
***ARKANSAS RIVER WATERSHED
NIMROD LAKE
ARKANSAS***

***MASTER PLAN FOR
DEVELOPMENT AND
MANAGEMENT OF NIMROD LAKE***



Draft: Summer 2024

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Executive Summary

The original Master Plan for Nimrod Lake was first approved in April 1946. Subsequent revisions were prepared with the latest revision being approved in 1975. The Nimrod Lake Master Plan (hereafter, “Master Plan” or “Plan”) is intended to serve as a guide for the orderly and coordinated development, management, and stewardship of all Federal lands and water surface of the project. It presents data on existing conditions, anticipated recreational use and the type of facilities needed to service anticipated use, sensitive resources requiring protection, and a projection of future management requirements. Since the 1975 Master Plan revision, development of private lands surrounding the lake has created increased demands on the public lands and associated natural and cultural resources of Nimrod Lake. The increased demands on project resources, as well as naturally occurring changes to the resources, combined with the need to recognize historic management practices at the project and implement current national USACE guidance and directives, has dictated the preparation of this Master Plan revision.

This revised Master Plan presents an inventory of land resources and existing recreation facilities, as well as revised land classifications, new resource management objectives, and an evaluation of future needs to provide a balanced plan that serves public needs and protects resources. Included in the revised Master Plan is an evaluation of expressed public opinion, an analysis of regionally important natural resources, and an evaluation of trends in outdoor recreation. The format utilized for this plan is outlined in Engineer Regulation/Engineer Pamphlet 1130-2-550 (dated 30 January 2013), which sets forth policy and procedure to be followed in preparation and revision of project Master Plans. The 1975 Nimrod Lake Master Plan, Design Memorandum 1D, all subsequent Master Plan revisions and prior supplements are listed in Appendix B.

An environmental assessment (EA) and finding of no significant impact (FONSI) were completed as part of the environmental documentation portion of the process. Both documents are included as Appendix A. Upon completion of the Master Plan revision process, if no significant impacts due to Federal action are determined, the FONSI will be signed signifying the approval of the Master Plan and the end of the revision process.

Acronyms and Abbreviations

404(b)(1) - Water quality permit per CWA 77	DOI - Department of Interior
AAR - After Action Review	DOJ - Department of Justice
AF - Acre Feet	DOT - Department of Transportation
AFB - Alternatives Formulation Briefing	DQC - District Quality Control
AOR - Area of Responsibility	DP - Decision Point
ASA(CW) - Assistant Secretary of the Army for Civil Works	DPM - Deputy for Project Management
ASAP - As Soon as Possible	DPR - Detailed Project Report
ATR - Agency Technical Review	DSAP - Dam Safety Assurance Program
BC - Benefit Cost	DX - Directory of Expertise
BCR - Benefit Cost Ratio	E&D - Engineering and Design
BFE - Base Flood Elevation	EA - Environmental Assessment
BLUF - Bottom Line Up Front	EC - Engineering Circular
BMP - Best Management Practice	EIS - Environmental Impact Statement
BOD - Biological Oxygen Demand	EM - Engineering Memorandum
BY - Budget Year	EO - Executive Order
C - Construction	EOY - End of Year
CDR - Commander	EP - Engineering Pamphlet
CE - Corps of Engineers	ER - Engineering Regulation
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act, 1980 (Superfund)	ERDC - Engineering Research & Design Center
CERL - Construction Engineering Research Laboratory	EPA - Environmental Protection Agency
CEQ - Council on Environmental Quality	ESA - Endangered Species Act
CF - Copy Furnished	EQ - Environmental Quality
CFR - Code of Federal Regulations	FWL - Fish and Wildlife
CFS - Cubic Feet per Second	FWS - Fish and Wildlife Service
CG - Construction General/ Commanding General	FCA - Flood Control Act
COL - Colonel	FCSA - Feasibility Cost Sharing Agreement
CONUS - Continental United States	FEIS - Final Environmental Impact Statement
COP - Community of Practice	FEMA - Federal Emergency Management Agency
CRA - Continuing Resolution Authority	FERC - Federal Energy Regulatory Commission
CW - Civil Works	FOIA - Freedom of Information Act
CWA - Clean Water Act, 1977	FONSI - Finding of No Significant Impact
CWBI - Civil Works Business Intelligence	FPMS - Floodplain Management Services
CX - Center of Expertise	FR - Federal Register
CY - Cubic Yard/ Current Year	FRM - Flood Risk Management
DA - Department of Army	FS - Feasibility Study
DCW - Director of Civil Works	FSM - Feasibility Scoping Meeting
DDC - Deputy District Commander	FUDS - Formerly Used Defense Site
DDE - Deputy District Engineer	FUSRAP - Formerly Utilized Sites Remedial Action Program
DE - District Engineer/ Division Engineer	FY - Fiscal Year
DEIS - Draft Environmental Impact Statement	FYI - For Your Information
DIV - Division	FYSA - For Your Situational Awareness
DMP - Decision Management Plan	GI - General Investigations
DOD - Department of Defense	GIS - Geographic Information Systems
DOE - Department of Energy	GNF - General Navigation Features
	GRR - General Reevaluation Report

GS - General Schedule
 H&H - Hydrology and Hydraulics
 HAC - Hydropower Analysis Center
 HAZMAT - Hazardous Materials
 HEC - Hydrologic Engineering Center
 HEP - Habitat Evaluation Procedures
 HES - Habitat Evaluation System
 HHS - Health and Human Services
 HQ - Headquarters
 HQUSACE - Headquarters, U. S. Army Corps of Engineers
 HTRW - Hazardous, Toxic, and Radioactive Wastes
 HU - Habitat Unit
 I - Investigations
 IDIQ - Indefinite Delivery, Indefinite Quantity
 IEPR - Independent External Peer Review
 IG - Inspector General
 IN - Inland Navigation
 IPR - In-Progress Review
 IRC - Issue Resolution Conference
 ITR - Independent Technical Review (now ATR)
 IWR - Institute for Water Resources
 IWW - Inland Waterways
 IWTF - Inland Waterway Trust Fund
 L&D - Lock and Dam
 LDA - Limited Development Area
 LER - Lands, Easements, and Rights-of-Way
 LERR - Lands, Easements, Rights-of-Way, and Relocations
 LERRD - Lands, Easements, Rights-of-Way, Relocations, and Disposal
 LOI - Letter of Intent
 LPP - Locally Preferred Plan/ Local Protection Project
 LRR - Limited Reevaluation Report
 LTC - Lieutenant Colonel
 M&I - Municipal and Industrial
 MCX - Mandatory Center of Expertise
 MFR - Memorandum for Record
 MG - Major General
 MHW - Mean High Water
 MIPR - Military Interdepartmental Purchase Request
 MLW - Mean Low Water
 MOA - Memorandum of Agreement
 MOU - Memorandum of Understanding
 MR&T - Mississippi River and Tributaries
 MRC - Mississippi River Commission
 MSC - Major Subordinate Command

MSL - Mean Sea Level
 NAS - National Academy of Sciences
 NAV - Navigation
 NDC - Navigation Data Center
 NED - National Economic Development
 NER - National Ecosystem Restoration
 NEPA - National Environmental Policy Act
 NFIP - National Flood Insurance Program
 NGO - Nongovernmental Organization
 NGVD - National Geodetic Vertical Datum
 NHPA - National Historic Preservation Act
 NLT - No Later Than
 NOAA - National Oceanographic and Atmospheric Administration
 NPS - National Park Service
 NRHP - National Register of Historic Places
 NTE - Not to Exceed
 NTP - Notice to Proceed
 O&M - Operations and Maintenance
 OBE - Overcome by Events
 OC - Office of Counsel
 OMB - Office of Management and Budget
 OMRR&R - Operations, Maintenance, Repair, Replacement and Rehabilitation
 OWPR - Office of Water Project Review
 P&D - Planning and Design
 P&G - Principles and Guidelines
 P&S - Principles and Standards/ Plans and Specifications
 PA - Planning Associate/ Per Annum
 PAB - Planning Advisory Board
 PAC - Post-authorization Change
 PACR - Post-authorization Change Report
 PAS - Planning Assistance to States
 PCoP - Planning Community of Practice
 PCX - Planning Center of Expertise
 PDT - Project Delivery Team
 PE - Professional Engineer
 PED - Pre-construction Engineering and Design
 PGM - Project Guidance Memorandum
 PGN - Planning Guidance Notebook
 PL - Public Law
 PM - Project Manager/Management
 PMBP - Project Management Business Process
 PMP - Project Management Plan
 PMF - Probable Maximum Flood
 POC - Point of Contact
 POTUS - President of the United States
 PPA - Project Partnership Agreement
 PRB - Project Review Board

PTL - Planning Technical Lead
 Q's & A's - Questions and Answers
 QA/QC - Quality Assurance / Quality Control
 R&D - Research and Development
 R&H - River and Harbor
 R&U - Risk and Uncertainty
 RBRCR - Remaining Benefits, Remaining Costs Ratio
 REC - Recreation
 RED - Regional Economic Development
 REP - Real Estate Plan
 RIT - Regional Integration Team
 RFP - Request for Proposal
 RP - Review Plan/ Resource Provider
 RMB - Regional Management Board
 RMC - Risk Management Center
 RMO - Review Management Organization/Resource Management Office
 RMP - Risk Management Plan
 ROD - Record of Decision
 ROW - Right of Way
 RR - Risk Register
 RTS - Regional Technical Specialist
 S&A - State and Agency/Supervision and Administration
 S&I - Supervision and Inspection
 SAR - Safety Assurance Review
 SCORP - State Comprehensive Outdoor Recreation Plan
 SCOTUS - Supreme Court of the United States
 SCS - Soil Conservation Service
 SEPWC - Senate Environment and Public Works Committee
 SES - Senior Executive Service
 SFO - Support for Others
 SHPO - State Historic Preservation Office
 SITREP - Situation Report
 SMART - Specific Measurable Attainable Risk-Informed Timely
 SME - Subject Matter Expert
 SOP - Standard Operating Procedure
 SOS - Scope of Services/Scope of Studies
 SOW - Scope of Work
 T&ES - Threatened and Endangered Species
 T&I - Transportation and Infrastructure (House)
 TBA - To be Announced
 TBD - To be Determined
 THPO - Tribal Historic Preservation Office
 TMDL - Total Maximum Daily Load
 TRC - Technical Review Conference

UDV - Unit Day Value
 USACE - U. S. Army Corps of Engineers
 USC - United States Code
 USCG - United States Coast Guard
 USEPA - United States Environmental Protection Agency
 USFWS - United States Fish and Wildlife Service
 USGS - United States Geological Survey
 VE - Value Engineering
 VT - Vertical Team
 VTC - Video Teleconference
 WMP - Watershed Management Plan
 WQ - Water Quality
 WRC - Water Resources Council
 WRDA - Water Resources Development Act
 WS - Water Supply

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Chapter 1 Introduction

1.1 Project Authorization

Authorization is defined as permission to undertake a specific activity. In the context of this Master Plan revision, project authorization refers to congressional legislation which granted authority to the USACE to study, construct, and eventually operate Nimrod Lake. Initial authorizations for the project included the primary project purpose of flood control, followed by subsequent authorizations for hydroelectric power, recreation, and water supply.

The Nimrod Dam and Lake project was authorized for construction by the Flood Control Act approved 28 June 1938, (Public Law No.761, 75th Congress, 3rd Session) as a modification of Nimrod Reservoir authorized by the Flood Control Act approved 18 August 1941 (Public Law No. 228, 77th Congress, 1st Session).

Section 4 of the Flood Control Act approved 22 December 1944 (P.L. 78-534), as amended by Section 4 of the Flood Control Act of 1946 (P.L. 79-526), and as further amended by Section 209 of the Flood Control Act of 1954 (P.L. 83-780), authorizes the Department of the Army to provide for recreational use of the lakes under its control. The Federal Water Project Recreation Act of 1965 (P.L. 89-72) directs that in investigating and planning any Federal navigation, flood control, reclamation, hydroelectric, or multipurpose water resource project, full consideration must be given to the opportunities, if any, which the project affords for outdoor recreation. Additionally, the Fish and Wildlife Coordination Act approved 12 August 1958 (P.L. 85-624) provides for more effective integration of a fish and wildlife conservation program with Federal water-resource developments. Useful references concerning recreation and project operations can be found in ER 1130-2-550, Appendix A, as well as the most current version of EC 1130-2-550.

On 3 July 1958, Congress passed the Water Supply Act of 1958 (P.L. 85-500) which allowed the inclusion of storage for municipal and industrial water supply in any USACE reservoir, simultaneously requiring Congressional authorization when such inclusion seriously affects the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes.

1.2 Project Purpose

Nimrod Lake is a multiple-purpose flood risk management project and is a major unit in a comprehensive plan for development of the water resources of the Arkansas River Basin in west central Arkansas. Additional purposes include Recreation, Water Supply, and Hydroelectric Power. However, Nimrod Dam is not currently equipped for hydroelectric power. While Fish and Wildlife is not an authorized purpose, environmental stewardship of project lands and waters is an inherent responsibility for USACE and must be taken into consideration with all project management activities.

1.3 Purpose and Scope of Master Plan

Master Plans are developed, reviewed, and revised for Civil Works projects operated and maintained by USACE. The Master Plan addresses all land (fee, easements, or other interests) originally and subsequently (following initial land acquisition) acquired to support the operations and authorized missions of the projects.

The Master Plan is the strategic land use management document that guides the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of the water resource project. The Master Plan guides the efficient and cost-effective management, development, and use of project lands. It is a vital tool for the responsible stewardship and sustainability of project resources for the benefit of present and future generations.

The Master Plan guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop project lands, surface waters, and associated resources. The Master Plan is a dynamic operational document projecting what could and should happen over the life of the project and is flexible based upon changing conditions. The Master Plan deals in concepts, not in details, of design and administration. Detailed management and administration functions are addressed in the Operational Management Plan (OMP), which implements the concepts of the Master Plan into operational actions.

The Master Plan is not intended to address the specifics of regional water quality, shoreline management, or water level management; these areas are covered in a project's shoreline management plan or water control manual. There is no Shoreline Management Plan for Nimrod Lake. The Water Control Manual addresses how the water in the lake is managed for flood risk management, and water supply purposes.

1.4 Brief Watershed and Project Description

Nimrod Dam is located on the Fourche La Fave River in the western part of Perry County, Arkansas, about 29 miles south of Russellville, Arkansas, and eight miles southeast of Plainview, Arkansas, and four miles west of the community of Nimrod, from where it derives its name. Nimrod Lake is located in Perry and Yell County, Arkansas. The dam is approximately two miles downstream of the boundary between the two counties. It's about 62 river miles upstream from the confluence of the Fourche La Fave and Arkansas Rivers.

The conservation pool of Nimrod Lake is at elevation 342.0 mean sea level (msl), and seasonally adjusted to 345.0 msl. for fisheries management. The total water surface is about 3,236 acres at conservation pool. Nimrod Lake lies in the sharply defined valley of the Fourche La Fave River, a tributary of the Arkansas River. Some tributary streams that flow into the lake include School House Branch, Earl Branch, Anderson Branch, Prairie Creek, Porter Creek, Gilkey Creek, Hogan Creek and Brush Creek. These are generally short and less than five miles in length. The total drainage area is approximately 680 square miles. The total fee owned area contained on the Nimrod Project, including both land and water surface, consists of 25,278 acres.

Construction of Nimrod Dam and appurtenant works was initiated in April 1940. It was

completed in March 1942 and the project placed in operation for flood control about 2 months later. There are 15 recreation areas on Nimrod Lake, 14 that are presently operated by USACE and one operated by the City of Plainview. A more detailed description of USACE recreation areas follows in Chapter 2.

1.5 Listing of Prior Design Memorandum

A listing of prior design memorandums and accompanying supplements are provided in Appendix B. Prior Master Plan supplements listed in Appendix B have been incorporated in this revised Master Plan.

1.6 Pertinent Project Information

Nimrod Dam's primary purposes are flood control and water supply. Although this revised Master Plan is focused on management of land and water surface related to project purposes of outdoor recreation and environmental stewardship of natural and cultural resources, the following information about primary project facilities is provided to aid in understanding of how all project purposes are interrelated.

The dam is a concrete gravity structure with a total length of 986 feet that has a maximum height of 98 feet above streambed. The spillway consists of seven ungated overflow bays and an ogee weir that terminates in a concrete stilling basin, seven low level conduits controlled by hydraulic slide gates, and two outlet conduits controlled by Howell-Bunger valves. The stilling basin includes one row of baffle blocks and an end sill before the channel transitions to the bedrock of the riverbed.

In 2005, the USACE started Screening for Portfolio Risk Analysis (SPRA). This analysis screened each dam in the USACE inventory based on available information, to expeditiously identify and classify every dam according to perceived risk. The screening yielded a basic understanding of the greatest risks and priorities for dams throughout USACE. Each dam was assigned a Dam Safety Action Classification System (DSAC) rating at the end of the screening process. This rating is based on the individual life safety risk associated with each dam. This risk is considered as a combination of probability of failure and potential life safety concerns. Other considerations such as economic and environmental issues, while important, are secondary compared to life safety issues. The DSAC system is intended to provide consistent and systematic guidelines for appropriate actions to address any dam safety issues and deficiencies at USACE dams. The DSAC table assists with prioritizing urgency of action commensurate with the societal risks associated with USACE dams. These actions range from recognition of an urgent situation requiring immediate action through normal operations and dam safety activities for dams without known issues.

DSAC I (Very High Urgency of Action) – Dams where progression toward failure is confirmed to be taking place under normal operations and the dam is almost certain to fail under normal operations within a time frame from immediately to within a few years without intervention, or the combination of life and/or economic consequences make probability of failure extremely high.

DSAC II (High Urgency of Action) – Dams where failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety, or the combination of life and/or economic consequences make probability of failure very high.

DSAC III (Moderate Urgency of Action) – Dams that have issues where the dam is significantly inadequate, or the combination of life, economic, and/or environmental consequences make the risks moderate to high.

DSAC IV (Low Urgency of Action) – Dams are inadequate but with low risk such that the combination of life, economic, and/or environmental consequences make a probability of failure low, although the dam may not meet all essential USACE engineering guidelines.

DSAC V (Normal) – Dams considered adequately safe, meeting all essential agency guidelines and the residual risk is considered tolerable.

A Screening Portfolio Risk Analysis (SPRA) for Nimrod Dam was performed in 2008 during which various failure modes were considered including structural stability and erosion of the abutments. The probability of these failures leading to uncontrolled loss of pool was found to be low. The downstream reaches have a low population at risk and the estimated life loss was very low in the evaluated failure scenarios. As a result, the SPRA resulted in Nimrod Dam being assigned a DSAC 4 (Low Urgency of Action).

Routine portfolio management activities require a periodic assessment and reassessment of risks at each USACE dam. As such, an updated risk assessment was conducted for Nimrod Dam in 2021. The outcome of this assessment of numerous potential failure modes identified low probability of failure for all scenarios and very low potential for life loss. The DSAC 4 was maintained.

Table 1-1. Pertinent Data Table

PERTINENT DATA OF THE DAM AND LAKE	
General Information	
Authorized Purpose, Stream, State	Flood Control, Fourche la Fave River, Arkansas
Drainage area, square miles	680
Average annual rainfall over the drainage area, inches (1978-2022)	52
Dam	
Crest Length in feet	1,012
Top of dam elevation, feet above mean sea level	400.0
Lake	
Nominal top of conservation pool Elevation, feet above mean sea level	
January 1 – March 1	342
March – March 15	342-345
March 15 – May 15	345
May 15 – July 1)	345-344.5
July 1 – October 1	344.5-342
October 1 – December 31	342
Surface Area, acres	3,236
Length of shoreline, miles	78.0
Nominal top of flood-control pool Elevation, feet above mean sea level	
	373.0
Surface Area, acres	18,149
Length of shoreline, miles	186

Table 1-2. Land Classifications

Classification	Acres
Project Operations	159.9
High Density Recreation	637.2
Environmentally Sensitive Areas	925.2
Multiple Resource Management Lands:	
Low Density Recreation	3,667.8
Wildlife Management	16,301.7
Vegetative Management	0
Water Surface:	
Restricted	11.8
Designated No-wake	0
Fish and Wildlife Sanctuary	0
Open Recreation	3,574.8
Total Acreage	25,278.4
Note: Acreages are approximate and are based on GIS data. Totals vary depending on changes in lake levels, sedimentation, and shoreline erosion.	

Chapter 2 Project Setting and Factors Influencing Management and Development (Existing Conditions)

2.1 Description of Reservoir

At conservation pool, elevation 342' msl, a wide and relatively shallow lake is formed, with numerous small coves and inlets at all stages of water levels. The total length of shoreline is approximately 78 miles with 3,236 surface acres of water at normal pool elevation of 342' msl. The project is located in west central Arkansas in a rather rugged, wooded area between the ridges and foothills of the Ouachita Mountains to the north and south. Much of the project lands south of the lake is bordered by the Ouachita National Forest, whereas project lands to the north are primarily bordered by private landowners and industrial timberlands. The forested land and shallow water areas around the lake result in diverse, productive fisheries and abundant wildlife habitat. Water released from Nimrod Lake flows down the Fourche La Pave River and courses in an easterly direction before its confluence with the Arkansas River east of Bigelow, Arkansas.

Primary recreational activities at Nimrod Lake are camping, swimming, boating, birdwatching, fishing and hunting. Much of the lake is shallow with stands of black willow and buttonbush around the edges of the lake. This provides excellent habitat for gamefish and waterfowl. Nimrod Lake is renowned for its crappie fishing, hunting opportunities and the Nimrod Loyd Millwood Wildlife Management Area and Loyd Millwood Greentree Reservoir and Waterfowl Area, managed by the Arkansas Game and Fish Commission in partnership with USACE. These resources attract sportsmen from across the nation.

Figure 2-1. Nimrod Dam



2.2 Hydrology and Groundwater

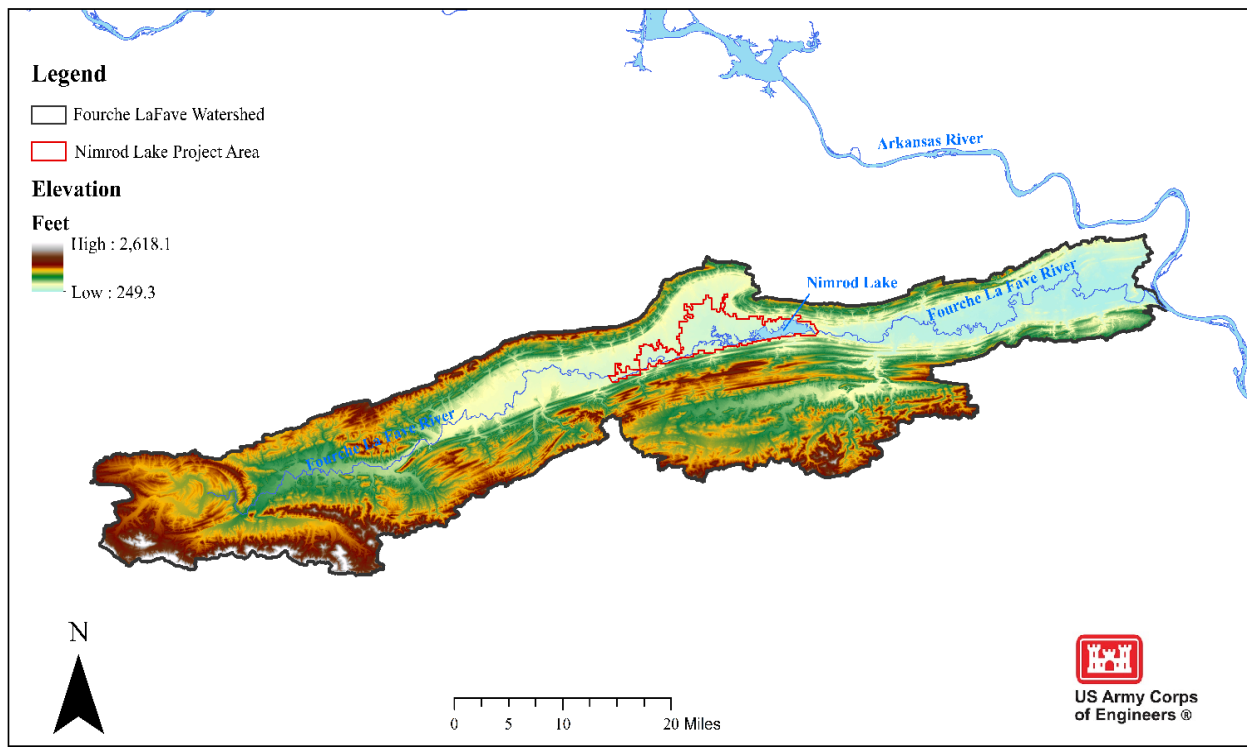
2.2.1 Surface Water

The Fourche La Fave River, located entirely in western Arkansas, is a major tributary to the Arkansas River. The Fourche La Fave watershed lies entirely within the Ouachita Mountains physiographic section (Woods et al., 2004) and the Environmental Protection Agency's (EPA's) Ouachita Mountains Level III Ecoregion (Woods et al., 2004). A small portion of the watershed, at the confluence with the Arkansas River, lies within the Arkansas Valley Plains and Arkansas River Floodplain Level IV Ecoregions, but most of the watershed lies within the Fourche Mountains Level IV Ecoregion (Woods et al., 2004).

The Fourche La Fave watershed is located in the Ouachita Mountains physiographic section (Fenneman and Johnson, 1946). Fenneman and Johnson (1946) broke out each of these broad-scale divisions based on geomorphology, i.e., terrain texture, rock type, and geologic structure and history. Elevation within the watershed ranges from approximately 2,618 feet above North American Vertical Datum of 1988 (NAVD88) at the western end of the watershed to approximately 249 feet NAVD88 at the eastern end and an average basin elevation of approximately 775 feet above msl (Figure 2-2). The relatively large change in elevation within the watershed is indicative of the physiography and geology within the watershed.

The Fourche La Fave River drops, on average, approximately 3.3 feet per mile from the headwaters (elevation 797.2 feet above msl) to the confluence with the Arkansas River (elevation 249.3 feet above msl) (**Figure 2-2**). The most notable tributary is the South Fourche La Fave River and joins the Fourche La Fave River below Nimrod Dam.

Figure 2-2. Fourche la Fave Watershed and Surrounding Topography



2.2.2 Groundwater

Nimrod Lake is located in the Pennsylvanian-aged Atoka Formation. This formation comprises the Ouachita Mountains aquifer and is located within the Interior Highlands aquifer system (Kresse et al, 2014). This aquifer system is formed by rocks of sedimentary origin and were deposited by a regionally extensive sinking trough (geosyncline) that extended at minimum from central Oklahoma to central Arkansas (Kresse et al, 2014). Filling and lithification of this geosyncline were followed by orogenic activity resulting in a complexly folded and thrust-faulted anticlinorium that trended east to west and in which many of the folds were broken by thrusts or high-angle reverse faults.

Groundwater availability occurs primarily through secondary porosity and permeability provided by faults, fractures, joints, and bedding planes and yields are highly dependent on the degree of fracturing (Kresse et al, 2014). Because of this dependency on degree of fracturing, well yields have a fairly large range but typically are low throughout the aquifer and, therefore, the primary use of groundwater is for domestic supply (Kresse et al, 2014).

Other information about water management may be found in the Arkansas Water Plan, the state's policy for long term water management. The State of Arkansas last updated their water plan in 2014. The update brings data, science, and public input together to define water demands, water supplies, issues, and potential solutions to meet the state's needs for the next 40 years.

2.3 Sedimentation and Shoreline Erosion

Throughout the lifespan of the project, silt and sediment has accumulated in Nimrod Lake. Most of the sediments entering Nimrod Lake come from the inflow of the Fourche La Fave River. Other contributing factors to accumulated sediment include sedimentation from upland areas and land use changes from areas within the watershed that are beyond USACE control and, to a lesser extent, from shoreline erosion.

There were no bathymetric surveys conducted immediately post-impoundment of Nimrod Lake. However, in collaboration with the United States Geological Survey (USGS), USACE conducted the first bathymetric survey for Nimrod Lake in April to mid-May 2016 (Wagner, 2018). The results of this survey produced a terrain dataset which combined the results of the bathymetric survey with a USACE provided December 2010 LiDAR data set. The degree of sedimentation could be determined by examining the changes between historical, preimpoundment topography, given the contour interval is small enough, and the April to mid-May 2016 bathymetric survey.

Reduced capacity of the lake will ultimately negatively impact the primary purposes of flood risk management and water supply. Furthermore, excessive sediment accumulation could cause a reduction in aquatic habitat in some areas of the lake.

2.4 Water Quality

Regional water quality is influenced by lithology, soil composition and land use activities. In the Ouachita Mountains, logging and recreation are major land uses while pasture and hay lands are found in the broader valleys accommodating cattle and broiler chickens (Fowler, 2015). Rivers within the Fourche Mountains often have higher turbidity than elsewhere in the Ouachita's (Woods et al., 2004).

Section 303(d) of the Clean Water Act (CWA) requires states to identify waters where existing pollution controls are not stringent enough to achieve state water quality standards and establish a priority ranking of these waters. The Arkansas Department of Energy and Environment (ADEE) is responsible for assessing water quality monitoring data and developing a 303(d) list every two years in accordance with the CWA. The Arkansas Draft 2022 303(d) List and 305(b) Report represent the most recent evaluation of water quality data. In these reports, Nimrod Lake is listed as not meeting the parameters set for Lake and Reservoir Dissolved Oxygen (DO) and Mercury in Tissue.

