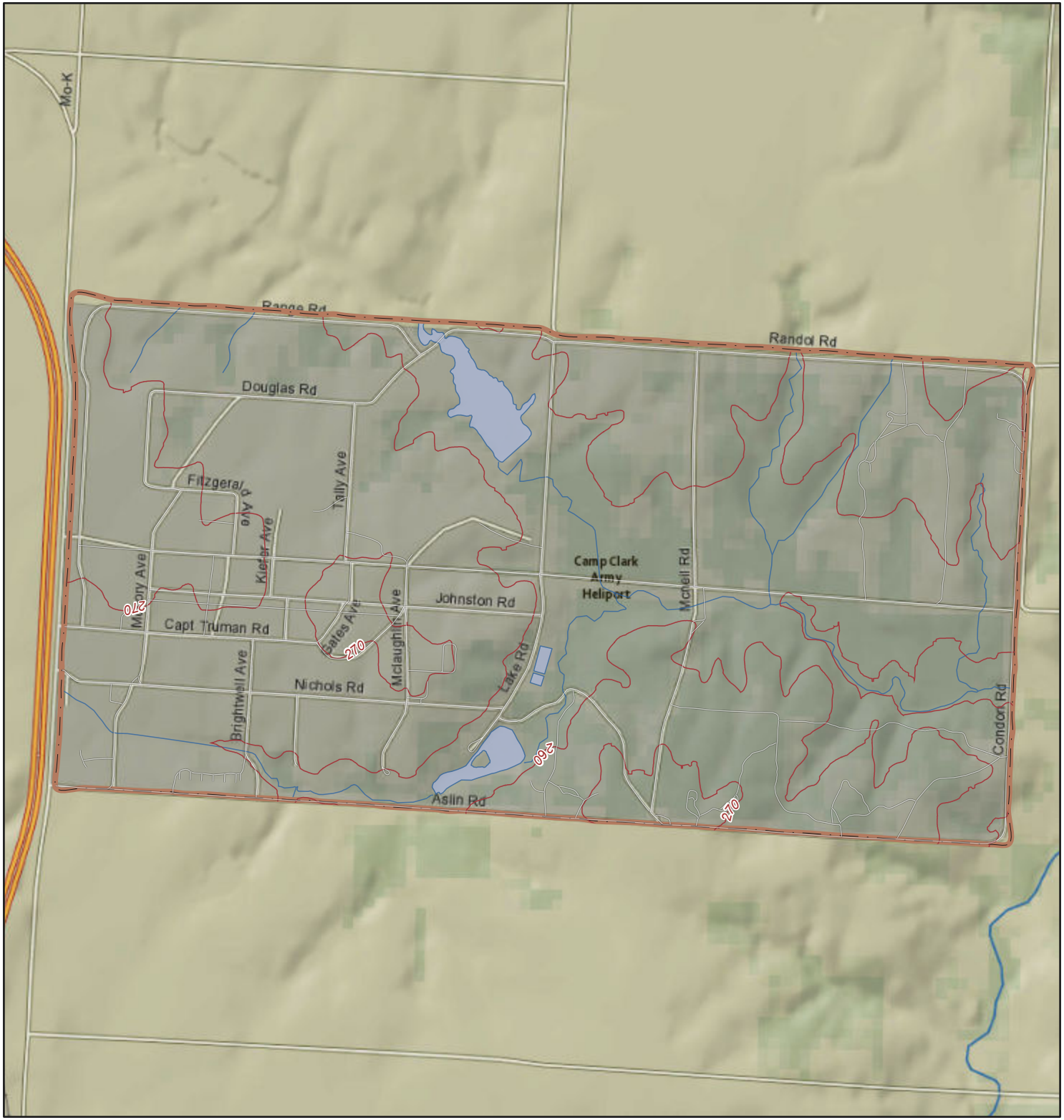


Figure 17

Topography

Site: 29505 - Camp Clark

County: Vernon | State: MO

Address: 18159 S K Hwy | Zipcode: 64850

Scale: 1:18,000	1 inch = 1,500 feet

0 1,000 2,000 Feet

N W E S

LEGEND

- Installation Boundary
- 10 Meter Contour
- Roads
- Streams
- Ponds and Lakes

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

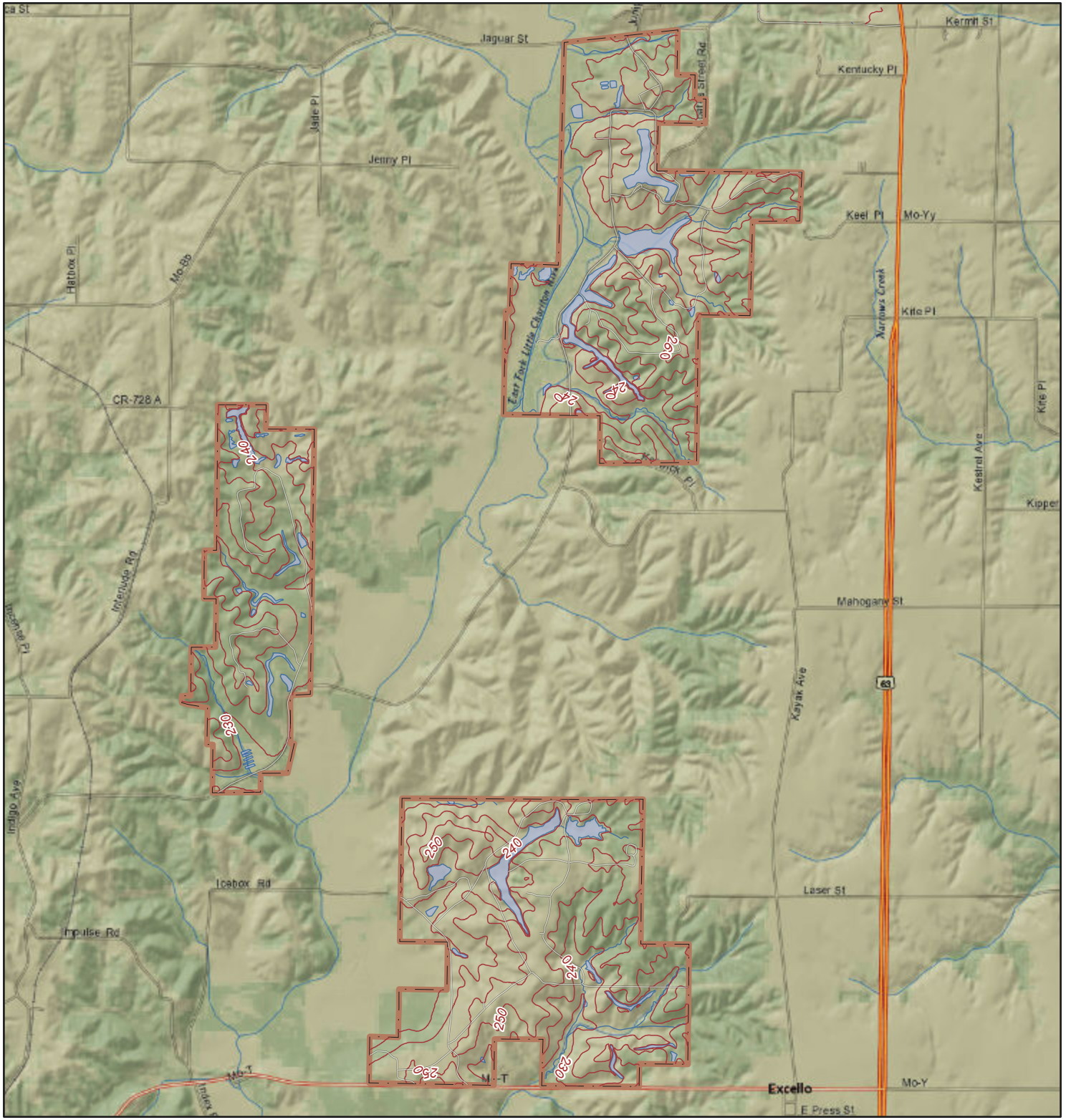


Figure 18

Topography

Site: 29B78 - Macon Training Site

County: Macon | State: MO

Address: 29614 Jaguar Street | Zipcode: 63552

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Installation Boundary
- 10 Meter Contour
- Roads
- Streams
- Ponds and Lakes

