# *McClellan-Kerr Arkansas River Navigation System*

## *Arkansas River*

# *LITTLE ROCK DISTRICT MASTER PLAN FOR DEVELOPMENT AND MANAGEMENT OF THE MKARNS*

**Final: July 2023**

CESWL-DE (1110-1-1804f) 5 July 2023

MEMORANDUM FOR RECORD

SUBJECT: Approval of the McClellan-Kerr Arkansas River Navigational System (MKARNS) Master Plan Revision, dated July 2023

1. References:

a. Finding of No Significant Impact (FONSI) – McClellan-Kerr Arkansas River Navigation System Master Plan Revision Environmental Assessment, July 2023

b. Final Environmental Assessment – Little Rock District Master Plan Revision, McClellan-Kerr Arkansas River Navigation System, July 2023

2. The McClellan-Kerr Arkansas River Navigational System (MKARNS) Master Plan Revision is approved. Enclosed is the MKARNS Master Plan.

3. This memorandum for record serves as the approval of the MKARNS Master Plan Revision.

4. My point of contact for this memorandum for record is Mr. John "Tyler" Mays, Project Manager for PPMD (CESWL-PM), at (501) 324-5657 or John.T.Mays@usace.army.mil.

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# Commonly Used Acronyms and Abbreviations

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

FPMS – Floodplain Management Services
FR – Federal Register
FRM – Flood Risk Management
FS – Feasibility Study
FSM – Feasibility Scoping Meeting
FUDS – Formerly Used Defense Site
FUSRAP – Formerly Utilized Sites Remedial Action Program
FY – Fiscal Year
FYI – For Your Information
FYSA – For Your Situational Awareness
GI – General Investigations
GIS – Geographic Information Systems
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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# Executive Summary

The McClellan-Kerr Arkansas River Navigation (MKARNS) Master Plans have been historically different from other Little Rock District Master Plan updates because they were previously divided into five (5) sections: (1) Pools 1, 2, 3; (2) Pools 4, 5, and 6; (3) Pools 7, 8, 9, and 13; (4) Ozark Jetta-Taylor Lock and Dam; and (5) Dardanelle Dam and Lake and later combining pools 1-6. The MKARNS Master Plans were first approved in:

- April of 1966, (Design Memorandum [DM] No. 7 Master Plan (Locks and Dams Nos 1, 2, 3, and 4))
- 1967, (DM No 10, Master Plan (Lock and Dam Nos. 5 and 7 and David D. Terry Lock and Dam))
- May of 1968, (DM-10, Master Plan, Recreation (Locks and Dams Nos. 8, 9, and 13))
- January of 1959, Lake Dardanelle (DM-13-1, Preliminary Master Plan)
- June of 1964 for Ozark Jetta Taylor Lock and Dam (DM 6-1, Preliminary Master Plan).

Subsequent revisions were prepared over time to consolidate these into four Master Plans, with the latest revisions approved in 1976 and 1977. This Master Plan is a combination of the 1976 and 1977 MKARNS Master Plans creating a comprehensive Regional Master Plan that will address the portion of the MKARNS that is under the jurisdiction of the Little Rock District Office.

The Master Plan is intended to serve as a guide for the orderly and coordinated development, management, and stewardship of all lands and water resources of the project. It presents data on existing conditions, anticipated recreational use and facilities needed to service anticipated use, sensitive resources requiring protection, and an estimate of future requirements. Since the 1976 and 1977 Master Plan revisions, public use and development in the MKARNS region has not occurred as anticipated on the project's public lands and resources. Based on elapsed time and the need to recognize current management practices within the project, as well as new guidance and directives within U. S. Army Corps of Engineers (USACE), these actions have dictated the preparation of this Master Plan revision.

This revised Master Plan presents an inventory of land resources and their associated classification, existing park facilities, an analysis of resource use, anticipated influences on project operation and management, and an evaluation of future and reasonably foreseeable needs as required to provide a balanced management plan for cultivating the value of the land and water resources while carrying out the project's primary missions. Included in the revised Master Plan is an evaluation of expressed public opinion and updated resource use objectives and land classifications. The format used for this plan is outlined in Engineer Pamphlet (EP) 1130-2-550 (change 5, dated 30 January 2013), which sets forth policy and procedures for preparing and revising project Master Plans. A full list of the MKARNS' original Master Plans (formally Design Memorandums [DMs]) and all subsequent Master Plan revisions and prior supplements can be found 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. Three alternatives were developed during the revision process and are described at length in the EA and may also be found in chapter five of this MP. Per NEPA guidance, the revision process included thorough public engagement. Comment summary reports and all feedback may be found as appendices to the EA. If no significant impacts due to Federal action are determined upon completion of the Master Plan revision process, the FONSI and a Memorandum for Record (MFR) will be signed signifying the end of the revision process and approval of the revised Master Plan.

# Chapter 1 Introduction

## 1.1 Project Purpose

The MKARNS is a multiple purpose project created for the primary purpose of navigation. The system is operated for the primary purpose of navigation and additionally hydropower for Dardanelle and Ozark Jetta-Taylor Locks and Dams, with secondary consideration of recreation, and fish and wildlife, water supply and irrigation to the extent that those additional purposes do not adversely affect navigation, or potential future authorized purposes of the project.

## 1.2 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, build infrastructure, and eventually operate the Arkansas River Basin project. Initial authorization for the overall project included the primary operating purpose of Navigation. Primary operating purposes for other sections of the project include hydroelectric power generation at Lake Dardanelle and Ozark Jetta-Taylor Lock and Dam as well as irrigation for Wilbur D. Mills Lock and Dam No. 2 and Charles D. Maynard Lock and Dam No. 5. Subsequent authorizations for the MKARNS include recreation, fish and wildlife, water supply, and irrigation. Authorized purposes for Lake Dardanelle Lock and Dam and Ozark Jetta-Taylor Lock and Dam previously included flood control; however, flood control was deleted from the plan of development during the post authorization phase.

Lock and Dam Nos. 1, 2, 3, 4, 5, and 6; Lock and Dam Nos. 7, 8, 9, and 13; Ozark Jetta-Taylor Lock and Dam and Lake, and Dardanelle Lock and Dam were all authorized by the River and Harbor Act of 24 July 1946 for navigation, as part of a comprehensive plan for navigation, flood control, and hydroelectric power generation. The Act approved the multi-purpose project recommended in the report to the Chief of Engineers dated 20 September 1945 and letter of the Chief of Engineers dated 19 March 1946. The report and letter are contained in House Document No. 758, Seventy-ninth Congress, second session. The Arkansas River project has been named the McClellan-Kerr Arkansas River Navigation System (MKARNS), honoring Senators John L. McClellan from Arkansas and Robert S. Kerr from Oklahoma. Several of the Lock and Dam structures have been renamed since completion.

The MKARNS project authorizations include the following:

- The Rivers and Harbor Act of 1946 (Public Law 79-525). This Act initially authorized the development of the Arkansas River and its tributaries for the purpose of navigation, flood control, hydropower, fish and wildlife, and recreation.
- Flood Control Act of 1946 (Public Law 100-202). This Act provided for the use of the MKARNS project for water supply and irrigation purposes.

## 1.3 Purpose and Scope of Master Plan

This Master Plan replaces:

- Design Memorandum No.8, 1976. "Locks and Dams Norrell, Nos 2, 3, 4, 5 and David D. Terry"
- Design Memorandum No. 9, 1976. "Locks and Dams Murray, Toad Suck Ferry, and Nos, 9 and 13, "Updated Master Recreation Plan for Navigation Pool and Development and Management Updated Master Recreation Plan for Navigation Pool Development and Management"
- Design Memorandum No. 6-3, 1977. "Ozark Jetta Taylor Lock and Dam, Updated Master Plan for Development and Management of Ozark Lake"
- Design Memorandum No. 13-4, 1977. "Updated Master Recreation Plan for Development and Management of Lake Dardanelle"

Regulation and guidance for Master Plan revisions are provided by Engineer Regulation (ER) and Engineer Pamphlet (EP) 1130-2-550; and Engineer Manual (EM) 1110-1-400.

The Master Plan is the strategic land use management document that guides the comprehensive management and development of all project's 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 the project lands, waters, and associated resources. The Master Plan is a dynamic operational document projecting what is proposed to 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 was developed and is kept current for Civil Works projects operated and maintained by the USACE and will include all land (fee, easements, or other interests) originally acquired for the MKARNS project within the Little Rock District and any subsequent land (fee, easements, or other interests) acquired to support the operations and authorized missions of the combined MKARNS project.

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 plan. However, specific issues identified through the Master Plan revision process can still be communicated and coordinated with the appropriate internal USACE resource (i.e., Operations for shoreline management) or external resource agency (i.e., Arkansas Natural Resources Division and Arkansas Department of Energy and Environment for water quality) responsible for that specific area.

## 1.4 Brief Watershed and Project Description

The Arkansas River begins high in the Rocky Mountains of Colorado. The river descends the eastern slopes of the Continental Divide as a clear mountain stream, flowing through the breathtaking Royal Gorge on a long journey to the Mississippi River. The Arkansas River moves into the wheat lands of Kansas and then meanders through the oil-rich northern Oklahoma before it crosses the border into Arkansas. In the 1,450-mile journey, the Arkansas River drains an area of 160,000 square miles. The MKARNS was authorized by Congress in the River and Harbor Act of July 24, 1946, and construction began in 1957 to secure navigation along the Arkansas River. The 445-mile Navigation System along the river reached Little Rock in December 1968, Fort Smith in December 1969, and the Port of Catoosa, the head of the Navigation System, in December of 1970. This Master Plan will cover the portion of the MKARNS that is under the jurisdiction of the Little Rock District Office.

The total area along the MKARNS project managed by the Little Rock District is 46,430.7 acres of land, and 46,163.6 acres of water surface, with a total of 92,594.3 acres combined. Boundary miles of fee land for the MKARNS system within the Little Rock District totals 722.3 miles. Additionally, there are 88,194.8 acres in flowage easements. (Note: acreage figures exist throughout this document that were derived from GIS data, which is more accurate and based on improved technology versus the deed language which was derived many years ago without the aid of current technology present during the revision of this Master Plan).

## 1.5 Listing of Prior Design Memorandum

A listing of prior design memorandums and accompanying supplements are provided in a table in Appendix B. A list of supplements to the preceding Master Plans is also provided in Appendix B and with the release of this Master Plan, are incorporated into this document.

## 1.6 Pertinent Project Information

The following tables provide pertinent information regarding pool and Lock and Dam information along the MKARNS within the Little Rock District, USACE.

Table 1-1 Pertinent Project Information

| Lock and Dam | *Elevation of Navigation Pool (Feet) | Intermittent Drainage area (Sq. Miles) | Surface Area at Normal Pool (acres) | Dam Navigation Mile (NM) | Dam Spillway Length (feet) |
|---|---|---|---|---|---|
| James W. Trimble Lock and Dam 13 | 391 | 2,463 | 6,240 | 292.8 | 1,050 |
| Ozark-Jetta Taylor Lock and Dam 12 | 370 | 1,153 | 10,600 | 256.8 | 900 |
| Dardanelle Lock and Dam 10 | 336 | 1,865 | 31,100 | 205.5 | 1,210 |
| Ormond Lock and Dam 09 | 284 | 1,283 | 4,910 | 176.9 | 840 |
| Toad Suck Lock and Dam 08 | 265 | 1,437 | 4,130 | 155.9 | 1,120 |
| Murray Lock and Dam 07 | 249 | 1,372 | 9,700 | 125.4 | 980 |
| David D. Terry Lock and Dam 06 | 231 | 291 | 4,730 | 108.1 | 1,190 |
| Colonel Charles D. Maynard Lock and Dam 05 | 213 | 249 | 6,680 | 86.3 | 1,050 |
| Emmett Sanders Lock and Dam 04 | 196 | 99 | 5,680 | 66 | 1,190 |
| Joe Hardin Lock and Dam 03 | 182 | 241 | 3,670 | 50.2 | 1,260 |
| Lock 2 | 162 | 1,539 | N/A | 13.3 | N/A |
| Wilbur D. Mills Dam 02 | 162 | 1,539 | 10,600 | **40.5 (ORM) | 1,120 |
| Norrell Lock and Dam 01 | 143.0 | N/A | 143 | 10.3 | 277 |
| Montgomery Point 00 | 115.0 | N/A | N/A | 0.6 | 300 |

*Minimum pool elevations to maintain a 9 ft. navigation channel, MSL
**(ORM)Original River Mile

Table 1-2 Fee and Easement Acreage by Pool

| | Fee Land (acres) | *Fee Water Surface (acres) | Flowage Easement (acres) | Operation Easement (acres) | Conservation Easement (acres) |
|---|---|---|---|---|---|
| Pool 00 | 1,111.2 | 212.8 | -- | 360.3 | -- |
| Pool 1 | 562.0 | 213.7 | -- | -- | -- |
| Pool 2 | 6,047.3 | 3,314.9 | 19,900.1 | 1,521.8 | -- |
| Pool 3 | 341.6 | 82.4 | 4,229.0 | 60.9 | -- |
| Pool 4 | 1,035.8 | 270.9 | 3,848.6 | 347.4 | -- |
| Pool 5 | 947.8 | 250.6 | 3,537.0 | 1,473.6 | -- |
| Pool 6 | 956.8 | 405.8 | 1,780.7 | 14.1 | -- |
| Pool 7 | 299.4 | 66.2 | 9,524.4 | 31.4 | -- |
| Pool 8 | 483.8 | 219.8 | 5,490.9 | 891.9 | 19.6 |
| Pool 9 | 449.7 | 544.8 | 4,466.2 | 1,238.6 | -- |
| Pool 10 | 25,065.6 | 31,809.0 | 8,603.8 | 316.5 | -- |
| Pool 12 | 8,452.2 | 8,700.6 | 21,986.0 | 725.1 | -- |
| Pool 13 up to District Boundary | 677.36 | 71.9 | 4,828.1 | 894.5 | -- |
| **Total** | 46,430.7 | 46,163.6 | 88,194.8 | 7,876.1 | -- |
| *Based on conservation pool or Navigation pool elevation. | | | | | |

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

## 2.1 Description of Project and Navigation Pools

The McClellan-Kerr Arkansas River Navigation System (MKARNS) was the largest civil works project ever undertaken by the USACE at the time of its opening in 1971. The 445-mile-long system begins at the confluence of the White River and the Mississippi River, proceeds 10 miles upstream on the White River to the manmade Arkansas Post Canal, and then 9 miles through the canal to the Arkansas River. The Navigation System then crosses the State of Arkansas into Oklahoma on the Arkansas River to the mouth of the Verdigris River at Muskogee, Oklahoma. The Navigation System terminates 51 miles upstream on the Verdigris River at the Port of Catoosa near Tulsa, Oklahoma. The MKARNS is comprised of 18 locks and dams with a total elevation lift of 420 feet. Through Oklahoma and Arkansas, dams and training structures (i.e., dikes and revetments) artificially deepen and widen this modest-sized river to create a series of pools and a commercially navigable body of water. The design enables traffic to overcome an elevation difference of 420 ft between the Mississippi River and the Tulsa Port of Catoosa. The McClellan-Kerr channel sustains commercial barge traffic and offers passenger and recreational use.

This Master Plan addresses the portion of the MKARNS from the mouth of the White River to the Oklahoma State Line, which is operated by the USACE Little Rock District. This area encompasses 308 navigation miles and includes 13 pools formed by 13 locks and dams, an additional dam, Wilbur D. Mills Dam, which helps form Pool 2, two hydropower plants operated by USACE, three Arkansas Electric Cooperative Corporation (AECC) powerplants, and one powerplant operated by the City of North Little Rock.

The MKARNS shoreline varies from steep bluffs and tree-lined banks to open farmland and level fields. The lower MKARNS, from Little Rock to the mouth of the White River, is relatively low and flat and consists of alluvial soils. The area adjacent to the river is marshy and intermittently wooded, varying from dense growths of hardwood timber to willow growths and open fields. Oxbow lakes occur quite extensively. The major land use is agricultural, and the only major cities are Little Rock, North Little Rock, and Pine Bluff.

The upper MKARNS from Little Rock to Fort Smith is bordered by the Boston Mountains to the North, and the Ouachita Mountains to the South. The river meanders between these mountain ranges on a predominately flat alluvial plain. The following sections describe each pool.