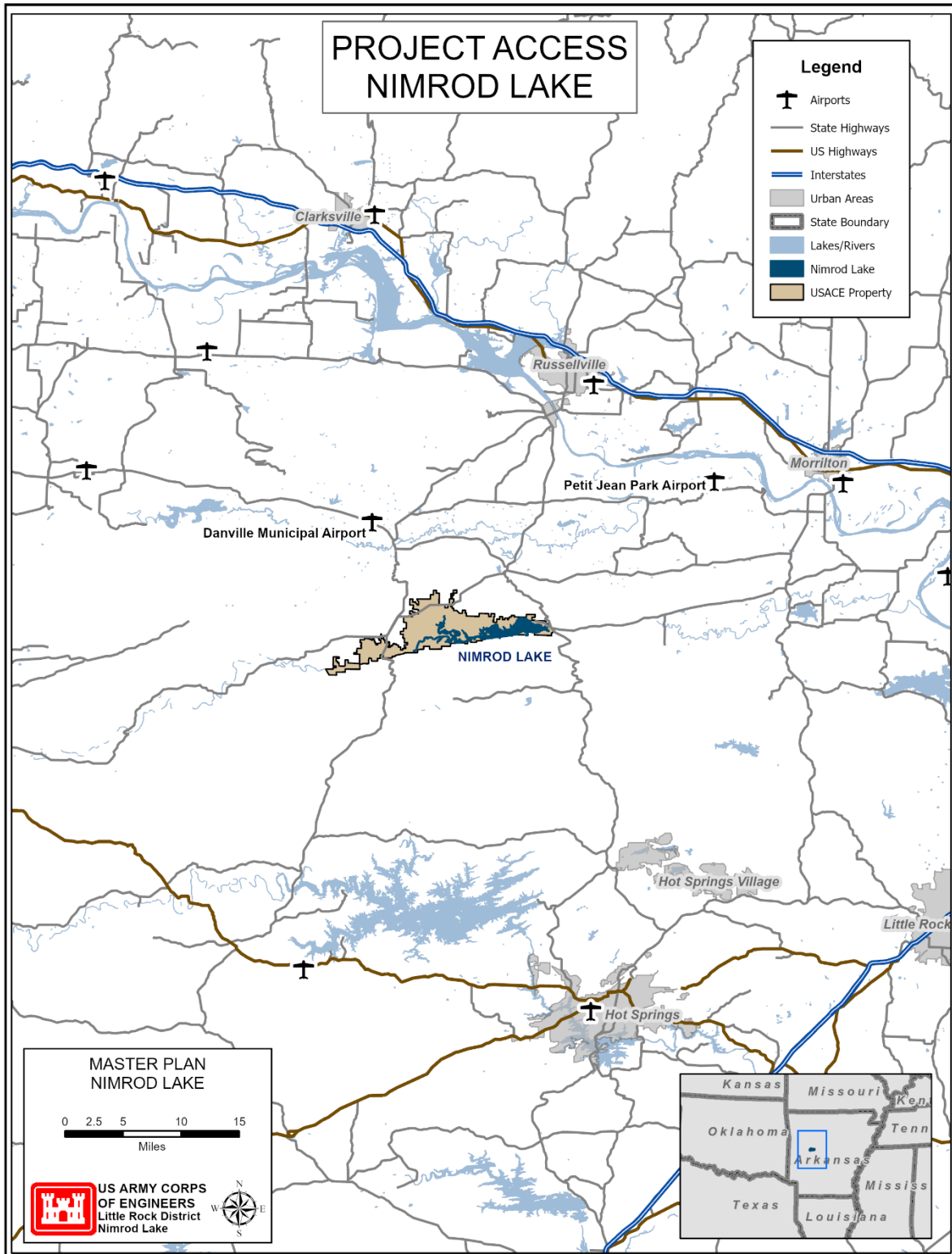
The DO parameters place Nimrod Lake in a Category 5 for nonattainment and high priority for resolution (ADEE, 2022a). DO is a measure of how much oxygen is dissolved in water and represents oxygen available to aquatic organisms. DO is required to support all forms of aquatic life at every trophic level. Nimrod Lake to have a total of 7.46 square miles, or approximately 4,775 surface acres, placed in Category 4a (impaired, but with a Total Maximum Daily Load) for mercury found by testing bioaccumulation of residues in aquatic organisms (ADEE, 2022b). From Nimrod Dam to the South Fourche area, specific regulations are in place to not eat more than two meals per month of largemouth bass longer than 16 inches because of mercury

contamination. For women who are pregnant and or breast feeding or are of childbearing age, they are advised not to consume largemouth bass from the area (AGFC, 2023).

2.5 Project Access

The lake is surrounded by US, State, and county roads, making access possible at many points in any given area of the lake. The project area is primarily accessed by Arkansas State Highway 28 and 60 that run east and west along the northern side of the lake. This region of Arkansas is accessed from the north and south by Arkansas State Highways 7 and 27. Interstate 40 also serves this region of the state and runs east and west across Arkansas. Access to the lake from State Highway 7 is provided by State Highway 60. The Nimrod Dam is located about 29 miles south of Russellville, Arkansas traveling south on State Highway 7. The dam is located about eight miles southeast of Plainview, Arkansas, traveling east on State Highway 60 and approximately 20 miles from Perryville, Arkansas, by traveling west on State Highway 60. Supplementing these main highway arteries is a network of county and community roadways. There are also two municipal public use airports located within 40 minutes of the lake; the Petit Jean Park Airport at Morrilton, Arkansas, and the Danville Municipal Airport located at Danville, Arkansas. Additionally, the Bill and Hillary Clinton National Airport is approximately 55 miles from the Nimrod Project. Further highway and airport access can be referenced in Figure 2-3, Nimrod Lake Project Access.

Figure 2-3. Nimrod Lake Project Access



2.6 Climate

The climate in the Nimrod Lake area is classified as humid subtropical according to the Köppen climate model. A humid subtropical climate is characterized by a warm, temperate climate with fully humid precipitation and temperatures that are hot during the summer months. Winters are typically mild to cool (Kottek et al., 2006). Warm, humid, subtropical air that is generated by the Gulf of Mexico can lead to heavy precipitation under certain large-scale pressure patterns. The warm, moist air meets with cold, dry air from the west, creating an environment of high instability and wind shear. These fronts tend to have a north-south alignment but can also shift east-west, can occur any time of year, and can generate heavy precipitation for daily or longer durations (Perica et al., 2013).

Precipitation

Proximity to the Gulf of Mexico makes Nimrod Lake susceptible to tropical storm systems, which account for the majority of extreme rainfall events (Perica et al., 2013). The region sees an average of 55.75 inches of rainfall and 2.53 inches of snow annually. At Nimrod Lake, the reservoir averages 4.5 inches of rainfall monthly, receiving the majority in the spring and averaging 54.43 inches annually. The reservoir's average precipitation is distributed over 92 days per year in the form of rain and snow, sleet, or hail (approximately 2.8 inches annually of frozen precipitation).

Temperature

With Nimrod Dam and Aplin being the only stations with temperature monitoring capabilities near Nimrod Lake, average annual temperatures for the area are approximately 61 degrees Fahrenheit (°F). Annual temperatures range from a maximum of 72.8°F to minimum annual temperatures of 49.9°F. August is typically the hottest month, with mean daily highs of approximately 93°F, and January being the coldest month, with a mean daily low of approximately 29°F (NOAA, 2023). Based on USACE data, evaporation from Nimrod Lake over the past 50 years (1971 to 2021) averages approximately 1,065 acre-feet annually, with the majority of evaporation occurring in late July and least occurring between December and January.

Climate Change

Climate change is an area of concern due to the potential for effects on many aspects of the environment, especially those related to water resources. While temperature and precipitation variations determine habitat types and wildlife diversity under normal conditions, extremes to include flooding, drought, and tornados will introduce stress that has the potential to negatively impact the health and productivity of ecosystems (USDA, 1999). The U.S. Global Change Research Program summarized information regarding climate change and its potential effects in regional assessments. In the South, extreme events such as heat waves, droughts and heavy rainfall events are projected to occur more frequently. If the current rate of greenhouse gas (GHG) emissions continues, the potential severity and frequency of these extreme weather events is likely to increase over time.

The USACE mission for the Responses to Climate Change Program is “to develop, implement, and assess adjustments or changes in operations and decision environments to enhance resilience or reduce vulnerability of USACE projects, systems, and programs to observed or expected

changes in climate.” Further, the USACE has prepared an Adaptation Plan in response to previously existing related EOs and Climate Action Plan. The Adaptation Plan includes the following USACE policy statement: “It is the policy of USACE to integrate climate change preparedness and resilience planning and actions in all activities for the purpose of enhancing the resilience of our built and natural water-resource infrastructure and the effectiveness of our military support mission, and to reduce the potential vulnerabilities of that infrastructure and those missions to the effects of climate change and variability.” The effects of climate change and mitigation efforts are evolving, and it is a USACE responsibility as a steward for some of the Nation’s most important natural resources to act accordingly. Nimrod Lake and all federally owned property is managed to comply with laws and executive orders to respond to the growing threat of climate change.

2.7 Topography, Geology, and Soils

2.7.1 General Topography

The topography in the southern portion and extreme western portion of the watershed of Nimrod Lake includes steep inclines typical of the Ouachita Mountains (Figure 2-2) with the area along the Fourche La Fave River, below Nimrod Lake, consisting of Quaternary alluvial deposits. The south-western portion of the watershed has a rugged topography, with average relief of several hundred feet and some areas that exceed 2,000 feet in elevation. This area also forms the topographic boundary between the Fourche La Fave River watershed and the headwaters of the Ouachita River watershed to the south.

2.7.2 Site Geology

The geology within the watershed is comprised of the Ouachita Mountains, which are complexly folded and faulted rocks originally deposited in mostly deep marine environments (Office of the State Geologist, 2024). The Ouachita Mountains consist of a series of east-west trending ridges and valleys and are composed of Early Ordovician through Middle Pennsylvanian age rocks (Figure 2-4). The valleys primarily consist of shales while the ridges primarily consist of competent sandstone, chert, and novaculite. The prominent structures within the Ouachita Mountains are folds, thrust faults, and reverse faults (U.S. Forest Service, 2024). Folding is intricate at all scale levels and consist of both complete and partial overturning (Office of the State Geologist, 2024). The Fourche La Fave watershed is a perfect example of the east-west trending ridges and valleys of the Ouachita Mountains (Figure 2-2).

The Ouachita Mountain physiographic province underlying the Nimrod Lake watershed is composed mainly of Paleozoic sedimentary rocks and represents the extreme frontal element of the orogenic belt and is a mildly compressed fold belt. The predominant formation underlying the Nimrod Lake watershed is the Pennsylvanian-aged Atoka Formation and is characterized has being mostly dark shales with sandstones and sandy limestones. The area known as the Arkansas River Valley has been above sea level and eroding since the beginning of the Permian Period and, therefore, no rocks were preserved until the Quaternary Period when the Arkansas River deposited sediment in the form of terraces (Chandler, 2007).

2.7.3 Soils

The Fourche La Fave headwaters rises in Scott County about 45 miles south of Fort Smith, Arkansas, and flows toward Nimrod Dam approximately 65 miles to the east through Scott, Yell, and Perry counties and draining the periphery of Garland, Saline, Polk, Montgomery, and Pulaski counties. Throughout this reach, the basin is relatively steep, long, and narrow with only one main stem fed by numerous short tributaries and drains a total area of 1,100 square miles. Soil Orders in the Fourche Mountains includes Ultisols and Inceptisols. On floodplains and stream terraces, Ultisols, Alfisols, Entisols are dominant (Woods et al., 2004).

The Fourche La Fave headwaters are in the south-central portion of Scott County and the north-central periphery of Polk County, which is characterized by large east to west linear mountains intermingled with large cone-shaped hills, smaller dissected mountains, and narrow valleys. Soils in the mountainous and hilly areas of the uplands consist primarily of the Carnasaw-Sherless-Clebit complex, which are characterized as being deep to shallow, gently sloping to very steep, well drained, gravelly, or stony, that consists of clayed and loamy residuum of sandstone and shale. Other soil complexes with the same or similar characteristics includes the Kenn-Avilla-Ceda, Spadra-Neff-Cupco, and the Leadvale-Endsaw-Taft complexes. The natural vegetation includes oak, hickory, dogwood, and pine with adapted species that include shortleaf and loblolly pine. Soils in the stream terraces and flood plains consist primarily of the Kenn-Avilla-Ceda series, which are characterized as being deep, level to gently sloping, well drained, with loamy alluvium. Major land uses are pasture and woodland (Soil Survey Staff, 2023).

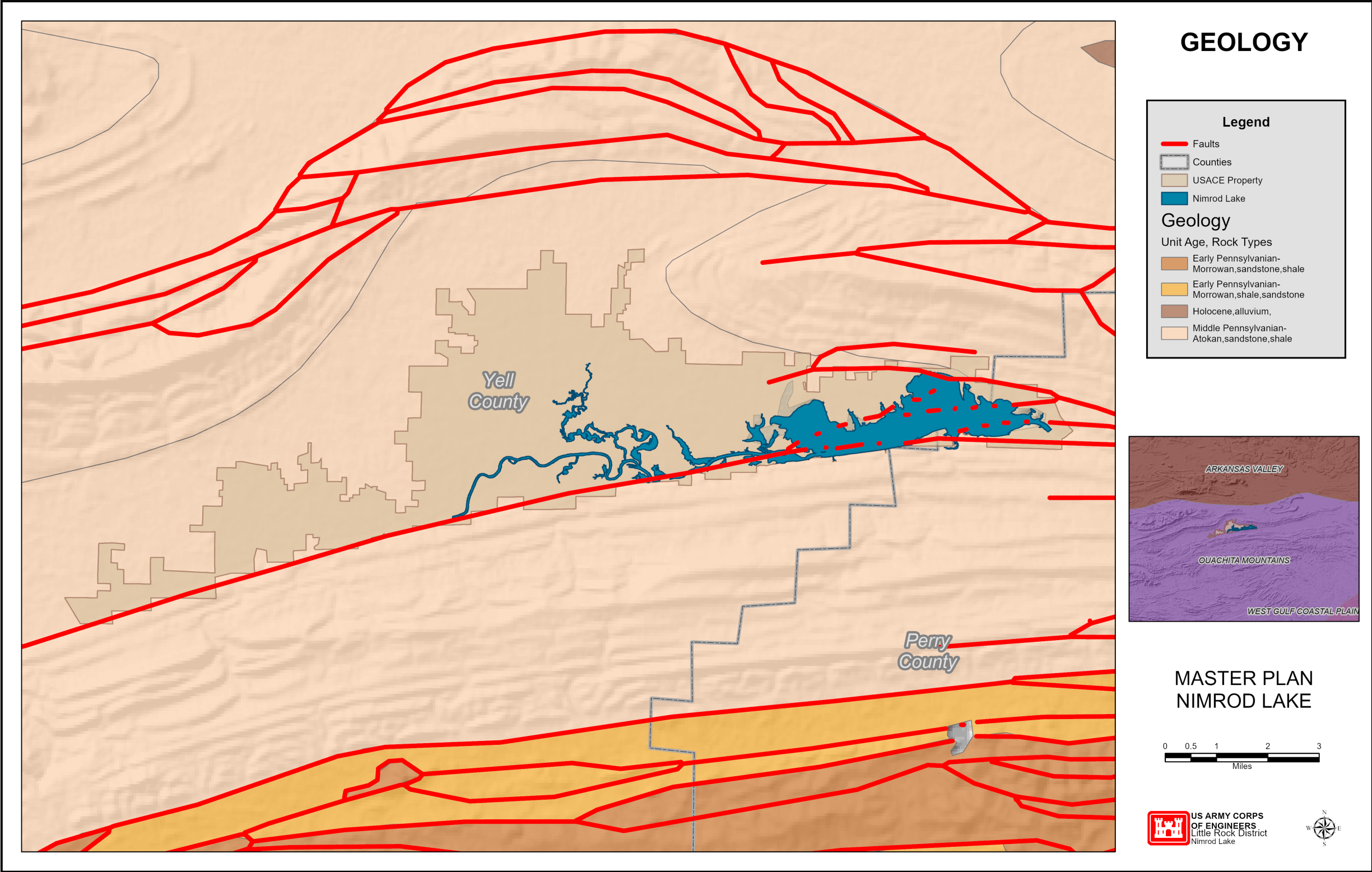
Upon leaving Scott County, the Fourche La Fave drains into south-central portion of Yell County. The soil formations in this part of the county are like that of Scott and Polk counties with the Carnasaw-Sherless-Clebit complex being the predominant soil series. In addition to previously mentioned series, the soil formations in this part of the county are primarily the Leadvale-Cane-Taft series located on foot slopes and toe slopes. These soils are characterized as being deep to very deep, level to gently sloping, moderately well drained, and silty alluvium. On a smaller scale, the Guthrie-Barling and Spadra-Barling-Pickwick complexes are also present. Major land uses include woodland, pasture, and hay land (Soil Survey Staff, 2023).

The Fourche La Fave flows through central Perry County before draining into the Arkansas River. The soil formations in Perry County are also like that of Scott and Polk counties with the addition of soils formed in Arkansas River alluvium. These areas consist primarily of the Carnasaw complex that now includes the Pirum series and the Leadvale complex is mixed with the Guthrie series. Both are characterized as being very deep, level to gently sloping, well to poorly drained, and loamy to clayey alluvium having slopes less than 1 percent. This soil series is best suited for woodlands and wildlife habitat and accommodates crops such as rice and soybeans. The Perry-Moreland complex, which are characterized as somewhat poorly drained, level to gently sloping, deep, clayey alluvium, on broad flood plains and low terraces (Soil Survey Staff, 2023), are located where the Fourche La Fave drains into the Arkansas River.

Soil surveys as published by the Natural Resources Conservation Service (NRCS) are available for all the counties located in the Nimrod Lake watershed. These could be utilized for developing specific resource management plans for the Operational Management Plan.

Soil conservation and management are major considerations when planning natural resource and recreation management practices. Soil movement is influenced by uncontrollable factors, such as climate, soil type, and topography. Additionally, it can also be negatively affected by compaction, modification of vegetative cover, and very high lake pool elevations which increase wave action and inundation of unprotected shoreline.

Figure 2-4. Geology and Fault Lines of Nimrod Lake and Surrounding Area



2.8 Resource Analysis (Level One Inventory Data)

Operational civil works projects administered by USACE are required, with few exceptions, to prepare an inventory of natural resources. The basic inventory required is referred to within USACE regulations (ER and EP 1130-2-540) as a Level One Inventory. This inventory includes the following: vegetation in accordance with the National Vegetation Classification System through the sub-class level; assessment of the potential presence of special status species including but not limited to federal and state listed endangered and threatened species, migratory species, and birds of conservation concern listed by the U.S. Fish and Wildlife Service (USFWS); land (soils) capability classes in accordance with the Natural Resources Conservation Service (NRCS) criteria; and wetlands in accordance with the USFWS' Classification of Wetlands and Deepwater Habitats of the United States. This basic inventory information is used in preparing project Master Plans and OMPs. An overview of the natural resources and related management actions at the project is provided in the following sections and paragraphs.

2.8.1 Fish and Wildlife Resources

2.8.1.1 Fishery

Management of the fisheries resource at Nimrod Lake is the responsibility of the Arkansas Game and Fish Commission (AGFC). The overall function of USACE in support of fisheries has been primarily one of support with planning and management. The waters of Nimrod Lake are categorized as a warm-water fishery. The lake is relatively shallow (at conservation pool level, more than 75% of the lake is less than ten feet deep), receives strong wind action, and regularly contains heavy concentration of colloidal turbidity.

The current Water Control Manual was devised and put in place in 1968. It came into being as a solution to the shallow water areas which created boating and fishing problems. The plan increased the water surface elevation seasonally by three feet (from 342' to 345' msl). The plan enhanced the fishery by increasing natural reproduction of fish and improving survival and growth rate of young fish.

Recent community sampling identified at least 25 fish species representing 15 taxonomic genus groups that have been identified in Nimrod Lake (see Table 2-1). The AGFC conducts various types of fish sampling surveys on Nimrod Lake to guide management decisions. Surveys may help determine the need for a drawdown, habitat work, or regulation modifications such as with daily limits, slot limits, and commercial fishing seasons. Lake drawdowns have been utilized since the mid 1950's to address lake water turbidity and for fisheries benefits. Drawdowns, both partial and total, should continue to be used to help manage the fisheries of the lake. These drawdowns are scheduled to occur every five years, but can be waived if deemed not necessary by either the AGFC or USACE. If drawdown is to occur priority work shall be coordinated to include items such as lakebed seeding, fish habitat work, and shoreline work.

The seasonal fluctuations of lake levels can have either beneficial or negative affects depending on the timing and duration of flooding. Fish stocking by AFGC is not an annual practice but can occur and may also include stocking of smaller bodies of water that occur within the Project. Fish structures should continue to be placed within the conservation pool area of the lake to

create additional habitat for suspending fish. These artificial structures can be constructed of wood, plastic, or other non-toxic materials.

Table 2-1. Common Fish Species on Nimrod Lake

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Notropis boops</i>	Bigeye Shiner
<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo
<i>Pomoxis nigromaculatus</i>	Black Crappie
<i>Fundulus olivaceus</i>	Blackspotted Topminnow
<i>Lepomis macrochirus</i>	Bluegill
<i>Ictalurus punctatus</i>	Channel Catfish
<i>Cyprinus carpio</i>	Common Carp
<i>Etheostoma proeliar</i>	Cypress Darter
<i>Notropis atherinoides</i>	Emerald Shiner
<i>Aplodinotus grunniens</i>	Freshwater Drum
<i>Dorosoma cepedianum</i>	Gizzard Shad
<i>Lepomis cyanellus</i>	Green Sunfish
<i>Lepomis spp.</i>	Hybrid Sunfish
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Lepomis megalotis</i>	Longear Sunfish
<i>Lepisosteus osseus</i>	Longnose Gar
<i>Menidia audens</i>	Mississippi Silverside
<i>Lepomis humilis</i>	Orangespotted Sunfish
<i>Percina fulvitaenia</i>	Ozark Logperch
<i>Lepomis microlophus</i>	Redear Sunfish
<i>Micropterus punctulatus</i>	Spotted Bass
<i>Lepisosteus oculatus</i>	Spotted Gar
<i>Minytrema melanops</i>	Spotted Sucker
<i>Lepomis gulosus</i>	Warmouth
<i>Pomoxis annularis</i>	White Crappie

2.8.1.2 Wildlife

Nimrod Lake provides a diversity of habitat, which supports a wide variety of wildlife species. The area provides a mix of wetlands, open fields, and woodlands of varied age and composition. White-tailed deer (*Odocoileus virginianus*) is the most abundant big game animal found on the project area. Eastern wild turkey (*Meleagris gallopavo*) and black bears (*Ursus americanus*) are also common. Additional wildlife species that are common to the area may be found in Table 2-2. The AGFC monitors the whitetail deer population for Chronic Wasting Disease (CWD), which though it has not yet been detected in Yell or Perry counties, has been detected within 40 miles of the Project in Pope and Logan counties.

The entirety of the Nimrod Lake Project lands is managed cooperatively with the AGFC through a license agreement. The license establishes the Project land as the Nimrod Lloyd Millwood WMA (Wildlife Management Area). Also, within the WMA is the Lloyd Millwood Green Tree Reservoir.(GTR)

Field work fluctuates annually, but AGFC plants an area of about 40-50 acres in the spring and then seed in a winter cover crop on the same area in the fall. USACE regularly plant another approximately 100-120 acres food plots, food strips, waterfowl patches. Other wildlife management may include mowing, soil disturbance, silvicultural activities such as mechanical and/or chemical wildlife stand improvements (WSI), removal/ treatment of exotic species, and application of prescribed fire. There are also areas within the Project that will benefit local wildlife by the creation of small watering holes.

Additional information can be found in the Fish and Wildlife Management Plan for Blue Mountain Lake, Appendix D to the 1975 Master Plan, until updated in the future.

Table 2-2. Common Wildlife around Nimrod Lake

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Neogale vison</i>	American Mink
<i>Ursus americanus</i>	Black Bear
<i>Lynx rufus</i>	Bobcat
<i>Colinus virginianus</i>	Bobwhite Quail
<i>Sylvilagus floridanus</i>	Eastern Cottontail Rabbit
<i>Canis latrans</i>	Coyote
<i>Sciurus niger</i>	Fox Squirrel
<i>Urocyon cinereoargenteus</i>	Gray Fox
<i>Sciurus carolinensis</i> G	Gray Squirrel
<i>Lenaida macroura</i>	Mourning Dove
<i>Castor canadensis</i>	North American Beaver
<i>Didelphis virginiana</i>	Virginia Opossum
<i>Procyon lotor</i>	Raccoon
<i>Lontra canadensis</i>	River Otter
<i>Mephitis mephitis</i>	Striped Skunk
<i>Sylvilagus aquaticus</i>	Swamp Rabbit
<i>Odocoileus virginianus</i>	White-Tailed Deer
<i>Meleagris gallopavo</i>	Eastern Wild Turkey

The American beaver (*Castor canadensis*) has emerged as a somewhat nuisance species on the Nimrod Lake Project. When gone unchecked their population exploded, which led to the inundation of dozens of acres while killing the trees therein. Additionally, since the areas that are chosen to impound water are on creeks, these creek channels become silted in from the turbid

inflow. Beaver also often choose to build along roads, so they can utilize a raised roadbed as part of their dam, which leads to road culverts being filled with mud and sticks creating road maintenance issues. Annual control measures need to continually be incorporated to reduce damage to natural resources and infrastructure.

Birding enthusiasts are provided an excellent opportunity for bird watching at the Nimrod Lake area. Additionally, a wide variety of waterfowl species migrating along the central flyway utilize Nimrod Lake. Of the birds on the state list, over 300 have been recorded on or near the lake. These species can be found at the Cornell Lab of Ornithology eBird website. Winter flooding which spreads into bottomland hardwoods provides feeding opportunities for many of the dabbling species while the open water of the lake is utilized by other diving duck species. A list of common bird species may be found in Table 2-3.

Vultures, primarily black vultures, have been increasing in numbers over the past decade, and are beginning to become a nuisance within the recreation areas causing significant damage to vehicles and boats. Mitigation may include cutting of dead trees (snags) in and around recreation areas to reduce roosting opportunities to these areas. Additional deterrents such as pyrotechnics, noise-making devices, chemical repellants, or even lethal means may become necessary with expanding populations utilizing the parks.

Table 2-3. Common Birds Species Around Nimrod Lake.

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Corvus brachyrhynchos</i>	American Crow
<i>Pelecanus erythrorhynchos</i>	American White Pelicans
<i>Mareca americana</i>	American Wigeon
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Coragyps atratus</i>	Black Vulture
<i>Passerina caerulea</i>	Blue Grosbeak
<i>Spatula discors</i>	Blue-Winged Teal
<i>Sitta pusilla</i>	Brown-Headed Nuthatch
<i>Branta canadensis</i>	Canada Geese
<i>Petrochelidon fulva</i>	Cave Swallow
<i>Bucephala clangula</i>	Common Goldeneye
<i>Phalacrocorax auritus</i>	Double Crested Cormorant
<i>Mareca strepera</i>	Gadwall
<i>Ardea herodias</i>	Great Blue Heron
<i>Ardea alba</i>	Great Egret
<i>Butorides virescens</i>	Green Heron
<i>Anas carolinensis</i>	Green-Winged Teal
<i>Lophodytes cucullatus</i>	Hooded Merganser
<i>Passerina cyanea</i>	Indigo bunting
<i>Aythya affinis</i>	Lesser Scaup
<i>Anas platyrhynchos</i>	Mallard Duck

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Pandion haliaetus</i>	Osprey
<i>Passerina ciris</i>	Painted Bunting
<i>Dryocopus pileatus</i>	Pileated Woodpecker
<i>Anas acuta</i>	Northern Pintail
<i>Podilymbus podiceps</i>	Pied-billed Grebe
<i>Protonotaria citrea</i>	Prothonotary Warbler
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
<i>Aythya collaris</i>	Ring-Necked Duck
<i>Oxyura jamaicensis</i>	Ruddy Ducks
<i>Tachycineta bicolor</i>	Tree Swallows
<i>Spatula clypeata</i>	Northern Shoveler

2.8.2 Vegetative Resources

The lands of the Nimrod Lake Project offer a mix of open land and forested land with diverse species populations (see Table 2-4 and Figure 2-5). This diversity can be attributed to the area's physiographic variations from river valleys to steep, rocky slopes.

Nimrod Lake Project utilizes the Agriculture & Grazing (A&G) leasing program to maintain some of the open lands in their current condition. Other open land is maintained by USACE through infrequent brush-hogging, rotational food plots, and prescribed burning. AGFC does maintain a 60-acre block of land in a manner similar to that of USACE.

Most of the Nimrod Lake Project is made up of various woodland types. The major types are bottomland hardwood, upland hardwood, pine-hardwood, and pine. The most common forest type within the bottomland hardwood is of a red oak-sweetgum composition. The frequent high water that occurs within the flood pool area has significantly impacted the bottomland hardwood forest, particularly those areas that fall below elevation 352 feet msl. Over the past 15 years there has been an increase in high water events that have frequently extended into the growing season. The result has been a massive die-off of multiple tree species. The greatest impact has been on the red oak species. A few of the pioneer species that have emerged in their stead include buttonbush (*Cephalanthus occidentalis*), water elm (*Planera aquatica*), and silvermaple (*Acer saccharinum*), which are far less desirable than the preexisting species. Reforestation efforts are difficult due to spring flooding, but also due to the changing hydric soil conditions in these low-lying areas. Also, common in these die-off areas are various vine species such as trumpet creeper (*Campsis radicans*) and buckwheat / red vine (*Brunnichia ovata*), which present in dense mats of vegetation and severely hinder the natural regeneration process. Regeneration efforts should continue to be explored where soil conditions allow. It may be necessary to shift species composition to more water tolerant species which may include species such as overcup oak (*Quercus lyrata*), water hickory (*Carya aquatica*) or possibly bald cypress (*Taxodium distichum*) in the wettest of areas. In areas where reforestation may not be conducive with current land conditions, they may be examined for their suitability to transition to open land.