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

Figure 19

Topography

Site: 29A57 - Truman Training Area

County: Benton | State: MO

Address: Limestone School Rd | Zipcode: 65355

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet

μ

LEGEND

- Installation Boundary
- 10 Meter Contour
- Roads
- Streams
- Ponds and Lakes

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

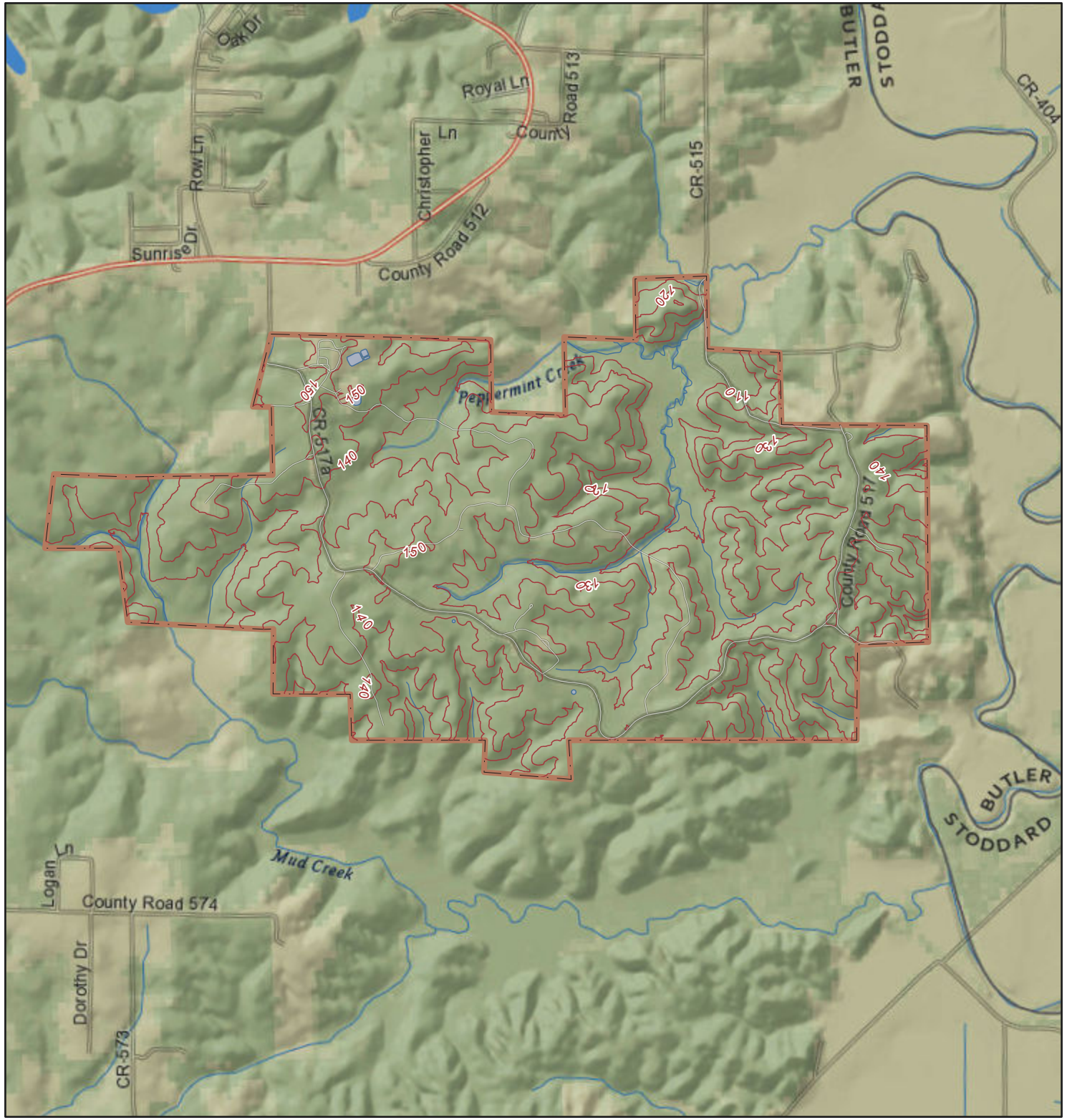


Figure 20

Topography

Site: 29D05 - Wappapello Training Site

County: Butler State: MO

Address: 461 Country RD 517 Zipcode: 63966

Scale: 1:30,000	1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S

LEGEND

- Installation Boundary
- 10 Meter Contour
- Roads
- Streams
- Ponds and Lakes

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

Figure 21

Soils Map

Site: 29155 - Camp Crowder

County: Newton | State: MO

Address: 890 Ray A. Carver Ave | Zipcode: 64850

Scale: 1:42,000	1 inch = 3,500 feet

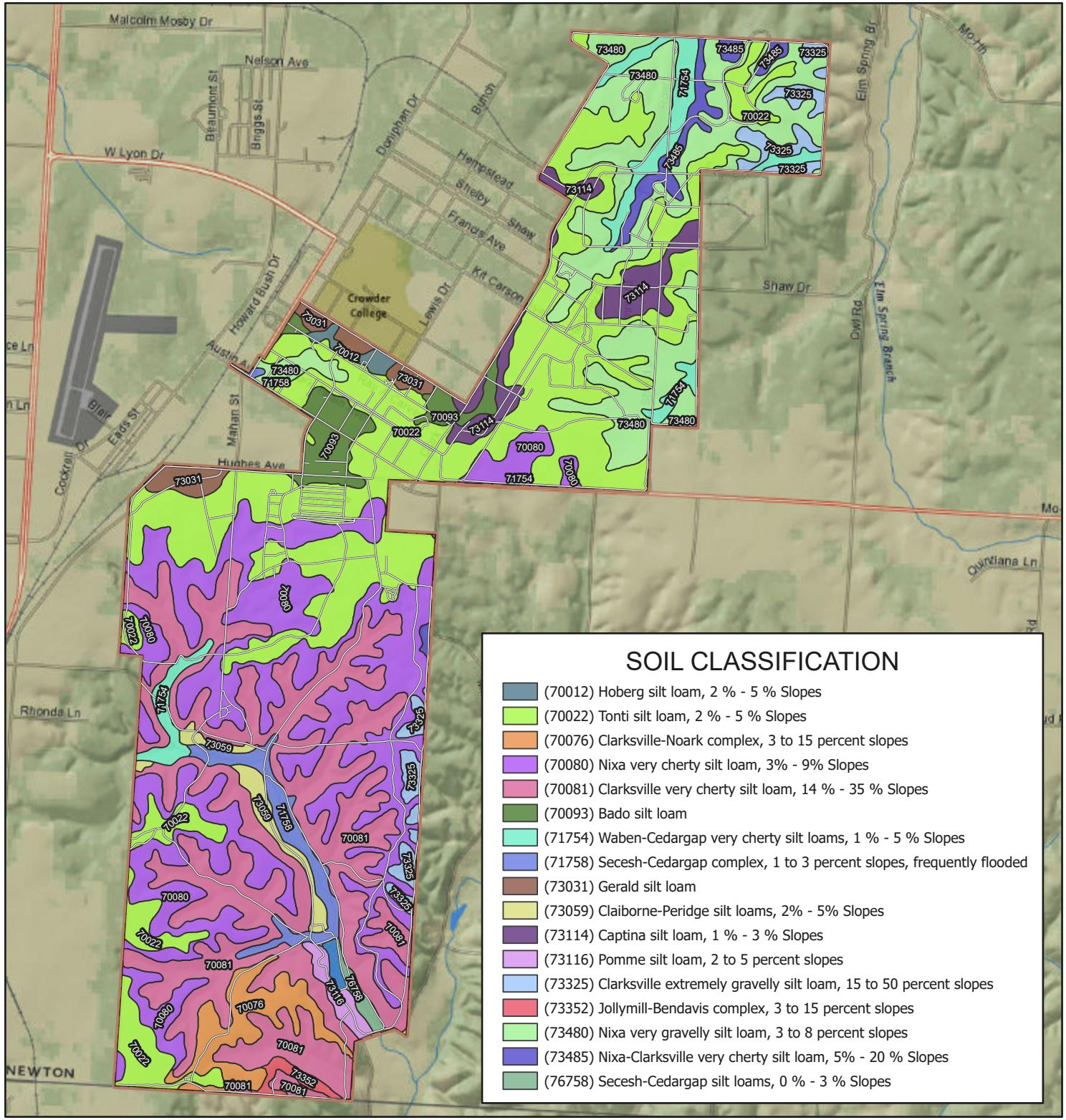
0 3,000 6,000 Feet

N W E S

LEGEND

Roads

Installation Boundary



Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

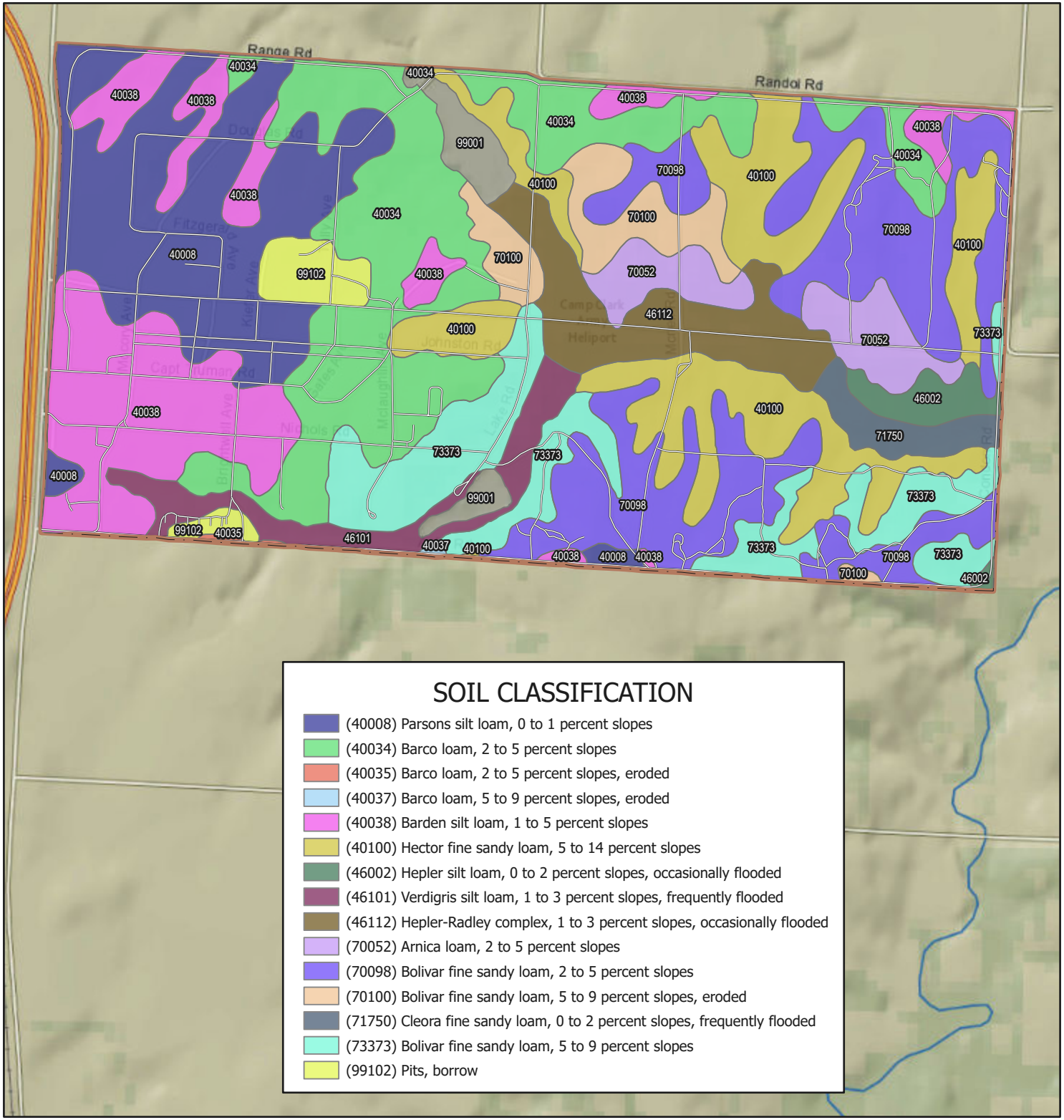
Figure 22
Soils Map
Site: 29505 - Camp Clark

County: Vernon | State: MO

Address: 18159 S K Hwy | Zipcode: 64850

Scale: 1:18,000	1 inch = 1,500 feet

0 1,000 2,000 Feet



SOIL CLASSIFICATION

- (40008) Parsons silt loam, 0 to 1 percent slopes
- (40034) Barco loam, 2 to 5 percent slopes
- (40035) Barco loam, 2 to 5 percent slopes, eroded
- (40037) Barco loam, 5 to 9 percent slopes, eroded
- (40038) Barden silt loam, 1 to 5 percent slopes
- (40100) Hector fine sandy loam, 5 to 14 percent slopes
- (46002) Hepler silt loam, 0 to 2 percent slopes, occasionally flooded
- (46101) Verdigris silt loam, 1 to 3 percent slopes, frequently flooded
- (46112) Hepler-Radley complex, 1 to 3 percent slopes, occasionally flooded
- (70052) Arnica loam, 2 to 5 percent slopes
- (70098) Bolivar fine sandy loam, 2 to 5 percent slopes
- (70100) Bolivar fine sandy loam, 5 to 9 percent slopes, eroded
- (71750) Cleora fine sandy loam, 0 to 2 percent slopes, frequently flooded
- (73373) Bolivar fine sandy loam, 5 to 9 percent slopes
- (99102) Pits, borrow