### 2.1.1 Montgomery Point Lock and Dam, Pool 0:

The Montgomery Point Pool begins at Navigation Mile (NM) 0.5, near the mouth of the White River, and extends upstream to Norrell Lock and Dam, NM 10.3. The dam spillway is 300 ft in length, with 10 hinged crest gates, each 30 ft. wide by 13 ft. tall. Adjacent lands are heavily forested with bottomland hardwood. The upper end of the pool is surrounded by the White River

National Wildlife Refuge, and Trusten Holder Wildlife Management Area. There are no developed recreation areas on this pool.

### 2.1.2 Norrell Lock and Dam, Pool 1:

Pool 1 begins at NM 10.3 and enters the Arkansas Post Canal at Norrell Lock and Dam. It extends to NM 13.3 at Lock 2. The dam spillway is a non-gated weir 277 ft. in length. A narrow band of project lands exist along each bank of the canal for construction and maintenance, and along the access road from Lock 2 to Norrell Lock. Adjacent to Norrell Lock and Dam is Wild Goose Bayou Access, the only recreation area associated with this pool. This portion of the canal is surrounded by White River National Wildlife Refuge and Trusten Holder Wildlife Management Area.

### 2.1.3 Lock 2 and Wilbur D. Mills Dam 2, Pool 2:

Pool 2 begins at Lock 2, NM 13.3, and extends up the canal to NM 19, where it reenters the Arkansas River at NM 19. The pool continues upstream to Joe Hardin Lock and Dam, NM 50. Wilbur D. Mills Dam 2 is located on the Arkansas River, just downstream of the canal entrance. Wilbur D. Mills Dam contains a non-federal hydropower plant owned and operated by AECC. The dam spillway is 1,120 ft in length with 16 tainter gates, each 60 ft wide and 30 ft tall. The lower portion of this pool includes project lands associated with Merrisach Lake, the construction of the Arkansas Post Canal, and Wilbur D. Mills Dam. The upper pool is marked with wide bends and frequent oxbow lakes and backwaters. Adjacent lands are predominantly heavily forested, cultivated crop land, or hay fields. Recreation areas associated with this pool includes Merrisach Lake Park, Moore Bayou Park, Notrebes Bend Park, Pendleton Bend Park, Jardis Point Park, Wilbur D. Mills Park, Big Bayou Meto Access, and Little Bayou Meto Access. Significant tributaries to this pool include Big Bayou Meto and Little Bayou Meto.

### 2.1.4 Joe Hardin Lock and Dam, Pool 3:

Pool 3 begins at Joe Hardin Lock and Dam, NM 50, and proceeds upstream to Emmett Sanders Lock and Dam, NM 65. The dam spillway is 1,260 ft in length with 18 tainter gates, each 60 ft wide and 25 ft tall. Adjacent lands are predominately open cultivated fields with narrow bands of forested areas, and oxbow lakes. Minimal project lands exist, which were primarily purchased for recreation. Recreation areas associated with Pool 3 includes Huffs Island Access, Rising Star Park, and Trulock Park. Significant tributaries to this pool include Plum Bayou.

### 2.1.5 Emmett Sanders Lock and Dam, Pool 4:

Pool 4 begins at Emmett Sanders Lock and Dam, NM 66, and proceeds upstream to Maynard Lock and Dam 5, NM 86. The dam spillway is 1,190 ft in length with 9 tainter gates, at 60 ft wide by 28 ft tall and 8 tainter gates, at 60 ft wide by 23 ft tall. The Pine Bluff Marine Terminal is located on Pool 4 adjacent to the Lock and Dam. The primary duties are to support navigation & hydropower with infrastructure repairs and maintenance. Mission essential staff and equipment at this location provides mission support to multiple business lines providing storage, operations maintenance capabilities, and floating plant dock operations keeping interstate

commerce available along the Arkansas River. The existence of commercial harbor facilities and the potential for future development exists in this area due to the proximity of the city of Pine Bluff. Adjacent lands are a mixture of forested and open cultivated farmlands. This area contains heavily forested undeveloped project lands near NM 77 adjacent to an old river cutoff and on Boyd Point in the back water area of Lake Langhofer. Recreation areas associated with Pool 4 are Sheppard Island Access and Ste. Marie Park.

### 2.1.6 Colonel Charles D. Maynard Lock and Dam, Pool 5:

Pool 5 begins at Colonel Charles D. Maynard Lock and Dam, NM 86.3, and proceeds upstream to David D. Terry Lock and Dam, NM 108. The dam spillway is 1,050 ft in length with 15 tainter gates, each 60 ft wide by 31 ft tall. Immediately upstream of the lock and dam are a number of private residences and cabins along the river shoreline, many with private boat docks permitted under Section 10. Entergy, an electric utilities company, owns a significant amount of adjacent property in conjunction with the White Bluff Power Plants near Redfield, AR. The remaining adjacent lands are predominately a mixture of forest, hayfields, and croplands. There are large oxbow lakes and backwater areas along this stretch of the Arkansas River. Recreation areas associated with Pool 5 include Dam Site 5 West Park, Lock 5 Access and Tar Camp Park. This area contains large parcels of project lands which are only accessible from the water. A Significant tributary for this pool is Pennington Bayou.

### 2.1.7 David D. Terry Lock and Dam, Pool 6:

Pool 6 begins at David D. Terry Lock and Dam, NM 108, and proceeds upstream to Murray Lock and Dam, NM 125. The dam spillway is 1,190 ft in length with 17 tainter gates, each 60' wide and 27' tall. This stretch of the Arkansas River passes through the Little Rock/North Little Rock metropolitan area. The riverbanks are highly developed commercially for navigation, private development for boat storage, as well as for public recreation and enjoyment. Features adjacent to the riverbanks of this pool includes the William J. Clinton Presidential Library, the Central Arkansas River Trail, Riverfront Park, Witt Stephens Nature Center, and the Arkansas Inland Maritime Museum. Recreation areas on Pool 6 include Dam Site 6 East Access, Dam Site 6 West Park, Willow Beach, Burns Park, and Murray Park. Significant tributaries to this pool include Fourche Creek.

### 2.1.8 Murray Lock and Dam, Pool 7:

Pool 7 begins at Murray Lock and Dam, NM 125 and proceeds upstream to Toad Suck Lock and Dam, NM 156. The dam spillway is 980 ft in length with 14 tainter gates (60 ft wide by 24 ft tall). This Lock and Dam contains a non-federal hydropower plant owned and operated by the City of North Little Rock. The Dam supports a portion of the "Big Dam Bridge", a project designed and constructed for Pulaski County by the USACE Little Rock District, and formerly known as the Pulaski County Pedestrian and Bicycle Bridge. The Big Dam Bridge, a 4,226-foot pedestrian and bicycle bridge, spans the Murray Lock and Dam. It is the longest pedestrian and bicycle bridge in North America and connects over 40 miles of scenic riverside trails between Little Rock and North Little Rock. Recreation areas on Pool 7 include La Harpe View Park, Cooks Landing Park, Maumelle Park, Palarm Creek Park, and Bigelow Park. Significant

tributaries within this pool include the Palarm Creek, Maumelle River, Little Maumelle River and the Fourche La Fave River. The area adjacent to the river valley is mountainous and intermittently covered with predominately hardwood timber. Land near the damsite is heavily populated with numerous residential developments. Where topography is suitable, land situated in nonurban locations is commonly used for agricultural purposes in this area.

### 2.1.9 Toad Suck Lock and Dam, Pool 8:

Pool 8 begins at Toad Suck Lock and Dam, NM 156 and proceeds upstream to Arthur V. Ormond Lock and Dam, NM 176.9. The dam spillway is 1,120 ft in length with 16 tainter gates, each 60 ft wide and 24 ft tall. MKARNS Project has a total of four floating plants that can travel up and down the MKARNS Project. Duties include supporting the marine terminal staff with navigation and hydropower infrastructure maintenance projects and regular navigation channel dredging operations to support interstate commerce along the McClellan Kerr Arkansas River Navigation SystemThe portion of the Arkansas River included in Navigation Pools 8 and 9 is contained in a relatively narrow valley. A system of levees exists that protect largely agricultural lands. Recreation areas on Pool 8 include Old Ferry Landing, Toad Suck Park, Cadron Settlement Park, Cypress Creek Access, and Point Remove Park. Significant tributaries for this pool include Cadron Creek and Point Remove Creek.

### 2.1.10 Arthur V. Ormond Lock and Dam, Winthrop Rockefeller Lake (Pool 9):

Winthrop Rockefeller Lake begins at Arthur V. Ormond Lock and Dam, NM 176.9 and proceeds upstream to Dardanelle Lock and Dam, NM 205.5. The dam spillway is 990 ft in length with 14 tainter gates, each 60 ft wide and 35 ft tall. This lock and dam contain a non-federal hydropower plant, owned and operated by AECC. A major feature on this pool is the Holla Bend National Wildlife Refuge, a 7,000-acre refuge bounded by an old oxbow lake created when the USACE cut a channel through the bend in the river to promote navigation. This land was transferred to the U.S. Fish and Wildlife Service (USFWS). Recreation areas on Pool 9 include Cherokee Park, Sequoya Park, Pontoon Park, Sweeden Island Access, and Holla Bend (future/inactive recreation area). A significant tributary associated with this pool is Petit Jean River.

### 2.1.11 Dardanelle Lock and Dam, Lake Dardanelle (Pool 10):

Lake Dardanelle was formed by the construction of Dardanelle Lock and Dam. The project includes the Arkansas River from NM 205.5, and proceeds upstream to Ozark Lock and Dam, NM 256.8. A federally owned and operated hydropower plant was constructed in conjunction with Dardanelle Lock and Dam. The dam spillway is 1,210 ft in length with 20 tainter gates, each 50 ft. wide and 39 ft. tall. It is the tallest dam on the Arkansas River. The Dardanelle Marine Terminal is located on Pool 10 adjacent to the Lock and Dam. The primary duties are to support navigation & hydropower with infrastructure repairs and maintenance. Mission essential staff and equipment at this location provides mission support to multiple business lines providing storage, operations maintenance capabilities, and floating plant dock operations keeping interstate commerce available along the Arkansas River. The lower one-third of the lake is surrounded by the tree covered, rocky slopes of the Boston Mountains. The upper two-thirds of the project is bordered by a broad, flat, fertile alluvial valley. Numerous clear water streams

enter the Arkansas River within the Lake Dardanelle Pool. Several of these streams create large embayments with clear waters to include the Illinois Bayou, Big Piney Creek, and Shoal Creek and are enjoyed by water related recreation enthusiasts. Recreation areas on Lake Dardanelle are abundant and may be found in section 2.15.2 of this chapter as well as Appendix D C Park Maps.

The Federal lands surrounding Lake Dardanelle are under a lease for fish and wildlife management purposes with the Arkansas Game and Fish Commission (AGFC) to operate as Lake Dardanelle Wildlife Management Area. In addition, the AGFC manages a number of Special Use Areas on Lake Dardanelle for waterfowl moist soil units, waterfowl rest areas, and boat ramp access areas.

Lake Dardanelle is operated in accordance with the Lake Dardanelle Shoreline Management Plan (SMP). The SMP establishes rules and guidelines for managing private uses of shoreline areas such as private boat docks and vegetation modifications and must be compatible with the MKARNS Master Plan.

### 2.1.12 Ozark Jetta-Taylor Lock and Dam, Ozark Lake (Pool 12):

Ozark Lake was formed by the construction of Ozark Jetta-Taylor Lock and Dam. The project includes the Arkansas River from NM 256.8 to 292.8. The dam spillway is 900 ft in length with 15 tainter gates, each 50 ft wide and 46 ft tall. This lock and dam contain a federally owned and operated hydropower plant. The river valley in the vicinity of the lake is bounded on the north by the Boston Mountains of the Ozark Plateau and on the south by the Fourche Mountains of the Ouachita Province. The topography of the lands around the lake is level to undulating with many long sharp ridges and broad-top conical hills and mountains rising above the plain. Large grape vineyards reminiscent of the European Rhineland dot the surrounding countryside. Two of the largest wineries in Arkansas are located at nearby Altus. A main tributary on this pool is the Mulberry River, which has been designated as a National Wild and Scenic River. Recreation areas are abundant on Ozark Lake and may be found in the section 2.15.2 of this chapter as well as Appendix D Park Maps.

The Federal lands surrounding Ozark Lake are under a lease for fish and wildlife management purposes with the AGFC to operate as Ozark Lake Wildlife Management Area.

### 2.1.13 James W. Trimble Lock and Dam, John Paul Hammerschmidt Lake (Pool 13):

John Paul Hammerschmidt Lake includes the Arkansas River from NM 292.8 to NM 308.7, at which point the Little Rock District ends and the Tulsa District begins. The lock and dam also contain a non-federal hydropower plant owned and operated by AECC. The pool is in a wide alluvial plain and oxbow lakes are frequent. Land near the dam on the right descending bank is suburban, on the left descending bank it is rural and is used principally for agricultural purposes, while near the Arkansas-Oklahoma State line land is highly populated with many residential and commercial developments are evident. Recreation areas associated with Pool 13 within the Little Rock district include Springhill Park, Haroldton Access, Lee Creek Access, and Fort Smith Park.

## 2.2 Hydrology (Surface Water and Groundwater)

The Arkansas River at the confluence of the Mississippi River has a drainage area of 160,576 square miles. Prior to entering Arkansas, the river flows through Colorado, Kansas, and Oklahoma, and receives runoff waters from New Mexico, Colorado, Kansas, Texas, and Oklahoma. The drainage area of the river within Arkansas encompasses 10,409 square miles. Significant tributaries entering the Arkansas River within the state from an upstream to downstream direction include Lee Creek, Mulberry River, Pine Creek, Point Remove Creek, Six Mile Creek, Petit Jean River, Fourche LaFave River, Cadron Creek, Maumelle River, Little Maumelle River Fourche Creek, Plum Bayou, Little Bayou Meto, and Big Bayou Meto.

Major tributary drainage areas entering the MKARNS include Lee Creek (451 square mile watershed) entering the river at Navigation Mile (NM) 302.4; Petit Jean River (1,083 sq. mi.) entering at NM 187; Fourche LaFave River (1,116 square miles) entering at NM 146.5; and Big Bayou Meto, draining an area of 998 square miles and entering the MKARNS at NM 31.2. Surface water of the MKARNS is managed by upstream Oklahoma reservoirs and the series of Locks and Dams in the system.

Available groundwater along the MKARNS study area also comes largely from alluvial aquifers of the Arkansas and the Mississippi River. These high yielding aquifers consist of sand, gravel, silt and clay. The highest yielding water storage is found in the Mississippi River Alluvial Plain Section physiographic region from Little Rock to the confluence of the MKARNS with the Mississippi River. The Ozark Plateau Province and the Ouachita Mountain Province Aquifer systems in northwestern Arkansas also provide groundwater resources along the study area. The alluvium aquifer adjacent to the MKARNS is currently providing domestic water supply to local communities.

## 2.3 Sedimentation and Shoreline Erosion

In the western part of Arkansas, rainfall runoff from the steeper terrain picks up sediments that then flow into the Arkansas River and its local tributaries. As the river meanders downstream through an alluvial plain with a gradual slope that flattens as it flows eastward, sedimentation buildup can become prevalent in certain pools, particularly Lake Dardanelle. High velocity runoff events can lead to an increase in the sediment load in the river. If rain events cause the river to spill its bank, sediment deposits are left once the river levels recede back to normal pool elevations. Alternatively, decreased flows may cause scouring in some areas within the river channel.

The high flows on the MKARNS also have potential to cause shoreline erosion, particularly in the alluvial plains that contain soft soils with a high concentration of sand and silt. Evidence in this shoreline erosion can be seen in the oxbow lakes along the Arkansas River. As sediment deposits in the river channel, the river will naturally find an easier path and erode a new course. The USACE manages this erosion and sedimentation with dredging and scour structures to keep sediment in the river moving downstream. Tapered discharges following high flows may be used to scour the river channel and prevent the need for dredging. However, tapering discharges can cause unwanted sediment scour and erosion as well concentrating the flow of the river and increasing water velocity in the river channel despite having a smaller quantity of water.

## 2.4 Water Quality

Historically, the Arkansas River was a 'polluted' stream, even prior to city and industrial development along its banks. This 'pollution' was in the form of natural pollution such as silt, sediment, and dissolved minerals from upstream watershed runoff containing varied sources of contaminants. The completion of the MKARNS has led to great improvements in water quality primarily through a reduction in salt and sediment contents due to the settling out of these substances in the pools formed by the series of dams in the navigation system.