Nimrod Lake Project utilizes/may utilize a wide array of tools to meet management objectives. Open land management may include mowing, disking, mulching, herbicide spraying, utilization of food plots and strips, mechanical clearing, and/or utilization of prescribed fire. Silvicultural prescriptions for woodland areas may include site prep actions such as chemical or mechanical using dozer, roller chopping, or mulching equipment. Timber Stand Improvement (TSI) work is performed to include pre-merchantable thinning, understory/midstory removal with or without herbicide (cut stump treatment), hack-and-squirt, basal spray applications, and foliar spray applications. Prescribed burning is also utilized within forested stands. Timber sales to include Minor Forest Products Sales in the form of small manager sales, salvage sales, and firewood sales, as well as major Forest Product sales will be utilized. Forest product sales will be coordinated with Real Estate as required in ER 405-1-12.

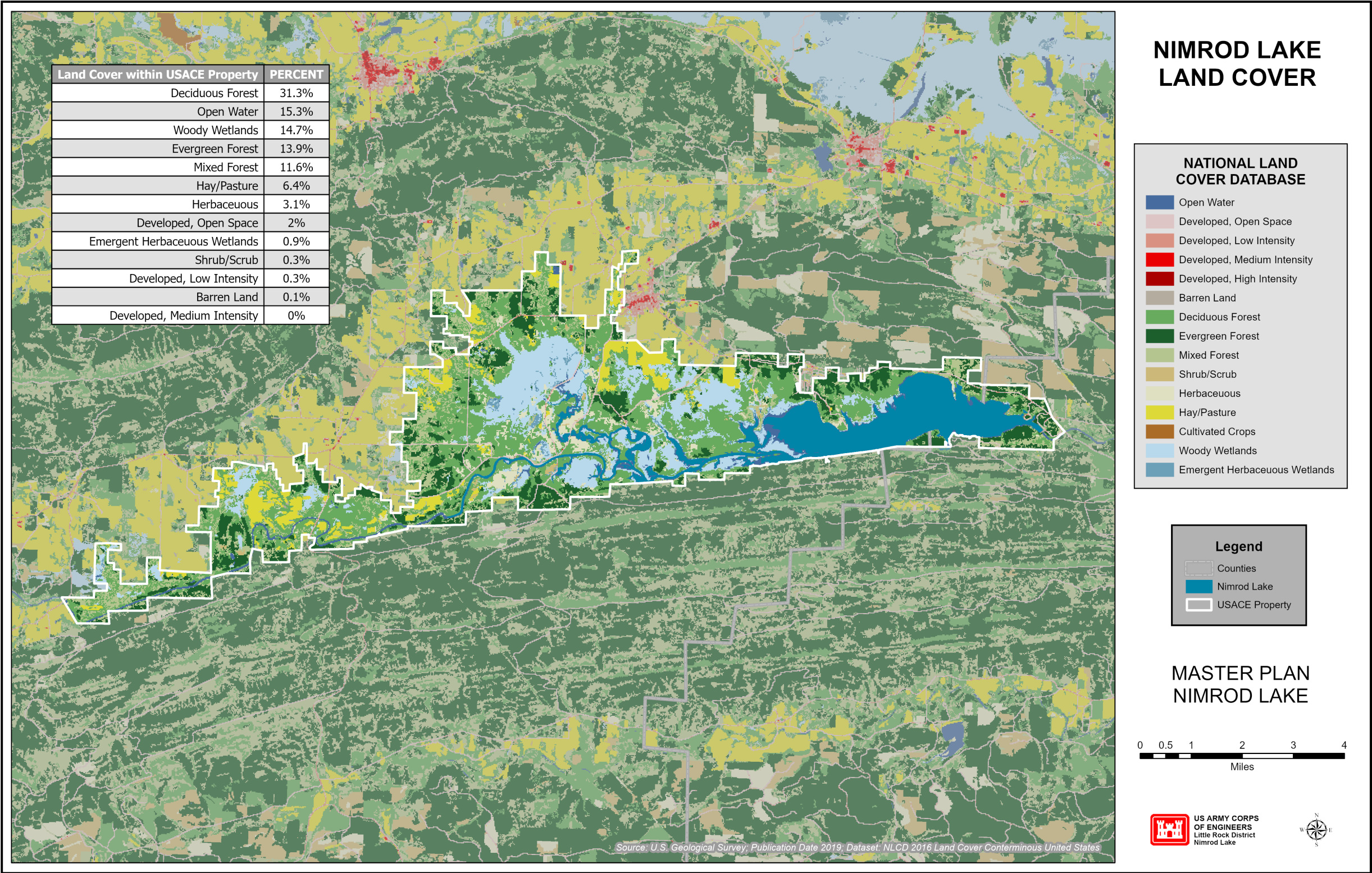
Additional information can be found in the Forest Management Plan for Nimrod Lake, Appendix B to the 1975 Master Plan, until updated in the future.

Table 2-4. Common Vegetation Around Nimrod Lake

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Teucrium canadense</i>	American Germander
<i>Styrax americanus</i>	American Snowbell
<i>Taxodium distichum</i>	Bald Cypress
<i>Vernonia baldwinii</i>	Baldwin's Ironweed
<i>Andropogon gerardii</i>	Big Bluestem
<i>Salix nigra</i>	Black Willow
<i>Rubus</i> spp.	Brambles: Blackberry, Dewberry
<i>Andropogon virginicus</i>	Broom Sedge
<i>Brunnichia ovata</i>	Buckwheat Vine
<i>Cephalanthus occidentalis</i>	Buttonbush
<i>Rudbeckia triloba</i>	Brown-Eyed Susan
<i>Solidago auriculata</i>	Eared Goldenrod
<i>Tripsacum dactyloides</i>	Eastern Gamagrass
<i>Juniperus virginiana</i>	Eastern Red Cedar
<i>Ulmus</i> spp.	Elms
<i>Cyperus echinatus</i>	Globe flatsedge
<i>Celtis</i> spp.	Hackberries
<i>Carya</i> spp.	Hickory: Bitternut, Mockernut, Pignut, Shagbark, Water
<i>Schizachyrium scoparium</i>	Little Bluestem
<i>Pinus taeda</i>	Loblolly Pine
<i>Chamaecrista fasciculata</i>	Partridge Pea
<i>Diospyros virginiana</i>	Persimmon
<i>Quercus</i> spp.	Red Oaks: Cherrybark, Northern, Pin, Shumard, Southern, Water, Willow

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
<i>Carex</i> spp.	Sedges
<i>Pinus echinata</i>	Shortleaf Pine
<i>Senna obtusifolia</i>	Sicklepod
<i>Polygonum pensylvanicum</i>	Smartweed
<i>Bidens</i> spp.	Spanish Needles
<i>Platanus occidentalis</i>	Sycamore
<i>Liquidambar styraciflua</i>	Sweet Gum
<i>Campsis radicans</i>	Trumpet Vine
<i>Vicia</i> spp.	Vetches
<i>Planera aquatica</i>	Water Elm / Planertree
<i>Quercus</i> spp.	White Oaks: Bur, Post, Overcup, White
<i>Hibiscus lasiocarpus</i>	Wooly Rosemallow

Figure 2-5. Land Cover at Nimrod Lake



2.8.3 Threatened and Endangered Species

There are many species in the Ouachita Mountains ecoregion that are considered either threatened, endangered, or state species of concern. Species become listed for a variety of reasons including over-hunting, over-fishing, and habitat loss as a result of human development and pollution. Of these, habitat loss is the main contributor that imperils most species. A threatened species is one that is likely to become endangered within the foreseeable future. An endangered species is one in danger of extinction throughout all or a significant portion of its range.

The Endangered Species Act establishes protections for fish, wildlife, and plants that are listed as threatened or endangered. The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool was utilized to determine species listed under the Endangered Species Act potentially located in the Nimrod Lake area (USFWS, 2023a). Table 2-5 below depicts federally listed species that may occur on project and/or surrounding lands.

Table 2-5. Federally Listed Species

Scientific Name	Common Name	Status
Mammals		
<i>Myotis sodalist</i>	Indiana Bat	Endangered
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Endangered
<i>Perimyotis subflavus</i>	Tricolored Bat	Proposed Endangered
Birds		
<i>Laterallus jamaicensis ssp. jamaicensis</i>	Eastern Black Rail	Threatened
<i>Charadius melodus</i>	Piping Plover	Threatened
<i>Calidris canutus rufa</i>	Red Knot	Threatened
<i>Picoides borealis</i>	Red-Cockaded Woodpecker	Endangered
Reptiles		
<i>Macrochelys temminckii</i>	Alligator Snapping Turtle	Proposed Threatened
Insects		
<i>Nicrophorus americanus</i>	American Burying Beetle	Threatened
<i>Danaus plexippus</i>	Monarch Butterfly	Candidate
Flowering Plants		
<i>Ptilimnium nodosum</i>	Harperella	Endangered
Source: USFWS 2023a		

The Arkansas Natural Heritage Commission (ANHC) maintains a biodiversity database that tracks the location and status of rare species of animals and plants as well as natural communities in Arkansas. Table 2-6 below depicts state listed species of concerns that may be located within the Nimrod Lake project and/or surrounding areas (ANHC, 2023).

Table 2-6. State of Arkansas Listed Species

Scientific Name	Common Name	State Status	Global Rank	State Rank
<i>Amsonia hubrichtii</i>	Ouachita Bluestar*	INV	G3	S3
<i>Callophrys irus hadros</i>	Frosted Elfin*	INV	G3T2T3	S1
<i>Carex latebracteata</i>	Waterfall's Sedge	ST	G3	S3
<i>Clematis glaucophylla</i>	White-Leaf Leather-Flower*	N/A	G4	S1
<i>Cypripedium kentuckiense</i>	Kentucky Lady's-Slipper	INV	G3	S2
<i>Diphasiastrum digitatum</i>	Southern Running-Pine	INV	G5T5	S1S3
<i>Dulichium arundinaceum</i> <i>var. arundinaceum</i>	Three-Way Sedge	INV	G5T5	S2S3
<i>Etheostoma teddyroosevelt</i>	Highland Darter*	INV	GNR	S3
<i>Gratiola brevifolia</i>	Sticky Hedge-Hyssop	INV	G4	S3
<i>Liatris compacta</i>	Ouachita Blazing-Star	INV	G3	S3
<i>Myotis septentrionalis</i>	Northern Long-Eared Bat*	SE	G1G2	S1S2
<i>Procambarus liberorum</i>	Osage Burrowing Crayfish	INV	G3G4	S3S4
<i>Ptilimnium nodosum</i>	Harperella*	INV	G2	S2
<i>Riparia riparia</i>	Bank Swallow	INV	G5T5	S3B
<i>Source: ANHC 2023</i>				

E = Endangered; S2: Imperiled: Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or state (1,000 to 3,000)-typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000); S3: Vulnerable: Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically, 21 to 100 occurrences or between 3,000 and 10,000 individuals; G3: Vulnerable: Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically, 21 to 100 occurrences or between 3,000 and 10,000 individuals.

* Known species occurrence on project lands

2.8.4 Invasive Species

In accordance with Executive Order (EO) 13112, an invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species can be microbes, fungi, plants, or animals that are not native to an ecosystem. Invasive species can take over and out-compete native species by consuming their forage, invading their habitat, and altering the ecosystem in ways that harm native species. Invasive species can be accidentally transported, or they can be deliberately introduced because they are thought to be helpful in some way. Invasive species cost local, state, and federal agencies billions of dollars every year.

Nimrod Lake Project has been impacted by the spread of invasive species. Table 2-7 identifies some of the more impactful invasive species recorded at Nimrod Lake. In addition to the known species there are some species of concern that occur at other USACE projects that could potentially affect Nimrod in the future. These include zebra mussels, hydrilla, giant salvinia, and Eurasian watermilfoil. Nimrod Lake staff will continue to work with other agencies and participate in species monitoring, public education through signage, preventative measures, and

control measures on Project lands as possible when needed.

Invasive species control measures may include mechanical and/or chemical treatment of species. These measures may be prescribed across any Land Classification category to include Environmentally Sensitive Areas in order to prevent or control the spread of microbe, fungi, plant, or animal species.

In accordance with Executive Order (EO) 13112, an invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species can be microbes, fungi, plants, or animals that are not native to an ecosystem. Invasive species can take over and out-compete native species by consuming their forage, invading their habitat, and altering the ecosystem in ways that harm native species. Invasive species can be accidentally transported, or they can be deliberately introduced because they are thought to be helpful in some way. Invasive species cost local, state, and federal agencies billions of dollars every year.

Table 2-7. Invasive Species Identified at Nimrod Lake

SCIENTIFIC NAME	COMMON NAME
<i>Pyrus calleryana</i>	Callery Pear
<i>Agrilus planipennis</i>	Emerald Ash Borer
<i>Hedera helix</i>	English Ivy
<i>Sus scrofa</i>	Feral Hogs
<i>Lonicera japonica</i>	Japanese Honeysuckle
<i>Pueraria montana</i>	Kudzu
<i>Rosa multiflora</i>	Multiflora Rose
<i>Ligustrum spp.</i>	Privets
<i>Solenopsis invicta</i>	Red Imported Fire Ant
<i>Nandina domestica</i>	Sacred Bamboo / Nandina
<i>Lespedeza cuneata</i>	Sericea Lespedeza
<i>Albizia julibrissin</i>	COMMON NAME
<i>Poncirus trifoliata</i>	Callery Pear

2.8.5 Wetlands

Wetlands are complex habitats that are transitional from dry land to open water, and they have soil, water, and plant components. Wetlands are defined as those areas inundated or saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Many common species of waterfowl, fish, birds, mammals, and amphibians also live in wetlands during certain stages of their lives. There are approximately 5,740 total acres of wetlands within the Nimrod Lake project boundary, with 4,036 of the total acreage characterized as lacustrine with water features including the lake itself as well as flowing and standing water within fee land. The remaining 1,704 acres of wetlands are characterized as palustrine, typically surrounded by standing dead timber and vegetated shorelines. Nimrod Lake palustrine wetlands can be further categorized as freshwater

emergent (approximately 7 acres) and freshwater forested/shrub wetlands (approximately 1,697 acres). The forested/shrub wetlands include a mixture of scrub/shrub (six meters or less in height) or forested wetland species of greater than six meters in height. Common woody wetland species typically include buttonbush, willow, green ash, hackberry, elm, willow oak, water oak, overcup oak, sweetgum, and river birch. Some locations may have cypress as well. Palustrine forested/shrub wetlands also occur in the feeder streams' floodplains and are called riverine wetlands (USFWS, 2023b).

2.8.6 Ecological Setting

The Natural Resource Management Mission of the U.S. Army Corps of Engineers (ER 1130-2-550, Chapter 2, Paragraph 2-2. a. (1), dated 15 November 1996) states the following:

“The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resource Management Mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance, and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, State, and local agencies as well as the private sector.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.”

In support of this mission statement, the following paragraphs describe the ecoregion where Nimrod Lake is located, and natural resources components found within the project area.

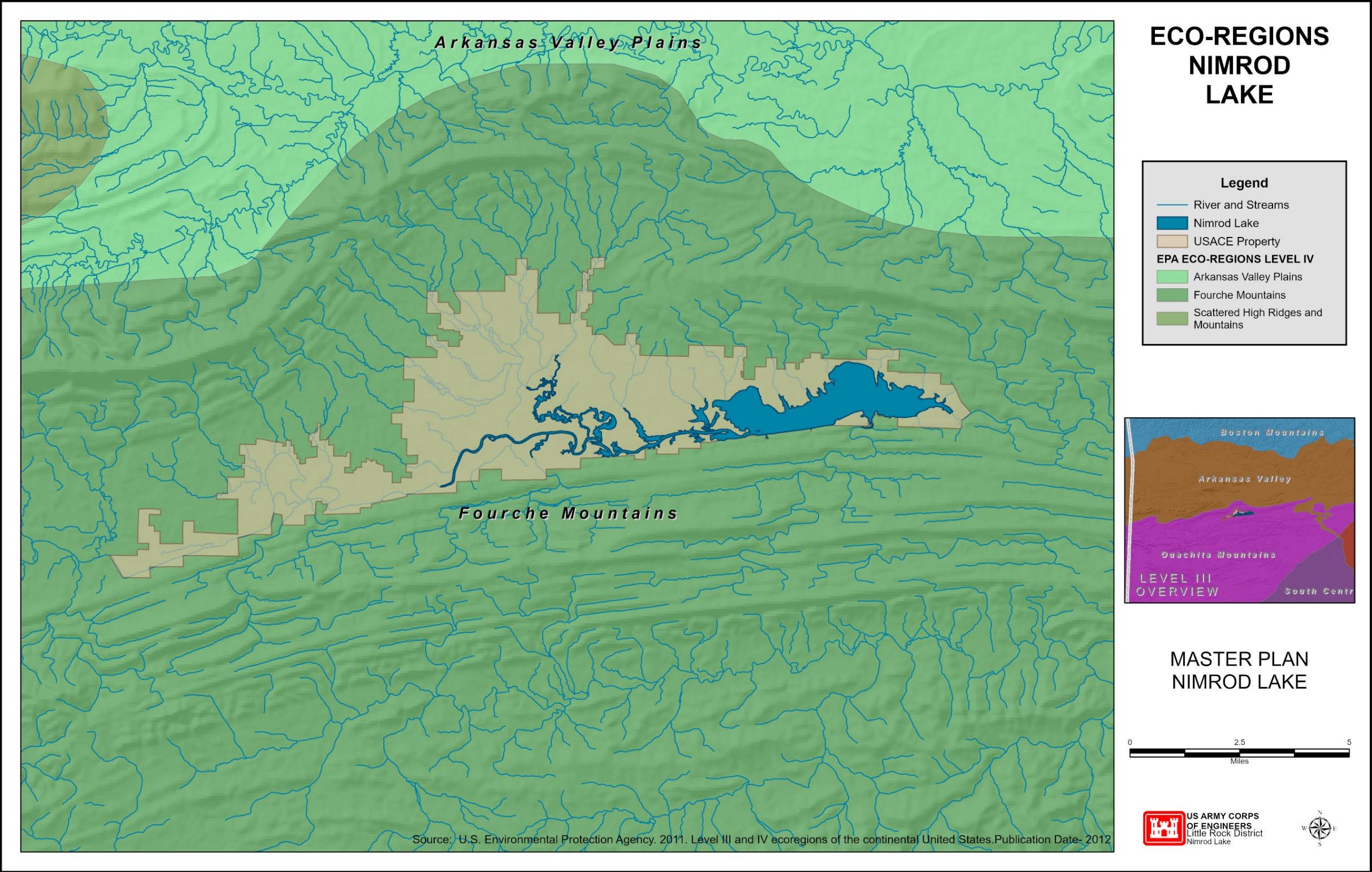
Ecoregions are areas with generally similar ecosystems and with similar types, qualities, and quantities of environmental resources. Ecoregion boundaries are determined by examining patterns of vegetation, animal life, geology, soils, water quality, climate, and human land use, as well as other living and non-living ecosystem components.

A large area that includes generally similar ecosystems and that has similar types, qualities, and quantities of environmental resources is known as an ecoregion. The purpose of ecological land classification is to provide information for research, assessment, monitoring, and management of ecosystems and ecosystem components. Federal agencies, state agencies, and nongovernmental organizations responsible for different types of resources within the same area use this information to estimate ecosystem productivity, to determine probable responses to land management practices and other ecosystem disturbances, and to address environmental issues over large areas, such as air pollution, forest disease, or threats to biodiversity.

Nimrod Lake lies within the Environmental Protection Agency (EPA) Ouachita Mountains Level III Ecoregion (see Figure 2-6), located in western central Arkansas and extending into eastern Oklahoma. The Ouachitas are made up of ridges, hills, and valleys formed by the erosion of folded and faulted Paleozoic sandstone, shale, and chert. They are a continuation of the Appalachians. More specifically, the Fourche Mountains Level IV Ecoregion encompasses

Nimrod Lake. This sub-ecoregion encompasses 2,452 square miles and is composed of long, east to west trending, forested ridges composed of sandstone. Intervening valleys are cut into shale. Ridges are longer, habitat continuity is greater, the lithologic mosaic is different, and the topographic orientation is more consistent compared to other parts of the Ouachita Mountains. Elevation ranges from 290 to 2,700 feet, with uplands the lowest in the east at 100 to 1600 feet. Differences in moisture and temperature between north- and south-facing slopes significantly influences native plant communities. Forests on steep, north-facing slopes are more mesic compared to southern aspects, the latter of which is characterized by grassy woodlands. Here, natural vegetation may include oak-hickory-pine forest; mixed shortleaf pine-upland deciduous forest in the uplands; and southern red oak, willow, elm, birch, maples, sweetgum, and American sycamore on the floodplains and low terraces. Presently, loblolly-shortleaf pine and upland oak-hickory-pine forest types are codominant. Pastureland and hay land are restricted to a few broad valleys. Logging is not nearly as intensive as in the commercial pine plantations of the less rugged Athens Plateau, another Level IV Ecoregion within the Ouachita Mountains. Nutrient, mineral, and biochemical water quality parameter concentrations are low in the surface waters of this region, but turbidity can be higher than in other mountainous parts of the Ouachitas (Woods et al., 2004).

Figure 2-6. Eco-Regions at Nimrod Lake



2.9 Borrow Areas and Utilities

Borrow sites are locations where shale is removed to be used for operational purposes. Originally, some of these areas were used for the construction of recreation areas. There are still active borrow areas around Nimrod Lake being utilized for construction projects.

Utilities passing through and providing service on project lands include telephone lines, communication cables, electrical transmission and distribution lines, natural gas pipelines, a water intake and distribution lines. The City of Plainview has a lease for a sewer treatment facility.

2.10 Mineral and Timber Resources

2.10.1 Forest Resources

Nimrod Lake is surrounded by forested land, which is managed for multi-use, sustained yield as outlined in the Public Law 86-717:

To provide for the protection of forest cover for reservoir areas under the jurisdiction of the Secretary of the Army and the Chief of Engineers.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it is hereby declared to be the policy of the United States to provide that reservoir areas of projects for flood control, navigation, hydroelectric power development, and other related purposes owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers shall be developed and maintained so as to encourage, promote, and assure fully adequate and dependable future resources of readily available timber, through sustained yield programs, reforestation, and areas for conservation, recreation, and other beneficial uses: Provided, That such development and management shall be accomplished to the extent practicable and compatible with other uses of the project.

USACE utilizes multiple tools as part of a timber management program. One management tool is timber disposal in the form of timber sales, which are administered through the Real Estate Branch of the Little Rock District. These timber sales are conducted as outlined in ER 405-1-90.

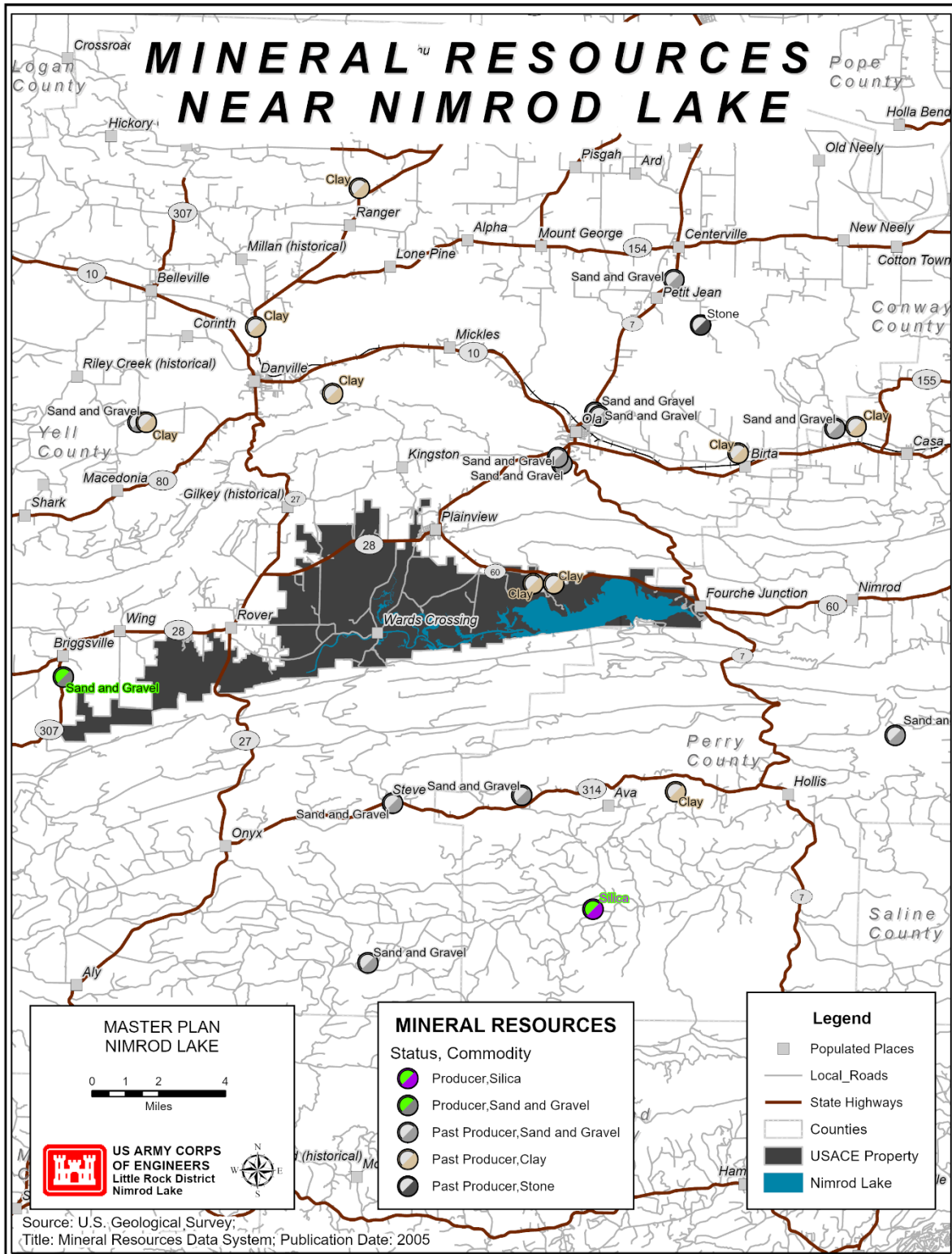
Forest management on Nimrod Lake will be conducted in consonance with PL 86-717, ER 1130-2-400, ER 405-2-835, TM 5-631, and AR 420-74.

See Nimrod Dam and Lake Design Memorandum No. 1-C (1975 Nimrod Lake Master Plan), Appendix B: Forest Management Plan.

2.10.2 Mineral Resources

There is no current extraction or mining of minerals on project lands. Reference Figure 2-7 below.

Figure 2-7. Minerals near Nimrod Lake



2.11 Cultural Resources

Cultural resources preservation and management is an equal and integral part of all resource management at USACE-administered operational projects. The term “cultural resources” is a broad term that includes, but is not limited to, historic and prehistoric archaeological sites, deposits, and features; burials and cemeteries; historic and prehistoric districts comprised of groups of structures or sites; cultural landscapes; built environment resources such as buildings, structures (such as bridges), and objects; Traditional Cultural Properties (TCP) and sacred sites. These property types may be listed on the National Register of Historic Places (NRHP) if they meet the criteria specified by 36 CFR 60.4 as authorized by the NHPA, reflecting significance in architecture, history, archaeology, engineering, and culture. Cultural resources that are identified as eligible for listing in the NRHP are referred to as “historic properties,” regardless of category. A TCP is a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. Ceremonies, hunting practices, plant-gathering, and social practices which are part of a culture’s traditional lifeways, are also cultural resources.

Stewardship of cultural resources on USACE Civil Works water resources projects is an important part of the overall Federal responsibility. Numerous laws pertaining to identification, evaluation, and protection of cultural resources, Native American Indian rights, curation and collections management, and the protection of resources from looting and vandalism establish the importance of cultural resources to our Nation’s heritage. With the passage of these laws, the historical intent of Congress has been to ensure that the Federal government protects cultural resources. Guidance is derived from a number of cultural resources laws and regulations, including but not limited to Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966 (as amended); Archaeological Resources Protection Act (ARPA) of 1979; Native American Graves Protection and Repatriation Act (NAGPRA); and 36 CFR Part 79, Curation of Federally-Owned and Administered Archeological Collections. Implementing regulations for Section 106 of the NHPA and NAGPRA are 36 CFR Part 800 and 43 CFR Part 10, respectively. All cultural resources laws and regulations should be addressed under the requirements of the National Environmental Policy Act (NEPA) of 1969 (as amended), as applicable. USACE summarizes the guidance provided in these laws in ER and EP 1130-2-540.

Cultural History Sequence

The cultural chronology of Arkansas is generally separated into Precontact and Historical Periods with each further subdivided into chronological periods of time as denoted by the archaeological and historical records. This cultural history sequence was derived primarily from two archaeological reports recently submitted to USACE: Cultural Resources Assessment Survey of 384 Acres at Blue Mountain Lake in Yell County, Arkansas by AmaTerra Environmental, LLC and Cultural Resource Assessment Survey Blue Mountain Lake: FY 18.3-BM-1 (Area 1), FY 18.3-BM-2 (Area 2), FY18.3-BM-3 (Area 3), and Fy18.3-BM-4 (Area 4) Logan County, Arkansas (Thomas, 2022b) (Horvath, 2019b).

Precontact Period Chronology

Paleoindian Period (13,500 – 10,500 BP)

Information used to reconstruct the Paleoindian Period in Arkansas has relied heavily on diagnostic Paleoindian projectile point surface finds, as well as archaeological data collected in other states (Sabo and Early, 1990; Morrow, 2011). Diagnostic fluted Paleoindian projectile points include the Clovis, Folsom, Sedgwick, and Gailey types (Morrow, 2011). Coldwater, Quad, and Pelican projectile points represent a transition from the Paleoindian Period to the Dalton Period. Stratified Paleoindian deposits have not been identified within the Ouachita Mountains and Arkansas Valley regions. Surface finds of fluted points and buried remains of megafauna indicate the presence and preservation of buried sites that date to this period is possible (Gilliam, 1996; Sabo and Early, 1990: 38-39). Potential Paleoindian residents in the Ouachita Mountains region may have traveled from the Crowley's Ridge area to the east, which appears to be a focal point of populations during the period (Morrow, 2011). Foraging opportunities would be changing as the previous boreal forests with a megafauna presence were transitioning to deciduous forests and the extinction of megafauna by 10,000 BP.