LEGEND

- Roads
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

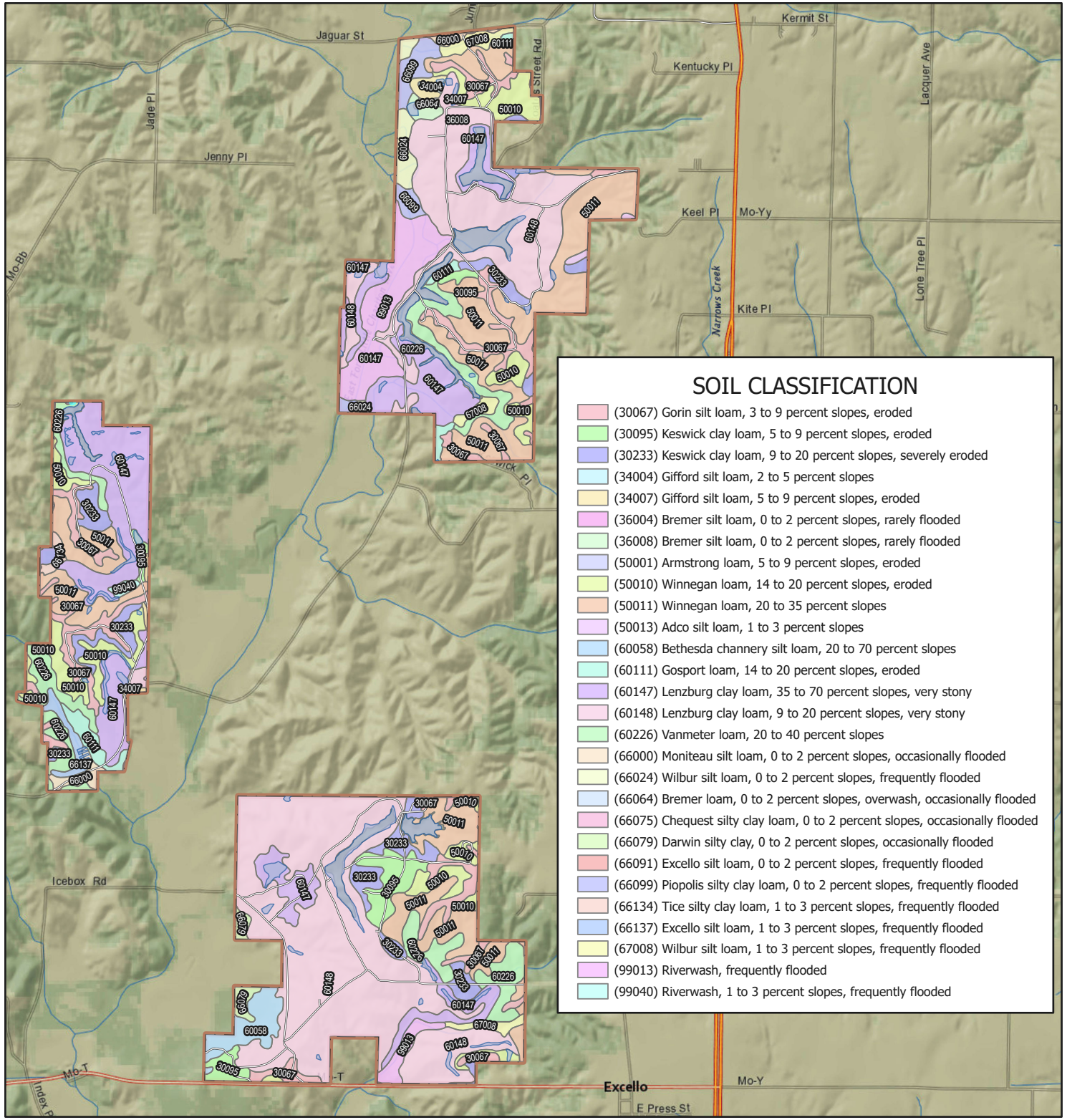
Reference Map

Figure 23
Soils Map
Site: 29B78 - Macon Training Site

County: Macon | State: MO
Address: 29614 Jaguar Street | Zipcode: 63552

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet



SOIL CLASSIFICATION

- (30067) Gorin silt loam, 3 to 9 percent slopes, eroded
- (30095) Keswick clay loam, 5 to 9 percent slopes, eroded
- (30233) Keswick clay loam, 9 to 20 percent slopes, severely eroded
- (34004) Gifford silt loam, 2 to 5 percent slopes
- (34007) Gifford silt loam, 5 to 9 percent slopes, eroded
- (36004) Bremer silt loam, 0 to 2 percent slopes, rarely flooded
- (36008) Bremer silt loam, 0 to 2 percent slopes, rarely flooded
- (50001) Armstrong loam, 5 to 9 percent slopes, eroded
- (50010) Winnegan loam, 14 to 20 percent slopes, eroded
- (50011) Winnegan loam, 20 to 35 percent slopes
- (50013) Adco silt loam, 1 to 3 percent slopes
- (60058) Bethesda channery silt loam, 20 to 70 percent slopes
- (60111) Gosport loam, 14 to 20 percent slopes, eroded
- (60147) Lenzburg clay loam, 35 to 70 percent slopes, very stony
- (60148) Lenzburg clay loam, 9 to 20 percent slopes, very stony
- (60226) Vanmeter loam, 20 to 40 percent slopes
- (66000) Moniteau silt loam, 0 to 2 percent slopes, occasionally flooded
- (66024) Wilbur silt loam, 0 to 2 percent slopes, frequently flooded
- (66064) Bremer loam, 0 to 2 percent slopes, overwash, occasionally flooded
- (66075) Chequest silty clay loam, 0 to 2 percent slopes, occasionally flooded
- (66079) Darwin silty clay, 0 to 2 percent slopes, occasionally flooded
- (66091) Excello silt loam, 0 to 2 percent slopes, frequently flooded
- (66099) Piopolis silty clay loam, 0 to 2 percent slopes, frequently flooded
- (66134) Tice silty clay loam, 1 to 3 percent slopes, frequently flooded
- (66137) Excello silt loam, 1 to 3 percent slopes, frequently flooded
- (67008) Wilbur silt loam, 1 to 3 percent slopes, frequently flooded
- (99013) Riverwash, frequently flooded
- (99040) Riverwash, 1 to 3 percent slopes, frequently flooded

LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 24
Soils Map
Site: 29A57 - Truman Training Area

County: Benton | State: MO
Address: Limestone School Rd | Zipcode: 65355

Scale: 1:48,000	1 inch = 4,000 feet

0 4,000 8,000 Feet

N W E S

LEGEND

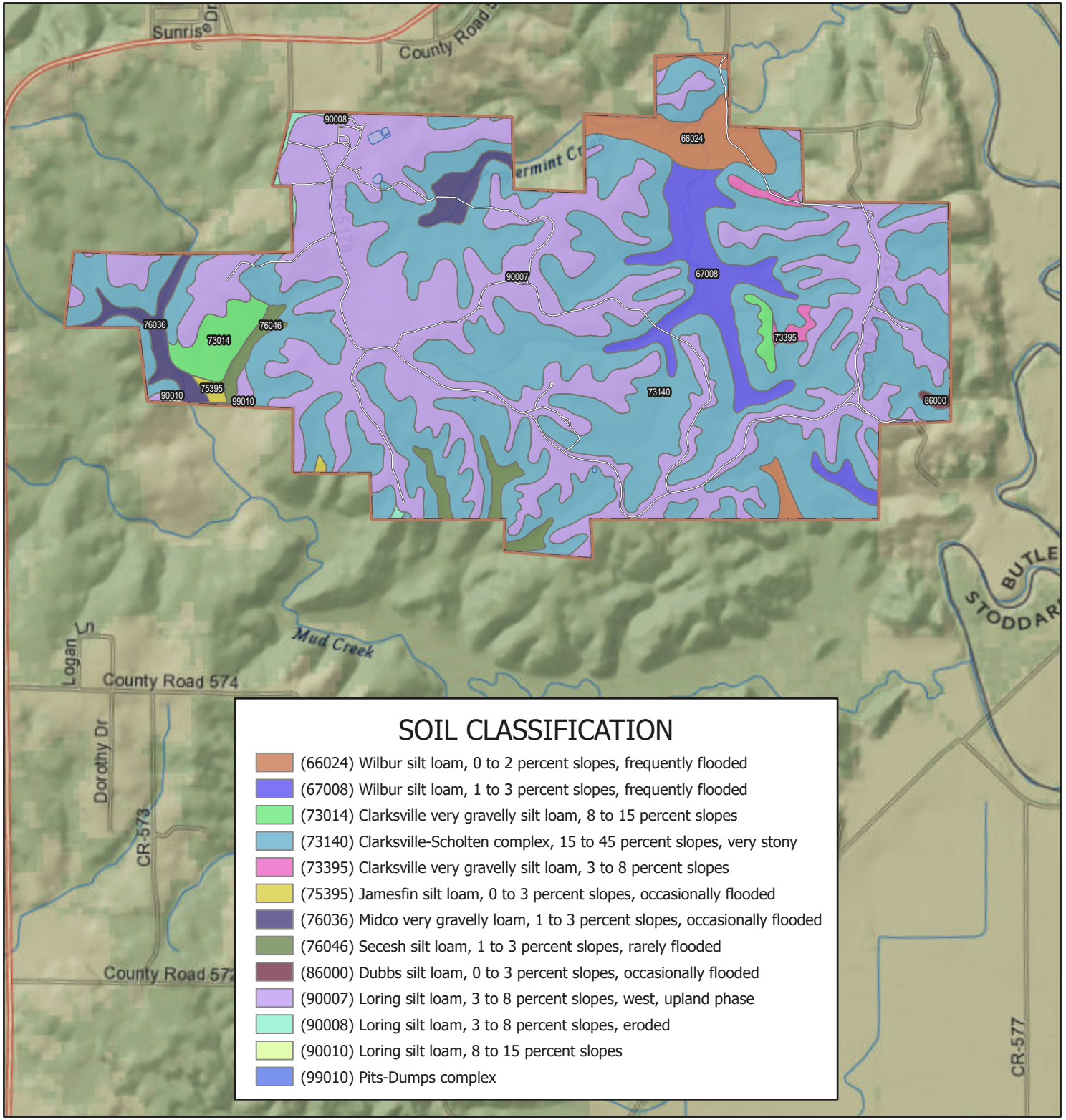
- Roads
- Streams
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

SOIL CLASSIFICATION

- (73000) Pomme silt loam, 3 to 8 percent slopes
- (73019) Poynor very gravelly silt loam, 1 to 8 percent slopes
- (73135) Union silt loam, 3 to 8 percent slopes
- (73136) Union silt loam, 1 to 3 percent slopes
- (73363) Bardley gravelly silt loam, 3 to 8 percent slopes
- (73365) Bardley very gravelly silt loam, 8 to 35 percent slopes, stony
- (73429) Gasconade-Rock outcrop complex, 8 to 50 percent slopes
- (73432) Gasconade-Rock outcrop complex, 3 to 8 percent slopes
- (73976) McGirk silt loam, 1 to 3 percent slopes



SOIL CLASSIFICATION

- (66024) Wilbur silt loam, 0 to 2 percent slopes, frequently flooded
- (67008) Wilbur silt loam, 1 to 3 percent slopes, frequently flooded
- (73014) Clarksville very gravelly silt loam, 8 to 15 percent slopes
- (73140) Clarksville-Scholten complex, 15 to 45 percent slopes, very stony
- (73395) Clarksville very gravelly silt loam, 3 to 8 percent slopes
- (75395) Jamesfin silt loam, 0 to 3 percent slopes, occasionally flooded
- (76036) Midco very gravelly loam, 1 to 3 percent slopes, occasionally flooded
- (76046) Secesh silt loam, 1 to 3 percent slopes, rarely flooded
- (86000) Dubbs silt loam, 0 to 3 percent slopes, occasionally flooded
- (90007) Loring silt loam, 3 to 8 percent slopes, west, upland phase
- (90008) Loring silt loam, 3 to 8 percent slopes, eroded
- (90010) Loring silt loam, 8 to 15 percent slopes
- (99010) Pits-Dumps complex