Overall surface water quality in the MKARNS area is good, and the river has water quality suitable for primary and secondary contact, fisheries, domestic, industrial, and agricultural water supply, as designated by the Arkansas Department of Energy and Environment (ADEE). The Arkansas River water quality standards are determined by ADEE, based on watershed size and ecoregion characteristics that influence overall water quality. Specific water quality standards for the river, and all other waters of the state, are outlined in ADEQ Regulation Number 2, titled Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas. Water quality standards are designed to enhance the quality, value, and beneficial uses of the water resources of the State of Arkansas; aid in the prevention, control, and abatement of water pollution; provide for the protection and propagation of fish and wildlife; and provide for recreation in and on the water. To maintain water quality, ADEE establishes permit limitations on point source discharges of municipal and industrial wastes into the state surface water. Compliance is attained by having a network of ambient water quality monitoring stations in all regions of the state, which are sampled monthly. There are 11 ambient water quality monitoring stations on the Arkansas River, with locations above and below Ft. Smith, Ozark, Russellville, Morrilton, Conway, Little Rock, David D. Terry Lock and Dam, Colonel Charles D. Maynard Lock and Dam, Pine Bluff, and Post Canal.

Section 303(d) of the Clean Water Act requires states to list waters that do not meet Federal water quality standards or have a significant potential not to meet standards as a result of point source dischargers or non- point source run-off. Subsequent to listing on the 303(d) list, the statute requires that the states develop and set the Total Maximum Daily Load (TMDL) for water bodies on the list within 13 years. A TMDL establishes the maximum amount of a pollutant that can enter a specific water body without violating the water quality standards. Values are normally calculated amounts based on dilution and the assimilative capacity of the water body.

## 2.5 Project Access

Major transportation corridors follow the Arkansas River through the state. Interstate 40 parallels the left descending bank of the Arkansas River from Fort Smith to Little Rock. Interstate 530 parallels the right descending bank from Little Rock to Pine Bluff and is followed by US Highway 65 to Dumas. A network of state and county roads provide access on both sides of the river, as well as bridge access at multiple locations throughout the project. (Reference Figure 2-1)

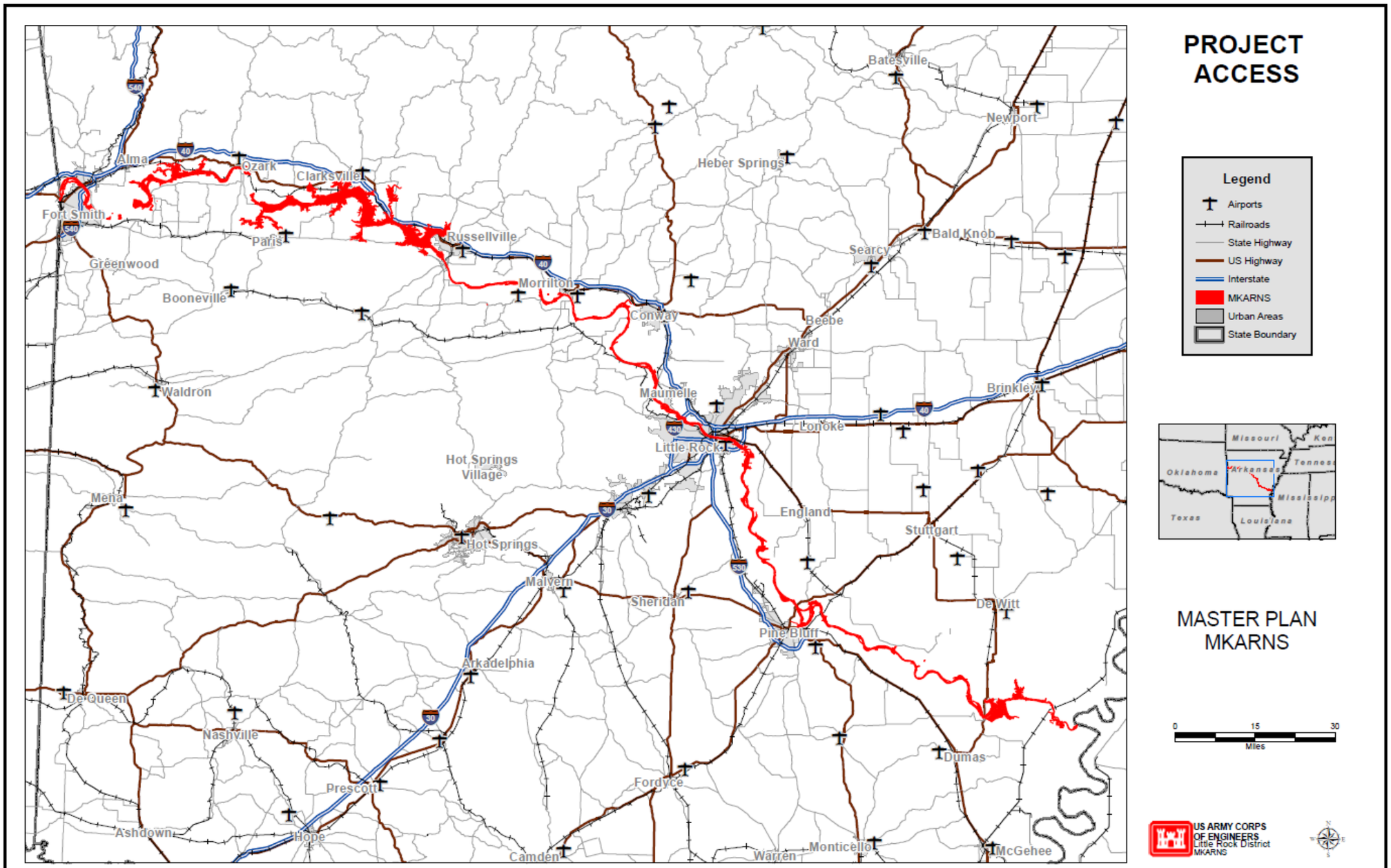



Figure 2-1 Arkansas River Project Access Map (Source: USACE)

## 2.6 Climate

Climate within the MKARNS watershed is temperate, with summer extremes lasting for longer periods throughout central and southeast Arkansas, and winter temperatures being more influential in the zone's western reaches in higher elevations of the river corridor. Extremes may vary from lows around 0°F in the winter months to highs above 100°F occurring from western Arkansas to central portions of the state during the summer months. Extreme temperatures may occur for short periods of time at any location within the state. Heavy rainfall events are common. Average annual rainfall in the western portion of the state is around 46 inches, with slight increases in the central and southeast portions (varies from 48 to 50 inches). Monthly rainfall varies from 2.5 inches in the winter months to about 5 inches in the spring. Snowfall each year averages from 3 to 6 inches, with the heavier amounts occurring in the western portion of the state. Snowpacks are usually short lived and are not commonly a concern for flooding.

Climate change became an area of concern due to the potential for effects on numerous aspects of the environment, especially those related to water resources. The U.S. Global Change Research Program (USGCRP) summarized information regarding climate change and its potential effects in regional assessments. In the Midwest, which extends from Minnesota to Missouri, extreme events such as heat waves, droughts and heavy rainfall events were projected to occur more frequently. Should these events become significant to impact the operation of the MKARNS, the Master Plan, and associated documents (i.e., Operations Management Plan and Shoreline Management Plan) will be reviewed and revised, if necessary.

## 2.7 Topography, Geology, and Soils

### 2.7.1 General Geology and Topography

The MKARNS project areas cross two physiographic provinces and three distinct physiographic sections. Physiographic divisions are based on landforms, not on climate or vegetation (Fenneman, 1916), and therefore have distinct soils, topography, and geology. The most eastern, lower Arkansas River project sites (David D Terry Lock and Dam 6; Col Charles D Maynard Lock and Dam 5; Emmett Sanders Lock and Dam 4; Joe Hardin Lock and Dam 3; Wilbur D. Mills Dam 2; Norrell Lock and Dam 1; and Montgomery Point Lock and Dam) reside in the Mississippi Alluvial Plain section of the Coastal Plain Province, with the western project sites residing in either the Ouachita Mountains (Arthur V Ormond Lock and Dam 9; Toad Suck Ferry Lock and Dam 8; and Murray Lock and Dam 7) or Arkansas Valley (James W Trimble Lock and Dam 13; Ozark Jetta-Taylor Lock and Dam 12; and Dardanelle Lock and Dam 10) sections of the Ouachita Province.

The Coastal Plain Province is described generally as a surface with low relief and contains all alluvial plains within its limits including the Mississippi Alluvial Plain. The Mississippi Alluvial Plain is a broad, relatively flat floodplain with deep alluvial soils, which, in general have poor drainage. The flat, deep soils and poor drainage allow for conditions that are suitable for wetlands; however, most of the natural wetlands have been cleared for cultivation. The Coastal Plain and Ouachita Provinces are separated by a distinct erosional scarp; this scarp marks the

contact between the Paleozoic Rocks of the Ouachita Province and the Tertiary sediments of the Coastal Plain Province.

The Ouachita Province includes both the Arkansas Valley section and the Ouachita Mountains. The Ouachita Province is described as having greater elevation and ruggedness as compared with neighboring areas. The Ouachita Mountains are an east-west trending mountain range where the valleys primarily consist of shales and the ridges primarily consist of competent sandstone, chert, and novaculite. The Arkansas Valley section consists of the land area flanking the Arkansas River and is located between the Ouachita Mountains and the Ozark Plateau and, in some respects, includes geological features typical of both. The Arkansas River and its tributaries have eroded the sediments of the Ouachita Mountains and Ozark Plateau creating isolated mountains surrounded by broad, rolling uplands. Additionally, the river has created wide bottomlands and flat terraces that are typical of a large floodplain.

The Mississippi Alluvial Plain consists of essentially flat-lying unconsolidated alluvial sediments (sands and gravels, silts, and clays) of Quaternary age that were deposited by the historic Mississippi River and its tributaries. The Quaternary-age sediments are poorly consolidated Tertiary sediments, which are marginal marine and coastal plain continental deposits (McFarland, 1998). The east-west trending Ouachita Mountains are composed of complexly folded Early Ordovician through Middle Pennsylvanian age sedimentary rocks (McFarland, 1998). The Arkansas Valley is dominated by Pennsylvanian-age clastic sediments that were deposited on the margin of a continental shelf primarily by deltas (McFarland, 1998). The area is dominated by broad synclines and are often the most prominent topographic feature within the Valley (McFarland, 1998).

### 2.7.2 Topography

Elevation within the MKARNS project's boundaries ranges from approximately 125 ft above mean sea level (msl) to approximately 692 ft above msl, with the highest elevations occurring in the western project boundaries, above Ozark Jetta-Taylor Lock and Dam 12, and the lowest elevations occurring in the eastern project boundaries, above Montgomery Point Lock and Dam. The average elevation among all project boundaries is approximately 321 feet above msl.

### 2.7.3 Soils

Soils within the MKARNS fall into either the Arkansas Valley and Ridges or the Bottom Lands and Terraces major soils groups (U.S. Soil Conservation Service, 1982). The Generalized Soil Map (STATSGO; Soil Survey Staff, 2022a) was used to identify the soils around the MKARNS and the Official Soils Series Descriptions were used for the generalized soil descriptions (Soil Survey Staff, 2022b).

#### 2.7.3.1 Arkansas Valley Section Soils

The sites within the Arkansas Valley section soils (James W Trimble Lock and Dam 13, Ozark Jetta-Taylor Lock and Dam 12, and Dardanelle Lock and Dam 10) are, in general, composed of Bruno, Enders, Leadvale, Linker, Muskogee, Perry, Roxana, and Spadra soil series. The Bruno

series consists of very deep, excessively drained, rapidly permeable soils and are formed in sandy alluvium on the flood plains of the Mississippi River and its tributaries (Soil Survey Staff, 2022b). The Enders series consists of deep, well drained, very slowly permeable soils that formed in loamy and clayey residuum from shale, or interbedded shale and sandstone. These soils are on nearly level to moderately steep upland mountaintops and ridges and gently sloping to very steep mountain side slopes and foot slopes (Soil Survey Staff, 2022b). The Leadvale series consists of deep to very deep, moderately well drained soils with a fragipan. These soils formed in silty materials in uplands or local silty alluvium from nearby uplands underlain largely by shale and siltstone or in places by sandstone, phyllite, and slate and are typically located on slightly concave toe slopes, benches, and terraces (Soil Survey Staff, 2022b). The Linker series consists of well-drained, fine-loamy, siliceous materials located in pasture that had previously been cultivated (Soil Survey Staff, 2022b). The Mountainburg series consists of shallow, well-drained, cobbly fine sandy loam, located on forested slopes of 20 percent (soil Survey Staff, 2022b). The Perry series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium and are located on level to gently undulating alluvial plains of the Arkansas River and their distributaries (Soil Survey Staff, 2022b). The Roxana series consists of very deep, well drained, moderately permeable soils that formed in loamy alluvium of Permian Red Bed origin and are located on level to undulating natural levees (Soil Survey Staff, 2022b). The Spadra series consists of deep, well drained, moderately permeable soils formed in loamy alluvium and are located on stream terraces (Soil Survey Staff, 2022b).

#### 2.7.3.2 Ouachita Mountains Section Soils

The sites within the Ouachita Mountains section soils (Arthur V Ormond Lock and Dam 9, Toad Suck Ferry Lock and Dam 8, and Murray Lock and Dam 7) are, in general, composed of Bruno, Carnasaw, Ceda, Enders, Leadvale, Linker, Muskogee, Perry, Roxana, and Spadra soil series. Only the soil series that differ, i.e., Carnasaw and Ceda, from the Arkansas Valley section soils will be described here; see "2.7.3.1 Arkansas Valley Section Soils" for the other soil series descriptions. The Carnasaw series consists of deep, well drained, slowly permeable upland soils that are formed in residuum weathered from shale of Pennsylvanian age. These gently sloping to steep soils are on side slopes of forested uplands of the Ouachita Mountains and the Arkansas Valley and Ridges (Soil Survey Staff, 2022b). The Ceda series consists of very deep, well drained, rapidly permeable soils that formed in loamy alluvium. These nearly level to very gently sloping soils are on flood plains of the Ouachita Mountains and the Arkansas Valley and Ridges (Soil Survey Staff, 2022b).

#### 2.7.3.3 Mississippi Alluvial Plain Section Soils

The sites within the Mississippi Alluvial Plain section soils (David D Terry Lock and Dam 6, Col Charles D Maynard Lock and Dam 5, Emmett sanders Lock and Dam 4, Joe Hardin Lock and Dam 3, Wilbur D Mills Dam 2, Norrell Lock and Dam 1, and Montgomery Point Lock and Dam) are, in general, composed of Bruno, Commerce, Perry, Rilla, and Sharkey soil series. Only the soil series that differ, i.e., Commerce, Rilla, and Sharkey, from the Arkansas Valley or Ouachita Mountains section soils will be described here; see "2.7.3.1 Arkansas Valley section soils" or "2.7.3.2 Ouachita Mountains section soils" for the other soil series descriptions. The Commerce series consists of deep, somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvial sediments and are located on level to undulating alluvial plains of

the Mississippi River and its tributaries (Soil Survey Staff, 2022b). The Rilla series consists of very deep, well drained, moderately permeable soils that formed in reddish silty and loamy alluvium and are located on nearly level to gently sloping natural levees along the present and abandoned channels of the Arkansas River (Soil Survey Staff, 2022b). The Sharkey series consists of very deep, poorly and very poorly drained, very slowly permeable soils that formed in clayey alluvium and are located on flood plains and low terraces of the Mississippi River (Soil Survey Staff, 2022b).

## 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 Operation Management Plans (OMP). The OMP is a five-year management plan setting forth detailed information required to implement the concepts set forth in the master plan. 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

The development of the MKARNS resulted in an increase in fisheries habitat and a diverse species composition. AGFC is the primary agency responsible in regulating and managing the fishery and through these efforts multiple species of fish are well-established. Project waters provide habitat for largemouth bass, white and striped bass, crappie, blue catfish channel and flathead catfish, green sunfish, red ear sunfish, bluegill and other sunfish species, sauger, carp, buffalo, gar, drum, and paddlefish. Paddlefish populations have decreased over past years primarily due to fishing for caviar production; however, AGFC has since implemented seasonal and commercial licensing regulations to facilitate population stability. Non-game species include a variety of minnows, shad, and silversides, as well as mussels and numerous invertebrates also inhabit the MKARNS. Additionally, the Pallid Sturgeon inhabits the lower White River and pools of Arkansas River just downstream of Lock and Dam 2. In 1990, this species was included on the endangered species list.