Dalton Period (10,500 – 9,500 BP)

The Dalton Period (10,500 – 9,500 BP) is a transitional phase between the Paleoindian and Archaic Periods (Sabo and Early, 1990). The most prominent temporal marker from this period are Dalton points, which are thin, concave-base, unnotched types found throughout Arkansas. Raw materials for the chipped stone tools of this period preference regional sources in the Ozark and Ouachita Mountains (Sabo and Early, 1990:44-46). Stratified Dalton Period deposits have not been found in the Ouachita Mountains and Arkansas Valley regions. However, the identification of surface recovered diagnostics indicate that alluvial valleys are areas with potential for the discovery of sites with buried context.

Archaic Period (9,500 – 2,700 BP)

The Archaic Period was a time of cultural development and population growth in central North America that corresponds to peak warmth after the end of the last Ice Age, followed by amelioration to modern climatic conditions (Trubitt, 2019). The Archaic Period is commonly broken up into the Early, Middle, and Late Archaic. Habitation during this time was concentrated along major river basins such as the Ouachita, Arkansas, Mississippi, and Red River valleys. The Early Archaic (9,500 – 7,000 BP) is marked by an increase in marine, small game, and wild plant subsistence resources, as well as the development and diversification of tools such as grooved axes and grinding stones. During the Middle Archaic from 7000 – 5000 BP, larger village sites in major river valleys were occupied on a year-round basis as climatic drying was taking place across most of central North America. Evidence of fabrics, basketry, and cordage first appear in the archaeological record during this time. During the Late Archaic (5,000 – 2,700 BP), climatic drying ended and the earliest pottery in the Midwest begins to appear at archaeological sites in the region. Additionally, early evidence of horticulture and Late Archaic burial mounds begin to occur in some areas of Arkansas. Although this phase is not well documented in the Arkansas Valley or upland in the Ouachita Mountains, researchers have suggested these are hunting-focused sites with intensive use of river environments.

Woodland Period (2,700 – 1,000 BP)

The Woodland Period is a cultural phase characterized by permanent settlements with social and economic hierarchies that intensified pottery manufacturing, mound building, and agriculture

(Mainfort, 2020). Like the Archaic Period, the Woodland Period is divided into three subperiods: The Early, Middle, and Late Woodland.

The Early Woodland Period (2,700 – 2,100 BP) within the Ouachita Mountains region is generally recognized as a continuation of the Wister phase (Sabo and Early, 1990:77). The Fourche Maline phase people intensively reoccupied some of the same site locations on first level terraces adjacent to fresh water. Evidence of subsistence does not indicate large changes from the previous Archaic Period, but chipped stone hoes are found suggesting some digging activities.

People during the Middle Woodland Period (2,100 – 1,500 BP) experienced social changes most evident in the archaeological record through earthwork construction and variation in pottery production. Arkansas peoples lived in small communities and built small mounds in some areas (Mainfort, 2020). Some sites have been recorded along tributary streams that extend upwards into the Ouachita Mountains (Sabo and Early, 1990:76-79). Local materials and material evidence of burial ceremonialism increases in occurrence from the Early Woodland Period.

The Late Woodland Period (1,550 – 1,000 BP) is generally defined by larger settlements and the introduction of the bow and arrow (Mainfort, 2020). Maygrass, lambs quarters, knotweed, sunflowers, and marsh elder were commonly cultivated during this time. In the latter half of the Late Woodland Period, maize production intensified in some areas of Arkansas. Plant remains indicate that cultivated foods became a marked portion of the diet. While exotic goods indicative of long-distance exchange remained infrequent, exchange between areas of the Ouachita Mountains and areas of the Arkansas Valley seem common as pottery styles and shared raw materials seem common on sites in both regions.

Mississippian Period (1,000 – 400 BP)

Complex social, political, and economic structures coupled with a shared religious belief system developed during the Mississippian Period (Payne, 2018). Mississippian Chiefdoms had a ruling class that gained power through hereditary succession (Payne, 2018). With structured social hierarchies, came increased food production and wide-spread trade networks. Maize, squash, and beans were the primary crops produced throughout Mississippian settlements, although utilization of non-cultivated foods remained an important element of people's foodways.

Home and town structures of the Mississippian Period were typically rectangular in shape and organized around a fortified central plaza with a pyramid-shaped mound (Payne, 2018). The population in Mississippian settlements greatly increased following the development of agriculture but left people vulnerable to crop blights and drought. Increased populations also hastened the spread of disease through local communities.

The de Soto Spanish expedition of 1541 into the interior of North America wrote detailed accounts of Mississippian towns and cultures they encountered. When Jacques Marquette and Louis Joliet traveled south along the Mississippi River for France in 1673, large towns along the river had deflated, and native peoples had depopulated city centers. Widespread disease, warfare, and crop-crippling drought are thought to be the causes of this evacuation of population

centers within less than 100 years of colonial contact (Hoffman, 1992; Key 2020; Mitchem 2017; Payne 2018).

Historic Period Chronology

Contact Period (520-250 BP)

The Contact Period (520–250 BP/1430-1700) contact between Native American cultures and Europeans (Jeter et al., 1989:221). With the presence of European records this overview will now shift to using the European Common Era dating system. In 1541, Hernando de Soto's Spanish expedition was the first group of Europeans to enter the Arkansas Valley region and possibly the southern Ouachita Mountains (Mitchem, 2017b).

Much of the Arkansas Valley and the Ouachita Mountains regions into the 1700s was the home of the Caddo. Caddo communities utilized constructed mounds as centers for community ceremonies and burials. Communities expanded well beyond these centers as family farms with multiple, circular thatched homes, fields, and other structures for farm use were clustered across the landscape (Mitchem, 2017). Early French travelers in 1687 and Joliet of the Marquette-Joliet French expedition in 1673 forged initial contacts with the Caddo for the French in the South-Central Plains region of Arkansas. The French encouraged trade with the Caddo. This trade and political contact grew in importance into the 1700s as the Caddo faced demographic shifts and hostility from the Osage in the north.

Eighteenth Century to Present (1700 – Present)

As the eighteenth century progressed, northern Caddo people increasingly relocated settlements closer to the Red River and to trading centers established by the French. Hostility between the Caddo and the Osage intensified in the 1730s and 1740s (Bailey, 2001). However, traditionally occupied lands were still recognized as part of their home and used for foraging (Mitchem, 2017a). The Osage also used areas of the Arkansas Valley region during the eighteenth century. Villages were recognized as permanent residences by the Osage with seasonal subsistence and community activities undertaken in areas away from the village (Chapman, 1974). Housing consisted of rectangular longhouses while circular structures were erected for temporary use away from the village. The Ouachita Mountains and Arkansas Valley regions of the late eighteenth century were also used for hunting and lightly occupied by various settlements of the Quapaw (Sabo, 1990b:122-134; Young and Hoffman, 2001).

The eighteenth and nineteenth century was a significant period of transition as Native, European, and African Americans moved into areas west of the Mississippi River. To establish trade with local Native American groups and colonize their territory, the French continued to establish trading posts along other major river ways in the states (Key, 2020). By the late 1700s, French, Spanish, and British colonial forces laid claims to various parts of the country. In 1776, the United States claimed independence from Britain, and in 1783, through the Treaty of Paris, most of the land east of the Mississippi was owned by the United States. The earliest European Americans to settle west of the Mississippi River were often engaged in the fur trade in the late eighteenth and early nineteenth century. As more people moved into Arkansas, settlements were established within the Ouachita Mountains in the early nineteenth century. Settlers in this region chose locations within the mountain uplands, often

foraging and herding livestock, or within the narrow river bottoms on small farms (Sabo, 1990a:136-156).

In 1803, all of Arkansas, Missouri, and Oklahoma was purchased by the United States as part of the Louisiana Purchase (Bolton, 2018; Key, 2020). Many areas of Arkansas were sparsely populated by Native peoples, already impacted by conflict and introduced disease, and traders were typically the only non-Native residents.

Removal Era History

Tens of thousands of Native Americans were forced to move west into Indian Territory after Andrew Jackson's administration passed the Federal Indian Removal Act in 1830 (Remini, 2001).

Arkansas, home to the Quapaw, Caddo, Osage, and Kickapoo tribes in the early nineteenth century, was the westward relocation destination of many tribes (Oklahoma Historical Society, 2021). Cherokee, Quapaw, Choctaw, Shawnee, Delaware, and Kickapoo were among the groups either relocated into or within Arkansas in the early nineteenth century (Sabo et al., 1990:121-134). As actions of the Federal Indian Removal Act gained momentum, pressure in the form of other acts, treaties, and aggression from new settlers would push Native American residents of Arkansas and other states into Indian Territory in Oklahoma.

Growth in the population and markets of Arkansas coincided with efforts to remove Native Americans from the states. Arkansas was separated from the Missouri Territory in 1819 and became a state in 1836. Growth of Arkansas after the 1830s was spurred by settlers producing cotton with the labor of enslaved Africans, which allied the state socially, culturally, and politically with the southern U.S. (Bolton, 2018). Larger farms devoted to cash crops typically occurred in the areas of the Arkansas River valley closest to the Mississippi River, near the Red River, or along the Mississippi River itself (Bolton, 1999). Enslaved people were only approximately 11% of the population of the Ouachita Mountains region (Bolton, 1999:5), but slavery became an increasingly powerful political discourse within Arkansas state politics into the mid-nineteenth century (Bolton, 1999; Missouri State Museum, 2020).

The United States Civil War

In 1861, Arkansas voted to secede from the Union and join the Confederacy (DeBlack, 2018). The Civil War negatively impacted the state, and territory shifted constantly between Union and Confederate control. Although no major battles took place near the project location, local skirmishes and guerrilla attacks were common in many areas. In the Ouachita Mountains region in 1863, the Battle of Devil's Backbone occurred on September 1, 1863, when federal forces secured Fort Smith, Arkansas, for the remainder of the war (Arey, 2018). Today, the battlefield is listed in the NRHP. Ongoing local conflicts, paired with financial hardships from the war, devastated the local economies. The Arkansas River was a focal point of conflict throughout the war as well. As a key transportation and supply route, the river was valuable to both the Union and Confederate armies and the strategic city of Dardanelle was severely damaged and held by Union forces for much of the war (Gleason, 2017).

Late Nineteenth and Twentieth Century History

During post-reconstruction, new social and economic trends were witnessed across the nation (Moneyhon, 2018). Termed the “Gilded Age” due to large wealth disparities during a period of economic growth, this period saw the expansion of railroads within the U.S. interior, allowing goods to be traded on a national market. Manufacturing facilities and resource extraction enterprises flourished, and urban populations grew. Railroad construction in previously isolated areas of Arkansas, such as the Ouachita Mountains, led to a "transition from household economies and neighborhood businesses to industrial activities on a larger scale" (Gannon, 1998:9). By 1899, the lumber industry was responsible for two-thirds of the value of the Arkansas manufactured goods total (Strausberg and Hough, 1997:7). Logging would peak within a decade, but the effects would leave long-lasting impacts.

Economic growth favored urban centers, and a cultural divide developed between farmers and city dwellers. These divides became more fractured between black and white citizens in the 1890s when formal segregation laws were passed. Social issues in the twentieth century mirrored those of the past. Race riots and the reemergence of the KKK, a failing and underfunded education system, crop blights, and the 1918 Influenza Pandemic tore the economic and social fabric of Arkansas apart. Arkansas, however, continued to grow and expand its economic and environmental interests until devastated by the effects of the economic collapse of 1929 and the Great Depression of the 1930s. A decline in farm prices and years of drought devastated that farm economy and many moved out of Arkansas in search of employment elsewhere. The state then came to rely heavily on the federal government’s “New Deal” programs to recover (Whayne, 2020).

Under the New Deal, a program initiated in the administration of President Franklin D. Roosevelt, the government invested in the welfare and recovery of the American people. Agencies such as the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA) were created to provide jobs for young, unemployed males. Relief programs such as these engaged in many conservation activities such as tree planting, development of recreation areas, firefighting, and other measures protecting natural resources. The work projects undertaken by the CCC were directed by the USDA on National Forest lands and by the Department of the Interior on National Park Service lands. The impact of New Deal work programs, including the WPA and most particularly the CCC, whose broad objectives were to alleviate a national economic and natural resource crisis, are represented in the distinct architectural legacy of the physical resources constructed by these programs in Arkansas forests and parks (AHPP, 1990; Smith, 1997).

During WWII, able-bodied men and women flooded to manufacturing centers throughout Arkansas to aid in the war effort and the U.S. government invested in training facilities and bases within the state (Johnson, 2017). Separate barracks were constructed at all military facilities to keep white and black service men and civilians segregated. Arkansas also hosted German and Italian prisoner-of-war (POW) camps. Although none are in or within one mile of the project location, Camp Chaffee located approximately 22 km northwest of the project location housed 3,000 German POWs between 1942 and 1946 (Radcliff, 2017). German and Italian POWs were utilized to harvest cotton.

The Flood of 1927

The Flood of 1927 was one of the largest disasters in American history. The deluge and the following relief efforts spurred major social, political, and economic changes on state and national levels. The following account is summarized from the Encyclopedia of Arkansas (Hendricks, 2017).

By 1927, numerous levees had been built along the rivers of Arkansas to control flooding. Low-lying forested lands behind the levees were drained and timbered. In the Roaring Twenties, farmers and planters with access to easy credit bought many low-lying lands and converted them to croplands. The spring thaw of 1927 arrived early in the northern headwaters of the Mississippi River watershed. Spring rains in the Midwest combined with the meltwaters to fill the Mississippi and its tributaries. In April, heavy rains fell in the South, but the saturated ground and full rivers left nowhere for the water to go.

In Arkansas, the Arkansas, St. Francis, and White Rivers began to back up due to high water in the Mississippi River. The White River even reversed and began to flow upstream due to the water pressure from the Mississippi River. Every levee on the Arkansas River between Oklahoma and Little Rock failed. Floodwaters up to 30 ft deep inundated towns, homes, and farmlands. The disaster was most widespread in Arkansas. In the state, the amount of farmland underwater was more than twice that of Mississippi and Louisiana combined. In some places, lands remained flooded for nearly half the year.

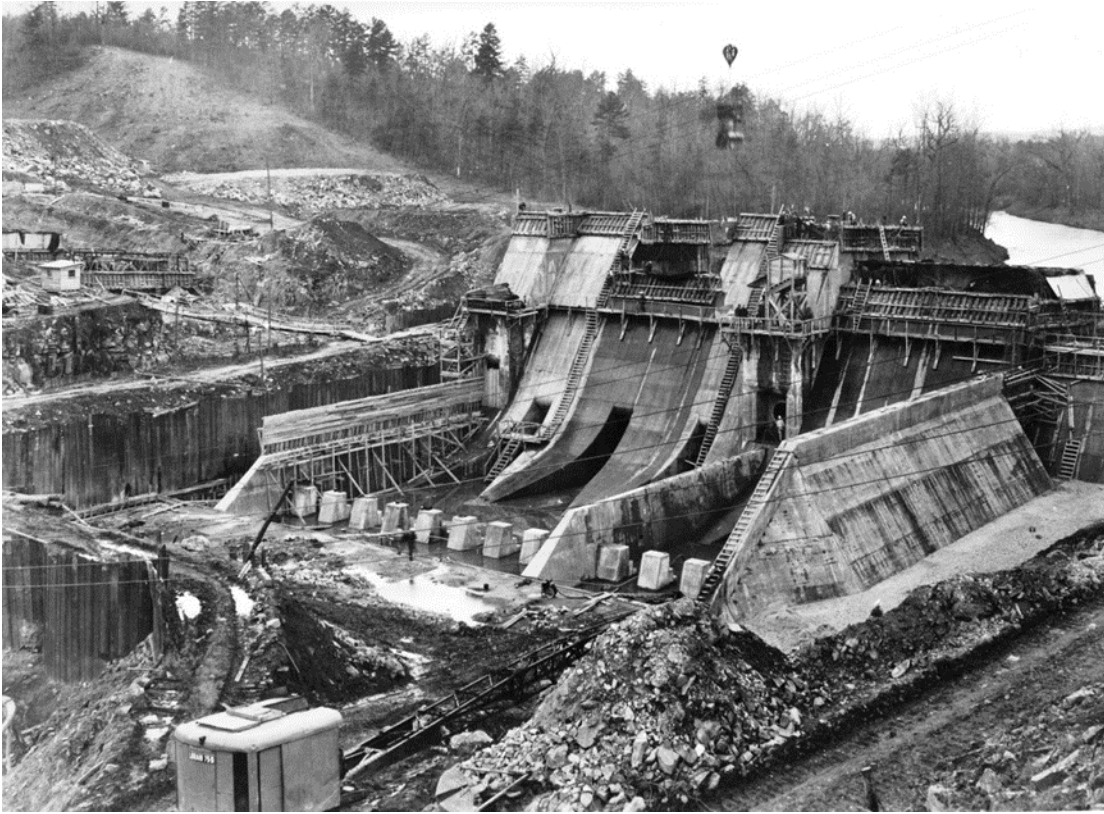
Recently developed technology aided relief efforts. Radios broadcast warnings and bulletins, airplanes helped find survivors, and motorboats carried people to dry land. Trains carried people to aid stations set up by the Red Cross and other organizations. Half of the 154 refugee camps established by the Red Cross were in Arkansas. The camps remained in operation into September of 1927. In Arkansas alone, over 100 people were killed by the flood and 350,000 people affected. The standing water remained for months, clogged with rotting animal carcasses and a breeding ground for mosquitoes. There were outbreaks of malaria, typhoid fever, dysentery, and even smallpox.

The Flood of 1927 had a number of long-term effects. Politically, the large-scale relief efforts and the anger at the lack of federal aid contributed to changing perceptions regarding the role of government in society. The Great Depression and the Dust Bowl drought of the 1930s exacerbated these trends supporting a growing belief among many Americans that the government should play a more active role in securing the welfare of the citizens.

The Construction of Nimrod Dam and Lake

As part of the federal response to the devastating flood in 1927 and additional floods in the 1930s, the Flood Control Act of 1938 was passed. The construction of Nimrod Dam, the oldest project of the USACE in the state of Arkansas, was authorized by the Flood Control Act. Damming the Fourche La Pave was considered an economical means of protecting communities and valuable crop land in Yell and Perry counties, as well as lessening spring flooding of the Arkansas River, into which the Fourche La Pave drained. Engineers began testing the proposed site for Nimrod Dam in October 1938, and the Department of War announced in January of the following year that the Nimrod site would be one of the seven Arkansas River Basin sites chosen for the construction of a dam (Lancaster, 2013).

Figure 2-8. Nimrod Dam Under Construction January 1941



Core drilling work was completed in August 1939, and by October 1941, the dam was largely complete. Heavy rains the following month filled the reservoir, providing an unexpected test of the dam's stability. By February 1942, the final clearing of trees from the dam's reservoir area was being carried out, with the whole project reaching completion in March 1942. The estimated cost of the entire project came to just under \$3.8 million (Lancaster, 2013).

Previous Archaeological Investigations within the Nimrod Lake Fee Boundary

There are more than 270 known archaeological sites located wholly or in part on USACE fee lands associated with Nimrod Lake.

While the majority of archeological sites at Nimrod Lake have been identified individually and separate from a survey, multiple formal systematic archaeological surveys have been completed at Nimrod Lake beginning the 1980s in response to ongoing activities such as lake construction, inadvertent discoveries, and NHPA Section 106 compliance. This section includes an overview of work conducted in the area. The first archaeological survey known to take place within USACE fee lands of Nimrod Lake was conducted by the AAS (Leatherman, 1978). The AAS conducted another survey in anticipation of the construction of a sewer line. One new site and

components of an existing site were identified (Martin, 1981). Burney McClurkan with the AHTD conducted a small survey in 1983 in an area designated for the construction of a new bridge that had been previously destroyed by flooding. No sites were identified in this survey (McClurkan, 1983).

Archaeological Assessments conducted a reconnaissance survey in the Sunlight Bay Recreational Area in 1986 to assess impacts of alternative roadway construction and two previously unrecorded sites were documented (Lee and Gettys, 1986). Panamerican Consultants, Inc. conducted a survey of a National Guard training area within fee boundaries at Nimrod Lake in 2005 that identified no new cultural resources (Cole, 2005). A 2010 survey by Brockington and Associates, Inc identified 10 previously unrecorded sites, none of which were recommended for further investigation (Agha and Whitley, 2011). In 2012, a pedestrian survey ahead of a prescribed burn by the USDA, identified one previously unrecorded site (Angelo, 2012). A 2017 survey conducted by Panamerican Consultants, Inc. resulted in no new sites identified (Buchner and Saatkamp, 2017).

Coastal Environments, Inc. conducted a survey in 2016 that identified six new archeological sites (Weinstein and Phillips et. al., 2019). Archaeological Consultants, Inc. and Coastal Environments, Inc. conducted a series of joint surveys between 2018 and 2020. The 2018 survey identified four new sites, the April 2019 survey identified ten new sites, the November 2019 survey identified nine new sites, the December 2019 survey identified nine sites, and the March 2020 survey identified a single site (Horvath, 2018) (Horvath, 2019a) (Horvath, 2019c) (Horvath, 2019d) (Horvath, 2020). A 2021 survey conducted by AmaTerra Environmental, Inc. identified no new sites (Thomas et. al., 2022a). AmaTerra also conducted a 2022 survey in which ten new sites were identified (Thomas et. al., 2022c).

Long-Term Objectives for Cultural Resources

As funding allows, the Little Rock District will plan and budget for a Historic Preservation Management Plan (HPMP) that shall be developed and incorporated into the Operational Management Plan (OMP) in accordance with EP 1130-2-540. The purpose of the HPMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Nimrod Lake and it will be accomplished if future funding is forthcoming. Completion of a full inventory of cultural resources at Nimrod Lake is a long-term objective that is needed for compliance with Section 110 of the National Historic Preservation Act (NHPA). All currently known sites with unknown eligibility and newly recorded sites must be evaluated to determine their eligibility for the NRHP. Identification and evaluation of sites is an ongoing process at Nimrod Lake. As more significant sites are identified, they could be protected through further land classifications.

In accordance with Section 106 of the NHPA, any proposed activities or projects at Nimrod Lake will require review by District Archaeologists to assess their potential to impact historic properties. These activities may include those described in this master plan or those that may be proposed in the future by others for leases, licenses, right-of-way easements, recreational development, construction, wildlife management, or other activities that can be considered undertakings subject to Section 106 of the NHPA. The need for cultural resource surveys to locate and evaluate historic and prehistoric resources, consultation, or other compliance activities

related to Section 106 of the NHPA shall be determined and coordinated by a qualified District Archaeologist. Resources determined eligible for the NRHP must be protected from proposed project impacts, or the impacts must be mitigated in consultation with appropriate parties.

The Archaeological Resources Protection Act (ARPA) secures the protection of archaeological resources and sites on lands owned and administered by the United States for the benefit of the American people. According to ARPA, it is illegal to excavate, remove, damage, or deface archaeological resources on public lands without a permit issued by the federal agency managing the land. It is also illegal to sell or transport archaeological resources removed from public lands. Little Rock District requires permits for archaeological investigations at Nimrod Lake in accordance with ARPA and is increasing surveillance and coordination with law enforcement agencies in the state to enforce ARPA civil and criminal penalties.

According to the Native American Graves Protection and Repatriation Act (NAGPRA), it is the responsibility of a federal agency to inventory human remains and associated funerary objects, as well as summarize any potential sacred objects, that existed within their archaeological collections prior to the passage of the law and, to the extent possible, identify their cultural affiliation in order to repatriate such objects to affiliated Tribes requesting their return. In addition, there are responsibilities related to the inadvertent discovery of human remains or funerary objects that occurred on federal land after the passage of the law that require a separate process of consultation, affiliation determinations, and notifications prior to repatriation. Although NAGPRA compliance has been an ongoing focus of the Little Rock District and many consultations and repatriations have occurred over the past 25-30 years, there is still more work to be done.

In recognition of the significance of the responsibility the Little Rock District has to ensure the proper and respectful treatment of the individuals who have been - or may inadvertently be - disinterred from Little Rock District land, and acknowledging the fact that this work requires more than a part-time effort to be accomplished, a new full-time position has been established to focus on the proper execution of this responsibility. The intensive process to verify existing documentation and complete any missing part of the process for all collections of human remains, funerary objects, or sacred objects subject to NAGPRA in Little Rock District archaeological collections is in progress. As a necessity, this renewed effort is starting with research and reorganization of associated records and archaeological collections to ensure the proper identification and initial inventory of all NAGPRA materials that are under the control of Little Rock District. This effort will include NAGPRA collections that have been made – or may yet be discovered - at Nimrod Lake, therefore, compliance with NAGPRA is ongoing.

2.12 Interpretation

Interpretive programs at Nimrod Lake are focused on four main areas of emphasis: water and boating safety, natural resource and wildlife management, recreation, and project authorized activities. Project personnel offer programs at various times throughout the year at local schools, community events, and USACE managed events; while most of these events are strongly geared toward children under 16 years of age, it is vital that everyone is informed on how to be safe on the water. Each year, over 3500 contacts are made through these events and programs. To

support the water safety program, life jacket loaner stations exist at most boat ramps so that visitors may “borrow” a life jacket for the day.

2.13 Zone of Influence

Nimrod Lake is located on the Fourche La Fave River approximately five miles southeast of Plainview, Arkansas in the Arkansas River Basin. The zone of influence (ZOI) for the socio-economic analysis of Nimrod Lake encompasses 12 counties in Arkansas.

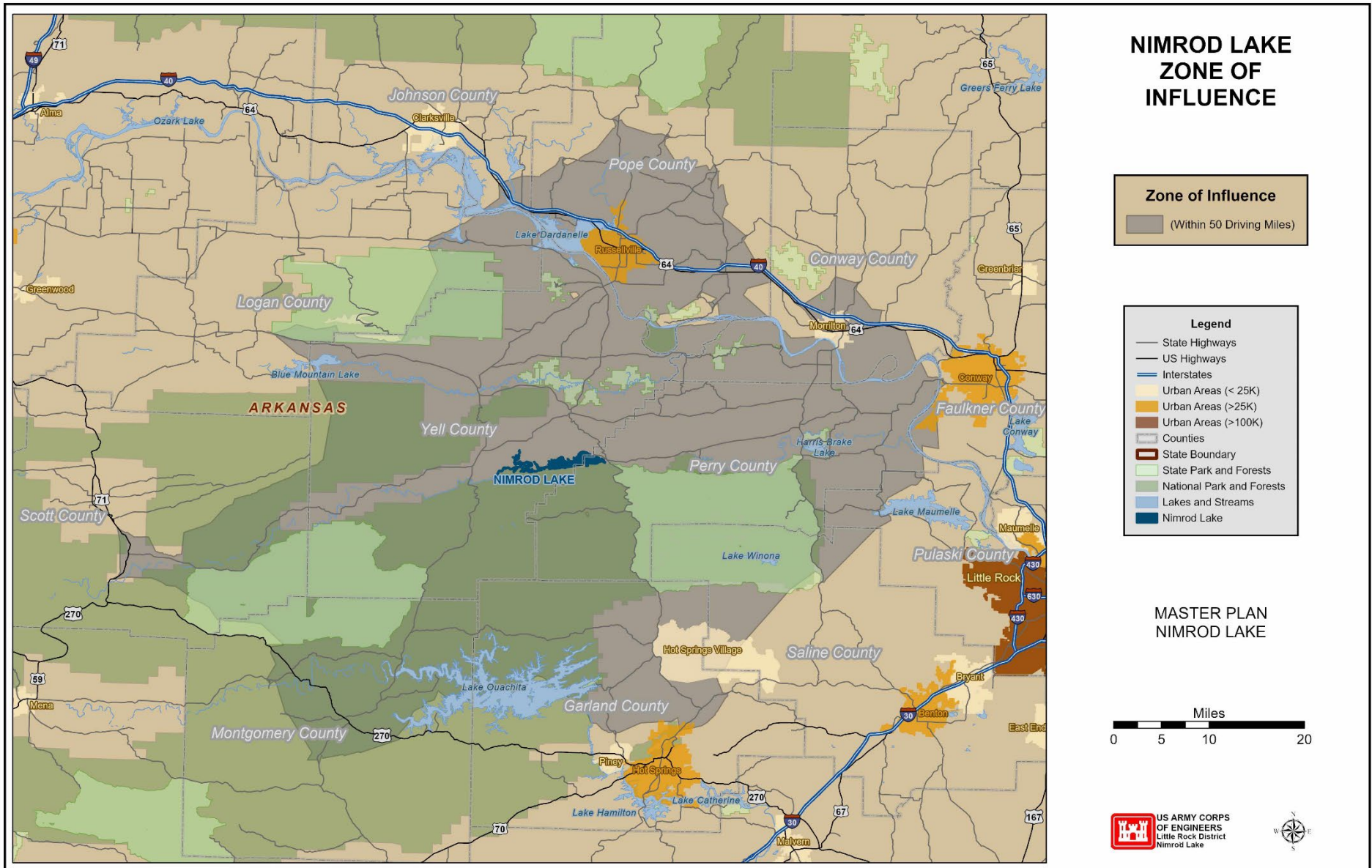
Table 2-8. Zone of Influence Counties

Zone of Influence Counties	
Conway County	Perry County
Faulkner County	Pope County
Garland County	Pulaski County
Johnson County	Saline County
Logan County	Scott County
Montgomery County	Yell County

The ZOI for the purposes of this Master Plan is defined as those areas within a 50-mile driving distance from the lake. This ZOI was based primarily on historic visitation information. The demographic and socioeconomic description in this section of the report is summarized at the county level. To determine which counties were included in the summary tables and figures, all counties that intersected or fell within the 50-mile driving radius were identified. The counties where at least half of the county (by area) was within the ZOI boundary are included in the Table 2-8 and Figure 2-9.