Figure 25
Soils Map

Site: 29D05 - Wappapello Training Site

County: Butler | State: MO

Address: 461 Country RD 517 | Zipcode: 63966

Scale: 1:30,000	1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S

LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

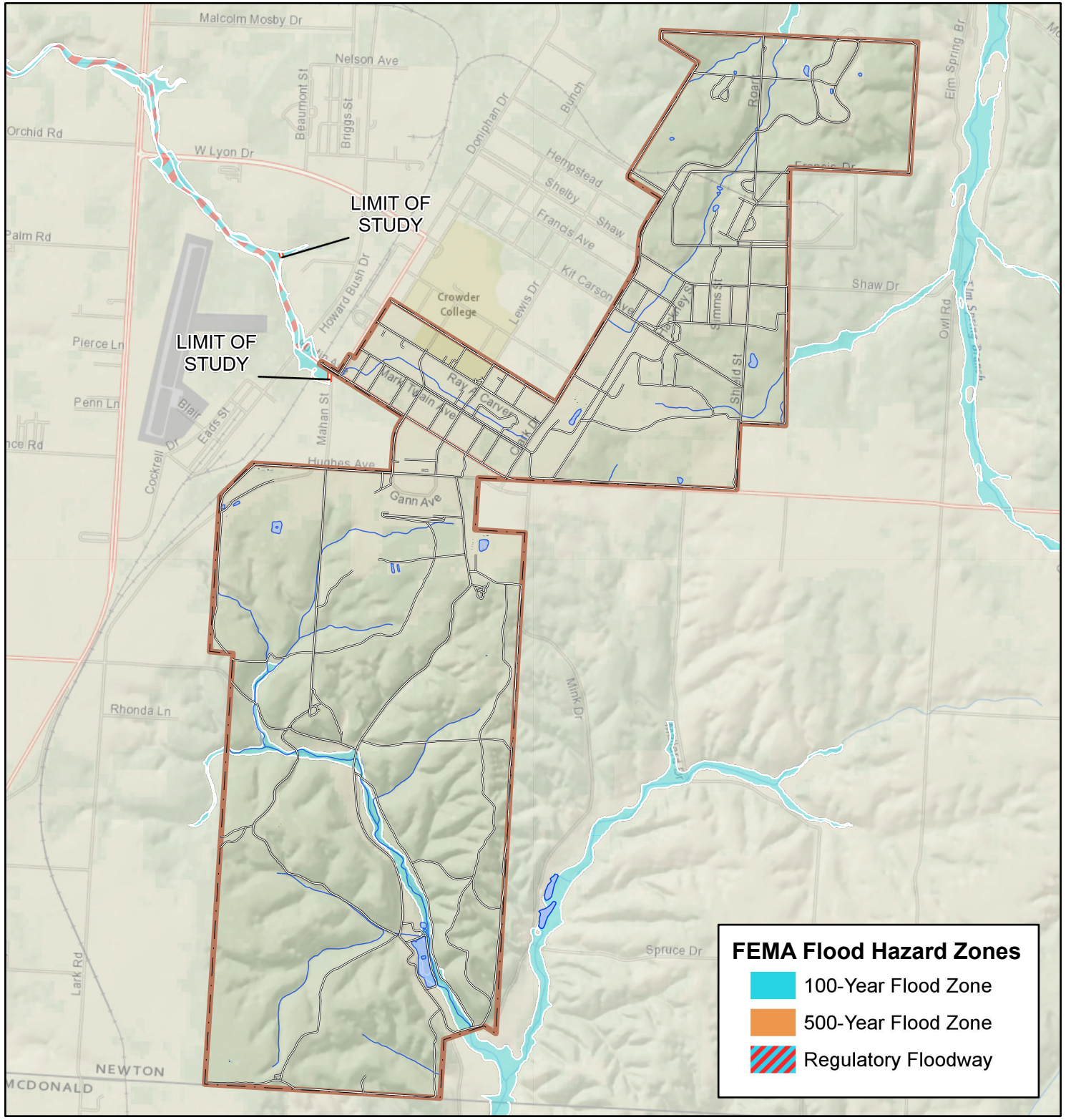
Reference Map

Figure 26
Surface Water and Wetlands
Site: 29155 - Camp Crowder

County: Newton State: MO
Address: 890 Ray A. Carver Ave Zipcode: 64850

Scale: 1:42,000 1 inch = 3,500 feet

0 3,000 6,000 Feet



LEGEND

- Roads
- Streams
- Ponds and Lakes
- Wetlands
- Installation Boundary

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

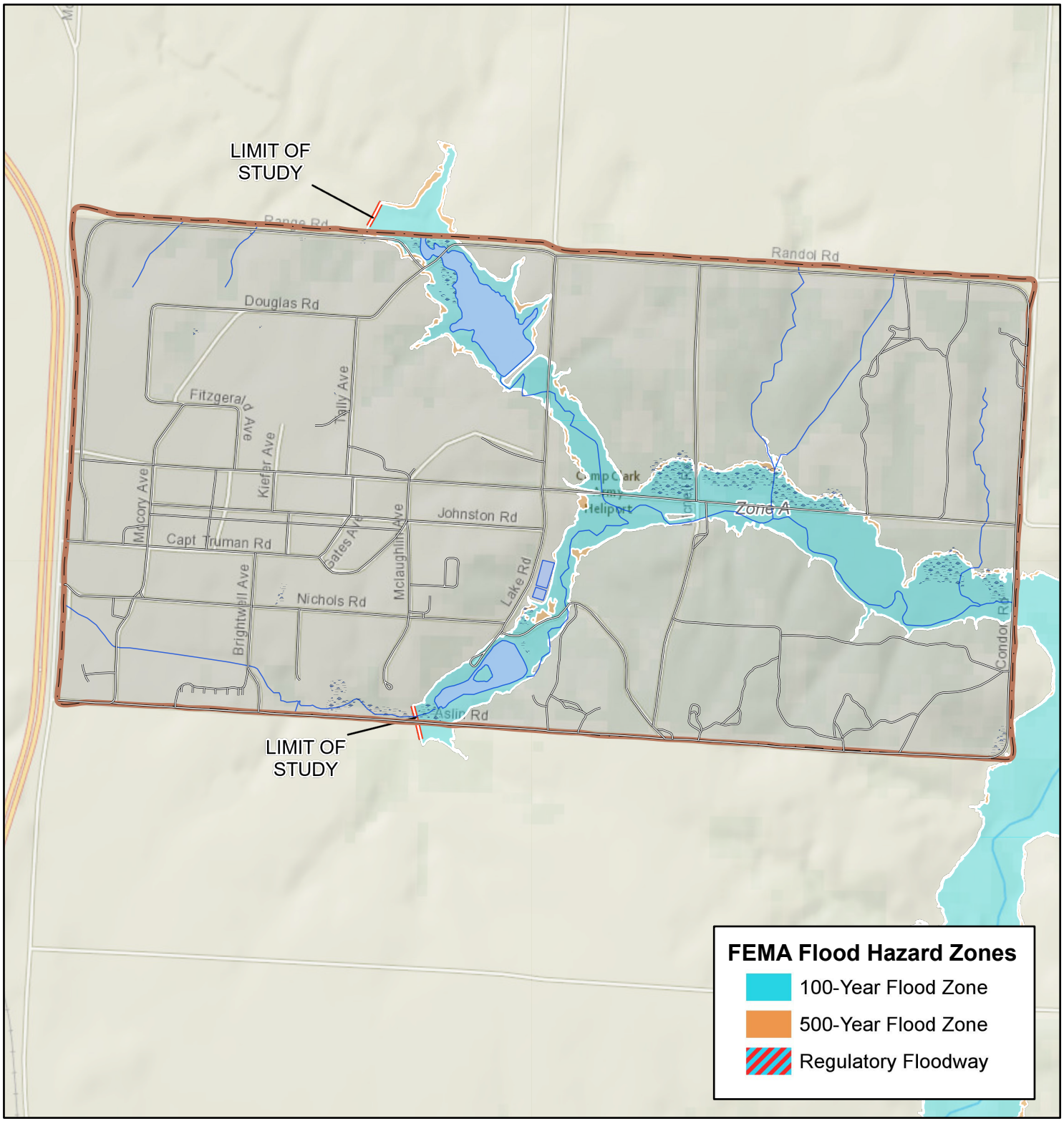
Figure 27
Surface Water and Wetlands
Site: 29505 - Camp Clark

County: Vernon State: MO

Address: 18159 S K Hwy Zipcode: 64850

Scale: 1:18,000 1 inch = 1,500 feet

0 1,000 2,000 Feet



LEGEND

- Roads
- Streams
- Ponds and Lakes
- Wetlands
- Installation Boundary

Date Published: 10/6/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 28

Surface Water and Wetlands

Site: 29B78 - Macon Training Site

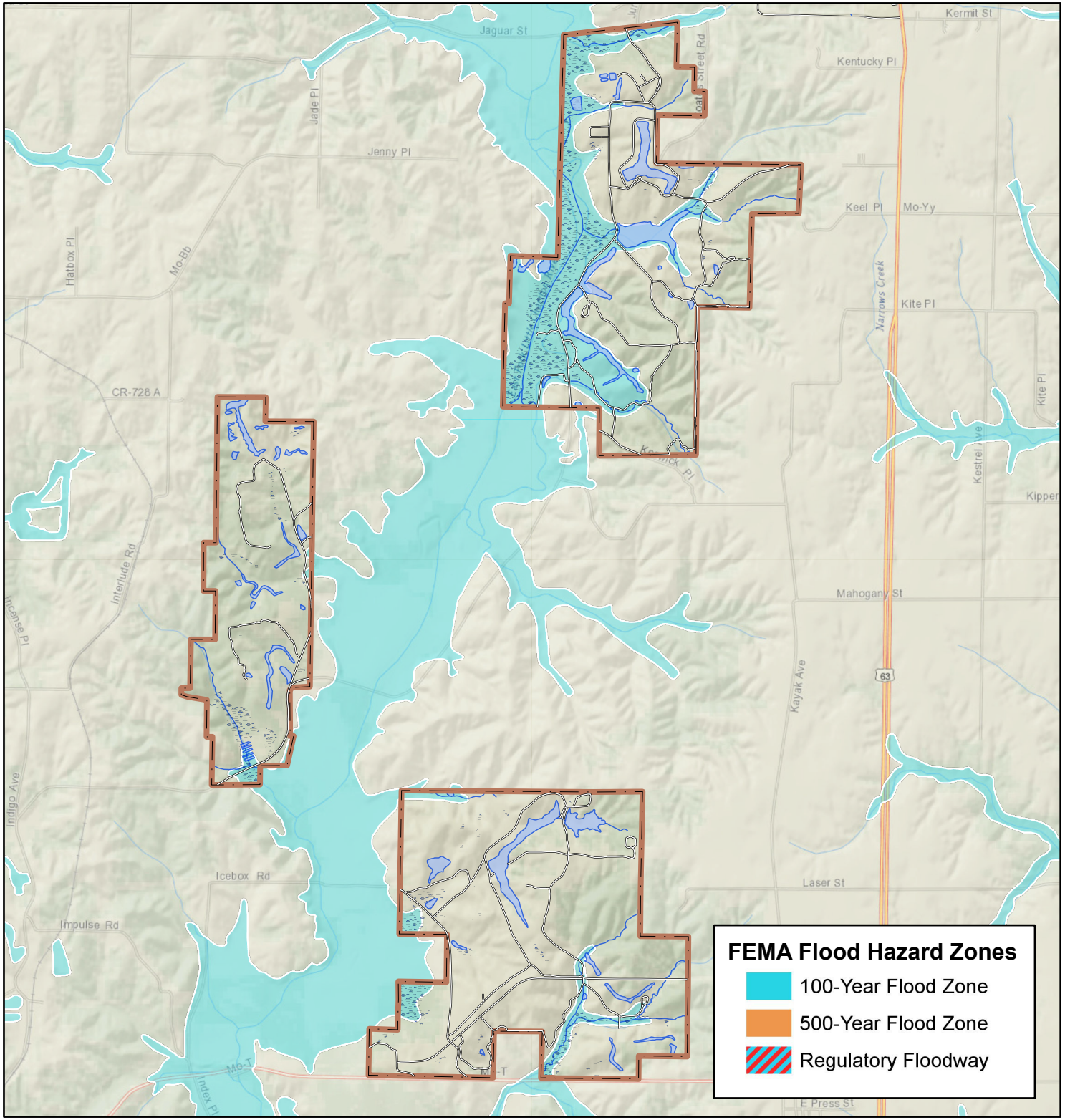
County: Macon State: MO

Address: 29614 Jaguar Street Zipcode: 63552

Scale: 1:45,000 1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S



LEGEND

- Roads
- Streams
- Ponds and Lakes
- Wetlands
- Installation Boundary

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 29

Surface Water and Wetlands

Site: 29A57 - Truman Training Area

County: Benton State: MO

Address: Limestone School Rd Zipcode: 65355

Scale: 1:45,000 1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Roads
- Streams
- Wetlands
- Ponds and Lakes
- Installation Boundary