AGFC monitors fish populations through electro-shocking, netting, and observing commercial fishermen. These sampling techniques aid in determining age composition, species densities and health characteristics. In the past the AGFC operated a 100-acre nursery pond near Knoxville, Arkansas that was constructed on Lake Dardanelle. Potential plans for this area may include consideration for other restricted fishing and hunting purposes.

Numerous bass tournaments are held on MKARNS each year. The Annual Big Bass Bonanza is the largest yearly bass tournament, ranging across the state from Fort Smith to Dumas, Arkansas. While smaller community tournaments may be found at virtually any boat ramp on the river throughout the week, the Arkansas State Parks has constructed a professional quality tournament area to host regional and national tournaments. It consists of a multi-lane launching ramp, multiple parking areas and a weigh-in facility at Lake Dardanelle State Park, Russellville area. The facility was greatly needed, as no local State Park or USACE facility could efficiently handle large bass tournaments that are becoming increasingly popular on the project.

Wildlife management objectives are directed towards providing optimum recreational use by both the consumptive and non-consumptive users while maintaining natural resources. The management objectives are accomplished in a collaborative effort with the AGFC through the designation Lake Dardanelle and Ozark Lake public lands as a Lake Dardanelle and Ozark Lake Wildlife Management Areas (WMA). All fee land encompassing Lake Dardanelle and Ozark Lake are under a license agreement with AGFC to create and managed these two WMAs. Most of the fee land in Pools 0-9, and 13 is contained in the recreation areas and around the damsites. The management for wildlife in these small, scattered areas is restricted to habitat improvement practices which will invite small mammals, birds, and both game and non-game species. Some management applications include planting native tree species including mast producing oak and hickory species, timber stand improvement methods, and mowing to maintain open habitat for wildlife. Project personnel are responsible for forest management, wildlife habitat improvement, and administration of agricultural and grazing lease programs for wildlife enhancement on fee owned land.

Wildlife habitat management will be applied to accommodate a diversity of wildlife. Habitats which are considered vital, as well as threatened or endangered species of plants and animals on MKARNS, will be protected. From Pool 3 through Pool 6, multiple perennial plant species have been planted in low volume areas to increase wildlife habitat. The primary animal species managed on the project include white-tailed deer, gray and fox squirrels, gray and red fox, cottontail and swamp rabbit, interior least tern, bald eagle, eastern wild turkey, bobwhite quail, ducks and a variety of migratory waterfowl and non-game bird species. White-tail deer, small game, and waterfowl are the primary species hunted on MKARNS. There has been an increased emphasis on small game management by the AGFC on Lake Dardanelle and Ozark Lake. Several open grassland areas along these two lakes have been managed for the benefit of small game species and are utilized for hunting.

Some species, such as beaver and resident populations of Canada geese, have become overpopulated in certain areas and must be managed to control populations. Management efforts have been made to trap beavers in areas where they have occluded drainage areas and damaged desirable trees. Canada geese populations have contributed to sanitary problems on the beach and recreation areas around MKARNS. Black vultures have also become a nuisance to the public, causing damage to vehicles and USACE infrastructure. In some instances, the U.S. Department of Agriculture has provided humane measures to reduce flock growth and stabilize local geese populations as well as provided measures to increase deterrence or reduce the black vulture populations.

Many avian species migrate during peak times along the Arkansas River. White pelicans, cormorants, gulls, and other species migrate during peak winter months. The population density for bald eagles is high at MKARNS and can be observed year-round along the project land and waters. The common migratory waterfowl species visiting MKARNS include mallard, pintail, wigeon, gadwall, shoveler, scaup, ringneck, wood duck, teal, goldeneye, mergansers, bufflehead, and other duck species. Waterfowl hunters, both in and out of state, travel to hunt waterfowl along project land and waters. A positive economic impact is created from waterfowl hunting in the lower pools where habitat and agriculture practices assists the attraction of migrating

waterfowl. Waterfowl management areas on Ozark Lake and Lake Dardanelle also assist in attracting waterfowl to allow for public access for hunting or provide rest areas for the waterfowl. From the 1990's through early 2000's, six waterfowl areas were constructed under partnerships agreements with the AGFC, NRCS, Ducks Unlimited, and USACE. Three of these areas serve as waterfowl rest areas and three allow for waterfowl hunting. These areas are operated and managed by the AGFC under partnerships with USACE. Five waterfowl areas are located on Lake Dardanelle and include Johnson County Waterfowl Rest Area, Bob Young/Carbon City Waterfowl Rest Area, Horsehead Waterfowl Rest Area, Potters Pothole Waterfowl Unit, McKennon Bottoms Waterfowl Unit, and Dyer Lake Waterfowl Unit, located on Ozark Lake in Pool 12.

### 2.8.2 Vegetative Resources

In general, most lands along the Arkansas River are privately owned, therefore, a majority of land-use planning is outside the jurisdiction of the Federal Government. Most fee owned property is located around Ozark Lake and Lake Dardanelle. Lower land elevations along the Arkansas River are generally used for agriculture, and the upper elevations are usually forested. Over 75 species of trees have been reported on MKARNS, including at least 14 oak species. Dominant evergreens are eastern red cedar and short leaf pine, with dominating hardwood species comprised of eastern cottonwood, sweetgum, box elder, elm species, green ash, willow oak, and water oak. Reference Figure 2-2 for a map displaying the vegetative cover around the MKARNS.

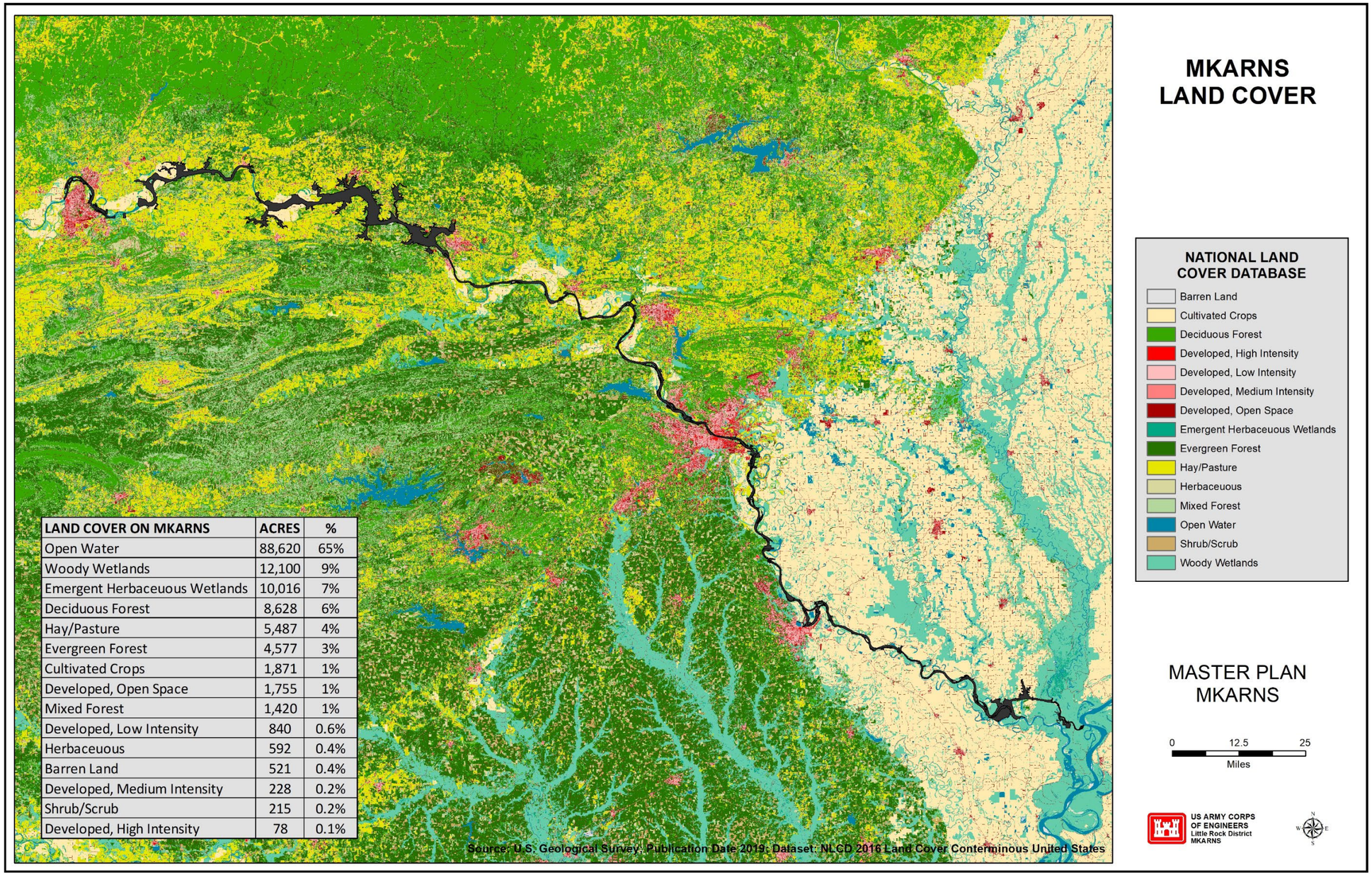
Vegetation adjacent to the Arkansas River are those typical of a major bottom system. Major forest vegetation types occurring in these areas include green ash, box elder, eastern cottonwood, water oak, willow oak, hackberry (*Celtis occidentalis*), black willow (*Salix nigra*), river birch (*Betula nigra*), roughleaf dogwood (*Cornus drummondii*), gray dogwood (*Cornus racemose*), flowering dogwood (*Cornus florida*), red mulberry (*Morus rubra*), overcup oak (*Quercus lyrate*), shumard oak (*Quercus shumardii*), native pecan (*Carya illinoinensis*), bur oak (*Quercus macrocarpa*), and associated midstory and understory species.

Vegetation along the flat, gradual tributaries is those typically associated with minor bottom systems. Dominant vegetative types in these areas include water oak, pin oak (*Quercus palustris*), willow oak, shumard oak, cherrybark oak (*Quercus pagoda*), overcup oak, bur oak, green ash, sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*), red mulberry, black willow, elm, water hickory (*Carya aquatica*), swamp privet (*Forestiera acuminata*), and associated midstory and understory species.

Narrow tributary streams descending from adjacent mountain ranges are dominated by upland hardwoods, shortleaf pine, or mixed upland pine-hardwood. Examples of upland hardwoods would include white oak (*Quercus alba*), post oak (*Quercus stellata*), southern red oak (*Quercus falcata*), northern red oak (*Quercus rubra*), blackjack oak (*Quercus marilandica*), mockernut hickory (*Carya tomentosa*), black gum (*Nyssa sylvatica*), and eastern red cedar with a variety of midstory and understory species such as flowering dogwood, pawpaw (*Asimina triloba*), black cherry (*Prunus serotina*), and elm.

Wildflowers on moist and less exposed sites include trillium (*Trillium*), trout lily (*Erythronium Americanum*), mayapple (*Podophyllum*), solomons-seal (*Polygonatum*), bellwort (*Uvularia grandiflora*), geranium (*Geranium*), columbine (*Aquilegia*), bloodroot (*Sanguinaria*), phlox (*Phlox*), golden ragwort (*Packera aurea*), and violets (*Viola*). Wildflowers found on dry sites include wild verbena (*Verbena bonariensis*), phlox, spiderwort (*Tradescantia*), birdsfoot violet (*Viola pedate*), bluet (*Houstonia*), false garlic (*Nothoscordum*), prickly pear cactus (*Opuntia*), sunflowers (*Helianthus*), goldenrod (*Solidago*), asters (*Aster*), and blazing star (*Liatris*).

The Arkansas River Valley provides nutrient rich soils which allow for the success of Arkansas' agriculture industry. Large portions of land along the river valley are utilized for row crop production purposes, with major products being wheat, soybeans, and corn in the upper portions and cotton, rice, wheat, soybeans, and corn in the lower portions of the project. Some fee land is leased for agricultural purposes. Theses leases are utilized for livestock grazing, hay, or row crop production under the USACE, Land-Use Regulations. In 2022, there were approximately 6,212 acres on MKARNS under the agriculture and grazing lease program and the majority of this acreage occurs around Lake Dardanelle and Ozark Lake.




| LAND COVER ON MKARNS | ACRES | % |
|---|---|---|
| Open Water | 88,620 | 65% |
| Woody Wetlands | 12,100 | 9% |
| Emergent Herbaceuous Wetlands | 10,016 | 7% |
| Deciduous Forest | 8,628 | 6% |
| Hay/Pasture | 5,487 | 4% |
| Evergreen Forest | 4,577 | 3% |
| Cultivated Crops | 1,871 | 1% |
| Developed, Open Space | 1,755 | 1% |
| Mixed Forest | 1,420 | 1% |
| Developed, Low Intensity | 840 | 0.6% |
| Herbaceuous | 592 | 0.4% |
| Barren Land | 521 | 0.4% |
| Developed, Medium Intensity | 228 | 0.2% |
| Shrub/Scrub | 215 | 0.2% |
| Developed, High Intensity | 78 | 0.1% |

Figure 2-2 Land Cover along the Arkansas River Study Area

### 2.8.3 Threatened & Endangered Species

There are many species in the Arkansas River Valley that are listed as threatened or endangered. Species become imperiled for a variety of reasons including over-hunting, over-fishing, water impoundment, and habitat loss because 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. According to USFWS, there is a total of nine endangered, seven threatened, and one candidate species that may occur on MKARNS Project lands (**Error! Reference source not found.**).

Formal (e.g., programmatic biological opinion) and informal consultations are conducted with the USFWS in relation to threatened and endangered species that occur or have the potential to occur within the consultation area along the MKARNS.

In 2020, the USFWS reclassified the American burying beetle (ABB) *(Nicrophorus americanus)* from endangered to threatened. ABB is within the consultation areas for all areas of Pool 13 and Pool 12 on Lake Ozark and portions of Pool 10 on Lake Dardanelle. No known representatives of the species have been observed within these areas. When the species were listed as endangered, a Conservation Management Plan for ABB was developed and approved by USFWS. The plan places 1,546 acres aside for mitigation in neighboring Blue Mountain Lake in response to land management practices determined to be detrimental to the consultation areas of the species identified by the USFWS in the Lake Dardanelle, Ozark Lake, and Blue Mountain Lake fee land area.

The interior least tern (ILT) was listed in 1985. Since 2000, USACE has partnered with Arkansas Tech University to survey for ILT. In 2021, the USFWS issued a final rule to remove the inland population from the Endangered Species Act and enter the delisting monitoring period. The USFWS in corporation with USACE and Arkansas Tech University will continue to monitor the population and manage the habitat for the ILT species under guidance established by the Southwestern Division Conservation Plan. The Endangered Species Act requires a minimum post monitoring period of five years and considering the longevity of the species this time could increase.

There are several endangered bat species in Arkansas: Ozark big-eared, gray, and Indiana bats. The northern long-eared bat is listed as threatened, with a proposal to be reclassified as endangered. The tri-colored bat is petitioned for listing. A comprehensive baseline bat survey is necessary to determine what species of bats are present on the MKARNS Project. Transient populations of gray bats (*Myotis grisescens*), Indiana bats (*M. sodalis*) and northern long-eared bats (*M. septentrionalis)* may be present in the upper pools of MKARNS.

No known populations, hibernacula, or roosting sites for these bats are known to be located on the MKARNS. However, until the presence of these bats is determined, tree cutting as a forestry practice will only occur in coordination with the USFWS to remove timber during the winter months or with a negative population survey for harvesting in the summer months. One hibernaculum utilized by gray bats is in proximity of USACE fee property on Lake Dardanelle

near Old Post Road Park. Attention is provided when conducting prescribed burning as to not negatively impact this critical habitat.

The bald eagle (*Haliaeetus leucocephalus*) is a common species along the MKARNS. In addition, several bald eagle nests are frequently disbursed along the Arkansas River. Although the bald eagle was delisted by USFWS in 2007 due to species recovery, both bald and golden eagles are still protected in accordance with the Bald and Golden Eagle Protection Act.