Demographic and socioeconomic data for the surrounding states and the nation are provided for comparison purposes.

Figure 2-9. Zone of Influence on Nimrod Lake



2.14 Demographics and Socioeconomics

2.14.1 Population

The total population for the zone of influence in 2020 was 925,797, as shown in Table 2-9. Approximately 43% of the zone of influence's population resides in Pulaski County, AR, 13% in Faulkner County, AR, and 13% in Saline County, AR. All counties are expected to see growth except Logan County and Montgomery County, AR. From 2020 to 2050, the population in the zone of influence is expected to increase from 925,797 to approximately 1,231,551. The distribution of the population among gender, as shown in Table 2-10 is approximately 49% male and 51% female in the zone of influence. Population age 65 and older represented averaged 17.5 % of the total population within the ZOI or a total of 161,717 persons.

Table 2-9. Population of the ZOI for Nimrod

Geographical Area	2010	2020	2021 Population Estimate	2050 Population Projection	65 years of Age and Older
Arkansas	2,915,918	3,011,524	3,006,309	3,832,115	536,051
Conway County	21,273	20,715	20,687	23,482	4,164
Faulkner County	113,237	123,498	123,191	169,228	17,784
Garland County	96,024	100,180	99,694	108,554	25,145
Johnson County	25,540	25,749	25,853	27,228	4,583
Logan County	22,353	21,131	21,299	19,871	4,332
Montgomery County	9,487	8,484	8,525	6,795	2,325
Perry County	10,445	10,019	10,056	10,353	2,114
Polk County	61,754	63,381	63,234	83,366	4,517
Pulaski County	382,748	399,125	397,931	499,818	67,851
Saline County	107,118	123,416	122,308	250,446	23,079
Scott County	11,233	9,836	9,928	10,949	2,115
Yell County	22,185	20,263	20,489	21,461	3,708
Zone of Influence Total	883,397	925,797	923,195	1,231,551	161,717

Source: U.S. Census Bureau, 2010 and 2020 Decennial Census. U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021). 2050 Population Projections from Arkansas Economic Development Institute.

Table 2-10. 2021 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Arkansas	1,483,520	1,522,789
Conway County	10,264	10,423
Faulkner County	60,286	62,905
Garland County	48,107	51,587
Johnson County	12,872	12,981
Logan County	10,492	10,807
Montgomery County	4,305	4,220
Perry County	5,110	4,946
Pope County	31,348	31,886
Pulaski County	190,929	207,302
Saline County	60,066	62,242
Scott County	5,302	4,626
Yell County	10,426	10,063
Zone of Influence Total	449,507	473,988

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Population by Race and Hispanic Origin is displayed in Table 2-11. The zone of influence is approximately 67% white, 6.4% Hispanic or Latino, 19.8% Black, 0.3% American Indian and Alaska native, 2.9% Asian, <0.0% native Hawaiian-Pacific Islander, 0.2% some other race and 2.9% two or more races.

Table 2-11. Population Estimate by Race/Hispanic Origin

Area	White	Hispanic or Latino	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race	Two or more races
Arkansas	2,123,715	236,001	455,748	13,665	45,575	10,408	6,267	114,930
Conway County	16,774	871	2,119	85	125	-	-	713
Faulkner County	97,514	5,281	14,370	368	15,377	-	563	3,558
Garland County	80,861	5,982	8,213	702	692	80	32	3,132
Johnson County	20,179	3,668	412	29	83	40	82	760
Logan County	18,851	652	306	92	35	-	10	1,023
Montgomer y County	7,716	383	43	94	83	-	-	206
Perry County	9,181	310	256	7	6	-	-	296
Pope County	52,601	6,026	1,493	139	764	8	56	2,147
Pulaski County	202,990	25,021	147,819	834	8,691	118	994	11,464
Saline County	101,130	6,383	9,817	171	1,376	107	199	3,125
Scott County	8,319	794	291	34	76	-	-	414
Yell County	15,210	4,274	342	59	228	-	-	376
Zone of Influence	631,326	59,645	185,481	2,614	27,536	353	1,936	27,214

Source: US Census Bureau, 2021 American Community Survey 5 Year (2017-2021)

2.14.2 Education and Employment

Table 2-12 displays the highest level of education attained by the population ages 25 and over. In the zone of influence, 3.5% of the population has less than a 9th grade education, and another 6.4% has between a 9th and 12th grade education; 30.1% has a high school diploma or equivalent, and another 22.3% has some college and no degree; 8.0% has an associate degree; 18.6% has a bachelor's degree, and 11.1% has a graduate or professional degree.

Table 2-12. Highest Level of Educational Attainment, Population 25 Years of Age and Older

Area	Population 25 years and over	Less than 9th grade	9th to 12th grade, no diploma	High school graduate (includes equivalency)	Some college, no degree	Associate degree	Bachelor's degree	Graduate or professional degree
Arkansas	2,021,290	93,191	155,530	688,732	437,893	154,675	313,527	177,742
Conway County	14,381	640	1,066	5,896	2,790	1,303	2,009	677
Faulkner County	76,466	1,863	3,405	23,020	17,072	5,951	15,682	9,473
Garland County	72,278	1,885	5,070	23,014	18,195	6,936	11,173	6,005
Johnson County	16,953	1,552	1,825	6,929	3,143	788	1,751	965
Logan County	15,100	579	1,274	6,704	3,432	1,203	1,260	648
Montgomery County	6,421	318	712	2,111	1,729	566	701	284
Perry County	7,090	245	372	3,076	1,727	429	893	348
Pope County	40,886	2,344	4,098	13,836	8,388	2,718	6,480	3,022
Pulaski County	270,836	8,215	14,868	69,538	58,689	21,094	58,292	40,140
Saline County	84,850	2,294	4,658	26,015	20,179	8,019	16,275	7,410
Scott County	6,921	536	851	2,827	1,436	514	562	195
Yell County	13,905	1,249	1,886	5,240	2,739	838	1,372	581
Zone of Influence	626,087	21,720	40,085	188,206	139,519	50,359	116,450	69,748

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Employment by sector is presented in Table 2-13, showing that the largest percentage of the ZOI is employed in the educational services, and health care and social assistance sector at 26.1%, followed by retail trade at 11.8%, and manufacturing at 9.5%.

Table 2-13. Annual Average Employment by Sector

Employment Sector	Arkansas	Conway County, AR	Faulkner County, AR	Garland County, AR	Johnson County, AR	Logan County, AR	Montgomery County, AR	Perry County, AR	Pope County, AR	Pulaski County, AR	Saline County, AR	Scott County, AR	Yell County, AR	ZOI
Civilian employed population 16 years and over	1,310,863	9,044	58,974	41,466	10,535	9,118	3,119	3,782	26,903	187,423	59,150	4,192	9,120	422,826
Agriculture, forestry, fishing and hunting, and mining	33,858	663	777	572	391	540	304	215	560	905	504	302	616	6,349
Construction	93,603	731	4,497	3,668	690	374	286	599	1,559	10,883	4,628	213	587	28,715
Manufacturing	173,633	1,614	4,462	2,882	2,675	2,079	325	474	4,672	12,844	4,806	1,167	1,976	39,976
Wholesale trade	31,953	204	1,338	955	57	48	71	48	646	4,972	2,120	127	95	10,681
Retail trade	170,365	822	7,374	5,832	1,538	1,190	445	544	3,245	20,676	6,911	301	935	49,813
Transportation warehousing, and utilities	78,705	506	2,824	1,054	616	519	199	190	2,137	10,507	3,719	205	619	23,095
Information	17,000	118	1,346	811	62	103	14	49	239	4,036	1,132	29	120	8,059
Finance and insurance, and real estate and rental and leasing	65,352	186	2,900	2,258	320	231	136	118	1,235	13,943	4,500	231	262	26,320
Professional, scientific, management, and administrative and waste management services	101,903	778	5,356	4,004	340	518	245	282	1,860	20,141	4,875	329	642	39,370
Educational services, health care and social assistance	319,672	2,132	17,462	9,403	2,107	2,230	665	730	6,370	51,054	15,899	805	1,703	110,560
Arts, entertainment, recreation, and accommodation and food services	103,712	498	5,729	5,291	724	503	164	246	2,560	15,774	3,649	169	884	36,191
Other services, except public administration	62,683	306	2,505	2,970	612	437	145	98	1,151	9,525	2,836	149	399	21,133
Public administration	58,424	486	2,404	1,766	403	346	120	189	669	12,163	3,571	165	282	22,564

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

2.14.3 Households, Income and Poverty

Table 2-14 displays the number of households and average household sizes in the state and ZOI. There were approximately 369,293 households in the ZOI with an average household size of 2.50.

Table 2-14. 2021 Households and Household Size

Geographic Area	Total Households	Average Household Size
Arkansas	1,158,460	2.53
Conway County	8,460	2.43
Faulkner County	46,445	2.55
Garland County	41,919	2.34
Johnson County	9,849	2.55
Logan County	8,271	2.51
Montgomery County	3,669	2.29
Perry County	3,732	2.66
Pope County	23,304	2.58
Pulaski County	164,697	2.38
Saline County	47,468	2.55
Scott County	3,938	2.51
Yell County	7,541	2.67
Zone of Influence	369,293	2.50

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

The median household income in the ZOI ranged from \$40,628 in Johnson County, AR to \$68,605 in Saline County, AR displayed in Table 2-15. Per capita income in the ZOI was \$26,978, lower than the state of Arkansas.

Table 2-15. 2021 Median and Per Capita Income

Geographic Area	Median Household Income	Per Capita Income
Arkansas	52,123	29,210
Conway County	45,812	27,435
Faulkner County	54,845	28,851
Garland County	49,985	29,214
Johnson County	40,628	22,509
Logan County	46,570	24,061
Montgomery County	41,032	24,184
Perry County	47,500	24,857
Pope County	47,322	26,212
Pulaski County	55,235	35,718
Saline County	68,605	33,861
Scott County	43,577	22,064
Yell County	51,070	24,771
Zone of Influence Median	49,348	26,978

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year (2017-2021)

Table 2-16 displays the percentage of persons and families whose incomes fell below the poverty level during the year 2021. Within the ZOI, Johnson, Conway, and Montgomery County, AR had the greatest share of people with incomes below the poverty level at 18.9%. In terms of families below the poverty level, Montgomery County, AR had the greatest share of people with incomes below the poverty level at 16.1%, followed by Johnson County, AR at 13.9%.

Table 2-16. Percent of Families and People Whose Income in the Prior 12 Month Period was Below the Poverty Level (2021)

Geographic Area	All Families	All People
Arkansas	11.6	16.0
Conway County	13.3	18.9
Faulkner County	9.8	14.8
Garland County	10.9	16.2
Johnson County	13.9	18.9
Logan County	10.5	15.7
Montgomery County	16.1	18.9
Perry County	13.1	15.3
Pope County	12.5	17.4
Pulaski County	11.7	15.8
Saline County	6.3	8.6
Scott County	11.2	15.2
Yell County	11.0	13.8
Zone of Influence Mean	11.7	15.8

Source: U.S. Census Bureau, 2021 American Community Survey 5-Year Estimates (2017-2021)

2.15 Recreation Facilities, Activities, and Needs

The Nimrod Lake Project serves as a staple recreational resource, not only for the local community, but also for the state of Arkansas. Many visitors, from both near and far, have fond memories of their childhood days camping on Nimrod Lake; some still carry on the tradition today by bringing their children or grandchildren. This continuation of tradition is what gives this lake value that cannot be expressed by monetary value. Nimrod Lake has been managed by USACE to preserve the natural beauty of the area, as well as utilize the land and natural resources to provide optimal recreational opportunities for visitors. Nimrod Lake offers numerous recreational opportunities such as camping, swimming, boating, canoeing, kayaking, picnicking, bird watching, fishing, and hunting. There are 14 recreation areas managed by USACE and one by the City of Plainview.

Figure 2-10. Visitors Fishing Nimrod Lake



Photo by USACE

The information and aspects of Nimrod Lake discussed in this section are standard in nature with intent to be used for planning, development, and management of Nimrod Lake; all while considering recent and relevant trends in recreation needs and activities as per the 2019-2023 Arkansas Statewide Comprehensive Outdoor Recreation Plan (SCORP). This information provides guidance for establishing quality and quantity of facilities capable of meeting the current and anticipated demand of visitors, as well as their expectations of such facilities; it also provides guidance for the operation, and maintenance of project facilities. ADA guidelines will be included in any the proposed design and improvements of current facilities.

2.15.1 Facility Information

The future development of parks and design/layout of facilities should consider the following criteria: high-quality engineering, public safety, environmental sustainability, and promotion of the health, welfare, and aesthetic satisfaction of the public. The location of each facility should result in a compromise between conserving the natural resource and meeting the demands for providing public use. New facilities should only be placed on the most adaptable terrain, with consideration to preserving the majority of the natural features, in order to maintain the scenic significance for other visitors. Facility design and placement should consider minimizing grading and clearing for site preparation to safeguard existing environmental features.

2.15.2 Recreation Areas

Multiple parks and campgrounds, lake access points, boat ramps, and primitive camping areas exist on Nimrod Lake Recreation area maps can be found in Appendix C. If adequate funding becomes available for park operation, recreation areas or portions of recreation areas will be brought up to current design standards and future develop may occur as identified in the park descriptions below. However, these proposed improvements are not indicated on the park plates. See the Nimrod Lake Recreation Overview map for location of recreation areas.

Table 2-17. Recreation Facilities at Nimrod Lake

Facility	Number of Sites
Recreation areas	15
Group Shelters	7
Camping sites	110
Playgrounds	9
Swimming areas	4
Boat ramps	17

The following areas are located within a High Density Recreation Land Classification and are USACE operated recreation areas:

River Road Park- Located just below Nimrod Dam, this park is approximately 32 acres with the Fourche La Fave River bordering the south side of it. This park has two entrances, one is off State Highway 7 and the second is off State Highway 60. This park also has good tree cover with a mixture of hardwood and pine. Recreational facilities available include 15 campsites with water and electrical hookups, six of which have a canopy over the picnic table, two of which are multi-family sites, and four of which have 50 amp electrical. There are two restrooms, one of which is a combination shower/restroom facility. A playground is located on the west end of the park and a dump station is located at the east entrance/exit of the park. There is a group picnic shelter and four picnic sites with a view of the dam on the west end of the park.

Anticipated renovations to this park, pending funding, include road improvements, making sites more accommodating for tents, and improving some sites for volunteers to stay at. Additional updates would be improvements made to the playground by the group shelter, more parking at the group shelter, bathroom and group shelter replacement, improved picnic sites at the Dam, adding Wi-Fi service, and placing an interpretive kiosk at the Dam. A beneficial change in addition to the

above improvements, would be to use this park as a day use area, except during peak season holidays (Memorial Day, July 4th, and Labor Day). During these times we would allow overflow camping, but for the remainder of the time it would be primarily day use.

Project Point Park- Located just above Nimrod Dam, this park is approximately 22 acres with a view of the lake. This park has two entrances, one off State Highway 60 and the second off State Highway 7. This park has good tree cover with a mix of pine and hardwoods. Recreational facilities available include six sites with electric hookups, four of which have a canopy over the picnic table, a centrally located water hydrant, and a portable toilet.

Anticipated renovations for this park, pending funding, would include road improvements and adding Wi-Fi service. A major change of benefit would be to use this park as a day use area, except during peak season holidays (Memorial Day, July 4th, and Labor Day). During these times we would allow overflow camping, but for the remainder of the time it would be primarily day use.

Quarry Cove Park- Located one mile West of Nimrod Dam, just off State Highway 60, this park contains approximately 52 acres. This park has good tree cover with maintained undergrowth around the perimeter of the park. Recreational facilities available include 31 campsites with water and electrical hookups, 20 of which have a canopy over the picnic table, two of which are multi-family sites, and six of which have 50-amp hookups, a combination shower/restroom facility, a dump station, a fish cleaning station, two boat launches, a swim beach with a covered table, a group shelter, and a playground.

Anticipated renovations to this park, pending funding, include road improvements, installation of a new gatehouse, improvements to the dump station, and installing a new restroom and improving the parking around it. Additional improvements would include extending campsites to accommodate larger campers, hardening campsites for ADA accessibility, adding Wi-Fi service, and removing the existing amphitheater and installing tent sites at that location. More upgrades would be replacing the existing playground and group shelter, adding a fishing pier at the West boat ramp, and installing a beach shower at the swim beach.

County Line Park - Located 1.5 Miles West of Nimrod Dam, and less than .5 Miles from Carden Point Park, this area is approximately 155 acres. This park is centrally located on Nimrod Lake with a great waterfront view. Recreational facilities available include 20 campsites with water and electrical hookups, some of which have a canopy over the picnic table, a combination shower/restroom facility, a dump station, three boat ramps, a swim beach, and a playground.

This park is currently closed with intentions to re-open in the future. If opened, pending funding, anticipated renovations would include installing a new gatehouse, a new restroom, a new playground, a new fish cleaning station, and the addition of Wi-Fi service. The campsites that flood should be re-purposed and made into picnic sites. Existing campsites should be renovated with canopies over the living areas and hardened sites for ADA accessibility. New water lines would need to be installed along with road improvements, improving the existing swim beach, installing a beach shower, and replacing buoys near the swim beach and boat ramps.

Carden Point Park – Located 1.5 miles West of Nimrod Dam, this area is approximately 28 acres and is a day use only park. Recreation facilities available include a group picnic shelter, four picnic sites with a pedestal grill and tables, a playground, a restroom, a swim beach, and boat ramp.

Anticipated renovations to this park, pending funding, include completion of road paving, hardening playground for ADA accessibility, upgrading picnic sites with canopies, and adding Wi-Fi service. We would also like to install a beach shower and a fishing pier.

Carter Cove Park- Located six miles West of Nimrod Dam, this park is approximately 180 acres with good tree cover. Recreation facilities available include 34 campsites with water and electric hookups, 24 of which have a canopy over the picnic table, three of which are multi-family sites, and seven of which have 50-amp hookups, four boat ramps, a swim beach, two combination shower/restroom facilities, a fish cleaning station, and a dump station.

Anticipated renovations to this park, pending funding, include a new gatehouse, a new dump station, upgrades to the fish cleaning station, replacing restrooms, improving the road, and adding Wi-Fi service. Extending campsites to accommodate larger campers, hardening sites for ADA accessibility, improving areas for tent sites, relocating day use area to Anderson Branch, relocating the group shelter, and installing horseshoe pits or cornhole boards are also potential improvements. The picnic shelters need to be upgraded, along with removal of the handicap fishing area and converting it to a fishing pier, installing a new fishing pier at Anderson Branch and removing the high-water ramp inside the park.

Sunlight Bay Park- Located 10 Miles West of Nimrod Dam, this park is approximately 84 acres with sparse tree cover. Recreation facilities available include 28 campsites with water and 50-amp electrical hookups, 18 of which have a canopy over the picnic table, four of which are multi-family sites, dump station, fish cleaning station, group picnic shelter, two boat ramps, a combination shower/restroom facility, and a playground.

Anticipated renovations to this park, pending funding, include a new restroom, a new playground, re-locating the group shelter, and adding Wi-Fi service. Upgrades to all sites should include extending campsites to accommodate larger campers, hardening sites for ADA accessibility, adding canopies over picnic tables, as well as adding tent sites to the campground. A fishing pier would be installed, as well as retaining walls along some sites due to the frequent flooding.

The following recreation area is within a High-Density land classification leased to the City of Plainview. Operational costs and capital improvements are the responsibility of the lessee.

Plainview City Park- This 84-acre recreation area is located within the city limits of Plainview. Recreation features include a playground, picnic sites, a group shelter, walking trail, baseball fields, basketball courts, and tennis courts.

Current and proposed improvement projects, pending funding, include the following: a Harold Blalock Memorial, pickle ball courts, updated basketball courts, playground equipment, park benches, bleachers/seating at the ball field, restoration of the old walking trail, and adding an amphitheater.

The following areas are located within a Low Density Recreation Land Classification and are USACE operated. Only minimal development and infrastructure that supports passive recreational use should occur in these areas:

Earl Branch- This 113-acre area is located between Carden Point Park and Carter Cove Park. Recreation features include primitive camping.

Ward's Crossing- This 2-acre area is located just West of Sunlight Bay Park. Recreation features include primitive camping and a boat ramp.

Rover Landing- This 24-acre area is located between Sunlight Bay Park and Highway 27, just South of Plainview, Arkansas. Recreation features include primitive camping and a boat ramp.

Twin Lakes – This 222-acre area is located off Wing Bottom Road, which is located off of Highway 28 between the towns of Rover, Arkansas and Briggsville, Arkansas. Recreation features include primitive camping.

Hogan Creek – This 1-acre area is located South of Ward's Crossing, on the Hogan Creek Tributary of the Fourche La Fave River. Recreation features include primitive camping.

Casa Camp- This area is located on the South side of the Fourche La Fave River, just south of Hogan Creek primitive area and is less than an acre in size. Recreation features include primitive camping.

There are two areas that are classified as Low Density that are improved water access points only. Those include the six acre **Porter Creek Access** and **Lloyd Millwood GTR**.

The only anticipated renovations for our Low-Density areas would be for access improvements. Providing road improvements and better access to our primitive camping and water access locations would allow more people to use these areas and would allow easier response to these areas in the event of an emergency.

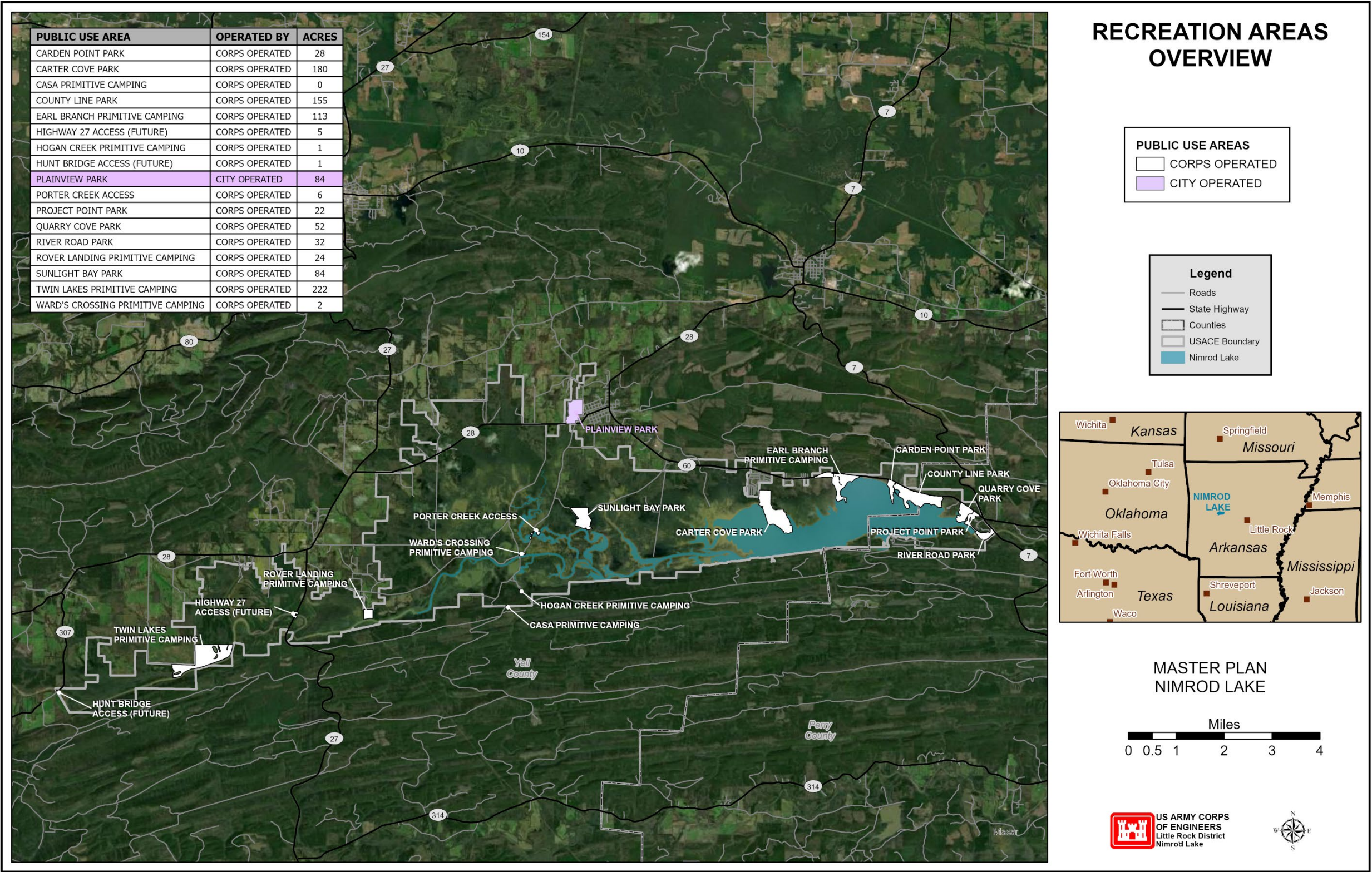
The following areas are located within a Low Density Recreation Land Classification and are potential future USACE operated access points. Only minimal development and infrastructure that supports passive recreational use should occur in these areas:

Potential future improved water access points are a one acre area located at **Hunt Bridge** and a five acre area at **Highway 27 Bridge** over the Fourche La Fave River.

Future plans, pending funding, would include adding parking areas and access for recreation activities.

Nimrod Bike Trail- There are plans to develop a bicycle/walking trail starting at the Dam on Nimrod Lake and eventually ending at Sunlight Bay Park (approximately 13 miles). The purpose of the trail is to connect recreation areas together to be enjoyed by cyclists and hikers. The trail will be developed in association with partners that will help design, build, and maintain the trail.

Figure 2-11. Nimrod Lake Recreation Area Overview



2.15.3 Future Park Development Areas

There are currently no project land areas classified for future park development and none have been added through this Master Plan revision. If future recreation development is needed, development will be accommodated within the existing High Density classified land areas or the reopening of previously closed camping loops, where road systems and park facilities have previously occurred.

Engineering and Design Recreational Facility and Customer Service Standards can be referenced in EM 1110-1-400.

2.15.4 Visitation Profiles

Table 2-18 shows visitation trends as tabulated by Corps personnel and recorded in the USACE's nationwide Civil Works Business Intelligence (CWBI) database. The methodology used to capture the information in the following table has varied over the period of record shown and should not be relied upon for precise enumeration.

Table 2-18. Project Visitation 2014-2023

Project Visitation 2014-2023	
2014	162,363
2015	161,857
2016	175,097
2017	161,825
2018	155,595
2019	136,338
2020	163,240
2021	188,633
2022	144,976
2023	134,201

2.15.5 Recreation Analysis

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) from 2019-2023 is an integral part of capturing the history and popular activities to enhance recreation opportunities in Arkansas. The SCORP ties together input from the users of recreation sites, planners and developers, government officials, agency managers and elected officials. This collaboration effort is in place to lay out a plan to guide recreation development in a useful, beneficial, and sustainable manner.

2.15.5.1 Arkansas SCORP Data (2019-2023)

Over the past 30 years the top 10 recreational activities that Arkansans prefer has not seen a substantial shift. Only two activities have occupied the top slot from year to year: walking or jogging for pleasure and exercise and driving for pleasure. Based on recent SCORP data, walking/jogging, or hiking holds the top slot, with sightseeing by car taking second place. An increased interest in healthy lifestyles, mixed with the desires to see new places helps these two activities remain at the top.

Table 2-19. Popular Outdoor Activities per SCORP

2019-2023	2009	1993
Walking or Jogging	Jogging or walking	Driving for pleasure
Sightseeing by car	Driving for pleasure	Walking for Pleasure
Picnicking, BBQ, cook-out	Swimming	Picnicking
Visit lakes, rivers, etc.	Nature Viewing and Outdoor Photography	Fishing
Relax	Boating	Swimming
Family Gathering	Picnicking	Visiting Historical Sites
Swim/Wade in freshwater	Visiting Historical and Ecological Sites	Wildlife Observation
Swim/Wade in outdoor pool	Camping	Short Hikes
Fishing	Bicycling	Pleasure Boating
Farmers Market	Playing Tennis	Bicycling
Outdoor concert/event		Camping/Developed Sites
Wildlife / bird/ nature viewing		Basketball
Camping		Jogging/Running
Off-road vehicle		Baseball/Softball
Zoo, garden, arboretum		Photography
Yard games		Hunting
Playground		Other Outdoor Games
Day Hiking		ORV Driving
Motor Boating		Canoeing/Floating
Target Shooting		Camping / Undeveloped Sites
Hunting		
Nature Interpretive Center		
Paddling		
Arts outside		
Cycling		
Running		

Just as with walking and driving, other interests involve water, such as swimming, fishing, and boating. Some leisure time gatherings such as picnics or camping, also involve water or access to water. Oftentimes, people incorporate trails into their outdoor activities, more so for cycling, hiking, walking, jogging for pleasure, or for just simply viewing nature. For this reason, trails are an important asset in terms of planning for outdoor recreation. Park access, trails, and other facilities are primarily accessed by automobiles and roadways. With increasing interest in driving for pleasure and general access to most recreational sites by car, public roadways are a high priority to the overall function of recreational sites and facilities.

A copy of the entire Arkansas SCORP for 2019-2023 can be found at the Outdoors grants website.