FEMA Flood Hazard Zones

- 100-Year Flood Zone
- 500-Year Flood Zone
- Regulatory Floodway

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

Figure 30
Surface Water and Wetlands
Site: 29D05 - Wappapello Training Site

County: Butler State: MO

Address: 461 Country RD 517 Zipcode: 63966

Scale: 1:30,000 1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S

LEGEND

- Roads
- Streams
- Ponds and Lakes
- Wetlands
- Installation Boundary

Date Published: 10/7/2021
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

FEMA Flood Hazard Zones

- 100-Year Flood Zone
- 500-Year Flood Zone
- Regulatory Floodway

Figure 31
Vegetative Communities
Site: 29155 - Camp Crowder

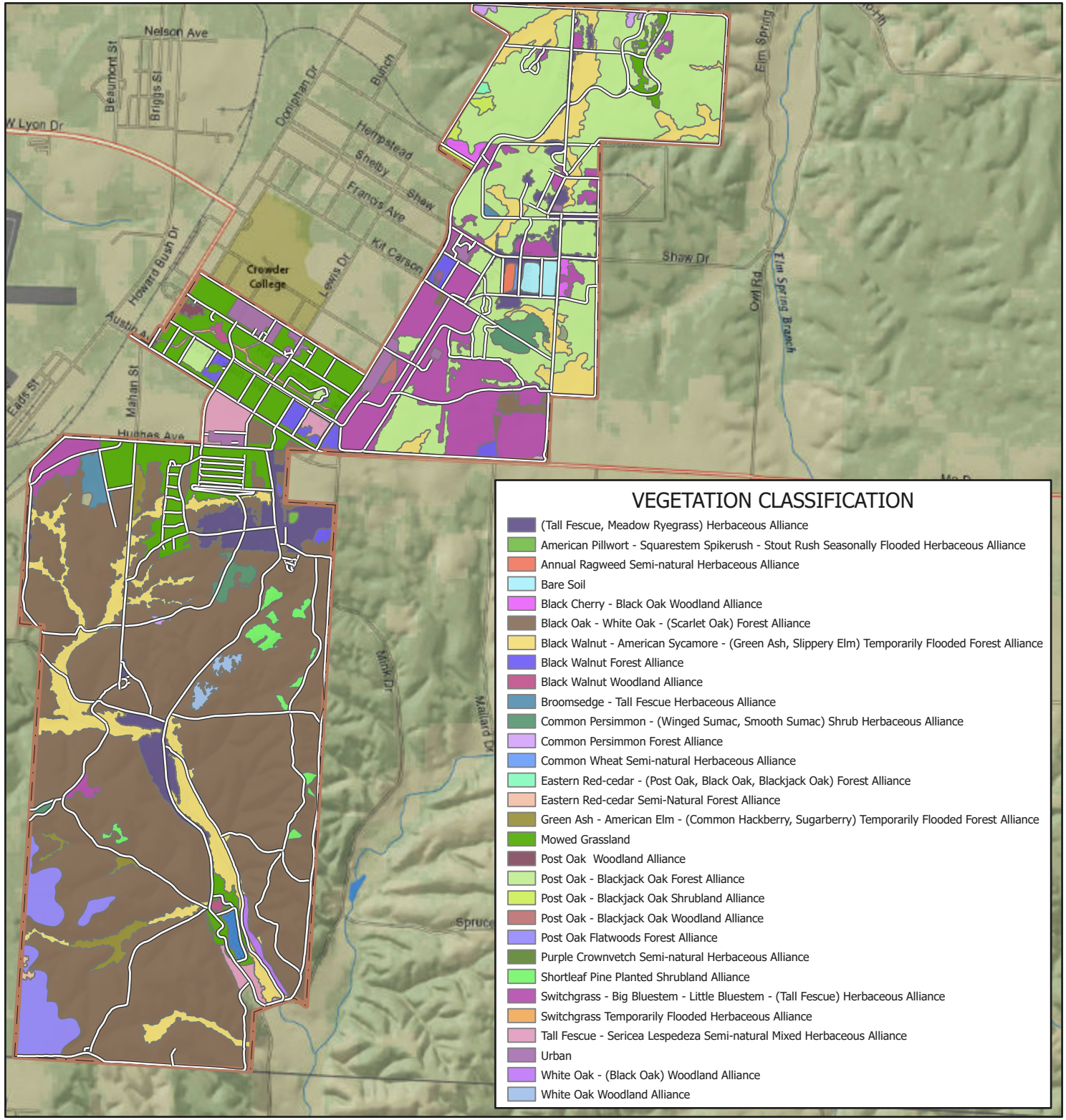
County: Newton | State: MO

Address: 890 Ray A. Carver Ave | Zipcode: 64850

Scale: 1:42,000	1 inch = 3,500 feet

0 — 3,000 — 6,000 Feet

N W E S



LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

VEGETATION CLASSIFICATION

- (Tall Fescue, Meadow Ryegrass) Herbaceous Alliance
- American Pillwort - Squarestem Spikerush - Stout Rush Seasonally Flooded Herbaceous Alliance
- Annual Ragweed Semi-natural Herbaceous Alliance
- Bare Soil
- Black Cherry - Black Oak Woodland Alliance
- Black Oak - White Oak - (Scarlet Oak) Forest Alliance
- Black Walnut - American Sycamore - (Green Ash, Slippery Elm) Temporarily Flooded Forest Alliance
- Black Walnut Forest Alliance
- Black Walnut Woodland Alliance
- Broomsedge - Tall Fescue Herbaceous Alliance
- Common Persimmon - (Winged Sumac, Smooth Sumac) Shrub Herbaceous Alliance
- Common Persimmon Forest Alliance
- Common Wheat Semi-natural Herbaceous Alliance
- Eastern Red-cedar - (Post Oak, Black Oak, Blackjack Oak) Forest Alliance
- Eastern Red-cedar Semi-Natural Forest Alliance
- Green Ash - American Elm - (Common Hackberry, Sugarberry) Temporarily Flooded Forest Alliance
- Mowed Grassland
- Post Oak Woodland Alliance
- Post Oak - Blackjack Oak Forest Alliance
- Post Oak - Blackjack Oak Shrubland Alliance
- Post Oak - Blackjack Oak Woodland Alliance
- Post Oak Flatwoods Forest Alliance
- Purple Crownvetch Semi-natural Herbaceous Alliance
- Shortleaf Pine Planted Shrubland Alliance
- Switchgrass - Big Bluestem - Little Bluestem - (Tall Fescue) Herbaceous Alliance
- Switchgrass Temporarily Flooded Herbaceous Alliance
- Tall Fescue - Sericea Lespedeza Semi-natural Mixed Herbaceous Alliance
- Urban
- White Oak - (Black Oak) Woodland Alliance
- White Oak Woodland Alliance

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

Figure 32
Vegetative Communities
Site: 29505 - Camp Clark

County: Vernon | State: MO

Address: 18159 S K Hwy | Zipcode: 64850

Scale: 1:18,000	1 inch = 1,500 feet

0 1,000 2,000 Feet

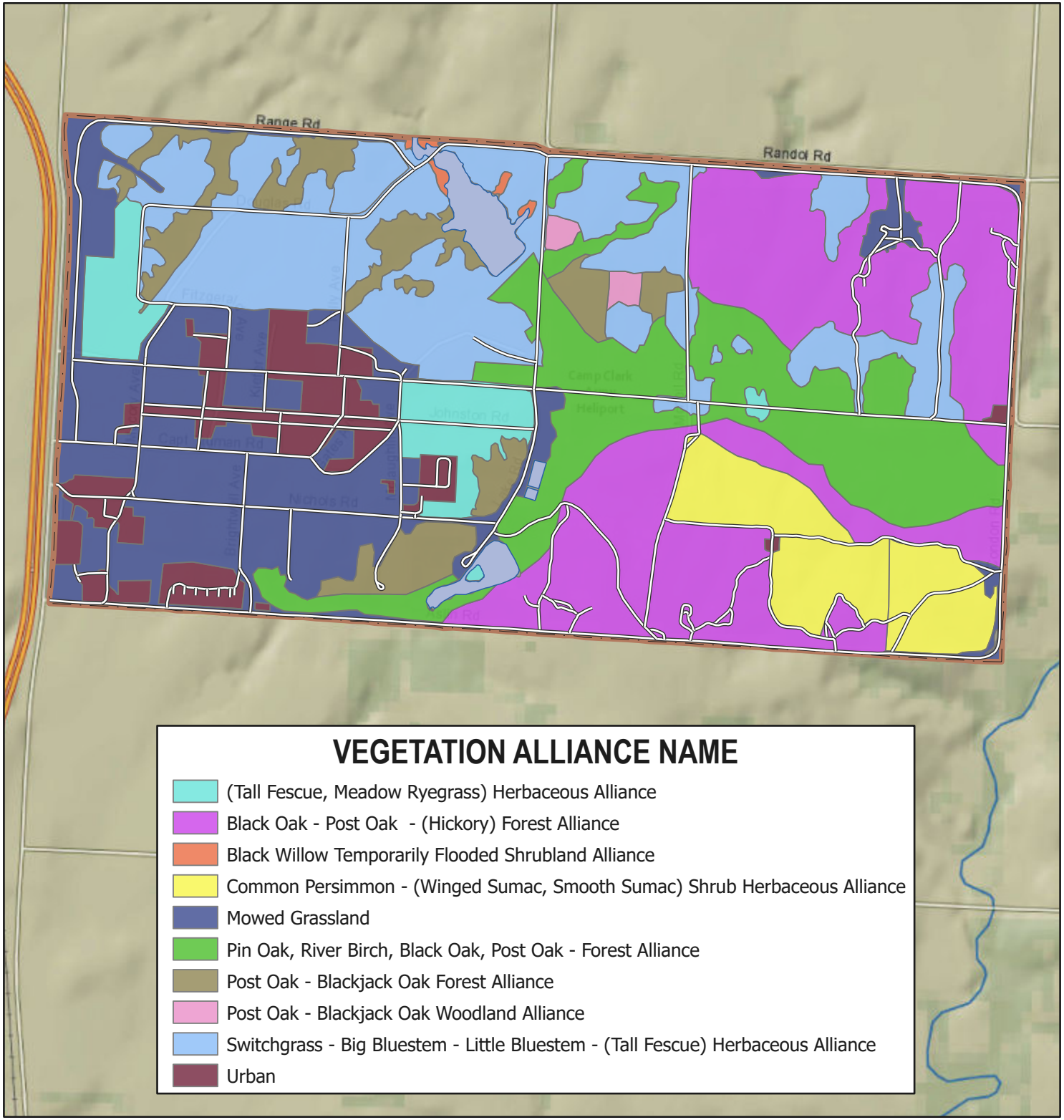
N W E S

LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map



VEGETATION ALLIANCE NAME

- (Tall Fescue, Meadow Ryegrass) Herbaceous Alliance
- Black Oak - Post Oak - (Hickory) Forest Alliance
- Black Willow Temporarily Flooded Shrubland Alliance
- Common Persimmon - (Winged Sumac, Smooth Sumac) Shrub Herbaceous Alliance
- Mowed Grassland
- Pin Oak, River Birch, Black Oak, Post Oak - Forest Alliance
- Post Oak - Blackjack Oak Forest Alliance
- Post Oak - Blackjack Oak Woodland Alliance
- Switchgrass - Big Bluestem - Little Bluestem - (Tall Fescue) Herbaceous Alliance
- Urban