Other species are candidates, proposed to be listed, or under review. The monarch butterfly (*Danaus plexippus*) is a candidate species under consideration for official listing for which there is sufficient information to support a listing. The alligator snapping turtle (*Macrochelys temminckii)* is proposed to become threatened. Alligator snapping turtles are associated with deeper water such as large rivers, major tributaries, bayous, swamps, and lakes with structure and high canopy cover or undercut stream banks. The USFWS has recently initiated a Species Status Assessment Review of the western chicken turtle (*Deirochelys reticularia miaria*) to determine if the species will be listed as a candidate species under the ESA. Western chicken turtle habitat includes semi-aquatic areas that contain slow-moving and shallow water, such as ponds, lakes, streams, and swamps. The tricolored bat (*Perimyotis subflavus*) is currently under review to be listed as endangered due to the impacts of white-nose syndrome plaguing the species. These species are known to be present in certain locations along the MKARNS. If these species become listed, this could influence mission operations and both forestry and wildlife management applications on project lands.

The following species listed in Table 2-1 and Table 2-2 are from the U.S. Fish and Wildlife Service's Federally classified status list of species and the Arkansas Natural Heritage data sets which have been reported on project lands. Threatened and endangered species as well as species of concern identified by the State of Arkansas was given consideration during the development of land classifications identified in Chapters 4 & 5.

Table 2-1 Special Status Threatened and Endangered Species, USFWS

| Pool | Common Name | *Scientific Name* | Federal Status |
|---|---|---|---|
| Project Wide | bald eagle | *Haliaeetus leucocephalus* | BGEPA* |
| Project Wide | eastern black rail | *Laterallus jamaicensis* | LT |
| Project Wide | piping plover | *Charadrius melodus* | LT |
| Project Wide | red knot | *Calidris canutus rufa* | LT |
| Project Wide | interior least tern | *Sternula antillarum athalassos* | *** |
| Pool 1 | pallid sturgeon | *Scaphirhynchus albus* | LE |
| Pool 1 | fat pocketbook | *Potamilus capax* | LE |
| Pool 1 | rabbitsfoot | *Quadrula cylindrica* | LT |
| Pool 1 | pink mucket | *Lampsilis abrupta* | LE |
| Pool 2 | rabbitsfoot | *Quadrula cylindrica cylindrica* | LT |
| Pool 7 | Indiana bat | *Myotis sodalis* | LE |
| Pool 8 | harperella | *Ptilimnium nodosum* | LE |
| Pool 8 | Indiana bat | *Myotis sodalis* | LE |
| Pool 9 | northern long-eared bat | *Myotis septentrionalis* | LT** |
| Pool 9 | Indiana bat | *Myotis sodalis* | LE |
| Pool 9 | Ozark big-eared bat | *Corynorhinus townsendii ingens* | LE |
| Pool 10 | harperella | *Ptilimnium nodosum* | LE |
| Pool 10 | American burying beetle | *Nicrophorus americanus* | LT |
| Pool 10 | gray bat | *Myotis grisescens* | LE |
| Pool 10 | northern long-eared bat | *Myotis septentrionalis* | LT** |
| Pool 10 | Indiana bat | *Myotis sodalis* | LE |
| Pool 10 | Ozark big-eared bat | *Corynorhinus townsendii ingens* | LE |
| Pool 12 | American burying beetle | *Nicrophorus americanus* | LT |
| Pool 12 | Indiana bat | *Myotis sodalis* | LE |
| Pool 12 | northern long-eared bat | *Myotis septentrionalis* | LT** |
| Pool 12 | Ozark big-eared bat | *Corynorhinus townsendii ingens* | LE |
| Pool 13 | American burying beetle | *Nicrophorus americanus* | LT |
| Pool 13 | Indiana bat | *Myotis sodalis* | LE |
| Pool 13 | northern long-eared bat | *Myotis septentrionalis* | LT** |
| Pool 13 | Ozark big-eared bat | *Corynorhinus townsendii ingens* | LE |

Data provided by the United States Fish and Wildlife Service, March 2022
*Protected under Bald and Golden Eagle Protection Act.
**NLEB listed threatened, proposed to be reclassified to endangered.
***ILT has been delisted - ESA requires the Service, in cooperation with states, and USACE to monitor species after delisting to ensure species remains stable.

Table 2-2 Special Status Species, ANHC

| Common Name | Scientific Name | Global Rank | State | Federal |
|---|---|---|---|---|
| **Animal** | | | | |
| alligator gar | *Atractosteus spatula* | *G3/G4* | *S2* | *Species of Concern (SOC)* |
| alligator snapping turtle | *Macrochelys temminckii* | *G3/G4* | *S2* | *SOC* |
| American eel | *Anguilla rostrata* | *G4* | *S3* | *SOC* |
| Bald Eagle | *Haliaeetus leucocephalus* | *G5* | *S3B/S4N* | *Protected under Bald and Golden Eagle Protection Act* |
| bank swallow | *Riparia riparia* | *G5* | *S3B* | *SOC* |
| crawfish frog | *Lithobates areolatus* | *G4* | *S2* | *SOC* |
| goldeye | *Hiodon alosoides* | *G5* | *S2* | *SOC* |
| gray bat | *Myotis grisescens* | *G4* | *S2/S3* | *LE* |
| interior least tern | *Sternula antillarum athalassos* | *G4/T3Q* | *S3B* | ** |
| lake chubsucker | *Erimyzon sucetta* | *G5* | *S3* | *SOC* |
| least bittern | *Ixobrychus exilis* | *G4/G5* | *S2B* | *SOC* |
| little brown bat | *Myotis lucifugus* | *G3* | *S1* | *SOC* |
| northern long-eared bat | *Myotis septentrionalis* | *G1/G2* | *S1/S2* | *LT** |
| Ohio shrimp | *Macrobrachium ohione* | *G4* | *S1/S2* | *SOC* |
| Osage burrowing crayfish | *Procambarus liberorum* | *G3/G4* | *S3/S4* | *SOC* |
| paddlefish | *Polyodon spathula* | *G4* | *S3* | *SOC* |
| pealip redhorse | *Moxostoma pisolabrum* | *G5* | *S2* | *SOC* |
| purple gallinule | *Porphyrio martinicus* | *G5* | *S1B* | *SOC* |
| queensnake | *Regina septemvittata* | *G5* | *S1* | *SOC* |
| Rafinesque's big-eared bat | *Corynorhinus rafinesquii* | *G3/G4* | *S3* | *SOC* |
| shoal chub | *Macrhybopsis hyostoma* | *G5* | *S3* | *SOC* |
| Strecker's Chorus Frog | *Pseudacris streckeri* | *G5* | *S2* | *SOC* |
| Swainson's Warbler | *Limnothlypis swainsonii* | *G4* | *S3B* | *SOC* |
| white liptooth | *Daedalochila peregrina* | *G2* | *SNR* | *SOC* |
| ***Plant*** | | | | |
| Alabama snow-wreath | *Neviusia alabamensis* | *G3* | *S1/S2* | *SOC* |
| Arkansas twistflower | *Streptanthus maculatus ssp. obtusifolius* | *G3/T3Q* | *S3* | *SOC* |
| California bulrush | *Schoenoplectus californicus* | *G5* | *S1/S2* | *SOC* |
| catchfly prairie-gentian | *Eustoma exaltatum* | *G5* | *S2* | *SOC* |

| Common Name | Scientific Name | Global Rank | State | Federal |
|---|---|---|---|---|
| clasping dogbane | *Apocynum sibiricum* | *GNR* | *S1* | *SOC* |
| fragrant ladies'-tresses | *Spiranthes odorata* | *G5* | *S1* | *SOC* |
| Ozark cornsalad | *Valerianella ozarkana* | *G3* | *S3* | *SOC* |
| phlox heliotrope | *Heliotropium convolvulaceum* | *G5* | *S2* | *SOC* |
| Riddell's spike-moss | *Selaginella arenicola ssp. riddellii* | *G4T4* | *S3* | *SOC* |
| six-angle spurge | *Euphorbia hexagona* | *G5* | *S2* | *SOC* |
| small-flower ground-cherry | *Physalis cinerascens var. cinerascens* | *G4/G5/T3/T5* | *S1* | *SOC* |
| Texas bergia | *Bergia texana* | *G5* | *S2* | *SOC* |
| western dwarf-dandelion | *Krigia occidentalis* | *G5* | *S3* | *SOC* |
| woolly prairie-clover | *Dalea lanata var. lanata* | *G5/TNR* | *S2/S3* | *SOC* |
| Data provided by Arkansas Natural Heritage Commission, August 2021<br>*NLEB listed threatened, proposed to be reclassified to endangered.<br>** ILT no longer listed as endangered - ESA requires the Service, in cooperation with states, and USACE to monitor species after delisting to ensure species remains stable. | | | | |

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; G5: Secure: Common; widespread and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically, with considerably more than 100 occurrences and more than 10,000 individuals.

### 2.8.4 Invasive Species

In accordance with Executive Order (EO) 13112, an invasive species is defined as a non-native organism whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species can be microbes, plants, or animals that are non-native (or native nuisance) to an ecosystem. In contrast, exotic species, as defined by EO 11987, include all plants and animals not naturally occurring, either presently or historically, in any ecosystem of the United States. Invasive species can take over and out-compete native species by consuming their food, taking over their territory, 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 Federal, State, and local agencies billions of dollars every year.

The MKARNS project is not protected from the spread of invasive species. Locally, the project personnel work with the following partners to control the spread of some of the Arkansas River Valley's most unwanted non-native species: AGFC, University of Arkansas Extension Services, and the United States Department of Agriculture - Animal Health and Inspection Service (USDA-APHIS). The introduction of feral swine (*Sus scrofa)*, gypsy moth (*Lymantria dispar*), emerald ash borer (*Agrilus planipennis*), alligator weed *(Alternanthera philoxeroides),* water hyacinth (*Eichornia crassipes*), zebra mussels (*Dreissena polymorpha*), coontail (Ceratophyllum demersum), and other multiple invasive trees and shrubs outcompeted native species causing a decline in native populations and in species diversity. Another invasive species, blue-green algae (*Lyngbya wollei)*, can cause skin irritation to swimmers.

Some efforts are being implemented to assist in the control of invasive species on MKARNS. USACE, Engineering Research and Development Center (ERDC), universities, and office staff conduct research to utilize biological methods to control alligator weed. Each year, traps are deployed for gypsy moth on project lands utilizing office staff and state personnel to monitor any infestations of these species in cooperation with the Arkansas State Plant Board. In 2021, a Memorandum of Understanding was signed with the USDA-APHIS to allow crews to perform aerial operations and trapping on Ozark Lake and Lake Dardanelle WMAs to assist in controlling the feral swine population. AGFC also partners to trap feral swine in these two WMAs.

### 2.8.5 Ecological Setting

The Natural Resource Management Mission of the USACE (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.* (ER 1130-2-550, 1996)

In support of this mission statement, the following paragraphs describe the ecoregions where the MKARNS is located, and the 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. The Environmental Protection Agency (EPA) has defined ecoregions across the United States and has divided the ecoregions into Level III and Level IV ecoregions, with Level III being larger and containing one or more Level IV ecoregions.

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.

The MKARNS and surrounding areas are within the Ouachita Mountains, Arkansas Valley and the Mississippi Valley Loess Plains, ecoregions as depicted in Figure 2-3 and Figure 2-4. This ecoregion is defined as follows:

OUACHITA MOUNTAINS

Location: Eastern Oklahoma and western Arkansas, just south of the Arkansas Valley.

Climate: The ecoregion has a mild mid-latitude humid subtropical climate. It is marked by mild winters and hot summers with no pronounced dry season. The mean annual temperature is approximately 15-17°C. The frost-free period ranges from 190 to 240 days. The mean annual precipitation is 52 in., ranging from 43 in. to 66 in. Snow is uncommon.

Vegetation: Once covered by oak-hickory-pine forests, most of this region is now in loblolly and shortleaf pine. Remaining hardwood forests include southern red oak, black oak, post oak, white oak, and hickories.

Hydrology: Numerous perennial streams, mostly moderate to high gradient. Several large reservoirs are in the region. Some springs occur.

Terrain: Mostly open high hills and low mountains, the region is made up of sharply defined east-west trending ridges, formed through erosion of compressed sedimentary rock formations. Narrow valleys are common. Elevations range from 289 ft to 2,690 ft. The folded and faulted geology is mostly Paleozoic and Mesozoic sandstones and shales. Soils are Ultisols, Inceptisols, and Alfisols, with a thermic soil temperature regime and udic soil moisture regime.

Wildlife: Most commonly found wildlife are white-tailed deer, black bear, coyote, bobcat, gray fox, gray squirrel, muskrat, mink, eastern fox squirrel, pine vole, wild turkey, wood thrush, red-eyed vireo, Carolina wren, box turtle, timber rattlesnake, Fourche Mountain salamander, Ouachita madtom, leopard darter.

Land Use/Human Activities: Commercial logging is the major land use in the region, along with woodland grazing, and some pasture and hay land. Some broiler chicken production. Outdoor recreation is increasing in importance. Public national forest land covers part of the region. Larger towns include Mena, Mt. Ida, Perryville, Hot Springs, and the western part of Little Rock.

The Fourche Mountains are a level 4 eco-region within the Ouachita Mountains that intersect the MKARNS.

ARKANSAS VALLEY

Location: Eastern Oklahoma and western Arkansas, just south of the Boston Mountains and north of the Ouachita Mountains

Climate: The ecoregion has a mild mid-latitude humid subtropical climate. It is marked by mild winters and hot summers with no pronounced dry season. The mean annual temperature is approximately 15-17°C. The frost-free period ranges from 190 to 245 days. The mean annual precipitation is 46 in., ranging from 41 in. to 62 in.

Vegetation: Natural vegetation included oak savanna and oak-hickory-pine forests. Post oak, blackjack oak, southern red oak, hickory, shortleaf pine, some planted loblolly pine. Floodplains with bottomland oaks, sycamore, sweetgum, willow, eastern cottonwood, green ash, and elm.

Hydrology: Moderate density of low to moderate gradient perennial streams and some intermittent streams. A few springs. Major rivers include the Canadian and the Arkansas. Several large reservoirs occur. Streams have considerably lower dissolved oxygen levels than those of most of the adjacent regions and support different biological communities.

Terrain: Plains with hills, some open to low mountains, and level to undulating floodplains and terraces. A region of valleys and ridges, the physiography is much less irregular than that of the

Boston Mountains to the north and the Ouachita Mountains to the south but is more irregular than the ecological regions to the west and east. Elevations range from 246 ft to 2,753 ft. Mostly Pennsylvanian-age sandstone, shale, coal, and limestone. Soils are mostly ultisols and inceptisols, with a thermic soil temperature regime and udic soil moisture regime.

Wildlife: White-tailed deer, coyote, bobcat, swamp rabbit, beaver, raccoon, armadillo, wild turkey, mourning dove, and box turtle.

Land Use/Human Activities: Forestry, agriculture, farm pasture and woodlots, and livestock grazing. About one fourth of the region is grazed and roughly one tenth is cropland. Crops include soybeans, corn, grain sorghum, wheat, hay, and alfalfa, some orchards and vegetables. Poultry production. Some coal mining and natural gas production. Small areas of public national forest land. Larger towns and cities include McAlester, Sallisaw, Poteau, Fort Smith, Waldron, Clarksville, Russellville, Morrilton, Conway, Heber Springs, and Searcy.

Scattered High Ridges and Mountains, Arkansas River Floodplain, Arkansas Valley Hills, and Arkansas Valley Plains are level 4 eco-regions within the Arkansas Valley that intersect the MKARNS.

MISSISSIPPI ALLUVIAL PLAIN

Location: This riverine ecoregion extends from southern Illinois, at the confluence of the Ohio River with the Mississippi River, south to the Gulf of Mexico.

Climate: The ecoregion has a mild mid-latitude humid subtropical climate. Winters are mild and summers are hot and humid, with temperatures and precipitation increasing from north to south. The mean annual temperature ranges from approximately 14°C in the north to 21°C in the south. The frost-free period ranges from 200 days in the north to 355 days near the Gulf of Mexico. The mean annual precipitation is 55 in., ranging from 45 in. to 69 in.

Vegetation: Bottomland deciduous forest covered the region before much of it was cleared for cultivation. It is one of the most altered ecoregions in the nation. Floodplain forest communities affected by hydroperiod. River swamp forests contain bald cypress and water tupelo. Hardwood swamp forests include more water hickory, red maple, green ash, and river birch. For higher, seasonally flooded areas, add sweetgum, sycamore, laurel oak, Nuttall oak, and willow oak.

Hydrology: The Mississippi River watershed drains all or parts of thirty-one states, two Canadian provinces, and approximately 2,000,422 sq. miles before the river finally reaches the Gulf. The ecoregion contained one of the largest continuous wetland systems in North America. Extensive areas have been modified by channelization and navigation and flood control engineering. Streams are low gradient. Oxbow lakes and ponds occur.