2.15.6 Recreation Carrying Capacity

Recreation Use Areas

Table 2-20. Nimrod Project Occupancy Percentage

Nimrod Lake Project Occupancy Percentage				
Park Name	# of Sites	Fiscal Year 2023		
		# of Available Nights	Occupancy	Percent
River Road Park	22	6,917	1,168	16.88%
Quarry Cove Park	32	8,358	2,499	29.89%
Carter Cove Park	34	10,069	2,858	28.38%
Sunlight Bay Park	30	7,264	1,571	21.62%
Total:	118	32,608	8,096	24.82%

Table 2-20 lists the Occupancy percentages for parks that are operated by USACE. The table represents the percent of occupancy for all 365 days of the year. Camping is largely a weekend recreational activity, which is reflected in these percentages. While the perception of occupancy percentage appears low, the national average for USACE facilities for 2023 was at 36%.

2.16 Real Estate

2.16.1 Acquisition Policy

Nimrod Lake was authorized by the Flood Control Act approved 28 June 1939, (Public Law No. 761, 75th Congress, 3d Session) which was later modified by the Flood Control Act approved 18 August 1941, (Public Law No. 228, 77th Congress, 1st Session) to include authorization of the project for flood control and generation of hydroelectric power. Section 4 of the Flood Control Act approved 22 December 1944, as amended by Section 4 of the Flood Control Act approved 24 July 1946, as amended by Section 209 of the Flood Control Act approved 3 September 1954 (Public Law No. 780, 83rd Congress), as amended by Section 207 of the Flood Control Act of 1962, as amended by Section 2 of the Land and Water Conservation Fund Act of 1965, and as further amended by Section 210 of the Rivers and Harbors Flood Control Act of 1968, authorized the Department of the Army to provide for recreational use of the lakes under its control.

2.16.2 Management and Disposal Policy

The Real Estate Management and Disposal program for Nimrod Lake is administered by the Little Rock District Real Estate Division in accordance with all applicable laws, regulations, and policies. All requests for real estate related actions must be received via a written request made to the Nimrod-Blue Mountain Operations Project Manager, who then makes a recommendation through the Little Rock District Chief of Operations to the Chief of Real Estate.

2.16.3 Explanation of Flowage Easement and Total Fee Acreage on Nimrod Lake

Table 2-21. Acreage differences

Type of Acreage	LiDAR	Deeded Language	1975 Master Plan
Flowage Easement	489.6 acres	356 acres	Not Applicable
Total Fee	25,278.4 acres	25,298 acres	24,840 acres

Note: A small difference in acreage figures exists throughout this document due to the use of newer technologies, like LiDAR, to generate data. Because of this, USACE recommends that adjacent landowners obtain a survey prior to taking any action that might impact federal property rights. Where flowage or other easements belonging to the United States are located, adjacent landowners should reference the relevant deed language for specific locations and rights. Generally, adjacent landowners must contact USACE for approval prior to beginning any action that may impact federal property rights.

2.17 Pertinent Public Laws

2.17.1 Application of Public Laws

Development and management of Federal reservoirs are regulated by a number of statutes and guided by USACE documents. The following sections provide a summary of the relevant policies and Federal statutes.

2.17.2 Recreation

The policies and public laws listed below address development and management of recreational facilities on public lands and are pertinent to the Nimrod Lake project:

- Flood Control Act of 1944, Public Law 78-534, (22 December 1944), authorized the Chief of Engineers to provide facilities in reservoir areas for public use, including recreation and conservation of fish and wildlife.
- Flood Control Act of 1946, Public Law 79-526 (24 July 1966), amended the Flood Control Act of 1944 to include authority to grant leases to nonprofit organizations at recreational facilities in reservoir areas at reduced or nominal charges.
- Flood Control Act of 1954, Public Law 83-780 (3 September 1954), further amends the Flood Control Act of 1944 and authorizes the Secretary of the Army to grant leases to Federal, State, or governmental agencies without monetary considerations for use and occupation of land and water areas under the jurisdiction of the Department of the Army for park and recreational purposes when in the public interest.
- Flood Control Act of 1962, Public Law 87-874, (23 October 1962), broadened the authority under Flood Control Act of 1944 to include all water resource projects.

- Joint Land Acquisition Policy for Reservoir Projects (Federal Register, Volume 27 (22 February 1962)), allows the Department of the Army to acquire additional lands necessary for the realization of potential outdoor recreational resources of a reservoir.
- Land and Water Conservation Fund Act of 1965, Public Law 88-578 (1 September 1964), prescribes conditions under which USACE may charge for admission and use of its recreational areas.
- Federal Water Project Recreation Act of 1965, Public Law 89-72 (9 July 1965), requires sharing of financial responsibilities in joint Federal and non-Federal recreational and fish and wildlife resources with no more than half of the cost borne by the Federal Government.
- Architectural Barriers Act of 1968, Public Law 90-480 (12 August 1968), as amended, requires access for persons with disabilities to facilities designed, built, altered, or leased with Federal funds.
- Americans with Disabilities Act of 1990 (ADA), Public Law 101-336 (26 July 1990), as amended by the ADA Amendments Act of 2008 (Public Law 110-325), prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires reasonable accommodation for persons with disabilities.
- Water Resources Development Act of 1992, Public Law 102-580 (31 October 1992), authorizes the USACE to accept contributions of funds, materials, and services from non-Federal public and private entities to be used in managing recreational facilities and natural resources.
- Omnibus Budget Reconciliation Act–Day Use Fees, Public Law 103-66 (10 August 1993), authorized the USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches, and boat ramps.
- Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-33 (12 November 1996), created an advisory commission to review the current and anticipated demand for recreational opportunities at lakes and reservoirs managed by the Federal Government and to develop alternatives to enhance the opportunities for such use by the public.

2.17.3 Water Resource Protection and Flood Risk Management

Several public laws address water resources protection and flood risk management and integration of these goals with other project purposes such as recreation. The following are pertinent to Nimrod Lake:

- Flood Control Act of 1938, Public Law 75-761, (28 June 1938), authorizes the construction of civil engineering projects such as dams, levees, dikes, and other flood risk management measures through the USACE.
- Flood Control Act of 1941, Public Law 77-228, (18 August 1941), amended the Flood Control Act of 1938 and appropriated \$24M to support construction of multiple-purpose reservoir projects in the White River Basin.

- Flood Control Act of 1944, Public Law 78-534, (2 March 1945), specifies the rights and interests of the states in water resources development and requires cooperation and consultation with State agencies in planning for flood risk management.
- Rivers and Harbors Act of 1945, Public Law 79-14, (2 March 1945), specifies the rights and interests of the states in watershed development and water utilization and control, and the requirements for cooperation with state agencies in planning for flood control and navigation improvements.
- Flood Control Act of 1954, Public Law 83-780, (3 September 1954). Authorized and appropriated funds for flood protection projects along the Arkansas River.
- Water Supply Act of 1958, Public Law 85-500, (3 July 1958), authorizes USACE to include municipal and industrial water supply storage in multiple-purpose reservoir projects.
- Flood Control Act of 1960, Public Law 86-645, (14 July 1960). Authorized the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- Federal Water Pollution Control Act Amendments of 1961, Public Law 87-88, (20 July 1961), requires Federal agencies to address the potential for pollution of interstate or navigable waters when planning a reservoir project.
- Flood Control Act of 1962, Public Law 87-874, (23 October 1962), Broadened the authority under PL 78-534 to include all water resource projects.
- Flood Control Act of 1962, Public Law 89-80, (22 July 1965), provides for the optimum development of the Nation's natural resources through coordinated planning of water and related land resources. It provides authority for the establishment of a water resources council and river basin commission.
- Flood Control Act of 1965, Public Law 89-298, (27 October 1965). Authorized the Secretary of the Army to design and construct navigation, flood risk management, and shore protection projects if the cost of any single project does not exceed \$10 million.
- Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act), Public Law 92-500, (18 October 1972). Established a national goal of eliminating all discharges into U.S. waters by 1985 and an interim goal of making the waters safe for fish, shellfish, wildlife, and people by July 1, 1983. Also provides that in the planning of any Corps reservoir consideration shall be given to inclusion of storage for regulation of streamflow.
- Clean Water Act of 1977, Public Law 95-217, (15 December 1977). Amended PL 87-88 and requires the Environmental Protection Agency (EPA) to enter into written agreements with the Secretaries of Agriculture, the Army, and the Interior to provide maximum utilization of the laws and programs to maintain water quality.
- Water Resource Development Act of 1986, Public Law 99-662, (17 November 1986). Established cost sharing formulas for the construction of harbors, inland waterway transportation, and flood risk management projects. The Water Resource Development Act of 2020 §110, required USACE to

adopt procedures to include more consideration of environment and social goals and regional economic benefits during project planning and selection of the preferred alternative.

- Executive Order 12088 of the President, Federal Compliance with Pollution Control Standards (13 October 1978). This order directs the head of each Executive agency to ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under the control of the agency.

2.17.4 Fish and Wildlife Resources

A number of public laws address protection and maintenance of fish and wildlife resources. The following are pertinent to Nimrod Lake:

- Fish and Wildlife Coordination Act, Public Law 79-732, (10 March 1934). Provides authority for making project lands available for management by interested State agencies for wildlife purposes.
- Fish and Wildlife Coordination Act, Public Law 85-624, (12 August 1958). States that fish and wildlife conservation will receive equal consideration with other project purposes and be coordinated with other features of water resources development programs.
- The Federal Water Project Recreation Act of 1965, Public Law 89-77, (9 July 1965). Requires consideration of opportunities for fish and wildlife enhancement in planning water resources projects. Non-Federal bodies are encouraged to operate and maintain the project fish and wildlife enhancement facilities. If non-Federal bodies agree in writing to administer the facilities at their expense, the fish and wildlife benefits are included in the project benefits and project cost allocated to fish and wildlife. Fees may be charged by the non-Federal bodies to repay their costs. If non-Federal bodies do not so agree, no facilities for fish and wildlife may be provided.
- National Environmental Policy Act of 1969 (NEPA), Public Law 91-190, (1 January 1970). Established a broad Federal policy on environmental quality stating that the Federal government will assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings, and preserve important historic, cultural, and natural aspects of our national heritage.
- Endangered Species Act of 1973, Public Law 93-205, (28 December 1973). Requires that Federal agencies will, in consultation with the U.S. Fish and Wildlife Service (USFWS), further conservation of endangered and threatened species and ensure that their actions are not likely to jeopardize such species or destroy or modify their critical habitat.
- Endangered Species Act Amendments of 1978, Public Law 95-632, (10 November 1978). Specified a consultation process between Federal agencies and the Secretaries of the Interior, Commerce, or Agriculture for carrying out programs for the conservation of endangered and threatened species.
- North American Wetland Conservation Act, Public Law 101-233, (13 December 1989). Directs the conservation of North America wetland ecosystems and requires agencies to manage their lands for wetland/waterfowl purposes to the extent consistent with missions.
- Neo-tropical Migratory Bird Conservation Act, Public Law 106-147, (20 July 2000). Promotes the conservation of habitat for neo-tropical migratory birds.
- Bald and Golden Eagle Protection Act of 1940, Title 16 U.S. Code (U.S.C.) §§ 668, (8 June 1940). As amended, prohibits anyone, without a permit issued by the Secretary of the Interior, from taking

bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), including their nests or eggs.

2.17.5 Forest Resources

The following law pertains to management of forested lands and is pertinent to Nimrod Lake:

- Conservation of Forest Land Act of 1960, Public Law 86-717, (6 September 1960), Stewardship management concept derives primarily from Public Law 86-717, The Forest Cover Act, which was written specifically to address the conservation and management of trust resources at USACE projects. This law provides for the protection of forest cover in reservoir areas and specifies that reservoir areas of projects developed for flood risk management or other purposes that are owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers will be developed and maintained so as to encourage, promote, and ensure fully adequate and dependable future resources of readily available timber through sustained yield programs, reforestation, and accepted conservation practices to increase the value of such areas for conservation, recreation, and other beneficial uses: Provided, that such development and management shall be accomplished to the extent practicable and compatible with other uses of the project. The Act further states in part that the "...Chief of Engineers, under the supervision of the Secretary of the Army, shall provide for the protection and development of forest or other vegetative cover and the establishment and maintenance of other conservation measures on reservoir areas under his jurisdiction, so as to yield the maximum benefit and otherwise improve such areas."

2.17.6 Cultural Resources

Several public laws mandate protection of cultural resources on public lands. The following are pertinent to USACE project lands along Nimrod Lake:

- Antiquities Act of 1906, Public Law 59-209, (8 June 1906). Applies to the appropriation or destruction of antiquities on federally owned or controlled lands and has served as the precedent for subsequent legislation.
- Historic Sites Act of 1935, Public Law 74-292, (21 August 1935). Declares that it is a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.
- Reservoir Salvage Act of 1960, Public Law 86-523, (27 June 1960). Provides for the preservation of historical and archaeological data that might otherwise be lost as the result of the construction of a dam and attendant facilities and activities.
- National Historic Preservation Act of 1966 (NHPA), Public Law 89-665, (15 October 1966). Establishes a national policy of preserving, restoring, and maintaining cultural resources. It requires Federal agencies to consider the effect an action may have on sites that may be eligible for inclusion on the National Register of Historic Places.
- Archaeological and Historic Preservation Act of 1974, Public Law 93-291, (24 May 1974). Amends PL 86-523 and provides for the Secretary of Interior to coordinate all Federal survey and recovery activities authorized under this expansion of the Reservoir Salvage Act of 1960. The

Federal construction agency may expend up to 1 percent of project funds on cultural resource surveys.

- Archaeological Resources Protection Act of 1979, Public Law 96-95, (31 October 1979). Updates PL 59-209 and protects archaeological resources and sites on public lands and fosters increased cooperation and exchange of information among governmental authorities, the professional archaeological community, and private individuals.
- Native American Graves Protection and Repatriation Act, Public Law 101-601, (16 November 1990). Requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.
- Executive Order 11593 of the President, Protection and Enhancement of Cultural Environment (13 May 1971). This Order sets out a policy for the Federal Government to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation.

2.17.7 Leases, Easements, and Rights-of-Way

Several laws and regulations govern the granting of leases, easements, and rights-of-way on Federal lands. The following are pertinent to USACE project lands along Nimrod Lake:

- U.S.C. Titles 10, 16, 30, 32, and 43 address easements and licenses for project lands.
- Impoundment or Diversion of Waters, 16 U.S.C. § 663, (10 March 1934). Wildlife resources management in accordance with the approved general plan.
- Leases: Non-excess Property of Military Departments and Defense Agencies, 10 U.S.C. § 2667, (10 August 1956). Authorizes the lease of land at water resource projects for any commercial or private purpose not inconsistent with other authorized project purposes.
- Construction and Operation of Public Parks and Recreational Facilities in Water Resource Development Projects; Lease of Lands; Preference for Use; Penalty; Application of Section 3401 of Title 18; Citations and Arrests with and without Process; Limitations; Disposition of Receipts, 16 U.S.C. § 460d, (22 December 1944). Authorizes use of public lands for any public purpose, including fish and wildlife, if it is in the public interest.
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, (2 January 1971). Establishes a uniform policy for fair and equitable treatment of persons displaced because of Federal or Federally assisted programs.
- Federal Land Policy and Management Act of 1976, Public Law 94-579, (21 October 1976). Establishes a policy that the Federal Government receive fair market value for the use of the public lands and their resources unless otherwise provided for by statute. Provides for the inventory of public land and land use planning. It also establishes the extent to which the executive branch may withdraw lands without legislative action.

2.17.8 Hydropower Mission

Nimrod Lake is authorized for a hydropower mission.

- River and Harbor Act of 1946, Public Law 79-525, (24 July 1946). Authorized hydropower for the Arkansas River and its tributaries.

2.17.9 Additional Laws and Regulations

The following is a list of additional pertinent laws regulating the use and enjoyment of public lands and water located around Nimrod Lake:

- Joint Land Acquisition Policy for Reservoir Projects (Federal Register, Volume 27, 22 February 1962). Allows the Department of the Army to acquire additional lands necessary for the realization of potential outdoor recreational resources of a reservoir.
- Land and Water Conservation Fund Act of 1965, Public Law 88-578, (3 September 1964). Prescribes conditions under which USACE may charge for admission and use of its recreational areas.
- Federal Water Project Recreation Act of 1965, Public Law 89-72, (9 July 1965). Requires sharing of financial responsibilities in joint Federal and non-Federal recreational and fish and wildlife resources with no more than half of the cost borne by the Federal Government.
- Fee Collecting System, Public Law 93-303, (7 June 1974). This law provides for the collection of fees at family camping and group camping areas having various classes of facilities as follows:
 - Class A. Waterborne restrooms; potable water; showers (warm water); sanitary disposal station; campsites with table; fireplace (rock ring or grill); refuse containers; paved roads; designated tent or trailer spaces; visitor protection control; personal fee collection (honor system will not be used).
 - Class B. Vault restrooms; potable water; sanitary disposal station; campsites with table; fireplace (rock ring or grill); refuse container; access and circulation roads; designated tent or trailer spaces; visitor protection control; personal fee collection.
 - Class C. Pit or vault restrooms; potable water; campsites with table; fireplace (rock ring or grill); refuse containers; access and circulation roads; designated tent or trailer spaces; visitor protection control; personal fee collection.
 - Class D. Portable or pit restrooms; potable water; fireplace (rock ring or grill); refuse containers; access and circulation roads; designated tent or trailer spaces; visitor protection control; personal fee collection.
- Safe Drinking Water Act, Public Law 93-523, (16 December 1974). This act amends Public Health Service Act to assure that the public is provided with safe drinking water.
- Federal Environmental Pesticide Control Act of 1972, Public Law 92-516, (21 October 1972). This act revises the Federal Insecticide, Fungicide and Rodenticide Act. It provides for complete regulation of pesticides to include regulation, restrictions on use, actions within a single State, and strengthened enforcement.
- Architectural Barriers Act of 1968, Public Law 90-480, (12 August 1968). As amended, requires access for persons with disabilities to facilities designed, built, altered, or leased with Federal funds.

- Americans with Disabilities Act of 1990 (ADA), Public Law 101-336. As amended by the ADA Amendments Act of 2008 (PL 110-325), prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires reasonable accommodation for persons with disabilities.
- Omnibus Budget Reconciliation Act–Day Use Fees, Public Law 103-66, (10 August 1993). Authorized the USACE to collect fees for the use of developed recreational sites and facilities, including campsites, swimming beaches, and boat ramps.
- Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-333. Created an advisory commission to review the current and anticipated demand for recreational opportunities at lakes and reservoirs managed by the Federal Government and to develop alternatives to enhance the opportunities for such use by the public.

Chapter 3 Goals and Objectives

3.1 The Nimrod Lake Master Plan Vision Statement

The Nimrod Lake Master Plan Revision Project Delivery Team (PDT) developed the following vision statement to help guide the process of revising the Nimrod Lake Master Plan:

“Deliver vital support to reduce risks from disasters, improve safe & efficient recreational opportunities, enhance natural resources, and maintain quality water for communities while taking care of people and seeking out partnerships.”

3.2 Policy and Master Plan Revision Schedule

Recreation and natural resource management policy and guidance are set forth in USACE regulations ER and EP 1130-2-550 and EP 1130-2-540. Included in these guidance documents is the process by which Master Plans are revised, as well as broadly stated management principles for recreation facilities and programs, and stewardship of natural and cultural resources. Of particular importance in the formulation of recreation goals and objectives are the policies governing the granting of park and recreation and commercial concession leases (outgrants) which dictate that such outgrants must serve recreational needs and opportunities created by the project and are dependent on the project’s natural or other resources. Other important guidance for management of all resources is the policy governing non-recreational outgrants such as, utility easements as well as the guidance in ER and EP 1130-2-540 to adhere to ecosystem management principles.

The Master Plan is implemented in five phases: Phase 1, Initiate Master Plan Revision Process; Phase 2, Develop Draft Master Plan; Phase 3, Develop Final Master Plan; Phase 4, Receive Approval of Final Master Plan; and Phase 5, Implement Final Master Plan. For more information regarding details of each phase and project schedule, please reference the Nimrod Lake Project Management Plan for the Master Plan revisions.

3.3 Goals and Objectives

3.3.1 Goals

The terms “goal” and “objective” are often defined as synonymous, but in the context of this Master Plan, goals express the overall desired end state of the Master Plan, whereas resource objectives are the specific task-oriented actions necessary to achieve the overall Master Plan goals.

The following excerpt from EP 1130-2-550, Chapter 3, express the goals for the Nimrod Lake Master Plan.

- GOAL A. Provide the best management practices to respond to regional needs, resource capabilities and suitability’s, and expressed public interests consistent with authorized project purposes.
- GOAL B. Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.
- GOAL C. Provide public outdoor recreation opportunities that support project purposes and public demands created by the project itself while sustaining project natural resources.
- GOAL D. Recognize the particular qualities, characteristics, and potentials of the project.

GOAL E. Provide consistency and compatibility with national objectives and other State and regional goals and programs.

3.3.2 Objectives

Resource objectives are defined as clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the Little Rock District, Nimrod Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, Environmental Operating Principles (EOPs), and applicable national performance measures. They are consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities, and take public input into consideration. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan. The SCORP was considered as well. The objectives in this Master Plan, to the best extent possible, aim to maximize project benefits, meet public needs, and foster environmental sustainability for Nimrod Lake.

Table 3-1. Resource Objectives, Nimrod Lake

Recreational Objectives	Goals				
	A	B	C	D	E
Evaluate the demand for improved recreation facilities and increased public access on USACE-managed public lands and water for recreational activities (i.e., camping, walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.) and facilities (i.e., campsites, picnic facilities, scenic overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots).	*		*	*	
Assess current public use levels (i.e., with focus on boating, camping, and day use trends) and evaluate impacts from overuse and crowding. Take action to prevent overuse, conflict, and public safety concerns.	*		*		*
Evaluate recreational activities (public and private use) for natural resource protection, quality recreational opportunities, and public safety concerns.	*	*	*	*	*
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Increase and/or enhance accessible facilities on Nimrod Lake.	*		*		*
Evaluate the demand for commercial facilities on public lands and waters.	*		*	*	
Consider flood/conservation pool operations to address potential impact to recreational facilities (i.e., campsites) and hunting areas. Note that water level management is not within the scope of the Master Plan.	*	*	*	*	
Ensure consistency with USACE Recreation Strategic Plan.	*	*	*	*	*
Reference the Arkansas Statewide Comprehensive Outdoor Recreation Plan (SCORP) to ensure consistency in achieving recreation goals.	*		*		*

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Consider flood/conservation pool levels to optimize habitat conditions, as long as there is no interference with the Project's other authorized purposes, i.e., flood risk management, water supply, etc. Note that water level management is not within the scope of the Master Plan.	*	*		*	

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Actively manage and conserve forest, fish, and wildlife resources (i.e., Green Tree Reservoir), special status species, by implementing ecosystem management principles and best management practices to ensure sustainability and enhance biodiversity.	*	*		*	*
Consider watershed approach during decision-making process.	*	*		*	*
Optimize resources, labor, funds, and volunteers/partnerships for protection and restoration of fish and wildlife habitats.		*			*
Optimize resources, labor, funds, and partnerships for the management and prevention of invasive species in and around Nimrod Lake.		*			*
Minimize activities which disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	*
Continually evaluate erosion control and sedimentation issues at Nimrod Lake.	*	*			*
Manage project lands and water to support threatened and endangered species and their habitat.	*	*		*	*
Identify and protect unique or sensitive habitat areas.	*	*		*	*
Stop and prevent unauthorized activities and uses of public lands such as cultural resources looting, encroachments, trespass, timber trespass, unauthorized roadways, off-road vehicle (ORV) use, trash dumping, and placement of personal property that create negative environmental impacts.	*	*	*	*	*
Promote forest health through timber resource management actions to create diverse and sustainable forest habitat.	*	*		*	*
Evaluate and determine appropriate non-statutory mitigation for land use actions that result in adverse environmental impacts.	*	*			*

Environmental Compliance	Goals				
	A	B	C	D	E
Manage project lands and water to avoid negative effects to public water supply, ensuring public health and safety.	*	*	*	*	*
Consider both point and non-point sources of water pollution during decision making.	*	*		*	*
Continue coordination, communication, and cooperation between regulating agencies and non-governmental organizations to resolve and/or mitigate environmental problems.	*	*		*	*
Ensure compliance with Environmental Review Guide for Operations (ERGO) at all Nimrod Lake facilities and outgrants.	*	*			*
Ensure compliance with regulations prohibiting Privately Owned Domestic Sewer Systems on Federal lands.	*	*			

Visitor Information, Education and Outreach Objectives	Goals				
	A	B	C	D	E
Continue coordination and communication between agencies, special interest groups, and the general public.	*			*	*
Provide educational and outreach programs on the lake. Topics to include USACE missions, water quality, history, cultural resources, water safety, recreation, nature, and ecology.	*	*	*	*	*
Maintain a network among local, state, and federal agencies concerning the exchange of lake-related information for public education and management purposes.	*			*	*
Increase public awareness of special use permits or other authorizations required for special activities, organized special events, and commercial activities on public lands and waters of the lake.	*	*	*		
Capture trends concerning incidents and accidents on public property and coordinate data collection with other public safety officials.	*		*		*
Promote USACE Water Safety message.	*		*	*	*

Visitor Information, Education and Outreach Objectives	Goals				
	A	B	C	D	E
Educate adjacent landowners on policies regarding public land.	*	*	*	*	*
Continue to educate the public on Nimrod Lake's Water Control Manual, along with other management and operation plans (i.e., Shoreline Management Plan, Operation Management Plan, etc.).	*	*	*	*	*

Economic Impacts Objectives	Goals				
	A	B	C	D	E
Balance economic and environmental interests involving Nimrod Lake.	*	*	*	*	*
Evaluate the type and extent of additional development that is compatible with national USACE policy on both recreation and non-recreational outgrants that may be sustained on public lands.	*	*	*	*	*
Work with local communities to promote tourism and recreational use of the lake.	*	*	*	*	*

General Management Objectives	Goals				
	A	B	C	D	E
Maintain the public land boundary lines to ensure it is clearly marked and recognized in all areas.	*	*		*	
Evaluate and assess adequacy of public lands to achieve USACE missions.			*	*	*
Secure and adapt to sustainable funding for business line programs such as flood risk management, recreation, and environmental stewardship.	*	*	*	*	*
Ensure consistency with USACE Campaign Plan (national level), Implementation Plan (regional level), Operations Plan (District level).					*
Ensure consistency with Executive Order 13990, "Climate Crisis; Efforts to Protect Public Health and Restore Science."					*

General Management Objectives	Goals				
	A	B	C	D	E
Manage non-recreation outgrants, such as utility easements for the benefit of the public, in accordance with national guidance set forth in ER 1130-2-550.	*	*		*	*

Cultural Resources Management Objectives	Goals				
	A	B	C	D	E
Monitor and coordinate development and the evaluation of cultural resources with the Arkansas State Historic Preservation Office (SHPO) and federally recognized tribes.	*	*		*	*
Continue to inventory cultural resources on the project based on operations and maintenance needs in conjunction with planned improvements and funding mechanisms.	*	*		*	*
Create an HPMP and work to ensure an accurate accounting for all currently identified cultural resources within fee boundary obtaining accurate horizontal site boundary data and eligibility determinations with SHPO and tribal concurrence in accordance with Title 36 C.F.R. Part 800. In conjunction with significant input from the SHPO, relevant Native American Tribal Nations, and the USACE, provide in the HPMP a schedule of inventory and evaluation based on future Federal undertakings that will occur within fee boundary	*	*		*	*
Maintain compliance with Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act; and the Native American Graves Protection and Repatriation Act within the Nimrod Lake Project fee boundary.		*		*	*
Prevent unauthorized or illegal excavation and removal of cultural resources on project lands through the use of game cameras and with the help of volunteer historic preservation groups. Work with the State Historic Preservation Officer and local archeological and historical societies to develop a Site Steward Program for the significant cultural resources on project lands, with the District Archaeologist providing significant input into this program		*		*	*
Utilize the Mandatory Center of Expertise for the Curation and Management of Archaeological Collections (MCX-CMAC) USACE St. Louis District's Veterans Curation Program in processing any past archaeological collections generated from cultural resource management within the Nimrod Lake Project management area.	*	*		*	*
Increase public awareness of the Nimrod Lake Project history.		*		*	*

Chapter 4 Land Allocations, Land Classifications, Water Surface Classifications, and Project Easement Lands

4.1 Introduction

Nimrod Lake is a multipurpose project constructed primarily for flood control and water supply. Project authorizations for Nimrod Lake other than flood control and water supply are hydroelectric power and recreation. Management of recreational resources must not conflict with the regulation of the lake for the primary purpose for which it was authorized. Environmental stewardship of project lands and waters is an inherent responsibility for USACE and must be taken into consideration with all project management activities. The principal purpose of the Master Plan for Nimrod Lake is to balance public use and benefits with protection and conservation of natural and cultural resources. This concept has been implemented, and first among priorities for public use are stringent standards for public health, safety, and sanitation. The Resource Plan in Chapter 5 considers these standards in land use classification and in planning for the recreational activities and stewardship of the lands and waters associated with the project. This chapter defines, in general terms, each category of land allocation, land classification, water surface classification, and project easement lands that can be found at USACE water resource projects.

Ownership of land adjacent to Government-owned land does not convey any rights to the adjacent landowner(s) that would allow private and exclusive access to the lake across Government-owned land. (Note: A small difference in acreage figures exists throughout this document due to the use of newer technologies, like LiDAR, to generate data. Because of this, USACE recommends that adjacent landowners obtain a survey prior to taking any action that might impact federal property rights. Where flowage or other easements belonging to the United States are located, adjacent landowners should reference the relevant deed language for specific locations and rights. Generally, adjacent landowners must contact USACE for approval prior to beginning any action that may impact federal property rights.).

Project land and water total 25,278 acres. There is an additional 354 acres of flowage easement lands. Flowage easement lands lie above or landward of the fee acquisition line up to elevation 378' msl on the lakeside of Nimrod Dam. There is an area on the south side of the lake where flowage easement is not at a specific elevation due to the flowage easement being retained over disposed tracts to the U.S. Forest Service. Flowage easement areas are indicated on the land classification maps in Appendix D.