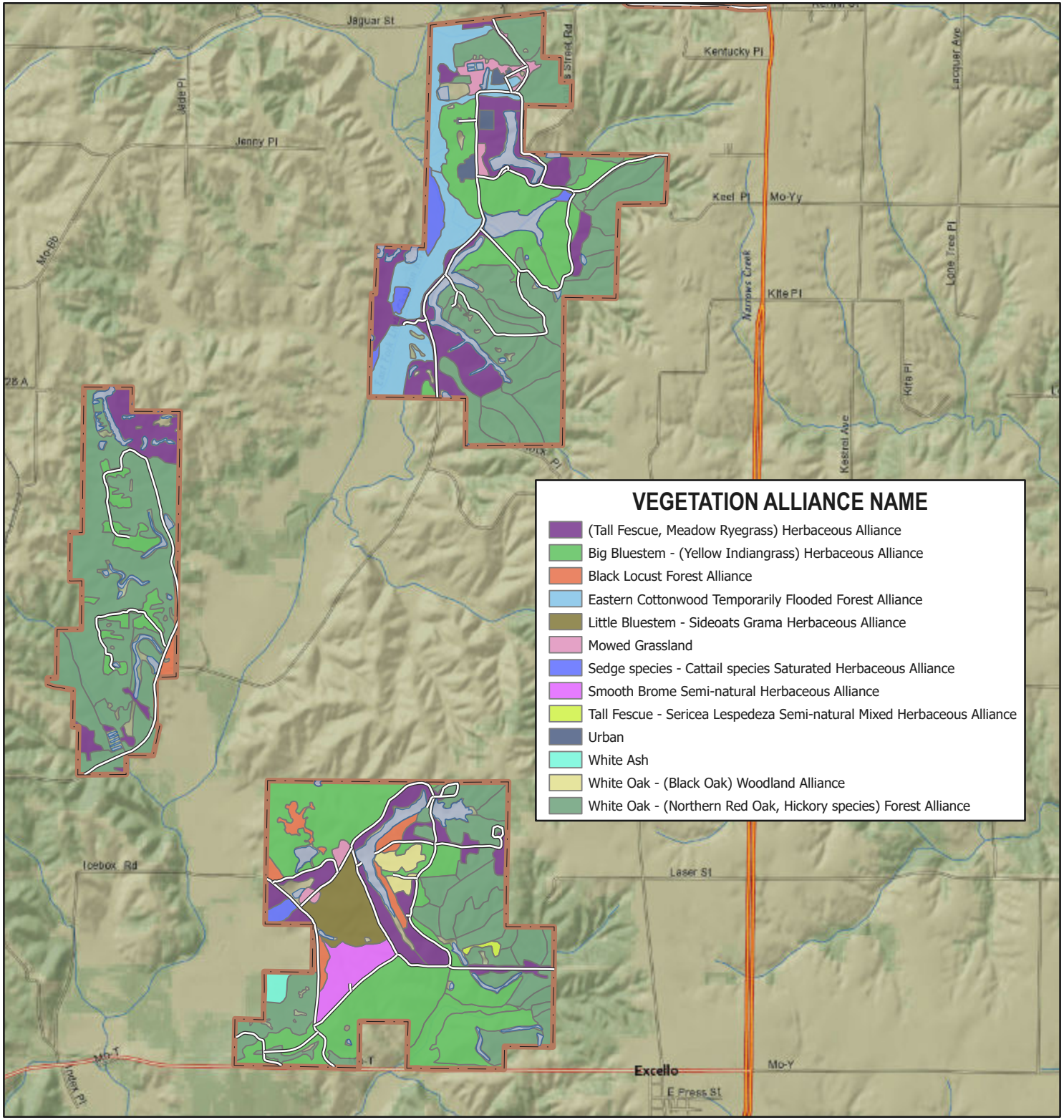


Figure 33
Vegetative Communities
Site: 29B78 - Macon Training Site

County: Macon | State: MO

Address: 29614 Jaguar Street | Zipcode: 63552

Scale: 1:45,000	1 inch = 3,750 feet

0 3,000 6,000 Feet

N W E S

LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

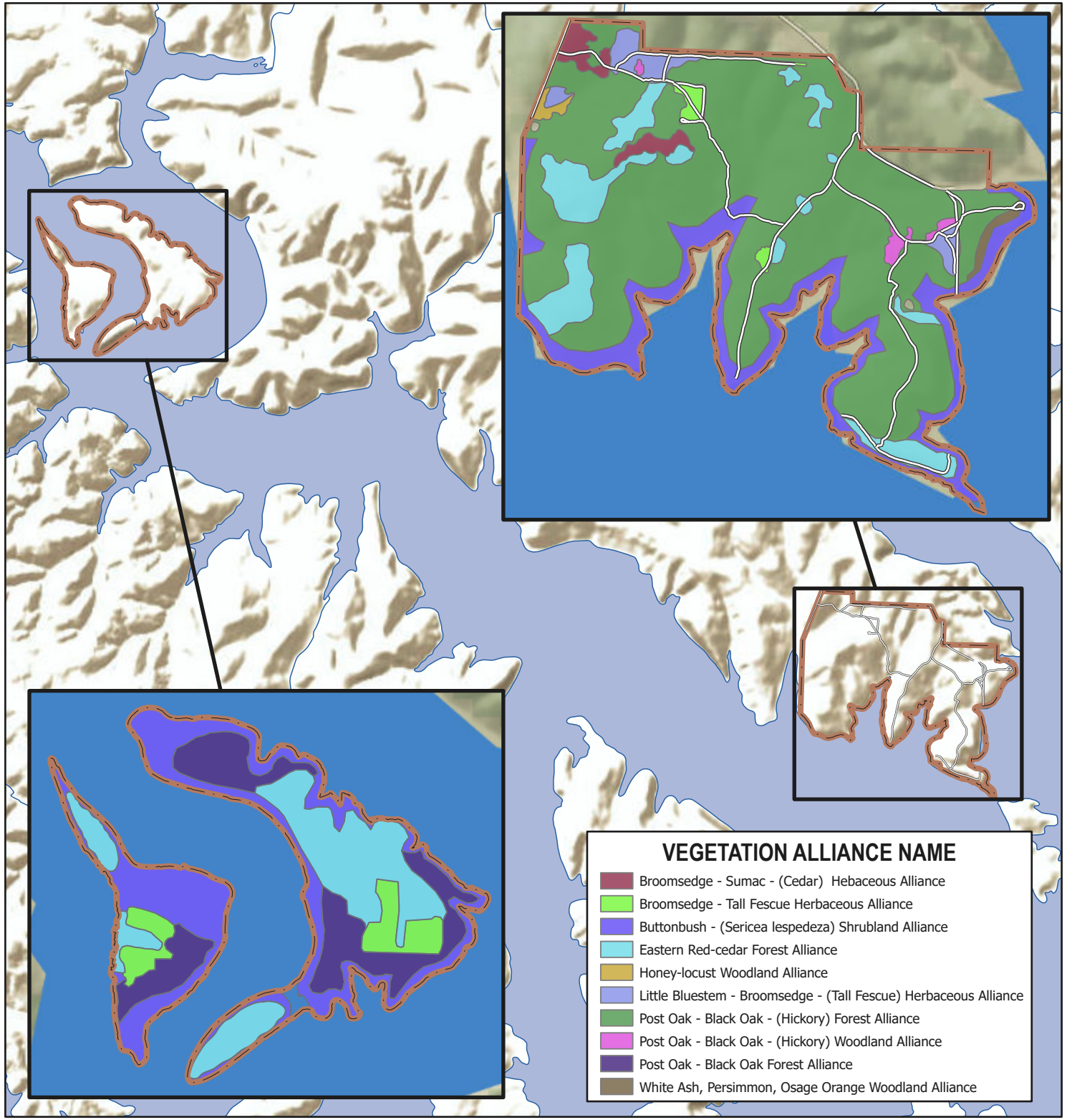


Figure 34
Vegetative Communities
Site: 29A57 - Truman Training Area

County: Benton | State: MO

Address: Limestone School Rd | Zipcode: 65355

Scale: 1:48,000	1 inch = 4,000 feet

0 4,000 8,000 Feet

N W E S

LEGEND

- Roads
- Streams
- Ponds and Lakes
- Installation Boundary

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Missouri National Guard GIS

Reference Map

Figure 35
Vegetative Communities

Site: 29D05 - Wappapello Training Site

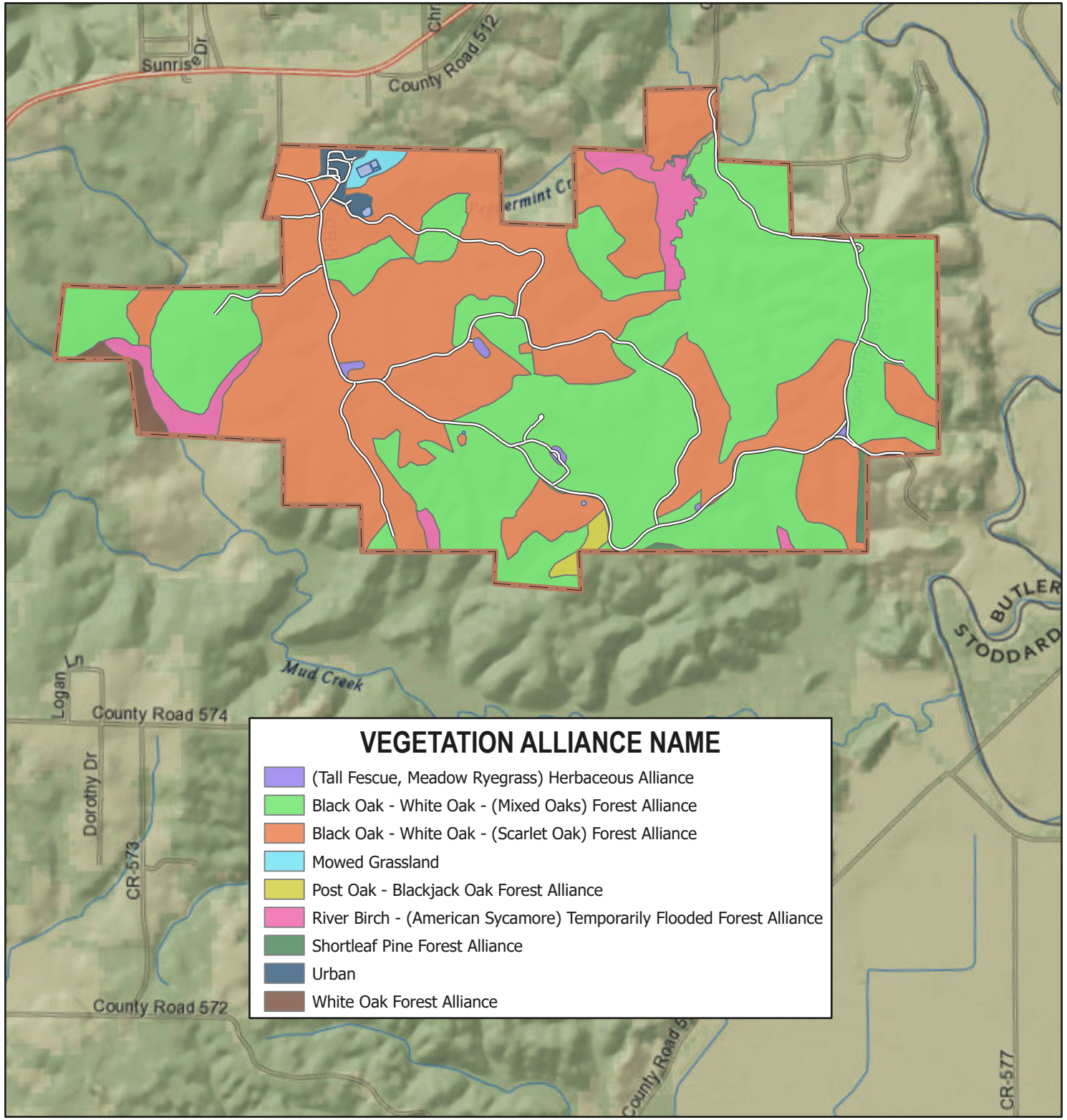
County: Butler | State: MO

Address: 461 Country RD 517 | Zipcode: 63966

Scale: 1:30,000	1 inch = 2,500 feet

0 2,000 4,000 Feet

N W E S



LEGEND

- Roads
- Ponds and Lakes
- Installation Boundary

VEGETATION ALLIANCE NAME

- (Tall Fescue, Meadow Ryegrass) Herbaceous Alliance
- Black Oak - White Oak - (Mixed Oaks) Forest Alliance
- Black Oak - White Oak - (Scarlet Oak) Forest Alliance
- Mowed Grassland
- Post Oak - Blackjack Oak Forest Alliance
- River Birch - (American Sycamore) Temporarily Flooded Forest Alliance
- Shortleaf Pine Forest Alliance
- Urban
- White Oak Forest Alliance

Date Published: 10/28/2020
Image Date: N/A
Coordinate System:
WGS 1984 UTM 15N

Reference Map

APPENDIX R. GLOSSARY

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100-year Flood – A flood event of such magnitude that it occurs, on average, every 100 years; this equates to a 1 percent chance of its occurring in a given year.