Terrain: Mostly a broad, flat alluvial plain with river terraces, swales, and levees providing the main elements of relief. Thick deposits of Pleistocene to Holocene sandy to clayey alluvium soils occur. Soils are typically finer-textured and more poorly drained than the upland soils of adjacent Mississippi Valley Loess Plains and the South-Central Plains ecoregions, although there are some areas of coarser, better-drained soils. Alfisols, vertisols, inceptisols, and entisols occur

and have a thermic soil temperature regime, with some hyperthermic in the far south. Soil moisture regimes are aquic and udic.

Wildlife: The widespread loss of forest and wetland habitat has impacted wildlife and reduced bird populations, although it is still a major bird migration corridor. White-tailed deer, black bear, bobcat, gray fox, raccoon, swamp rabbit, migratory waterfowl, wild turkey, cormorants, egrets, herons, mourning dove, wood thrush, yellow-throated vireo, alligators, "big river" species such as alligator gar and pallid sturgeon.

Land Use/Human Activities: Extensive agricultural land use. Almost all of the region is in cropland, with soybeans, cotton, corn, rice, wheat, pasture, and some sugarcane in the south. Catfish and crawfish are commercially produced in ponds. Larger settlements include Kennett, New Madrid, Blytheville, Clarksdale, Cleveland, Greenville, Yazoo City, Monroe, Morgan City, Houma, and New Orleans.

Grand Prairie, Northern Holocene Meander Belts, Western Lowlands Pleistocene Valley Trains, Arkansas/Ouachita River Holocene Meander Belts, Arkansas/Ouachita River Holocene Meander Belts, and Arkansas/Ouachita River Backswamps are level 4 eco-regions within the Mississippi Alluvial Plain that intersect the MKARNS.

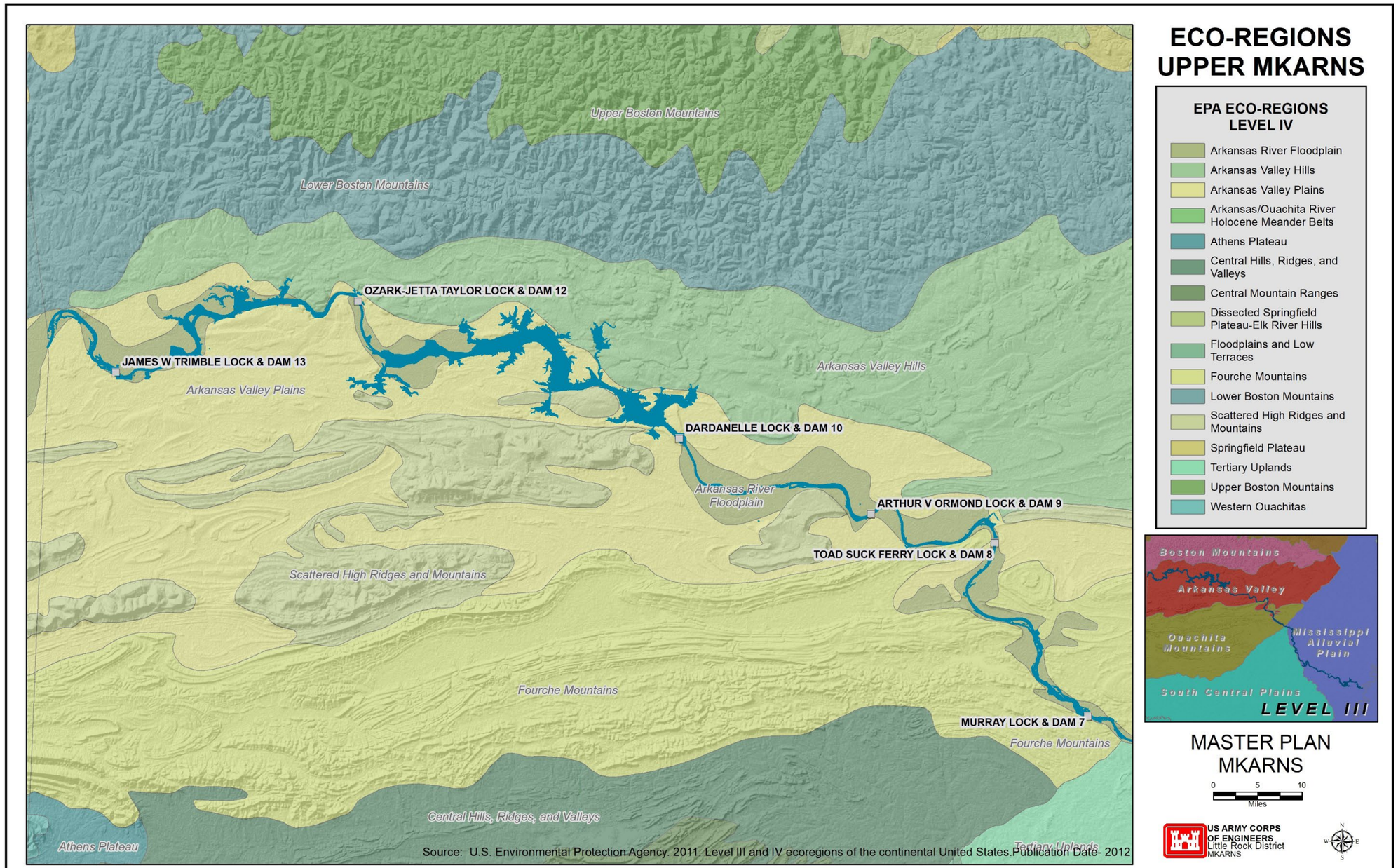



Figure 2-3 Eco-Regions, Upper MKARNS


Figure 2-4 Eco-Regions, Lower MKARNS

## 2.9 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 utilize wetlands during certain stages of their lives.

In accordance with national USACE policy, wetlands at operational projects are inventoried using the protocol established by the USFWS in their Classification of Wetlands and Deepwater Habitats of the United States. While the main river channel of the MKARNS is classified as lacustrine (open water), all the shoreline acreage in the system is classified as palustrine (standing dead timber and vegetated shorelines). Palustrine wetlands include freshwater ponds, fresh water emergent, and shoreline wetlands, which include a mixture of scrub/shrub (6 meters or less in height) or forested wetland species of greater than 6 meters in height. Palustrine forested/shrub wetlands also occur in the feeder streams' floodplains and are called riverine wetlands. These palustrine wetlands occupy approximately 10,467 acres of the 46,430.7 acres in the project area.

Wetland acreages are subdivided by pools created by the locks and dams in the navigation system. Pool 2, upstream from Lock 2, includes 3,562 acres of palustrine wetland types. Within the project owned lands of Pool 12 there are 2,965 acres of wetlands.

The next highest wetland acreage (2,106 acres) is within the boundaries of Pool 10, which is formed by the construction of the Dardanelle Lock and Dam.

The remaining pools in the MKARNS system have lesser amounts of wetlands, which is dictated by the project owned acreage bordering the river.

## 2.10 Borrow Areas and Utilities

Borrow sites are locations where soil is removed to be used for operational purpose. Originally, some of these areas were used for the construction of the locks and dams. There are still active borrow areas along the MKARNS being utilized for projects like levee repair.

Utilities passing through and providing service on project lands include communication lines, electrical transmission and distribution lines, electrical switchyards, water intake and distribution lines, sewer lines, and fuel lines.

## 2.11 Mineral and Timber Resources

### 2.11.1 Minerals

Natural gas production and extraction occurs on fee lands of the MKARNS. There are a total of 45 active and 28 inactive natural gas wells on fee property. The highest concentration for gas extraction occurs on lands surrounding Ozark Lake (Pool 12), Lake Dardanelle (Pool 10), and Pool 13. Permission to drill for the purposes of natural gas extraction on fee lands is processed

by the USACE Real Estate Division which administers easements to conduct these activities. A non-statutory mitigation plan and recommendation is provided to the Little Rock District Real Estate Division, the approving authority for these actions. After the closure of a gas well, the site is restored back to the original contour and previous conditions of the site prior to the soil disturbance. These conditions are based upon the requirements listed within the executed easement describing the site closure requirements. Typically, mineral rights were not purchased by USACE on fee lands located on the MKARNS, though there are some exceptions. Permits for natural gas extraction are issued by the Department of Interior, Bureau of Land Management (BLM). Table 2-3 represents well status on Pools 10-13. These are the only Pools that currently possess producing gas wells on MKARNS. Figure 2-5 represents locations of gas wells on USACE lands within the Arkoma Basin.

Table 2-3 Oil Well Status on the MKARNS

| Well Status | Lake Dardanelle | Ozark Lake | Pool 13 | Total Active Wells | Total Inactive Wells | Total Wells |
|---|---|---|---|---|---|---|
| Producing Wells | 15 | 26 | 4 | 45 | - | - |
| Plugged and abandoned | 11 | 16 | - | - | 27 | - |
| Temporarily Abandoned | 1 | - | - | - | 1 | - |
| **Total** | **27** | **42** | **4** | **45** | **28** | **73** |

Sand and gravel operations on private land occurs around the MKARNS, however no excavation for these natural resources occurs on MKARNS fee lands. Currently, there are three licenses which grant permission to use fee land for loading gravel or sand to be transported on the Arkansas River. The River Mountain Quarry and Pine Bluff Sand and Gravel are the only two companies remaining in operation. River Mountain Quarry is located at NM 218 in Delaware, Arkansas. Pine Bluff Sand and Gravel's primary facility is located near NM 71 at the Port of Pine Bluff in Pine Bluff, AR. The River Port facility, which is located at NM 233 in Scranton, AR, is not currently in operation.

### 2.11.2 Timber

Timber harvesting and management for the purpose of timber stand improvement and wildlife enhancement is practiced on the MKARNS fee land. These silvicultural practices are implemented primarily on Lake Ozark, Lake Dardanelle, and Pool 2 and are managed by the project office staff. Timber management includes prescribed burning, artificial forest regeneration (bare root seedling planting), and timber harvesting to enhance wildlife habitat, restore native hardwood forest, and promote forest health. These activities generate some revenue which is reinvested in the natural resource management operations on the MKARNS. In the last 30 years, bare root seedlings have been planted to create native hardwoods stands from idle fields. These areas have created young stands of native forest or have created vegetated buffer strips for the creation of stream management zones. These buffered areas, along the tributaries that are adjacent to the Arkansas River, improve water quality while creating wildlife habitat.

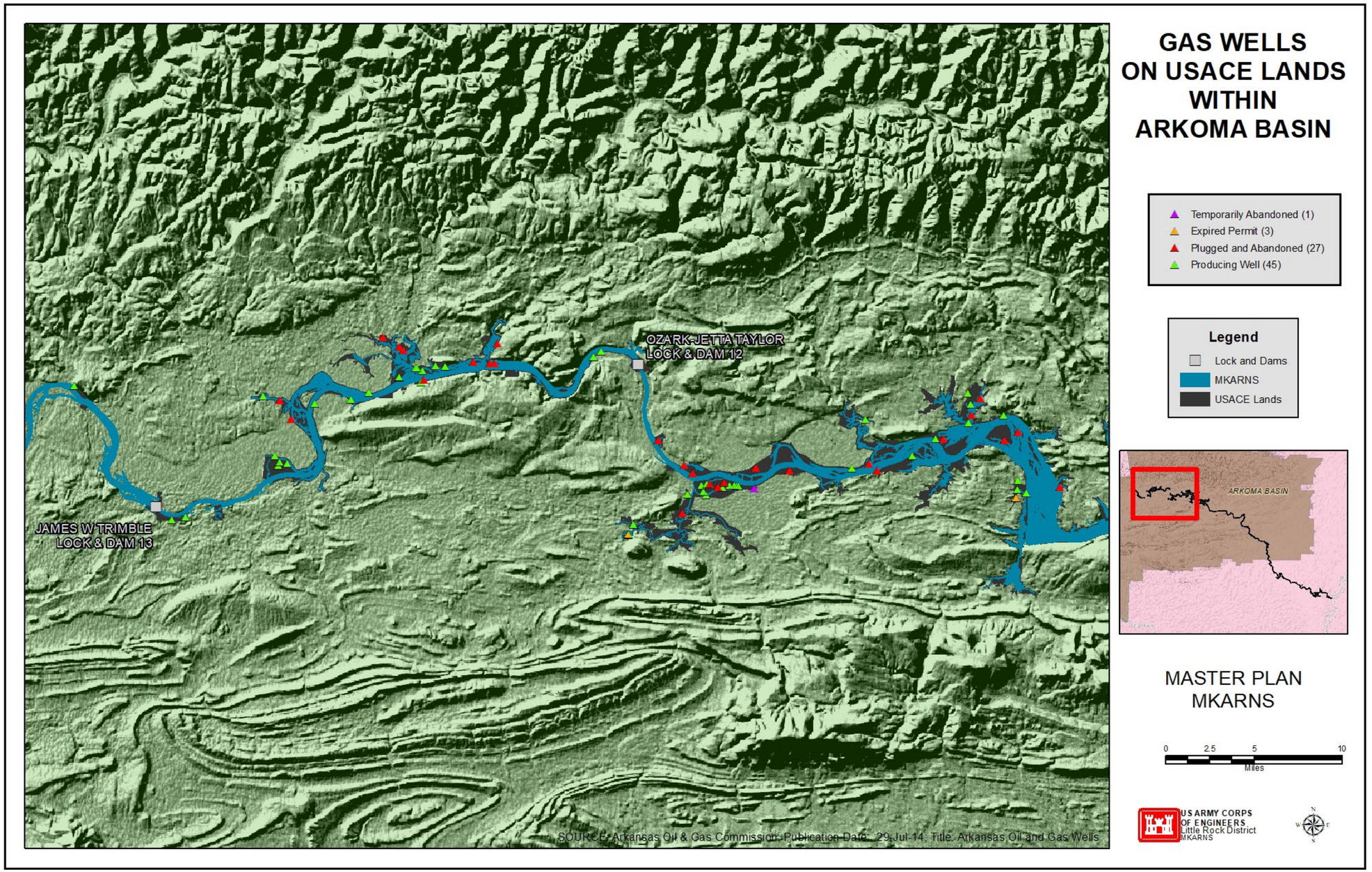



Figure 2-5 Gas Wells on USACE Lands within the Arkoma Basin

## 2.12 Cultural Resources

This section presents information on archeological and architectural resources located on USACE lands in the MKARNS system and associated properties. The discussion includes a description of methods used to identify existing archeological and architectural resources; the number and types of archeological and architectural resources known within the areas owned in fee; and the number of archeological and architectural resources that are listed or eligible for the National Register of Historic Places (NRHP) in those areas.

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for traditional, religious, scientific, or any other reason. Cultural resources are discussed in terms of archeological sites, which include both prehistoric and historical occupations either submerged or on land, and architectural resources. Archeological sites can become submerged when they are inundated following impoundment of rivers, and shipwrecks are a specific type of submerged archeological site.

Stewardship of cultural resources on USACE Civil Works water resources projects is an important part of the overall Federal responsibility of USACE. 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. Guidance is derived from a number of cultural resources laws and regulations, including Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966; 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 applicable.

### 2.12.1 Cultural History

Paleoindian Period (12,000 - 8,000 B.C.)

The earliest well-documented era of human occupation in North America is the Paleoindian period. It is characterized by the colonization of the New World by nomadic bands of hunter-gatherers. Traditional chronologies estimate that, by 14,000 years ago, these peoples crossed the Bering Strait from Asia on land exposed by the lowering of sea levels during the peak of the last ice age. Although the founding populations were small, there were abundant natural resources and these people quickly spread out across the continent.

A mosaic of spruce, other conifers, and possibly deciduous forests with extensive open areas dominated most of Arkansas. Summers were cold and moist, and winters were significantly colder than present. Paleoindians utilized now-extinct megafauna species, including mammoth, mastodon, giant ground sloth, and bison, although many other plant and animal resources were

also used (O'Brien and Wood 1998; Sabo et al. 1990). The Dalton Horizon, 8,500 to 7,500 B.C., is transitional between the Paleoindian and Archaic periods. This period represents the transition between the "big-game" hunters of the Paleoindian period and the more generalized hunter-gatherers of the Archaic period. The Dalton period coincides with the warming trend that began at the end of the Pleistocene and continued to the Holocene and the beginning of generally modern climate in the region (Bryson et al. 1970). The final extinction of Pleistocene megafauna in North America occurred during this time; much of Arkansas was covered by oak/chestnut forest (Jeter and Williams 1989a).