Land Allocation is a term used by USACE to describe the purpose for which lands at a project were acquired. The four possible allocations include: Operations, Recreation, Fish and Wildlife and Mitigation. At Nimrod Lake, all lands are allocated as Operations lands. No lands were specifically acquired for Recreation, Fish and Wildlife, or Mitigation. The four land allocations used by USACE are fully described below in the following paragraphs.

4.2 Land Allocations

Lands are allocated by their congressionally authorized purposes for which the project lands were acquired. There are four land allocation categories applicable to USACE projects:

- (1) Operations. These are the lands acquired for the congressionally authorized purpose of constructing and operating the project. All 25,278 acres of project lands at Nimrod Lake are

included in this allocation.

- (2) Recreation. These lands were acquired specifically for the congressionally authorized purpose of recreation. These lands are referred to as separable recreation lands. Lands in this allocation can only be given a land classification of “Recreation”. No project lands at Nimrod Lake are included in this allocation.
- (3) Fish and Wildlife. These lands were acquired specifically for the congressionally authorized purpose of fish and wildlife management. These lands are referred to as separable fish and wildlife lands. Lands in this allocation can only be given a land classification of “Wildlife Management”. No project lands at Nimrod Lake are included in this allocation.
- (4) Mitigation. These lands were acquired specifically for the congressionally authorized purpose of offsetting losses associated with development of the project. These lands are referred to as separable mitigation lands. Lands in this allocation can only be given a land classification of “Mitigation”. No project lands at Nimrod Lake are included in this allocation.

4.3 Land Classifications

USACE further divides land allocations through a system of land classification which designate the primary use for which project lands are managed. Project lands are classified for development and resource management consistent with authorized project purposes and the provisions of the National Environmental Policy Act (NEPA) and other Federal laws. Land classifications also consider recreational trends, regionally important natural resources, and cultural resources. The proposed land classifications at Nimrod Lake are depicted on the land classification maps in Appendix D and are described as follows:

1. Project Operations. This category includes those lands required for the dam, spillway, switchyard, levees, dikes, offices, maintenance facilities, and other areas that are used solely for the operation of the project.

Proposed acreage: 159.9 acres

2. High Density Recreation. Lands developed for intensive recreational activities for the visiting public, including day use areas and/or campgrounds. These also include areas for commercial marina concessions, quasi-public development, and comprehensive resorts.

Proposed acreage: 637.2 acres

3. Mitigation. This classification will only be used for lands with an allocation of Mitigation and that were acquired specifically for the purposes of offsetting losses associated with development of the project.

Proposed acreage: None

4. Environmentally Sensitive Areas. Areas where scientific, ecological, cultural, or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic

Preservation Act or applicable State statutes. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands, unless necessary for a specific resource management benefit, such as prairie restoration. These areas are typically distinct parcels located within another, and perhaps, larger, land classification, area.

Proposed acreage: 925.2 acres

5. Multiple Resource Management Lands. This classification allows for the designation of a predominate use as described below, with the understanding that other compatible uses described below may also occur on these lands (e.g., a trail through an area designated as Wildlife Management.). Land classification maps must reflect the predominant sub-classification, rather than just Multiple Resource Management.

- (a) Low Density Recreation. Lands with minimal development or infrastructure that support passive public recreational use (e.g., primitive camping, fishing, hunting, trails, wildlife viewing, etc.).

Proposed acreage: 3,667.8 acres

- (b) Wildlife Management. Lands designated for stewardship of fish and wildlife resources.

Proposed acreage: 16,301.7 acres

- (c) Vegetative Management. Lands designated for stewardship of forest, prairie, and other native vegetative cover.

Proposed acreage: None

- (d) Future/ Inactive Recreation Areas. Areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources.

Proposed acreage: None

6. Water Surface Classifications. If the project administers a surface water zoning program, then it should be included in the Master Plan.

- (a) Restricted. Water areas restricted for project operations, safety, and security purposes.

Proposed acreage: 11.3 acres

- (b) Designated No-Wake. To protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and for public safety.

Proposed acreage: None

- (c) Fish and Wildlife Sanctuary. Annual or seasonal restrictions on areas to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning.

Proposed acreage: None

- (d) Open Recreation. Those waters available for year-round or seasonal water-based recreational use.

Proposed acreage: 3,575.3 acres

4.4 Project Easement Lands

Project easement lands are all lands for which the USACE holds an easement interest, but not a fee title. Planned use and management of easement lands will be in strict accordance with the terms and conditions of the easement estate acquired for the project. Easements were acquired for specific purposes and do not convey the same rights or ownership to the USACE as other lands.

1. Operations Easement. USACE retains rights to these lands necessary for project operations.

Current acreage: None

2. Flowage Easement. USACE retains the right to inundate these lands for project operations.

Current acreage: 489.6, in addition to all affected parts and portions of Yell County roads located within the boundaries of the dam and reservoir and portions of State Highways 27, 28, and 60.

3. Conservation Easement. USACE retains rights to lands for aesthetic, recreation, and environmental benefits.

Current acreage: None

Chapter 5 Resource Plan

The Resource Plan chapter describes in broad terms how project lands and water surface will be managed. For Nimrod Lake, the Management by Classification approach as set forth in EP 1130-2-550 was utilized.

A brief description of each alternative developed during the Master Plan revision process is presented for reference. A more detailed description is provided in the accompanying Environmental Assessment, Appendix A, to this document. All alternatives are compared against Alternative 1, the No Action (1975 Plan).

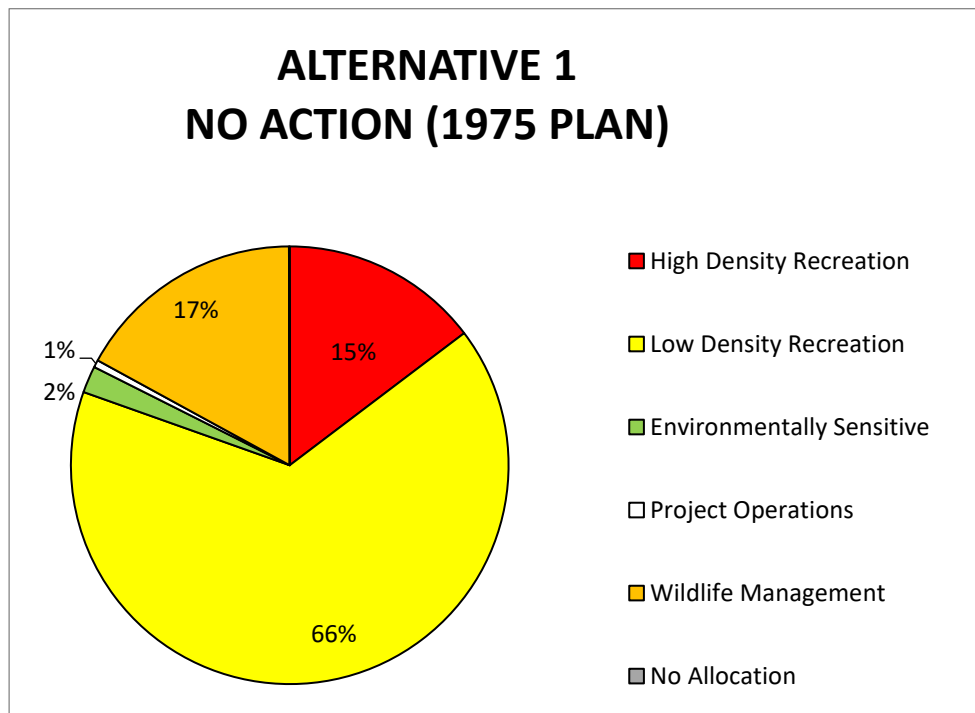
The Draft Master Plan contains land classifications proposed for Alternative 2, which is the USACE “Preferred” alternative. The accompanying final Environmental Assessment evaluated three alternatives: Alternative 1 – No Action (1975 Plan), Alternative 2 - Preferred, and Alternative 3 – Limited Development.

5.1 Alternatives Developed during the Master Plan Revision Process

5.1.1 Alternative 1 NO ACTION (1975 PLAN)

- The No Action alternative is not a favorable alternative because:
 - 0.1% or 12.2 acres of Federal lands were not classified in the 1975 Plan.
 - This alternative does not recognize public comment or regional trends (recreation and resource management).
 - The 1975 Master Plan attributed 66% of fee land to Low Density and 17% to Wildlife Management, grossly overestimating passive recreation usage and underestimating areas utilized for stewardship of natural resources and land management.
- The No Action alternative does not address resource management laws, policies, and regulations that were implemented after the 1975 Nimrod Lake Master Plan.

Figure 5-1. Alternative 1, No Action (1975 Plan)

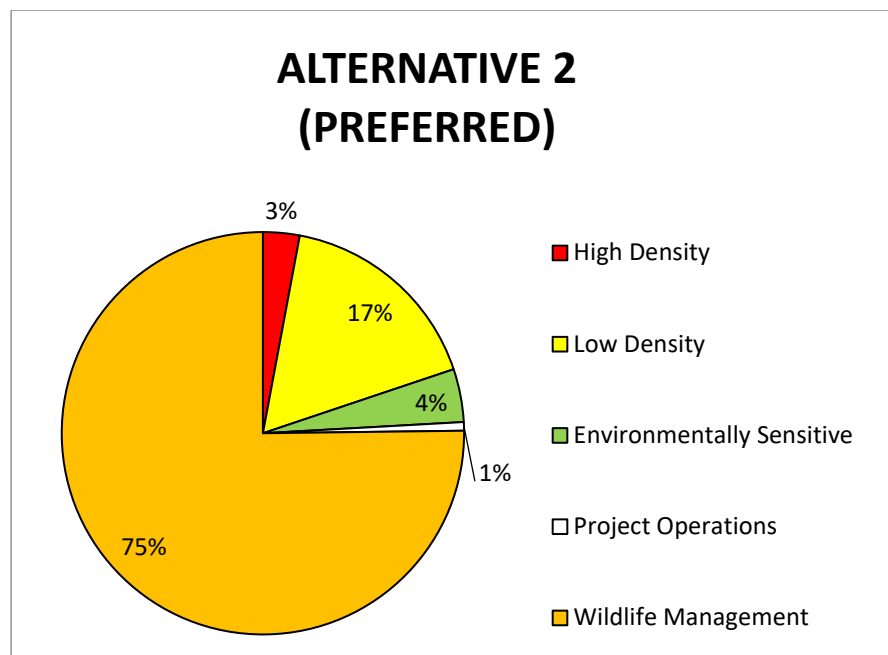


5.1.2 Alternative 2 PREFERRED

The Preferred alternative balances public preference for recreation opportunities expressed during the scoping comment period with regional natural resource management priorities (see Figure 5-2). This alternative is compared against Alternative 1, the No Action (1975 Plan). The Preferred alternative is selected because:

- Recognizes USACE historical management and reflects historical as well as present and projected management and usage of Federal lands.
- Increase in Wildlife Management land classification: Brush Creek Future Park Area, Carter Cove Park, Highway 27 Future Park Area, Hogan Creek Park, Quarry Cove Park, River Road Park, Rover Park and Sunlight Bay Park. These recreation areas from the 1975 MP have been at least partially reclassified from High Density to Wildlife Management based on current land management practices and uses, including hunting, fishing, timber management, and habitat management. Several large tracts of undeveloped land were reclassified from Low Density to Wildlife Management due to the same practices and uses.
- Increase acreage of Environmentally Sensitive Areas (ESA). All islands and most shoreline bluffs and narrow bands of isolated land are reclassified as ESA to protect unique and environmentally sensitive areas. These ESA classified lands include many areas that are not easily accessible to the public to help prevent outside disturbance and allow for more uninterrupted conservation.
- Most previously classified High Density areas other than the Future Park Areas are remaining High Density to some degree to allow for possible future park improvements and facility expansions.
- Reclassified Lloyd Millwood GTR area from Wildlife Management to Low Density due to all of the recreational use and activities in the area.
- County Line Park to potentially reopen and the large undeveloped area on the east side of park to remain High Density to allow for potential future development.

Figure 5-2. Alternative 2, Preferred

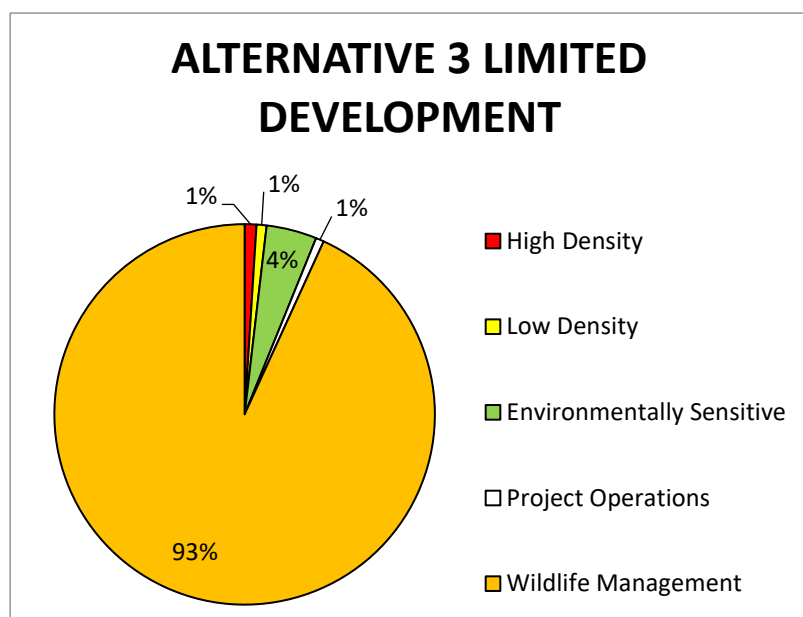


5.1.3 Alternative 3 LIMITED DEVELOPMENT

Alternative 3 seeks to limit future development of recreation areas to the greatest extent possible, maximizing wildlife management and ESA lands. In general terms, Alternative 3 increases Wildlife Management and ESA lands converted from High and Low Density land classifications. This alternative is compared against Alternative 1, the No Action (1975 Plan). Alternative 3 is not a favorable alternative because:

- Converted all primitive camping areas and accesses designated as Low Density Recreation lands to Wildlife Management except for Ward's Crossing, Rover Landing, and Porter Creek Access as they all have boat ramps, which would eliminate primitive camping in these areas.
- Reduced High Density Lands reserved in Alternative 2 for potential future development at County Line Park, Plainview Park, and Sunlight Bay Park to Wildlife Management. Restricts recreation facilities from further development and reflects unlikelihood of receiving funding to further expand existing park areas.
- Increased acreage of ESA from Low Density by eliminating Hunt Bridge Access (Future) and Highway 27 Access (Future)
- Increased acreage of Wildlife Management by converting the Lloyd Millwood Green Tree Reservoir (15% of overall project lands) from Low Density in Alternative 2 to Wildlife Management.
- This alternative would not allow for balancing the use of local resources with conservation efforts.
- Does not take into consideration the public desire for improvement of existing park areas and increase in recreation opportunities as expressed in Scoping comments.

Figure 5-3. Alternative 3 Limited Development



5.2 Classifications and Justification

In the process of delineating land classifications, general assumptions were made which included that past classification lines, edges of outgrants, roads, USACE boundary monuments and corners, and terrain features such as drainage inlets and well-defined changes in vegetation such as tree lines were used as boundaries between classifications.

The previous land classifications (from the 1975 Master Plan), the feasibility of keeping or changing the land classifications with the Master Plan revision, and the potential future development needs around the lake were considered. All agency and public comments received during the public comment periods were considered during the revision process.

5.2.1 Project Operations

Project operations land classification includes those lands required for the dam, spillway, water intake, offices, maintenance facilities, and other areas that are used solely for the operation of the project or lessees.

Justification: On Nimrod Lake, the lands classified as Project Operations have been classified by definition. Portions of Project Point Park and River Road Park near Nimrod Dam and Project Office area were reclassified from High Density to Project Operations to include all related facilities and accesses and to include a protective buffer. The lease area for the U.S. Forest Service's workstation on Highway 27 was reclassified as Project Operations from Low Density. The City of Plainview's sewer treatment facility remains classified as Project Operations.

Resource Objectives: General Management

(Acreage = 159.9 acres or 1 % of USACE land)

5.2.2 High Density Recreation

High density recreation land classification is for those lands intended to be developed or currently developed for intensive recreational activities for the visiting public including day use areas and/or campgrounds.

Justification: No areas were classified as High Density Recreation on Nimrod Lake that were not classified as such in the 1975 plan.

From the 1975 Master Plan, High Density areas in Brush Creek Future Park, Carter Cove Park, Highway 27 Future Park Area, Hogan Creek Park, the island south of Sunlight Bay Park, Project Point Park, Quarry Cove Park, River Road Park, Rover Park, and Sunlight Bay contain lands reclassified to ESA, Low Density, Project Operations, and Wildlife Management. These changes are in response to current and expected future land use.

Resource Objectives: Recreation, Economic Impacts, General Management

(Acreage = 637.2 or 3% of USACE land)

5.2.3 Mitigation

Mitigation land classification allows for lands with an allocation of Mitigation which were acquired specifically for the purposes of offsetting losses associated with development of the project.

(Acreage = None)

5.2.4 Environmentally Sensitive Area (ESA)

Environmentally sensitive area land classification is for those land areas where scientific, ecological, cultural, or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as, the Endangered Species Act, the National Historic Preservation Act or applicable State statutes. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands; examples of actions that could be authorized are specific erosion control measures and removal of invasive species. Public right-of-ways in the ESA land classification will be considered on a case-by-case basis.

At Nimrod Lake, approximately 0.5% of ESA lands have permitted roads and utility lines.

No agricultural, grazing, or mowing is permitted on these lands unless necessary for a specific resource management benefit. Invasive species management and prescribed fires are also permitted for specific resource management benefits.

Justification: ESA lands are classified as such to preserve the scenic, historical, archaeological, scientific, water quality, or ecological value of the overall project.

Classification of lands as ESAs took into consideration the location or habitat of threatened, endangered, and state species of concern at Nimrod Lake. The classification of ESA also considered locations of significant cultural or historic resource sites, as well as resource protection (i.e., prairie restoration areas, fragile habitats) and aesthetics. The ESA classification is also responsive to public comment seeking to keep the lake natural, scenic and to ensure that water quality is maintained for future generations.

Some areas of Low Density and High Density were reclassified to ESA. Most islands, shoreline bluffs, and narrow bands of isolated land were reclassified as ESA to protect unique and environmentally sensitive areas. These ESA classified lands include many areas that are not easily accessible to the public to help prevent outside disturbance and allow for more uninterrupted conservation.

Resource Objectives: Environmental Compliance, Cultural Resource Management, Natural Resource Management

(Acreage = 925.2 or 4% of USACE land)

5.2.5 Multiple Resource Management

Multiple resource management land classification allows for the designation of a predominant use as described below, with the understanding that other compatible uses described below may also occur on these lands (e.g., a trail through an area designated as Wildlife Management). Land classification maps reflect the predominant sub-classification, rather than just Multiple Resource Management. Right-of-ways

for public utilities in Multiple Resource Management land classifications will be considered and reviewed on a case-by-case basis and must comply with the national USACE policy governing non-recreation outgrants.

5.2.5.1 Low Density Recreation

Low density recreation land classification includes lands with minimal development or infrastructure that support passive public recreational use (e.g., primitive camping, fishing, hunting, trails, wildlife viewing, etc.).

Justification: All areas which allow primitive camping or are historic access/use areas were classified as Low Density. Carden Point Park, Highway 27 Future Park Area, Hogan Creek Park, Rover Park, and Sunlight Bay Park were all previously classified as High Density. Portions of these areas were reclassified to Low Density because there is no expected increase in development and most are still used for lake accesses and/or primitive camping. Lloyd Millwood Green Tree Reservoir, previously classified as Wildlife Management, has been reclassified to Low Density due to the recreational activities and uses that take place there.

Resource Objectives: Recreation, Economic Impact, Natural Resource Management, Environmental Compliance, Cultural Resource Management, Visitor Information and Education

(Acreage = 3,667.8 or 17% of USACE lands)

5.2.5.2 Wildlife Management

Wildlife management land classification is designated for stewardship of fish and wildlife resources.

Justification: On Nimrod Lake, areas classified as wildlife management lands consist of large tracts of land and shoreline areas where habitat improvement activities can be established to enhance the existing wildlife habitats. The areas classified contain sustainable habitat for native wildlife and will be managed for this purpose. The majority of these areas established are in locations that are accessible by road or water for the public. If these areas are developed as wildlife management in the future, hunting will be allowed, unless otherwise posted.

Nimrod Lake has large tracts of public land containing natural resources and wildlife. Throughout the 22,046-acre land base adjacent to Nimrod Lake, a variety of habitats occur including: closed canopy forest, glades, mature pine stands, agriculture fields, wildlife openings, alluvial flood plains, and riparian corridors. These diverse habitats require diversity of management actions to achieve habitat improvement for the benefit of wildlife and environmental sustainability. Viable habitats and healthy project lands require prudent management. Through classifying appropriate projects lands as Wildlife Management, they are protected from resource degradation and development while ensuring their continued health and sustainability by allowing quality management practices. The majority of lands classified as Wildlife Management are currently being managed for wildlife habitat. The AGFC has a license for wildlife management purposes for most of the total project acres. Much of the additional acres proposed for Wildlife Management have and continue to be managed by USACE personnel. Classifying 75% of the Nimrod Lake Project land base as Wildlife management will align the land classification with how the land has historically been managed along with projected future management practice.

Specific areas reclassified to Wildlife Management include portions of Brush Creek Future Park Area, Carter Cove Park, Highway 27 Future Park Area, Hogan Creek Park, Quarry Cove Park, River Road Park, Rover Park and Sunlight Bay Park. These recreation areas from the 1975 MP have been partially reclassified from High Density based on current land management practices and uses including hunting, fishing, trapping, timber management, and habitat management.

Resource Objectives: Natural Resource Management, Recreation, Environmental Compliance

(Acreage = 16,301.7 or 75% of USACE lands)

5.2.5.3 Vegetative Management

Vegetative management land classification is designated for stewardship of forest, prairie, and other native vegetative cover. The project has no land classified as Vegetative Management.

5.2.5.4 Future or Inactive Recreation Areas

Future or inactive recreation area land classification is for those land areas with site characteristics compatible with potential future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources.

The project has no Future or Inactive Recreation Areas. This plan suggests that if future recreation development is needed, this development will be accommodated either within the existing High Density classified land areas or on private property.

5.2.6 Water Surface Classification

Waters classified for particular purposes when the project administers a surface water zoning program.

5.2.6.1 Restricted

Surface waters are restricted for project operations, safety, and security purposes.

Justification: Restricted water surface classification areas are restricted due to USACE policy for safety and security. These areas include immediately above and below the dam and areas around the water intake structure. In addition, it is generally understood that areas near designated swim beaches are considered 'restricted' for swimmer safety.

Resource Objectives: General Management

(Acreage = 11.8)

5.2.6.2 Designated No Wake

Designated no wake surface waters are established to protect environmentally sensitive shoreline or recreational water access areas from disturbance and for public safety.

Nimrod Lake has no water surface area in this classification category; however, it is generally understood (i.e., posted and/or buoyed) and in accordance with state laws that areas near designated boat ramps, bridges, and other supporting structures are considered ‘no wake’ for boater safety.

5.2.6.3 Fish and Wildlife Sanctuary

Fish and wildlife sanctuary surface waters are where annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning are present.

Nimrod Lake has no water surface areas in this classification category.

5.2.6.4 Open Recreation Areas

Open recreation water surface classification is for those waters available for year-round or seasonal water-based recreation use.

Justification: On Nimrod Lake all water surface acres are classified as open recreation, with the exception of those classified as restricted.

Resource Objectives: Recreation, Natural Resources Management, Economic Impact, General Management

(Acreage = 3,574.8)

5.2.7 Project Easements

Project easements are for those lands for which the USACE holds an easement interest, but not fee title. Planned use and management of easement lands will be in strict accordance with the terms and conditions of the easement estate acquired for the project. Easements were acquired for specific purposes and do not convey the same rights or ownership to the USACE as other lands. The following types of easements were acquired for the Nimrod Project:

5.2.7.1 Operations Easement

USACE retains rights to these lands necessary for project operations (access, etc.). There are no operation easement lands on Nimrod Lake.

Resource Objectives: General Management, Recreation, Economic Impact, Natural Resource Management

(Acreage: 0 Acres)

5.2.7.2 Flowage Easement

The USACE retains the right to inundate these lands for project operations.

Justification: The flowage easement estate grants the Government the perpetual right to occasionally overflow the easement area, if necessary, for the operation of the reservoir; and specifically provides that, “No structures for human habitation shall be constructed or maintained on the land [...]”; and provides further that, “No other structures of any other type shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project.”

The flowage easements acquired for the operation of Nimrod Lake Project are typically applicable to that portion of the described property lying between the government fee line and elevation 378' msl on the lakeside of Nimrod Dam. There is an area on the south side of the lake where flowage easement is not at a specific elevation due to the flowage easement being retained over disposed tracts to the U.S. Forest Service. All affected parts and portions of Yell County roads located within the boundaries of the dam and reservoir areas as well as portions of State Highways 27, 28, and 60 are also covered by flowage easement. Flowage easement areas are indicated on the land classification maps in Appendix D.

Resource Objectives: General Management

(Acreage: 489.6 Acres)

5.2.7.3 Conservation Easement

USACE retains the rights to lands for aesthetic, recreation, and environmental benefits. There are no conservation easement lands on Nimrod Lake.

Chapter 6 Special Topics/Issues/Considerations

This chapter discusses the special topics, issues, and considerations the Project Delivery Team identified as critical to the future management of Nimrod Lake. Special topics, issues, and considerations are defined in this context as any problems, concerns, and/or needs that could affect or are affecting the stewardship and management potential of the lands and waters under the jurisdiction of the Nimrod Lake Project Office. For simplicity, the topics are discussed below under generalized headings.

6.1 Fourche La Fave River Minimum Flows

“Fourche La Fave River Minimum Flows” is described in detail in the Water Control Manual of 2002. In summary, it refers to a minimum typical release for water supply of about 15 to 20 cubic feet per second (cfs). However, releases will be reduced to 5 cfs when forecast indicates significant depletion of conservation pool. Fish and Wildlife is not a specifically authorized project purpose. However, NEPA (PL 91-190) commits the USACE Civil Works Program to involvement in stewardship of the environmental impacts within the project area. A minimum continuous release of 5 cfs to benefit downstream fisheries and wildlife is maintained as long as possible without depleting the conservation pool. The 5 cfs was based on observed flow at dam prior to construction. Releases may be reduced below 5 cfs during drought conditions, emergencies, or maintenance.

6.2 Water Supply

A water supply agreement is in place with Tri-County Regional Water System to utilize 143 acre-feet of storage in Nimrod Lake. The storage space is to be used to impound water for present demand or need for municipal and industrial water supply. It was authorized under easement to establish a water intake structure and backup water lines on Nimrod Lake, just east of the City of Plainview, for the purpose of withdrawing water to meet their supply demands. USACE maintains releases through the provisions of the Nimrod Dam Water Control Manual in order to satisfy the needs of the required water supply.

6.3 Periodic Drawdown and Seasonal Lake Levels for Fisheries Management

Fish and Wildlife is not a specifically authorized project purpose. However, NEPA prioritizes USACE’s involvement in stewardship of environmental impacts within the project area. Summarized below are examples of coordination activities which meet this goal. A minimum release is typically about 15 to 20 cfs, however, releases will be reduced to five cfs when forecasts indicate significant depletion of the conservation pool to continue benefits downstream for fisheries and wildlife. The five cfs was the observed minimum flow at the dam site prior to construction.

The AGFC requests lake drawdowns to elevation 337’ msl every four years or as possible with the flood control purposes of the lake. The purpose of the drawdowns is to enable them to plant sorghum-sudan grass hybrids, or other comparable vegetation in the lakebed to improve the water quality and fish habitat. The drawdowns also improve fish habitat through natural revegetation, increases spawns and benefit the overall fisheries in the lake. At the same time, USACE may complete work that cannot be performed at normal pool elevations, i.e. boat ramp repair, swim beach improvements, permanent buoy anchoring and work on the dam itself that needs to be done when the lake level is down.

Reservoir regulation procedures were changed several years ago to enable holding the pool level at 345’

msl. from 15 March to 15 May, during the spawning period for fish. This of course is not possible during flooding events.

6.4 Mobility Impaired Hunt

Nimrod Lake Project has been hosting a hunt for mobility impaired individuals since 2003. The goal of the hunt is to provide an opportunity for a quality hunting experience to some outdoor enthusiasts who may otherwise not be able to hunt due to a mobility impairment. This hunt has been coordinated through the Little Rock District Office in conjunction with other project hunts around the state to include several Vicksburg District hunts. Additionally, the hunt is coordinated with the AGFC to establish hunt dates and bag limits.

The hunt is conducted in areas where access can be controlled during the days leading up to the hunt. The hunt is currently being held in the Girl Scout Camp area, an area south of the dam, and in the County Line Overflow Camping area.

The hunt will be continued if interest and support continue. In addition to the current mobility impaired hunt, a special youth hunt may be offered in the future in an effort to expose more of today's youth to the outdoors.

6.5 Lloyd Millwood Green Tree Reservoir (GTR)

Lloyd Millwood Green Tree Reservoir was originally constructed in 1952. Over the years part of the levee, spillway, and gates were rebuilt. Although the land and water belong to the USACE, it is the responsibility on the AGFC to manage the wildlife resources and operate the levee system. The GTR is located approximately two miles southeast of Plainview, Arkansas, and contains approximately 2,400 acres bordering the north side of Nimrod Lake. The perimeter of the area is Highway 28 to the north, the lower duck pond road and the levee to the east, the upper duck pond road to the west, and Fourche La Fave River to the south. The levee is approximately 1.3 miles long with a spillway, two operating gates, and a center tube. There is also a concrete ramp on the south end of the levee so the GTR can be accessed during inundation.