Aesthetics – Pertaining to the quality of human perception of natural beauty.

Agriculture – The process of producing food, feed, fiber, and other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock). The practice of agriculture is also known as farming.

Alluvium – Sand, clay, or similar material gradually deposited by moving water, as along a river or the shore of a lake.

Amphibian – Any of a class of vertebrates that regulate their body temperature externally; lay shell-less eggs in wet areas; live in water during early development and live both in water and on land as adults; and use lungs, gills and their skin for breathing.

Annual Training – Two week yearly training period required for National Guard Troops.

Aquatic – Living or growing in or on the water.

Aquifer – An underground geological formation containing usable amounts of groundwater that can supply wells and springs.

Archaeology – The discovery, recovery, and study of material evidence or artifacts (i.e. structures, tools, clothing, implements, and burial sites in various states of preservation) of past human life and culture.

Army – One of three military departments (Army, Navy, and Air Force) reporting to the Department of Defense (DoD). The Army is composed of two distinct and equally important components: the active component and the reserve component. The reserve components are the United States Army Reserve and the Army National Guard. Regardless of component, the Army conducts both operational and institutional missions. The operational Army consists of numbered armies, corps, divisions, brigades, and battalions that conduct full spectrum operations around the world. The institutional Army supports the operational Army. Institutional organizations provide the infrastructure necessary to raise, train, equip, deploy, and ensure the readiness of all Army forces. The training base provides military skills and professional education to every soldier, as well as to members of sister services and allied forces. It also allows the Army to expand rapidly in time of war. The industrial base provides world-class equipment and logistics for the Army. Army installations provide the power-projection platforms required to deploy land forces promptly to support combatant commanders. Once those forces are deployed, the institutional Army provides the logistics needed to support them.

Army National Guard (ARNG) – A civilian Reserve Component of the Army composed of guardsmen who serve during overseas peacekeeping missions and during local emergencies. The ARNG maintains properly trained and equipped units available for prompt mobilization for war, national emergency, or as otherwise needed.

Avian – Of, relating to, or derived from birds.

Barracks – A building or group of buildings used to house military personnel.

Barrier – Any material, structure, or condition that prevents or substantially delays a movement.

Baseline – Documentation of current conditions so that changes can be identified.

Battalion – A military unit consisting of a headquarters company and three to five functional (combat arms, combat support, or combat service support) companies consisting of approximately 250 to 1,000 persons, depending on the type of unit.

Berm – An earthen ridge created to provide concealment or to protect an emplacement from enemy fire.

Best Management Practices (BMPs) – Resource management decisions that are based on the latest professional and technical standards for the protection, enhancement, and rehabilitation of natural and cultural resources.

Biodiversity – The variety of life and its processes, including genetic combinations, species functions, and associations occurring in an area, the differences among species, and the communities and ecosystems in which they occur.

Biotic – That which pertains to life.

Bivouac – A temporary encampment made by soldiers in the field. On permanent training installations, several bivouac sites may be established throughout the area to avoid overuse of any given site.

Bog – Wet, spongy land which is usually poorly drained, highly acidic, and rich in plant residue.

Canopy – The more or less continuous cover of leaves and branches in a forest, usually formed by the crowns of the dominant and codominant trees.

Cantonment Area – The developed portions (city-like areas) of a permanent military installation.

Chert – A very fine-grained rock formed in ancient ocean sediments. It often has a semi glassy finish and is usually white, pinkish, brown, gray, or blue gray in color. It can be shaped into arrowheads by chipping. It has often been called flint, but true flint is found in chalk deposits and is a distinctive blackish color. It was commonly used by Native Americans to form arrowheads and other tools.

Clay – A mineral soil separate consisting of particles less than 0.002 millimeter in equivalent diameter.

Climate – The meteorological elements, including temperature, precipitation, and wind that characterize the general conditions of the atmosphere over a period of time at any one place or region of the Earth's surface.

Cobble – Rounded rocks ranging in diameter from approximately 64 to 256 mm.

Code of Federal Regulations (CFR) – The CFR is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government. The purpose of the CFR is to present the official and complete text of agency regulations in one organized publication and to provide a comprehensive and convenient reference for all those who may need to know the text of general and permanent federal regulations. The CFR is keyed to and kept up-to-date by the daily Federal Register.

Community – (1) A group of species of plants and/or animals living and interacting at a particular time and place; (2) a group of people residing in the same place and under the same government; and (3)

spatially defined places, such as towns.

Company – A military unit that is the next smaller unit of a battalion; the most basic administrative and tactical unit (approximately 50 to 200 persons, depending on the type of unit).

Composition – The numbers and kinds of plants and animals in an area.

Contaminants – Any physical, chemical, biological, or radiological substances that have an adverse effect on air, water, or soil.

Contiguous – Connecting without a break within a common boundary.

Convoy – A group of vehicles traveling together for mutual protection and convenience.

Craton – An old and stable part of the continental crust that has survived the merging and splitting of continents and supercontinents for at least 500 million years. Cratons are generally found in the interiors of continents and are formed of a crust of lightweight felsic igneous rock, such as granite, attached to a section of the upper mantle.

Critical Habitat – A habitat determined to be important to the survival of a threatened or endangered species, to general environmental quality, or for other reasons as designated by the state or federal government.

Cultivated – No longer in the natural state; developed by human care and for human use.

Cultural Resources – Cultural resources include historic properties as defined by the NHPA, cultural items as defined by NAGPRA, archaeological resources as defined by ARPA, sacred sites as defined in EO13007 to which access is afforded under AIRFA, and collections and associated records as defined in 36 CFR 79.

DBH – Tree diameter at breast height is defined as 4.5 feet (1.37 meters) above the forest floor on the uphill side of the tree.

Deciduous – Plants having structures that are shed at regular intervals or at a given stage in development, such as trees that shed their leaves seasonally.

Delineation – The technique of identifying and determining the jurisdictional boundary of wetlands.

Den – The lair or resting-place of a wild animal.

Department of the Army (DA) – The executive part of the Department of the Army at the seat of government and all field headquarters, forces, reserve components, installations, activities, and functions under the control or supervision of the Secretary of the Army.

Drainages – A natural system of drains that channel surface water.

Ecosystem – A dynamic and natural complex of living organisms interacting with each other and with their associated nonliving environment.

Ecosystem Management – A style of natural resource management that uses a broad approach to integrate the relationships of all organisms, including humans, with each other and with the nonliving

elements of their environment. Managers identify and integrate human activities, natural communities, ecosystems, and the natural disturbances found in those ecosystems. Management is goal-driven; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, state, tribal, and federal interests.

Edge – Interface or transition zone between closed forest and clearings or roadways; a favored habitat of several wildlife species including many game species.

Endangered Species – Any species that is in danger of extinction throughout all or a significant portion of its range.

Environmental – (1) In a scientific context, a combination of natural conditions, and (2) in a planning context, a category of analytical studies of aesthetic values, ecological resources, cultural (historical) resources, sociological and economic conditions, etc.

Environmental Assessment (EA) – A publication that provides sufficient evidence and analysis to show whether a proposed system will adversely affect the environment or be environmentally controversial. If the proposed system will adversely affect the environment or be controversial, an EIS is prepared to disclose impacts.

Environmental Impact Statement – As defined in the Council on Environmental Quality regulations, a detailed written report that provides a "full and fair discussion of significant environmental impacts, and (informs) decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment." The draft EIS evaluates a range of reasonable alternatives and their associated impacts and presents a preferred alternative if one option is clearly favored above the others. After departmental review, the draft EIS is circulated among agencies and the public for comment. Following the public hearing held to formally record comments on the draft, a final EIS is prepared incorporating public and agency input and recommending a selected alternative.

Erosion – The wearing away of land surface by wind and water.

Exotic Species – Species that occur in a given place, area, or region as the result of direct or indirect, deliberate or accidental introduction of the species by human activity. These species often spread rapidly, reduce populations of native species, and cause substantial detrimental changes to natural communities.

Fauna – Animal life, especially the animal characteristics of a region, period, or special environment.

Feral – Having become wild from a state of cultivation or domestication.

Firing Range – The area or group of practice firing points designed for use by particular types of weapons.

Fiscal Year – A 12-month period to which a jurisdiction's annual budget applies and at the end of which its financial position and the results of its operations are determined.

Floodplain – The lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands including, at a minimum, that area inundated by a 1 percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain.

The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

Flora – Vegetation; plant life characteristic of a region, period, or special environment.

Forage – All browse and herbaceous food that is available to livestock or game animals, it may be used for grazing or harvested for feeding.

Forb – A herbaceous plant, which is not a grass, sedge, or rush.

Forest Stand Improvement (FSI) – Improving the quality of a forest stand by removing or deadening undesirable species to achieve desired stocking and species composition. FSI practices include applying herbicides, burning, girdling, or cutting.

Game – An animal sought for its fur, feathers, flesh, or trophy value, and which is considered to possess those sporting qualities that enhance the hunting or angling experience.

Geographic Information System (GIS) – A computer system, which enables a person to process natural resource and a variety of other data, collected from various surveys and inventories. High quality color maps and management documents can be conveniently produced, manipulated, and used for data and inventory management, education, and a variety of planning purposes.

Geologic – Of or related to a natural process acting as a dynamic physical force on the Earth (i.e., faulting, erosion, mountain building resulting in rock formations).

Geology – Science that deals with the earth's physical history, the rocks of which it is composed, and its physical changes.

Grassland – Land on which the existing plant cover is dominated by grasses.

Groundwater – Water contained in pores or fractures in the unsaturated or saturated zones below ground level.

Habitat – Area in which a plant or animal lives and reproduces.

Hardwoods – A description applied to woods from deciduous broad-leafed trees such as oak, maple, and ash.

Hay – The dried stems and leafy parts of plants cut and harvested by man, such as alfalfa, clovers, other forage legumes, and the finer stemmed, leafy grasses.

Hazardous Material – A substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce and that has been designated as hazardous under section 5103 of federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of CFR chapter I (USDOT 2003).

Hazardous Waste – A solid waste (or combination of wastes) that, due to its quantity, concentration, or physical, chemical, or infectious characteristics, can cause or significantly contribute to an increase in mortality. RCRA further defines a hazardous waste as one that can increase serious, irreversible, or

incapacitating reversible illness or pose a hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed.

Headwater – The source or point of origin of a stream or river.

Herbaceous – A plant with soft rather than woody tissues.

Herbicide – A pesticide designed to control or kill plants, weeds, or grasses.

Historic – The time after information was written down.

Holistic – Of or related to a view of the natural environment that encompasses an understanding of the functioning of the complete array of organisms and chemical-physical factors acting in concert rather than the properties of the individual parts.