Dalton peoples are thought to have adapted to stream valley environments, and probably lived on stream terraces and in rock shelters, with periodic use of the uplands (Sabo et al. 1990:44). Dalton period sites are more common than Paleoindian sites (Jeter and Williams 1989a).

Archaic Period (8,000 – 500 B.C.)

The Archaic is characterized by the technological and social changes that accompanied the environmental changes following the retreat of the glacial ice sheets. People adapted to the resources of their local environment. Dalton societies continued into the early Archaic, but other, later populations used many new forms of tools as regional varieties of points increased.

The advent of horticulture in the region occurred during this time, as did the introduction of ceramic technology, distinct mound building episodes, and the interment of exotic materials in mortuary contexts. Tool forms became increasingly specialized in order to exploit region-specific resources, and the bow and arrow was introduced.

During the Late Archaic, the course of the Arkansas River was significantly different from that of today. It joined the Mississippi River further south, in Louisiana (Jeter and Williams 1989a:95). Consequently, people along the lower Arkansas River at this time were influenced by Poverty Point, a Late Archaic culture centered on the Poverty Point site in northeastern Louisiana with elaborate earthworks and mounds (Gibson 2001).

Woodland Period (500 B.C. – A.D. 900)

Aside from a slight cooling trend, the climate during the Woodland Period was largely consistent and essentially modern. Pollen data suggests oak/hickory forests dominated upland settings, and elm/walnut forest dominated lowland settings (Henry 1978). The Woodland period is traditionally defined by the rise of and widespread use of ceramic vessels, increased sedentism, increasing social complexity, and improved agricultural techniques.

The use of pottery became more widespread and allowed for increased food storage and cooking capabilities, and the bow and arrow became common. Population gradually increased, and a variety of new points were adopted. Woodland groups shared certain traits, including ceramic manufacture, status differentiation, unequal access to resources, and differential mortuary treatment for some individuals. Woodland peoples often built earthen mounds for ceremonial purposes and burial interment.

Two of the primary tribes that historically occupied modern day Arkansas can trace their lineage to the Dhegiha Siouan tribes of the Ohio River Valley. The Dhegiha tribes include the Omaha,

Ponca, Kaw, Quapaw, and Osage. During this Middle Woodland period (A.D. 200-A.D. 400), the Dhegiha collectively began migrating down the Ohio River Valley to the confluence with the Mississippi River. During the Late Woodland (A.D. 400-A.D. 500), the Dhegiha began to separate into the modern tribes we see today. The Dhegiha, with the exception of the Quapaw, traveled up the Mississippi River. The Quapaw remained to the south and were known as U-ga'-qpa or Quapaw, meaning "the down-stream people" and settled in northern and eastern modern-day Arkansas (Hunter et al 2013).

Mississippian/Caddo Period (A.D. 900 - 1500)

The widespread appearance of political and religious hierarchies between A.D. 900-1450 are hallmarks of the Mississippian/Caddo Period. New forms of social integration emerged in cultures across most of the Southeast, continuing the social evolution sparked in the Late Woodland Period. Subsistence continued to be derived from a mixture of wild plant and animal foods, but with substantial reliance on Mesoamerican cultigens, particularly corn and beans. A hierarchical social system emerged at this time, with elite political-religious leaders, and non-elite followers who were primarily farmers. Mississippian settlement patterns in eastern Arkansas typically consisted of a large, central village containing one or more mounds surrounded by smaller villages and hamlets that provided maize as tribute to the central village. Settlements were located on the floodplains of large drainage systems because of their fertile soils. Platform mounds were topped with special purpose buildings, including temples, charnel houses, and elite residences.

In southern and western Arkansas, the Caddo developed as a regional variant of the Mississippian between AD 800-1100 and were encountered and described by Europeans during the 1500s and 1600s. The Caddo subsisted on agriculture supplemented with hunting and gathering. They used simple digging tools of bone, wood, or shell to cultivate crops such as corn, beans, squash, and tobacco. The Caddo were also skilled potters and made salt. Agriculture coincided with a dispersal of people into residential, year-round settlements that usually had circular dwellings with pitched roofs. Elaborate mound burials were common until later in the period (Early 2012).

Caddoan sites in western Arkansas include residential communities of different sizes such as villages, hamlets, and farmsteads, ceremonial centers, and ephemeral short term special-use camps. Caddoan sites are found in valley settings, including floodplains, terraces, upland projections, and upland slope formations. Local resources such as bison skins, wood for bows (Osage Orange), and pottery were exported. Non-local materials such as turquoise and cotton were imported from the west, and copper, marine shell, and large stone tools were brought in from the northeast and east.

Sometime after the Quapaw broke off from the larger Dhegiha Siouan tribes, the rest of the Dhegiah Sioux established themselves at Cahokia (near modern day St. Louis) and then further separated into four tribes. The Osage were the last to leave Cahokia around A.D.1300 moving to the upper reaches of the Osage and Missouri Rivers. "Osage" is a corruption by later French traders of "Wazha'zhe," meaning "Children of the Middle Waters" (Hunter et al 2013). By the contact period, the Osage occupied the area south of the Missouri River into the northern half of Arkansas and further west into Kansas and Oklahoma.

Protohistoric (A.D. 1500-1700)

The end of Mississippian Period began in 1541 when the Spanish explorer Hernando De Soto entered the region. De Soto encountered "Capaha" or Quapaw on the western bank of the Mississippi, though his encounter occurred south of the confluence of the Arkansas River, where they would later occupy. (Key 2019). The earliest Europeans to arrive were the Spanish explorers in the mid-sixteenth century, followed by the French trappers and traders in the late seventeenth century. The Arkansas River was first discovered by Europeans in 1541 by Francisco Vasquez de Coronado near present day Dodge City, Kansas. In the same year, Hernando De Soto encountered the lower Arkansas River on his overland march from Florida through the interior southeast. Jacques Marquette and Louis Joliet entered the mouth of the Arkansas from the Mississippi River in 1673 and in 1682 LaSalle claimed the Arkansas River in the name of the King of France. Henri de Tonti, a French explorer, traveled throughout the valley in the late 1600s establishing a fort at the mouth of the Arkansas named Poste Aux Arcansas in 1682. Known today as Arkansas Post, this became the first Euro-American settlement in the Louisiana Territory and was intended to open the fur trade and encourage further exploration, and ultimately, settlement of the region. The location of the Post along the Arkansas River made trade easier with the Osage to the north and the Quapaw and Caddo to the south. Diseases the Europeans brought with them, such as smallpox and influenza, had a devastating effect. The tribes inhabiting the area had no immunity against these diseases, and up to 90 percent of the populations were decimated.

Historic Period (post A.D. 1700)

The dramatic cultural changes brought about by the advent of European colonies, as well as the new trade goods and European diseases, resulted in drastic and permanent changes to Native cultures. Introduction of European items and European demand for particular resources, such as beaver pelts and deer skins transformed Native trading systems.

After the Louisiana Purchase in 1803, the Osage relinquished all territory north of the Arkansas River, with the understanding that they would still use the area for hunting. In 1817 a treaty with the Eastern Cherokee of Georgia and South Carolina established a reservation between the White River and the Arkansas River. During the early 1800s, a group of Cherokee voluntarily moved west to this reservation where they came into conflict with the Osage, who saw this move as an incursion into their hunting grounds and an act of war. The groups continued to clash over resources. In an effort to stop the violence, the United States signed treaties in 1818 and 1825 with the Osage establishing their reservation in southern Kansas and forcing Osage removal from their current location in Indian Territory along the Arkansas border. The United States Army built a western military post, Fort Smith, at the western edge of the Arkansas River valley in 1817 in an effort to keep the peace between the Osage and the Cherokee. After the Osage removal, official voyages of exploration resulted in mapping of the region's rivers, and settlements and homesteads began to appear in what is now northeast Arkansas.

By the time that President James Monroe signed the act creating the Territory of Arkansas in 1819, there were 14,000 settlers in Arkansas. Meanwhile, Arkansas Post had grown from a frontier trading post, and had lawyers, land speculators, politicians, and the Arkansas Gazette, the first newspaper west of the Mississippi River. The War Department decided to push the

frontier further westward, and Little Rock became the capital of the Arkansas Territory. The land was open for public sale in 1921, and the Arkansas Territory became a state in 1836.

The Indian Removal Act was passed in May 1830. This act empowered the President of the United States to move eastern Native Americans west of the Mississippi, to what was then "Indian Territory" (present-day Oklahoma). In the years immediately following establishment of the Arkansas Territory, the Federal government concentrated efforts on abrogating old treaties with the Indian tribes, and signing new treaties aimed at clearing the resident tribes from the southeastern states. From 1830 to 1839, the removal of the major southeastern tribes occurred from east of the Mississippi to the new Indian Territory. The Arkansas River was traversed by thousands of Choctaw, Creek, Chickasaw, Cherokee, and Seminole in part of what came to be known infamously as the Trail of Tears. For some tribes, it has been estimated as many as one fourth of their population perished, and were hastily buried along the route.

During the period from 1840 to the end of the century, the population of Arkansas increased from the influx of European immigrants, and dispersed villages were founded around newly established rural post offices. With an economy dependent upon slave labor to keep its 1,393 plantations operable, Arkansas sided with the south when the Civil War began and sent 60,000 able-bodied men to war with the Union. The bulk of military operations in Arkansas early in the war occurred in the northern portion of the state and to the east along the Mississippi River. A few major battles, such as Pea Ridge, were fought in the northwest. As the war unfolded, much of Arkansas descended into lawlessness and poverty as food and other necessities were in short supply and marauding guerillas became common. The subsequent abolition of slavery in 1865 led to replacement of the plantation system with tenant farms. The landscape became dominated by small, dispersed farms operated by Euro-American or African-American renters, or sharecropper families. The river was the most economical way to ship cotton and produce to markets further east, and steamboats were common from the 1830s onward.

The 1870s saw an influx of new settlement as many chose to resettle, rather than rebuild. The railroad was making its way toward the west, enabling a faster settlement of the lands west of the Mississippi River.

The introduction of rail transportation in the Arkansas River basin in the 1870s, and the unpredictable nature of the river, resulted in a severe decline in waterway commerce. However, with the expansion of the west into the Arkansas and Indian Territories, the need for irrigation waters resulted in the construction of water diversion structures in the upper Arkansas River. These canals developed in the late 1800s in Colorado and Kansas along the Arkansas River. Irrigation on the upper river drastically diminished summer flows in lower portions of the river, further hurting river transportation.

### 2.12.2 MKARNS History

The first steamboat to travel the Arkansas River was the Comet (154 tons), in 1820, and took eight days to reach Arkansas Post from New Orleans. In addition to valuable trade commerce, steamboats were utilized for many military purposes including the transportation of supplies and equipment, troops, as well as movement of displaced Native Americans.

The early 1900s witnessed many severe floods in the Arkansas River valley that hit rail transportation, levees and public works projects very hard. Following the Flood of 1927 on the Arkansas River, the Arkansas River Flood Control Association was formed to lobby Congress for a flood control program. Congress included the Arkansas River in early flood control legislation in 1928, and then passed a landmark flood control act in 1936. This established a Southwestern Division of the USACE and authorized 211 flood control projects in 31 states. This division began work on the Arkansas River the next year.

Although the Flood Control Act authorized recreation facilities at reservoirs in 1944, the authorization of the MKARNS, through Congressional passing of the Rivers and Harbors Act in 1946, formalized a plan for navigation, flood control, hydroelectric power and recreation improvements to the waterway. Initial funding of $55 million was established for the most critical improvements. However, funding was required to be obtained on a year-to-year and project-by-project basis thereafter.

In the 1950s major flood, flow, and navigation issues were studied and projects established to resolve these issues including channelization efforts, construction of upstream reservoirs, and construction of lock and dam projects on the system. In 1954, the Waterways Experiment Station evaluated a channelization plan to reduce sedimentary flow (as 100 million tons of silt flowed down the Arkansas River each year) by creating deeper, straighter, and narrower channels to increase river flow and flush out trapped sediments.

The major components of the MKARNS were finally completed in December of 1970, and the first commercial barge to navigate the entire system arrived at the Tulsa Port of Catoosa on January 21, 1971. The cargo was 650 tons of newsprint from the Bowater Paper Company. The MKARNS was officially dedicated by then President Richard M. Nixon on June 5, 1971.

### 2.12.3 Cultural Resources along the MKARNS

Use of the Arkansas River system as a major means of travel, commerce, and for military purposes predates European contact. Cultural resources are present along the river spanning the period of human occupation in the region, from Paleoindian through the historic era to the present. Sites in the project area include lithic scatters, rock or bluff shelters, camps, villages, special use/ resource extraction sites, fish weirs, mounds, burials, middens, historic sites such as farmstead and town sites, ferry landings, wharfs, mills, dams, bridges, and watercraft—including canoes, boats, flatboats, barges, keelboats, dredges, and steamboats. These sites may be on land or submerged beneath the waters of the system. Only a small portion of the MKARNS system has been systematically surveyed for cultural resources, therefore, known sites are only a sample of the total population of resources likely present in the system. The known cultural resources are discussed below for each pool. These resources include all archeological sites and architectural resources, including those listed on and eligible for the NRHP or listed in the most up to date survey information according to the records of the Arkansas Archeological Survey.

Mouth of the White River

There are no recorded archeological or architectural resources on USACE lands in the White River segment of MKARNS.

Little of this area has been previously surveyed prior to construction of the MKARNS system. Construction of a new lock and dam complex at Montgomery Point, NM 0.5, was completed in 2005. Survey for cultural resources prior to the construction of the new lock and dam covering the river channel and banks from NM 0-2 occurred in 1989 (Bennett et al. 1989b); only one archeological site was found in this segment, primarily because most of the sediments are extremely young.

Pool 1: Norrell Lock and Dam No. 1

Only two archeological sites were identified on USACE lands at Pool 1. This is probably due to the fact that Pool 1 is a short, artificial canal, excavated into the relatively recent river-deposited sediments of the Arkansas/White River floodplains and drainage divide. There are also no NRHP-listed architectural resources within USACE properties at Pool 1.

Previous archeological investigations at the pool include an emergency survey near the canal in 1965 (Davis and Baker 1975) initiated after the start of construction. The surveyed area began at Lock and Dam # 1, NM 10 and went to about NM 22.4, Pendleton Ferry, but no sites within the area of potential effects (APE) of Pool 1 were identified. Scholtz and Hoffman (1968) may have surveyed some portions of Pool 1 prior to construction of the MKARNS system, but no sites were identified in the area.

Archeological Consultants, Inc. (ACI) and Coastal Environments, Inc. (CEI) conducted a cultural resource assessment survey (CRAS) of six areas (Haroldton Access, Sweeden, Fletcher Bend, Maumelle Day Use Area, Merrisach, Rifle Pit) within the MKARNS in 2019. The Massey Cemetery (3AR0242) was discovered in the Merrisach survey area. The headstone for Pvt. Massey dates from 1936, but he died in 1920. There appeared to be several other unmarked graves in the cemetery, which has been fenced on three sides with hog-wire. Although cemeteries are generally ineligible for inclusion in the NRHP, preservation and avoidance of the site was recommended, and the site was determined to be eligible for the NRHP. It was also recommended that a ground penetrating radar survey of the area be conducted to determine if other unmarked graves are present, and if so, make sure that they are marked for preservation/ avoidance (Almy et al. 2020).

In 2021, the Little Rock District conducted a Cultural Resources Survey for the Three Rivers Project. Site 3AR243 is a precontact site located on USACE fee land and was determined eligible for the NRHP. Architectural elements for three rivers located on USACE fee land include the Historic cutoff structure, the Arkansas-White Containment Structure and the Owens Weir land. None of these structures were determined to be eligible for the NRHP (Lopinot et al 2022).

Table 2-4 Pool 1 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | 1 |
| Prehistoric | 1 |
| Multicomponent | |
| Total | 2 |
| **National Register Eligibility Status** | |
| Not Evaluated | |
| Not Eligible | 1 |
| Eligible | 1 |
| Listed | |

Pool 2: Wilbur Mills Lock and Dam No. 2

No architectural resources were identified on USACE lands at Pool 2. Previous archeological investigations at Pool 2 include emergency survey of the Arkansas Post Canal in 1965 (Davis and Baker 1975), initiated after the start of construction. One precontact site within Pool 2 had almost been destroyed by canal construction (3AR33) when it was identified. No features or undisturbed contexts were observed, and only a surface collection, primarily of ceramics, was made, indicating a Woodland Period occupation. The site is considered not eligible for the NRHP. Scholtz and Hoffman (1968) surveyed some portions of Pool 2 prior to construction of the MKARNS system. Bennett et al. (1989a) surveyed portions of Pool 2, examining the geomorphology with regard to identifying landforms that have some probability for containing archeological sites; however, no sites were identified within the vicinity of Pool 2. Two sites were recorded through archival research, and neither was verified by fieldwork. Both sites (3AR217 & 3AR218) were Civil War earthworks associated with Fort Hindman at Arkansas Post., and neither have been evaluated for the NRHP.