At beginning of operation of the GTR, the AGFC used a pipe and pump to flood the area before waterfowl season. Over the years, the cost of operating the pump to flood the area has become unfeasible and for most years, the area is naturally flooded. The area is naturally flooded by many small creeks and drainages. This area had not been pumped since around 2005. The height of the water levels in the GTR is controlled by the operating gates and center tube. Management plans should include a cycle of when the operating gates and center tube will not be closed and the area is not flooded. Oftentimes during flood events, the lake will back over the levee from the downstream side due to high lake levels.

The terrain is flat with minor increases in elevation. The elevation ranges from 300-500 feet above sea level. The red oak component of the GTR is almost nonexistent and the vegetation now consists largely of water tolerant species. Restoration work needs to be completed to restore these valuable species to the area. Restoration work should also include drainage maintenance to restore natural flows to the area so the water can be evacuated as soon as possible.

6.6 Road Plan

A road plan will be developed in the future to determine which roads located on the project will be open and which roads will be closed. This will apply to all vehicles. The development of this plan will consider what is best for the project and reducing potential impacts. Public input and other agency input will be obtained before decisions are made on the road plan.

Chapter 7 Public and Agency Coordination

7.1 Introduction

No single agency has complete oversight of stewardship activities on the public lands and waters surrounding Nimrod Lake. Responsibility for natural resource and recreation management falls to several agencies that own or have jurisdiction over these public lands and waters.

Increasingly, competition for the use of these lands and waters and their natural resources can create conflicts and concerns among stakeholders. The need to coordinate a cooperative approach to protect and sustain these resources is compelling. Many opportunities exist to increase the effectiveness of Federal programs through collaboration among agencies and to facilitate the process of partnering between government and non-government agencies.

To sustain healthy and productive public lands and waters with the most efficient approach requires individuals and organizations to recognize their unique ability to contribute to commonly held goals. The key to progress is building on the strengths of each sector, achieving goals collectively that could not be reasonably achieved individually. Given the inter-jurisdictional nature of Nimrod Lake, partnering opportunities exist and can promote the leveraging of limited financial and human resources. Partnering and identification of innovative approaches to deliver justified levels of service defuse polarization among interest groups, and lead to a common understanding and appreciation of individual roles, priorities, and responsibilities.

To the extent practical, this Master Plan and a proactive approach to partnering will position Nimrod Lake to aggressively leverage project financial capability and human resources in order to identify and satisfy customer expectations, protect, and sustain natural and cultural resources and recreational infrastructure, and programmatically bring USACE management efforts and outputs up to a justified level of service.

Public involvement and extensive coordination within USACE and with other affected agencies and organizations is a critical feature required in developing or revising this Master Plan. In accordance with NEPA, ER 200-2-2, and ER/EP 1130-2-550, USACE initiated the environmental compliance and review process for the Nimrod Lake Master Plan revision. The following sections contain brief summaries of each phase of the public involvement and review process for the Nimrod Lake Master Plan revision.

7.2 Scoping

The process of determining the scope, focus, and content of a NEPA document is known as “scoping”. Scoping is a useful tool to obtain information from the public and governmental agencies. The Blue Mountain Lake and the Nimrod Lake Master Plans were completed concurrently. The Nimrod-Blue Mountain Master Plan Revision website was created to be the primary source of information during this time. Website information was provided through various sources, such as notification postcards, news releases, agency scoping letters, and media outreach. These sources invited individuals to visit the project website to find out more information about the Master Plan revision process and to solicit comments for scoping. As part of the initial phase of the NEPA process, a public scoping comment period was open for 45 days between March 16, 2023, and April 30, 2023, to gather agency and public comments on the Master Plan and issues that should be examined as part of the NEPA analysis.

In particular, the scoping process was used as an opportunity to get input from the public and agencies about the vision for the Master Plan update and the issues that the Master Plan should address. Participants were provided a comment card that asked for responses to specific questions in addition to providing general comments about the plans and the environmental review. The specific questions included:

- How would you like to see Nimrod Lake in 20 years?
- What changes, if any, would you like to see at the lake?
- What about Nimrod Lake is most important to you?
- What about Nimrod Lake is least important to you?
- Additional comments on the Master Plan revision or about issues that should be studied.

USACE published notice of the scoping workshops through an email notification, a direct mail postcard, press releases made available to several regional and local papers, flyers, a notice placed on Recreation 1 Stop (R1S) website, agency notification letters, and announcements on the Nimrod Lake Master Plan webpage. The email notifications and postcard notices were sent to adjacent landowners, holders of fishing permits purchased in Arkansas whose listed zip code is within seven miles of Nimrod Lake, stakeholders, and those that reserved campsites at Nimrod Lake campgrounds during the 2022 recreational season. Flyers were posted on bulletin boards at campgrounds and recreational facilities around the lake. Agency coordination letters were sent to potentially interested agencies.

The comment period was posted from March 16 to April 30, 2023. The comment period was announced on March 13, 2023, on the USACE webpage and through a news release.

Eighteen comment forms and letters were received during the comment period. A full breakdown of comments and analysis is available in the Scoping Report, which is Appendix A to the Environmental Assessment.

7.3 Draft Master Plan and Draft Environmental Assessment

Scheduled to be completed in the Summer of 2024.

7.4 Final Nimrod Lake Master Plan and Environmental Assessment

Scheduled to be completed in the Summer of 2025.

Chapter 8 Summary of Recommendations

8.1 Summary Overview

The previous chapters of this Master Plan describe actions necessary to manage Nimrod Lake's current and future challenges. Actions set forth in this plan can ensure the future health and sustainability of Nimrod Lake's natural resources while still allowing for continued use and development. The factors considered cover a broad spectrum of issues including, but not limited to, public use, environmental, socioeconomic, and manpower. Information on each one of these topics was thoroughly researched and discussed before any proposals were made.

This Master Plan is considered to be a living document, establishing the basic direction for development and management of the Nimrod project consistent with the capabilities of the resource and public needs. The plan is also flexible, in that supplementations can be achieved through a process, to address unforeseen needs. The Master Plan will be periodically reviewed to facilitate the evaluation and utilization of new information as it becomes available.

This Master Plan for Nimrod Lake will guide the comprehensive management and development of all project recreational, natural, and cultural resources throughout the life of the water resource project.

8.2 Land Classifications

As described in detail in Chapter 5, USACE strove to achieve balanced resource management in making the land classification decisions. The team took numerous factors and expressed public concerns into consideration when determining land classification for the Nimrod Lake Master Plan revision, which included but is not limited to: how lands were previously classified in 1975; what kind of development or non-development was taking place adjacent to USACE property; and what kinds of activities were taking place in those areas.

Table 8-1 and Table 8-2 provide overview information on what the land and water surface classifications were in the 1975 Master Plan and what the land and water surface Classification acreages are in the Preferred Alternative.

Table 8-1. Land and Water Surface Classification Acreages
Alternative 1-No Action (1975 Master Plan)

Land Classification		Acres
Project Operations		123.0
High Density Recreation		3,185.2
Environmentally Sensitive Areas		429.4
Low Density Recreation		14,257.9
Wildlife Management		3,684.1
No Allocation		12.2
Total Land Acreage		21,691.8
Water Surface:		
Restricted		11.8
Designated No-wake		0
Fish and Wildlife Sanctuary		0
Open Recreation		3,574.8
Total Water Acreage		3,586.6
Note: Acreages are approximate and are based on GIS data. Totals vary depending on changes in lake levels, sedimentation, and shoreline erosion.		

Table 8-2. Alternative 2-Preferred Land and Water Surface Classification Acreages

Land Classification	Acres
Project Operations	159.9
High Density Recreation	637.2
Environmentally Sensitive Areas	925.2
Low Density Recreation	3,667.8
Wildlife Management	16,301.7
No Allocation	0
Total Land Acreage	21,691.8
Water Surface:	
Restricted	11.8
Designated No-wake	0
Fish and Wildlife Sanctuary	0
Open Recreation	3,574.8
Total Water Acreage	3,586.6
Note: Acreages are approximate and are based on GIS data. Totals vary depending on changes in lake levels, sedimentation, and shoreline erosion.	

8.3 Recommendation

This proposed Master Plan presents an inventory of land resources and how they are classified, existing park facilities, an analysis of resource use, anticipated influences on project operation and management, and an evaluation of existing and future needs necessary to provide a balanced management plan for cultivating the value of the land and water resources. It is recommended that this Master Plan be approved as the basis for future development and management of the Nimrod Project land and water resources. Approval of the Master Plan is conveyed by the signing of Memorandum for Record and the Finding of No Significant Impact (FONSI) located within the Environmental Assessment (EA), Appendix A.

Chapter 9 Bibliography

- Agha, Andrew., and Thomas G. Whitley. 2011. *American Recovery and Reinvestment Act 2009 Section 110 Compliance for the U.S. Army Corps of Engineers, Little Rock District: Section 110 Survey of 2,519 Acres at Beaver, De Queen, Dierks, Gilham, Millwood, and Nimrod Lakes, Benton, Carroll, Little River, Polk, Sevier, and Yell Counties, Arkansas*. Brockington and Associates, Inc. Norcross, Georgia.
- Angelo, Diana. 2012. *Long Hollow Prescribed Burns-FY2012*. United States Department of Agriculture, Ouchita National Forest, Jessieville-Winona-Fourche Ranger District, Jessieville, Arkansas.
- Arey, Frank. 2018. Action at Devil’s Backbone. *Encyclopedia of Arkansas*, <https://encyclopediaofarkansas.net/entries/action-at-devils-backbone-1130/>, accessed 18 September 2023.
- Arkansas Department of Energy and Environment (ADEE). 2022a. “2022 Draft Impaired Waterbodies – 303(d) List.” Available at: <chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2022/2022-draft-impaired-waters.pdf>.
- ADEE. 2022b. “2022 Draft TMDL List.” Available at: <chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2022/2022-draft-tmdl-list.pdf>.
- Arkansas Game and Fish Commission (AGFC). 2023. “Fourche La Fave River.” Accessed on 31 July 2023. Available at: <https://www.agfc.com/en/zone-map/fishing-map/612/>.
- Arkansas Historic Preservation Program (AHPP). 1990. *Civilian Conservation Corps and the Works Progress Administration Historic District National Register Nomination Form*. On file, Arkansas Historic Preservation Program, Little Rock, AR.
- Arkansas Natural Heritage Commission (ANHC). 2023. “Elements of Special Concern by HUC12, Nimrod Lake Watershed.” Arkansas Department of Park, Heritage and Tourism. Little Rock, AR.
- Bailey, Garrick A. 2001. Osage. *Handbook of North American Indians*, Vol. 13, Part 1, edited by William Sturtevant, pp. 476-496. Smithsonian Institution, Washington, D.C.
- Bearden, Russell E. 2018. Japanese American Relocation Camps. In *Encyclopedia of Arkansas*, <https://encyclopediaofarkansas.net/entries/japanese-american-relocation-camps-2273/>, accessed 18 September 2023.
- Bolton, S. Charles. 1999. Slavery and the Defining of Arkansas. *The Arkansas Historical Quarterly* 58(1):1-23.
- Bolton, S. Charles. 2018. Louisiana Purchase through Early Statehood, 1803 through 1860. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/louisiana-purchase-through-early-statehood-1803-through-1860-398/>, accessed 18 September 2023.

- Buchner, C. Andrew, and Andrew Saatkamp. 2017. *Phase 1 Cultural Resources Survey for the Plainview Water Intake, Yell County, Arkansas*. Panamerican Consultants, Inc., Memphis, Tennessee.
- Carter, Cecile Elkins. 1995. *Caddo Indians: Where We Come From*. University of Oklahoma Press, Norman, Oklahoma.
- Carter, Cecile Elkins. 2018. Caddo Nation. *Encyclopedia of Arkansas*, <https://encyclopediaofarkansas.net/entries/caddo-nation-549/>, accessed 19 September 2023.
- Chandler, A., 2007. The Geologic Story of Petit Jean State Park: Arkansas State Geological Survey State Park Series 02, accessed at https://www.geology.arkansas.gov/docs/pdf/publication/state_park_series/geology-of-petit-jean-state-park.pdf, on September 27, 2023.
- Chapman, Carl H. 1974. *The Archeology of Missouri I*. University of Missouri Press. Columbia.
- Cole, Steve C. 2005. *Cultural Resources Reconnaissance and Inventory of 72 Army National Guard Local Training Areas in Arkansas*. Panamerican Consultants, Inc. Memphis, Tennessee.
- Curry, Patricia L. 2018. *Logan County*. Central Arkansas Library System, Little Rock, AR. <https://encyclopediaofarkansas.net/entries/logan-county-786/>. Accessed 18 September 2023
- DeBlack, Thomas A. 2018. Civil War through Reconstruction, 1861 through 1874. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/civil-war-through-reconstruction-1861-through-1874-388/>, accessed 18 September 2023.
- Fowler, Allison (Ed). 2005. "Arkansas Wildlife Action Plan." Arkansas Game and Fish Commission. Little Rock, AR. 1678 pp.
- Gannon, Tom. 1998. An Introduction to the Archaeology of Coal Mining in South Sebastian County Arkansas. *Field Notes* 284:9-13.
- Gilliam, J. Christopher. 1996. A View of Paleoindian Settlement from Crowley's Ridge. *Plains Anthropologist*, 41:273-286.
- Gleason, Mildred Diane. 2017. Dardanelle and the Bottoms: Environment, Agriculture, and Economy in an Arkansas River Community, 1918-1970. University of Arkansas Press, Fayetteville, Arkansas.
- Hendricks, Nancy. 2017. Flood of 1927. In *Encyclopedia of Arkansas*, <https://encyclopediaofarkansas.net/entries/flood-of-1927-2202/>, accessed 18 September 2023.
- Hoffman, Michael P. 1992. Protohistoric Tunican Indians in Arkansas. *The Arkansas Historical Quarterly*. Vol. 51:1; pp. 30-53. Arkansas Historical Association, Fayetteville, Arkansas.

- Horvath, Elizabeth A. 2018. *Cultural Resource Assessment Survey: Nimrod and Blue Mountain Lakes, FY17-NR-1 Area 1; FY17-NR-2 Area 2; FY17-BM-1 Logan and Yell Counties, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Horvath, Elizabeth A. 2019a. *Cultural Resource Assessment Survey: Nimrod Lake, FY18-NR-1 (Norman Hill), FY18-NR-2 (Hogan Creek), FY18-NR-3 (Whitten Place), and FY18-NR-4 (Rover Bottoms) Yell County, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Horvath, Elizabeth A. 2019b. *Cultural Resource Assessment Survey: Blue Mountain Lake, FY18.3-BM-1 (Area 1), FY18.3-BM-2 (Area 2), FY18.3-BM-3 (Area 3), and FY18.3-BM-4 (Area 4) Logan County, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Horvath, Elizabeth A. 2019c. *Cultural Resource Assessments Survey: Nimrod Lake, FY19.1-NR-1 (Area 1-Sunlight Bay), FY19.2-NR-2 (Area 2-Carter Cove), and FY19.1-NR-3 (Area 3-Quarry Cove), Perry and Yell Counties, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Horvath, Elizabeth A. 2019d. *Cultural Resource Assessment Survey: Nimrod Lake, FY18.3-NR-1 (Area 1), FY18.3-NR-2 (Area 2), FY18.3-NR-3 (Area 3), and FY18.3-NR-4 (Area 4) Yell County, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Horvath, Elizabeth A. 2020. *Cultural Resource Assessment Survey: Nimrod Lake, FY20.1 Perry County, Arkansas*. Archaeological Consultants, Inc. and Coastal Environments, Inc., Sarasota Florida and Baton Rouge, Louisiana.
- Jeter, Marvin D., Jerome C. Rose, G. Ishmael Williams Jr., and Anna M. Harmon. 1989. *Archeology and Bioarcheology of the Lower Mississippi Valley and Trans-Mississippi South in Arkansas and Louisiana*. Arkansas Archeological Survey Research Series No. 37. Prepared by the Arkansas Archeological Survey for the U.S. Army Corps of Engineers, Southwestern Division, Contract No. DACW63-84-C-0149. Available from the Arkansas Archeological Survey at <https://archeology.uark.edu/wp-content/uploads/2015/04/RS37.pdf>.
- Johnson, Ben. 2017. Modern Era, 1968 through the Present. In *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/modern-era-1968-through-the-present-405/>, accessed 18 September 2023.
- Kappler, Charles J. (editor). 1904. *Indian Affairs: Laws and Treaties*, Vol. 2. Government Printing Office, Washington D.C.
- Key, Joseph Patrick. 2020. European Exploration and Settlement, 1541 through 1802. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/european-exploration-and-settlement-1541-through-1802-2916/>, accessed 18 September 2023.

- Klinger, Timothy C. 2005. *Seeco, Inc. USA 5-26 #1-10 Drill Pad, Access Road, and Pipeline*. Historic Preservation Associates, LLC. Fayetteville, Arkansas.
- Kottek, Markus et al. 2006. "World Map of the Köppen-Geiger Climate Classification Updated. *Meteorologische Zeitschrift*". 15. 259-263. 10.1127/0941-2948/2006/0130.
- Kresse, T.M., Hays, P.D., Merriman, K.R., Gillip, J.A., Fugitt, D.T., Spellman, J.L., Nottmeier, A.M., Westerman, D.A., Blackstock, J.M., and Battreal, J.L., 2014, *Aquifers of Arkansas—Protection, management, and hydrologic and geochemical characteristics of groundwater resources in Arkansas*: U.S. Geological Survey Scientific Investigations Report 2014–5149, 334 p., <http://dx.doi.org/10.3133/sir20145149>.
- Lancaster, Guy. 2013. *Nimrod Dam and Lake*. Central Arkansas Library System, Little Rock, AR. <http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=2908>. Accessed 18 September 2023.
- Lancaster, Guy. 2015. *Pete Jean River*. Central Arkansas Library System, Little Rock, AR. <http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=6252>. Accessed 18 September 2023.
- Leatherman, Thomas L. 1978. *Nimrod Lake, Nimrod Lake: An Archaeological Survey of a Reservoir Drawdown*. Submitted by U.S. Army Corps of Engineers, AMASDA Survey ID 516. Copies available from the Arkansas Archeological Survey, Fayetteville, Arkansas.
- Lee, Aubra L., and Anne Frances Gettys. 1986. *Cultural Resources Survey: Sunlight Bay Recreational Area, Nimrod Lake, Arkansas*. Archeological Assessments, Inc.
- Mainfort, Robert C. Jr. 2020. Woodland Period. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/woodland-period-543/>, accessed 19 September 2023.
- Martin, William. 1981. *An Archeological Survey of the Proposed Wastewater Treatment Facility for the City of Plainview, Yell County, Arkansas*. Arkansas Archeological Survey, Fayetteville, Arkansas.
- McClurkan, Burney B. 1983. *Archeological Investigation of AHTD Job No. BR-75-2 Porter Creek Bridge and Approaches FAS Route 2539, Yell County*. Arkansas State Highway and Transportation Department.
- Miller, John. 1986. *An Archeological Survey of the Proposed Petit Jean River Bridges and Approached, AHTD Job Number R40058, Logan County, Arkansas*. Arkansas State Highway and Transportation Department.
- Missouri State Museum. 2020. Archaeology in Missouri. Missouri Archaeological Society. <https://www.missouriarchaeologicalsociety.org/archaeology-in-missouri>, accessed 18 September 2023.
- Mitchem, Jeffrey M. 2017. Hernando de Soto (1500?-1542). *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/hernando-de-soto-1770/>, accessed 18 September 2023.

- Mitchem, Jeffrey M. 2017a. Hernando de Soto (1500?-1542). *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/hernando-de-soto-1770/>. Accessed 18 September 2023.
- Mitchem, Jeffrey M. 2017b. Route of the De Soto Expedition. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/route-of-the-de-soto-expedition-7679/>. Accessed 18 September 2023.
- Moneyhon, Carl H. 2018. Post-Reconstruction through the Gilded Age, 1875 through 1900. In *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/post-reconstruction-through-the-gilded-age-1875-through-1900-402/>, accessed 18 September 2023.
- Morrow, Juliet E. 2011. Paleoindian Period. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/paleoindian-period-541/>, accessed 19 September 2023
- Morrow, Juliet E. 2013. Dalton Period. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/dalton-period-545/>, accessed 19 September 2023.
- Morrow, Juliet E. 2017. Sloan Site. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/sloan-site-3696/>, accessed 19 September 2023.
- Morse, Dan F. and Phyllis A. Morse. 1983. *The Archaeology of the Central Mississippi Valley*. Elsevier, Inc.
- National Park Service. 1992. Comprehensive Management and Use Plan: Trail of Tears National Historic Trail. United States Department of the Interior, Denver, Colorado.
- National Park Service. 2011. New Madrid and the Trail of Tears. National Park Service Trail of Tears Association, <https://www.nps.gov/trte/learn/historyculture/upload/new-madrid-exhibits-2011.pdf>, accessed 18 September 2023.
- National Park Service. 2020. Trail of Tears National Historic Trail. Electronic resource, <https://www.nps.gov/trte/index.htm>, accessed 18 September 2023.
- Oklahoma Historical Society. 2021. Removal of Tribes to Oklahoma. Electronic document, <https://www.okhistory.org/research/airemoval>, accessed 18 September 2023.
- Office of the State Geologist, 2024, Stratigraphic Summary of the Arkansas River Valley and Ouachita Mountains: Arkansas Department of Environment and Energy, accessed at <https://www.geology.arkansas.gov/geology/stratigraphic-summary-of-the-arkansas-river-valley-and-ouachita-mountains.html>, on January 25, 2024.
- Payne, Claudine. 2018. Mississippian Period. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/mississippian-period-544/>, accessed 19 September 2023.
- Perica, Sanja et al. 2013. "Precipitation-Frequency Atlas of the United States. Volume 9, Version 2.0. Southeastern States; Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi." National Oceanic and Atmospheric Administration. Silver Spring, Maryland.

- Radcliff, Maranda. 2017. Fort Chaffee. *Encyclopedia of Arkansas*, <https://encyclopediaofarkansas.net/entries/fort-chaffee-2263/>, accessed 18 September 2023.
- Remini, Robert Vincent. 2001. *Andrew Jackson and His Indian Wars*. Penguin Books, New York, New York.
- Sabo III, George. 1990a. Historic Europeans and Americans. In *Human Adaptation in the Ozark and Ouachita Mountains*, pp. 135-170. Arkansas Archaeological Survey, Fayetteville, Arkansas
- Sabo III, George. 1990b. Historic Native Americans. In *Human Adaptation on the Ozark and Ouachita Mountains*, pp. 120-121. Arkansas Archaeological Survey, Fayetteville, Arkansas.
- Sabo III, George, and Ann M. Early. 1990. Prehistoric Cultural History. In *Human Adaptation in the Ozark and Ouachita Mountains*, pp. 34-134. Arkansas Archaeological Survey, Fayetteville, Arkansas.
- Sabo III, George., and Anne M. Early, Jerome C. Rose, Barbara A. Burnett, Louis Vogeley, Jr. and James P. Harcourt. 1990. *Human Adaptation in the Ozark and Ouachita Mountains*. Arkansas Archeological Survey, Fayetteville, Arkansas.
- Sequoyah National Research Center (SNRC). 2022. *Journey of Survival: Indian Removal Through Arkansas*. Sequoyah National Research Center and Arkansas Natural and Cultural Resources Council, <https://www.journeyofsurvival.org/>, accessed 18 September 2023.
- Sloan, Kitty. 2019. Trail of Tears. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/trail-of-tears-2294/>, accessed 18 September 2023.
- Smith, Sandra Taylor. 1997. *The Civilian Conservation Corps in Arkansas, 1933-1944*. Arkansas Historic Preservation Program, Little Rock, AR
- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture: Official Soil Series Descriptions. Available online. Accessed June 30, 2023.
- Spurgeon, John. 2018. Trail of Tears National Historic Trail. *Encyclopedia of Arkansas*. <https://encyclopediaofarkansas.net/entries/trail-of-tears-national-historic-trail-4887/>, accessed 18 September 2023.
- Strausberg, Stephen, and Walter A. Hough. 1997. *The Ouachita and Ozark-St. Francis National Forests: A History of the Lands and USDA Forest Service Tenure*. General Technical Report SO-121. USDA, Forest Service, Southern Forest Experiment Station, New Orleans, LA.
- Tesce, Steven. 2017. *Blue Mountain Dam and Lake*. Central Arkansas Library System, Little Rock, AR. <http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=6558>. Accessed 18 September 2023.
- Thomas, Sunshine., et. al. 2022a. *Cultural Resources Assessment Survey of 438 Acres at Nimrod Lake in Yell County, Arkansas*. AmaTerra Environmental, Inc., Austin, Texas.

- Thomas, Sunshine., et. al. 2022b. *Cultural Resources Assessment of 384 Acres at Blue Mountain Lake in Yell County, Arkansas*. AmaTerra Environmental, Inc., Austin, Texas.
- Thomas, Sunshine., et. al. 2022c. *Cultural Resources Assessment of 1,011.1 Acres at Nimrod Lake in Perry and Yell Counties, Arkansas*. AmaTerra Environmental, Inc., Austin, Texas.
- Trubitt, Mary Beth. 2019. Archaic Period. Encyclopedia of Arkansas.
<https://encyclopediaofarkansas.net/entries/archaic-period-542/>, accessed 18 September 2023.
- U.S. Department of Agriculture (USDA). 1999. "Ozark-Ouachita Highlands Assessment: Aquatic Conditions. Gen. Tech. Rep. SRS-33." U.S. Department of Agriculture, Forest Service, Southern Research Station. 317 p. 10.2737/srs-gtr-33. Asheville, North Carolina.
- United States Department of Agriculture (USDA). 2006. *Land Resource Regions and Major Land Resource Areas of the United States, Caribbean, and the Pacific Basin*, U.S. Department of Agriculture Handbook 296. Copies available from Natural Resources Conservation Service.
- U.S. Fish and Wildlife Service (USFWS). 2023a. "List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project." U.S. Department of the Interior. Conway, AR. Accessed 21 March 2023.
- USFWS. 2023b. "National Wetlands Inventory – Surface Waters and Wetlands." Accessed 31 July 2023. Available at: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>.
- U.S. Forest Service, 2024, Minerals and Geology - Ozark-Ouachita Highlands Assessment: United States Department of Agriculture Forest Service Southern Research Station General Technical Report SRS-33, accessed at https://www.fs.usda.gov/detail/ouachita/learning/nature-science/?cid=fsm9_039810, on January 26, 2024.
- Wagner, D.M., and Whaling, A.R., 2018, Bathymetry and Storage Capacity of Nimrod Lake, Arkansas: U.S. Geological Survey data release, <https://doi.org/10.5066/F7TD9WBV>.
- Weinstein, Richard A., Erin E. Phillips, et. Al. 2019. *Cultural Resources Investigations of Corps of Engineers Managed Lands in Arkansas and Missouri: Blue Mountain, Bull Shoals, Clearwater, DeQueen, Dierks, Greers Ferry, Millwood, MKARNS, Nimrod, and Ozark Pool Project Areas*. Coastal Environments, Inc., Baton Rouge, Louisiana.
- Whayne, Jeannie. 2020. Early Twentieth Century, 1901 through 1940. *Encyclopedia of Arkansas*.
<https://encyclopediaofarkansas.net/entries/early-twentieth-century-1901-through-1940-403/>, accessed 18 September 2023.
- Williams, Barbara. 1993. *An Archeological Survey of a Proposed Timber Project in Compartments 472, 273, 474, 475, 476, and 477. Fourche Mountain Ecosystem Management Area Fourche Ranger District Yell County, Arkansas*. United States Department of Agriculture, Forest Service Ouachita National Forest, Hot Springs, Arkansas.

- Woods, A.J. et al. 2004. "Ecoregions of Arkansas (color poster with map, descriptive text, summary tables, and photographs)." U.S. Geological Survey. Reston, Virginia (map scale 1:1,000,000).
- Woods A.J., Foti, T.L., Chapman, S.S., Omernik, J.M., Wise, J.A., Murray, E.O., Prior, W.L., Pagan, J.B., Jr., Comstock, J.A., and Radford, M., 2004, Ecoregions of Arkansas (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).
- Young, Gloria A. and Michael P. Hoffman. 2001. Quapaw. In *Handbook of North American Indians*, Vol. 13, Part 1, edited by William Sturtevant, pp. 497-514. Smithsonian Institution, Washington D.C.

Appendix A NEPA Documents

Appendix B Nimrod Lake Prior Design Memorandums and Supplements

<u>Supplement #</u>	<u>Date Submitted</u>	<u>Date Approved</u>	<u>Description</u>	<u>Location</u>
Design Memorandum #1-D Supplement #1 A	8-Jul-83	23-Aug-83	AGFC has requested a change to annual water level control plan for Nimrod lake to Improve the reproductive success of early fish spawning.	
Design Memorandum #1-D Supplement #1 B	30-Sep-83	29-Nov-83	Reallocate 80 acres of land from Operations: Recreation-Low Density Use to Project Operations Municipal Water Treatment as shown on enclosed Plate 4.	
Design Memorandum #1-D Supplement #2	26-Dec-84	15-Jan-85	Update park site plans to reflect existing recreational facilities and minor site plan revisions.	
Design Memorandum #1-D Supplement #3	4-Feb-86	27-Feb-86	Identify the location of a proposed new access road to Sunlight Bay Park.	Sunlight Bay Park
Design Memorandum #1-D Supplement #4	25-May-89	12-Jun-89	Identify the proposed relocation boat launching ramp site at County Line Park as shown on the enclosed Plate 9.	County Line Park
Design Memorandum #1-D Supplement #5	13-Sep-91	3-Oct-91	Indicate the proposed expansion of the Plainview City Park. City of Plainview has requested an additional 2.2 acres be added to the existing city park lease.	Plainview City Park

Appendix C Recreation Area Maps

Appendix D Land Classification Maps