Hydric Soils – Soils that are wet frequently enough to periodically produce anaerobic conditions, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrology – (1) The study of water characteristics, especially the movement of water; (2) the study of water, involving aspects of geology, oceanography, and meteorology

Hydrophytic Vegetation – Plants that grow in water or in wet or saturated soils.

Impact Area – The area where projectiles fired in gunnery practice are aimed.

Insecticide – A chemical used to kill or control certain populations of insect pests.

Installation – A grouping of facilities, located in the same general vicinity, over which the installation commander has authority (AR 200-1).

Integrated Cultural Resources Management Plan (ICRMP) – A plan that defines the process for the management and protection of cultural resources on military installations.

Integrated Natural Resource Management Plan (INRMP) – A plan written to provide an overall framework and approach for managing, monitoring, protecting, and utilizing natural resources on military installations. These plans typically use an ecosystem-based approach to support sustainable military use of installation lands, while protecting and enhancing resources for multiple use, sustainable yield, and biodiversity.

Integrated Training Area Management (ITAM) – A program designed by USACERL to help determine the land's ability to support training with the least impact on natural resources, including wildlife habitats.

Invasive Species – An alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invertebrate – An animal without an internal skeletal structure.

Land Rehabilitation and Maintenance (LRAM) – A component of the ITAM program, which provides a means to repair, restore, and maintain land impacted by training activities through the use of erosion control practices and revegetation.

Landscape – The traits, patterns, and structure of a specific geographic area including its biological composition, its physical environment, and its anthropogenic or social patterns.

Legacy Program – DOD program designed to encourage and promote research, conservation, and preservation of natural, cultural, and historical resources on military installations.

Lime – Compounds mostly of calcium carbonates and other alkaline substances used in high rainfall climates to correct soil acidity problems.

Listed Species – Any plant or animal designated as a state or federally threatened, endangered, special concern, or candidate species.

Low-Water Stream Crossing – A structure that provides access across a stream during normal flow but is periodically closed due to flooding.

Mammal – A warm-blooded animal with hair that breathes air, has internal fertilization, and nurses its live-born young.

Maneuver – The planned and controlled tactical movement of troops, vehicles, and aircraft.

Maneuver Areas – Range on which employment of live/inert ordnance is prohibited, used for maneuver element training only.

Marsh – A periodically wet, or continually flooded, area where the surface is not deeply submerged.

Mesic – Refers to a habitat that is well drained, but usually moist through most of the growing season.

Mitigation – Lessening the effects to natural or cultural resources caused by implementation of projects or activities that result in adverse impacts. Mitigation can include limiting the magnitude of the action; repairing, rehabilitating, or restoring the affected resource; avoiding the effect altogether; reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action; and/or compensating for the effect by providing substitute resources or environments.

Multiple Use – The integrated, coordinated, and compatible use of natural resources so as to achieve a sustainable yield of a mix of desired goods, services, and direct and indirect benefits while protecting the primary purpose of supporting and enhancing the military mission and observing stewardship responsibilities.

Munition – A synonym for ammunition.

National Environmental Policy Act (NEPA) PL 91-190, 1 Jan 1970 – The law requiring federal governmental agencies to consider the potential impacts to the environment when planning and executing major actions.

National Guard Bureau (NGB) – An agency directly related to national security. The U.S. National Guard Bureau (NGB) must ensure that its systems remain operational at all times. The NGB supports mission-critical communications between numerous Army and Air National Guard units across North America. The NGB provides key advice to the United States President and Congress, as well as to the Adjutant Generals of the 54 U.S. states and territories.

National Historic Preservation Act (of 1966) – The nation's central historic preservation law. It

establishes the legal and administrative context within which local historic preservation commissions relate to, and participate in, the national historic preservation program. Passed at a time when Americans were becoming increasingly aware of modern development's damaging effects on their heritage, and strengthened and elaborated upon several times since, the Act is designed to encourage preservation and wise use of our historic resources.

National Register of Historic Places (NRHP) – The listing of officially recognized historical structures, places, buildings, objects, and districts; under the authority of the U.S. Department of the Interior; operated by the National Park Service. Items on this list are worthy of preservation consideration because of significance in American history, architecture, archaeology, engineering, or culture. Significance may be local, state, or national in scope.

Native Species – With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

Natural Communities – Interrelated assemblages of plants and animals found in a given area.

Natural Resources – All elements of nature and their environments of soil, air, and water. Those consist of two general types: earth resources, which consist of the nonliving resources such as minerals, water, and soil components, and biological resources, which consist of living resources such as plants and animals.

Noxious Weeds – Any living stage (including but not limited to, 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 United States, 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 United States or the public health.

Organism – Any living thing.

Permeability – In general terms, the capacity of such mediums as rock, sediment, and soil to transmit liquid or gas. Permeability depends on the substance transmitted (e.g., oil, air, water) and on the size and shape of the pores, joints, and fractures in the medium, as well as the manner in which they interconnect. "Hydraulic conductivity" is equivalent to "permeability" in technical discussions relating to groundwater.

Pest – An insect, rodent, nematode, fungus, weed, or other form of terrestrial or aquatic plant or animal life that is injurious to health or the environment.

Pesticide – Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest; also applies to herbicides, fungicides, avicides (bird agents), rodenticides, and various other substances used to control pests.

Physiographic Province – A region in which the landforms are similar in geologic structure and differ significantly from landform patterns in adjacent regions.

Plateau – An area of highland, usually consisting of relatively flat open country uplifted by tectonic activity.

Platoon – A subdivision of a military company divided into squads or sections and usually commanded by a lieutenant.

Potable Water – Water that is suitable for drinking.

Predator – An animal that lives by capturing and devouring other animals.

Prime Farmland – Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion.

Range and Training Land Assessment (RTLA) – A component of the ITAM program, which was designed to inventory, monitor, and evaluate the natural resources on Army lands.

Readiness – The state or quality of being ready; preparation; promptness; aptitude; willingness.

Reconnaissance – An inspection or exploration of an area, especially one made to gather military information.

Remediation – A long-term action that reduces or eliminates a threat to the environment.

Reptile – A cold-blooded vertebrate that lays eggs and has scales or plates on its skin.

Requisite – Required; essential.

Restoration – The return of an ecosystem or habitat to its original community structure, natural complement of species, and natural functions.

Rip Rap – Broken rock, cobbles, or boulders placed on earth surfaces for protection against the action of water.

Riparian Areas – Areas adjacent to rivers and streams that have a high density, diversity, and productivity of plants and animals

Rodenticide – A pesticide that is used to kill rats, mice, and other rodents.

Roost – The place, or the support upon which, birds rest, especially at night.

Rural – A definition used to characterize an area with a substantially modified natural environment. Sights and sounds of humans are readily evident, and the interaction between users is moderate to high. A considerable number of facilities are designed for use by large numbers of people. Facilities for intensified motorized use and parking are available. Sparsely settled places away from the influence of large cities and towns.

Sand – A soil particle between 0.05 and 2.0 millimeters in equivalent diameter.

Sandstone – A sedimentary rock consisting of quartz sand united by some cementing material, such as iron oxide or calcium carbonate.

Sawtimber – Uncut trees fit to yield logs of suitable size and quality timber.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle to the bottom.

Sedimentation – The process of subsidence and deposition of suspended matter from a wastewater by gravity.

Sensitive Species – Those plant and animal species for which population viability is a concern because they are highly responsive or susceptible to modification by external agents or influences. These species often show decreases in population numbers or densities following modifications to their natural environments such as habitat fragmentation, changes in water quality, or increased human activities.

Shale – A fine-grained sedimentary rock formed from mud and silt, commonly gray to black that tends to split into thin layers.

Shrub – A woody perennial plant differing from a tree by its low stature and by its characteristic of generally producing several basal shoots instead of a single bole.

Slash – Branches and other woody material left on a site after logging.

Small Arms – Weapons carried and operated by individuals. This group of weapons includes pistols and rifles carried and operated by individuals.

Snags – Dead, but standing, trees.

Soil – The mixture of altered mineral and organic material at the earth's surface that supports plant life.

Soil Amendments – Additives to the soil that provide the capability to retain moisture, improve drainage, provide nutrients, and improve the soil texture.

Spatial Data – Data pertaining to the location, shape, and relationship among geographical features.

Species of Concern – A species or subspecies, which might become threatened under continued or increased stress. Also, a species or subspecies for which there is some concern, but for which information is insufficient to permit an adequate status evaluation. This category may contain species designated as a furbearer or game species, but whose statewide population is dependent on the quality and/or quantity of habitat and is not adversely impacted by regulated harvest.

Stakeholder – A person, jurisdiction, organization, or agency with an interest in a particular project.

State Historic Preservation Officer (SHPO) – An individual responsible for the operation and management of the Office of Historic Preservation, as well as for long range preservation planning. The Governor appoints the SHPO in consultation with the State Historical Resources Commission and the Director of the Department of Parks and Recreation. The SHPO assists the Commission in accomplishing its goals and duties by developing and administering a program of public information, education, training, and technical assistance. The SHPO also serves as Executive Secretary to the Commission and is responsible for developing an administrative framework for the Commission, as well as for implementing the Commission's preservation programs and priorities.

Stewardship – The concept of responsible caretaking, based on the premise that we do not own resources, but are managers and are responsible to future generations for their condition.

Strath – A valley of considerable size, through which a river runs.

Succession – The progressive development of vegetation toward its highest ecological expression,

the climax.

Surface Waters – All water occurring above ground. This includes wetlands, lakes, rivers, and streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or ponds.

Sustainable Range Awareness (SRA) – The component of the ITAM program that provides a means to develop and distribute educational materials and conduct operational awareness activities.

Sustainable Use – Managing to provide long-term availability and quality of installation lands for military training operations by not degrading existing natural resources, including living and nonliving components and the processes that tie them together.

Sustainable Yield – Managing a renewable natural resource to provide an annual or periodic yield of goods, services, and direct and indirect benefits, into perpetuity. That may include, but is not limited to, maintaining economic benefits, ecological processes and functions, and biodiversity.

Swamp – An area saturated with water throughout much of the year, but with the surface of the soil usually not deeply submerged, it is usually characterized by tree or shrub vegetation.

Take – To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, root up, cut, sever, or to attempt to engage in any such conduct upon an animal or plant. A term used with discussions on endangered and threatened animal or plant species.

Terrain – (1) A particular geographic area; a region; (2) a piece of ground having specific characteristics or military potential.

Terrestrial Communities – Groups of cover types with similar moisture and temperature regimes, elevation gradients, structures, and use by vertebrate wildlife species.

Threatened Species – Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Topography – Physical features of the ground surface, such as hills, plains, mountains, steepness of slope, and other features.

Topsoil – The surface layer of soil containing partly decomposed organic debris, which is usually high in nutrients, contains many seeds, and is rich in mycorrhizae.

Turf Reinforcement Mats (TRM) – A geosynthetic material used to prevent soil erosion and allow vegetation of severe slopes, high-flow ditches, and stream bank

Understory – The layer formed by the leaves and branches of the smaller trees under the forest canopy.

Upland – The land that is at a higher elevation than the alluvial plain or stream terrace.

Vascular Plants – Plants with a well-developed vascular system that transports water, minerals, sugars, and other nutrients throughout the plant body. Excludes the bryophytes: mosses, hornworts, and liverworts.

Vigor – Overall health; the capacity to grow and resist physiological stress.

Water Resources – The supply of groundwater and surface water in a given area.

Waterfowl – Collectively, all species of ducks, geese, and swan.

Watershed – The region draining into a particular stream, river, or entire river system.

Wetlands – Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soils. This classification includes swamps, marshes, bogs, wet meadows, and similar areas.

Wildlife – Undomesticated animals considered collectively.

Wildlife Habitat – The set of living communities in which a wildlife population lives.

Woodland – Any land used primarily for growing trees and shrubs.

Xeric – Of or concerning plants and/or areas with low or irregular supplies of water.

APPENDIX S. REFERENCES

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