Archeological Consultants, Inc. (ACI) and Coastal Environments, Inc. (CEI) conducted a cultural resource assessment survey (CRAS) of six areas (Haroldton Access, Sweeden, Fletcher Bend, Maumelle Day Use Area, Merrisach, Rifle Pit) within the McClellan-Kerr Arkansas River Navigation System (MKARNS) in 2019. No cultural resources were recorded in the Rifle Pit area of this pool (Almy et al. 2020).

Table 2-5 Pool 2 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | 2 |
| Prehistoric | 1 |
| Multicomponent | |
| Total | 3 |
| **National Register Eligibility Status** | |
| Not Evaluated | 2 |
| Not Eligible | 1 |

| | |
|---|---|
| Eligible | |
| Listed | |

Pool 3: Joe Hardin Lock and Dam No.3

No archeological sites or architectural resources were identified on USACE lands at Pool 3. Previous archeological investigations in Pool 3 include a survey of some portions by Scholtz and Hoffman (1968) prior to construction of the MKARNS system. More recently, Bennett et al. (1989a) surveyed portions of Pool 3, examining the geomorphology with regard to identifying landforms that have some probability for containing archeological sites. No cultural resources were identified.

Pool 4: Emmett Sanders Lock and Dam, Lake Langhoffer

Previous archeological investigations in Pool 4 include a survey of some portions by Scholtz and Hoffman (1968) prior to construction of the MKARNS system, however, no cultural resources were identified within the locality of Pool 4. In 1978, the Arkansas Archeological Survey recorded a levee partially on USACE fee land north of Lake Langhofer dating to 1908. More recently, Bennett et al. (1989a) surveyed portions of Pool 4, examining the geomorphology with regard to identifying landforms that have some probability for containing archeological sites. However, no cultural resources were identified. In 1991, McClurkan surveyed the route for the Lock and Dam Number Four Demonstration Project for the Arkansas Department of Transportation. In 2001, the Operations Project Manager for the Pine Bluff Project Office recorded a historic artifact scatter that had been extensively disturbed from construction activities. Neither the levee nor the historic artifact scatter have been evaluated for the NRHP.

Table 2-6 Pool 4 Archeological Sites.

| **Type of Site** | **Number of Sites** |
|---|---|
| Historic | 2 |
| Prehistoric | |
| Multicomponent | |
| Total | 2 |
| **National Register Eligibility Status** | |
| Not Evaluated | 2 |
| Not Eligible | |
| Eligible | |
| Listed | |

Pool 5: Lock and Dam 5

No archeological sites or architectural resources have been identified on USACE fee land at Pool 5. Previous archeological investigations in the area include a survey by Scholtz and Hoffman (1968) of some portions of Pool 5 prior to construction of the MKARNS system, and Bennett et

al.'s geomorphological study (1989a) that included a pedestrian survey. Neither survey identified archeological sites on USACE fee land in Pool 5.

Pool 6: David D. Terry Lake, David D. Terry Lock and Dam No. 6

Previous archeological investigations in the area include Scholtz and Hoffman's survey of the David D. Terry Lock and Dam site and some public use areas (1968), and Bennett et al.'s geomorphological study of MKARNS pools 1-9 (1989a). No sites in the project area were located during either project. Three landforms in Pool 6 were identified as having some likelihood of buried cultural deposits (Bennett et al. 1989a: 52-53). Stewart-Abernathy recorded a submerged cypress barge or wharf boat (3PU257) that was discovered during river dredging, but no report on this investigation was filed. Davies recorded the Farmers Home Cemetery (3PU761) in 2005, an African American cemetery dating to the early 20th century near Murray Lock and Dam.

Table 2-7 Pool 6 Archeological Sites

| **Type of Site** | **Number of Sites** |
|---|---|
| Historic | 2 |
| Prehistoric | |
| Multicomponent | |
| Total | 2 |
| **National Register Eligibility Status** | |
| Not Evaluated | 2 |
| Not Eligible | |
| Eligible | |
| Listed | |

Pool 7: Murray Lake, Murray Lock and Dam

Seven archeological sites have been identified on USACE fee land at Pool 7. These include four prehistoric sites, a portion of one historic cemetery, one historic bridge, and one historic road. None of these sites are currently listed on the NRHP. None of the sites have been evaluated for NRHP eligibility. No architectural resources listed on the NRHP occur in Pool 7.

Only a small portion of Pool 7 has been surveyed for archeological resources. Bennett et al.'s geomorphological study (1989a) included a pedestrian survey. Seven landforms in Pool 7 were identified as having some likelihood of buried cultural deposits (Bennett, et al 1989a: 52-53). Four locations have high potential for buried sites, including the Palarm Creek floodplain, the Maumelle River floodplain, the Little Maumelle River floodplain, and the Fourche La Fave Creek floodplain. Three locations have moderate potential for buried sites, including the mouth of the Maumelle River NM 130, south of Easterwood Mountain NM 147, and northeast of Beaverdam Island. NM 126 and NM 132 have low potential for buried sites.

Archeological Consultants, Inc. (ACI) and Coastal Environments, Inc. (CEI) conducted a survey of six areas (Haroldton Access, Sweeden, Fletcher Bend, Maumelle Day Use Area, Merrisach, Rifle Pit) within the McClellan-Kerr Arkansas River Navigation System (MKARNS) in 2019. One isolated flake (FB-1) was discovered within the Fletcher Bend tract and two isolates

(MDUA-1, nail and MDUA-2, glass) were discovered within the Maumelle Day Use Area. None of these were recorded as sites or considered eligible for the NRHP (Almy et al. 2020).

A notable cultural resource present at Pool 7 is the *Hudson Site (3PU0016*). This site is located within the Maumelle Park in Pool 7 on a low natural levee. It appears to have had a dominant Late Ceramic Stage occupation as evidenced by considerable shell tempered pottery. The survey report recommended extensive testing of the site to gain knowledge of the Late Ceramic Stage in the area, but the site appears to not have been revisited since the mid-1970s.

Table 2-8 Pool 7 Archeological Sites

| **Type of Site** | **Number of Sites** |
|---|---|
| Historic | 3 |
| Prehistoric | 4 |
| Multicomponent | |
| Total | 7 |
| **National Register Eligibility Status** | |
| Not Evaluated | 7 |
| Not Eligible | |
| Eligible | |
| Listed | |

Pool 8: Toad Suck Ferry Lake, Toad Suck Ferry Lock and Dam

A total of four archeological sites have been identified on USACE fee land at Pool 8. The Cadron Settlement or Cedar Creek site (3FA0025 and 3FA0044, listed on the NRHP in 1974), is a historic French Trading post dating to the late 1700s. The site was later settled by Cherokee who immigrated to the area in the early 18th century until they were removed to Indian Territory. Prehistoric components present at the site as well, meaning the site is considered to be multicomponent. The other three sites are prehistoric with unknown eligibility for listing on the NRHP. No architectural resources are located in Pool 8 that are listed on the NRHP.

A brief archeological survey at Pool 8 was conducted in 1968 by Scholtz and Hoffman. Bennett et al.'s geomorphological study of MKARNS (1989a) included a pedestrian survey in Pool 8. They identified two landforms in Pool 8 as having some likelihood of buried cultural deposits, including the Cadron Creek floodplain, which has high potential for buried sites, and the area southwest of Morrilton and north of Willow Bend, which has moderate potential for buried sites (Bennett et al. 1989a: 52).

Table 2-9 Pool 8 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | |
| Prehistoric | 3 |
| Multicomponent | 1 |
| Total | 4 |
| **National Register Eligibility Status** | |
| Not Evaluated | 3 |
| Not Eligible | |
| Eligible | |
| Listed | 1 |

Pool 9: Winthrop Rockefeller Lake, Arthur V. Ormond Lock and Dam

A total of five archeological sites and four isolated finds have been identified on USACE fee land at Pool 9. There are no architectural resources in Pool 9 that are listed on the NRHP. Site 3PP21 is a multicomponent site with unknown eligibility for listing on the NRHP.

Bennett et al.'s geomorphological study of MKARNS (1989a) included a pedestrian survey in Pool 9, and they identified one landform as having low/moderate potential of buried cultural deposits, the area north of Crane Island, at NM 189 (Bennett et al. 1989a: 52).

Archeological Consultants, Inc. (ACI) and Coastal Environments, Inc. (CEI) conducted a cultural resource assessment survey (CRAS) of six areas (Haroldton Access, Sweeden, Fletcher Bend, Maumelle Day Use Area, Merrisach, Rifle Pit) within the MKARNS in 2019. Four sites and four isolates were discovered within the Sweeden survey area. Site 3PP1393 is a culturally indeterminate lithic scatter with a few historic artifacts. It is not considered eligible for listing in the NRHP. Sites 3PP1394 and 3PP1395 are historic home sites that are considered eligible for listing in the NRHP as they have structural remains and may provide data on the occupation of the region. Site 3PP1396 is a vehicle disposal area dating from the mid-20th century. It is not considered eligible for the NRHP because of its low research potential. The four isolates in the Sweeden area consist of three isolated flake (S-3, S-5, S-7) and an isolated piece of whiteware (S-4). None of these is eligible for the NRHP (Almy et al. 2020).

Table 2-10 Pool 9 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | 3 |
| Prehistoric | 2 |
| Multicomponent | |
| Total | 5 |
| **National Register Eligibility Status** | |
| Not Evaluated | 1 |
| Not Eligible | 2 |
| Eligible | 2 |
| Listed | |

Pool 10: Lake Dardanelle, Dardanelle Lock and Dam

A number of archeological surveys have been conducted at the Lake Dardanelle reservoir bottom at all non-inundated fee land and at all of the public use areas. To date, 258 archeological sites have been recorded on USACE fee land at Pool 10 (Almy et al 2018, Almy et al 2019, Almy et al 2020, Bennet et al 1986, Caldwell 1960, Cole 1969, Greengo 1957, Hogan et al 2021, Klinger 2001, Klinger 2008, Northrip and Bennet 1988, Thomas et al 2022b). Of the sites, 182 are prehistoric, dating to the Archaic, Woodland, Mississippian and Caddoan periods. The archeological record at these sites is composed primarily of isolated finds, deflated surface scatters of lithic debris, as well as some intact deposits. Forty-seven archeological sites are historic and 29 of the recorded sites are multicomponent. Two of the prehistoric sites and two of the historic sites are considered eligible for listing on the NRHP. One prehistoric and one historic site are considered ineligible for listing, and the remaining sites are unevaluated.

No architectural resources occur on USACE lands at Pool 10 that are listed on the NRHP.

Notable sites at Pool 10 include *Dardanelle Rock, Spadra Bluff, and Dwight Mission* Dardanelle Rock was an early landmark for pioneers and river boat captains and. It is located less than 1 mile upstream from the Arkansas State Highway 7 bridge on the right descending bank and a half mile downstream from the dam. It possesses several examples of prehistoric rock art (3YE0255, 3YE0256) and one example of historic graffiti dating to 1853 (3YE1228). The Arkansas Natural Heritage Commission purchased 12 acres of the site to help ensure its protection.

Spadra Bluff was the site of an early trading post known as the “Federal Trading Factory” (3JO0033). The site has been disturbed by the clearing of land and the construction of restrooms and a picnic area, and its current state is unknown. Several prehistoric sites (3JO0227, 3JO0228, 3JO0229 and 3JO0230) are also present in the immediate vicinity.

Dwight Mission was a Protestant Cherokee Mission from 1820 to 1829, and the site has now been inundated. A marker and cemetery remain on the west bank of the Illinois Bayou at Russellville (3PP1232).

Table 2-11 Pool 10 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | 47 |
| Prehistoric | 182 |
| Multicomponent | 29 |
| Total | 258 |
| **National Register Eligibility Status** | |
| Not Evaluated | 252 |
| Not Eligible | 2 |
| Eligible | 4 |
| Listed | |

Pool 12: Ozark Lake, Ozark-Jeta Taylor Lock and Dam

Archeological studies have been conducted on much of the Pool 12 fee land and public use areas, resulting in the identification of 92 sites on USACE fee land (Weinstein et al 2019, Bennet et al 1985, Bennet et al 1987, Almy et al 2019, Thomas et al 2022a). The archeological record at the 70 prehistoric sites is composed primarily of isolated finds, deflated surface scatters of lithic debris, and locations at which intact deposits are documented or suspected, and are from the Archaic, Woodland, and Mississippian periods. Eleven historic period sites and eleven multicomponent sites were also identified. None of the archeological sites are listed on the NRHP. Fifteen sites have been determined to be not eligible for inclusion. The remaining 77 sites have not been evaluated for NRHP eligibility status.

The Merle Whitman Tourist Cabin is a historic traveler's accommodation at 200 North Bell Street in Ozark, Arkansas. It is a distinctively styled vernacular structure, built out of local fieldstone, cut sandstone, and concrete. Built in 1933–34, it is the only known tourist building in Franklin County using this combination of materials. It was used as tourist accommodation until the 1960s, when it was purchased by USACE as part of land acquisition for the Ozark Jetta-Taylor Lock and Dam project. It housed the offices of the local chamber of commerce between 1966 and 1995. The cabin was listed on the National Register of Historic Places in 2006.

Table 2-12 Pool 12 Archeological Sites

| Type of Site | Number of Sites |
|---|---|
| Historic | 11 |
| Prehistoric | 70 |
| Multicomponent | 11 |
| Total | 92 |
| **National Register Eligibility Status** | |
| Not Evaluated | 77 |
| Not Eligible | 15 |
| Eligible | |
| Listed | |

Pool 13: John Paul Hammerschmidt Lake, James W. Trimble Lock and Dam

Only four archeological sites have been identified within Arkansas at Pool 13, which extends into Oklahoma. Sites 3SB0011 and 3SB0012 are described as prehistoric sites that may have been destroyed due to construction activities. No architectural resources occur in Pool 13 within Arkansas that are listed on the NRHP.

In 2019 ACI and CEI conducted a survey of six areas (Haroldton Access, Sweeden, Fletcher Bend, Maumelle Day Use Area, Merrisach, Rifle Pit) within the MKARNS. 3CW1336 is a low-density historic scatter within the Haroldton Access property and 3CW1237, as contained within the survey area, is a low density multicomponent artifact scatter. Neither site, as contained within the survey area, is considered eligible for listing in the NRHP due to the low artifact density and diversity, lack of association with important individuals or events, and a subsequent low research potential (Almy et al. 2020).

Table 2-13 Pool 13 Archeological Sites

| **Type of Site** | **Number of Sites** |
|---|---|
| Historic | 1 |
| Prehistoric | 2 |
| Multicomponent | 1 |
| Total | 4 |
| **National Register Eligibility Status** | |
| Not Evaluated | 2 |
| Not Eligible | 2 |
| Eligible | |
| Listed | |

Table 2-14 Summary of Archeological Sites on USACE Owned Lands on the MKARNS

| **Type of Site** | **Number of Sites** |
|---|---|
| Historic | 72 |
| Prehistoric | 265 |
| Multicomponent | 42 |
| **Total** | 379 |
| **National Register Eligibility Status** | |
| Not Evaluated | 348 |
| Not Eligible | 23 |
| Eligible | 7 |
| Listed | 1 |

Submerged Cultural Resources Along MKARNS

Shipwrecks, the sunken remains of boats, barges, steamboats, and other watercraft, are documented throughout the Arkansas River system. Historic accounts including newspapers, diaries, and military records, describe some of these events (Branam 2003; Wright 1930). Some of the wrecks were salvaged immediately, but others quickly disappeared. Remnants of wrecked vessels may remain in the river if they were quickly buried by protective sediments, while some

were likely destroyed by the river current, subsequent dredging activities, or were simply washed downstream into the Mississippi River. Shipwrecks have sometimes been found buried in abandoned river channels that are now on dry land. Wrecks were usually caused by boiler explosions, shoaling, or hitting snags and submerged objects. Consequently, the potential exists for the proposed actions to impact undiscovered shipwrecks in the MKARNS, both on dry land, and on land now submerged by the pools. Information on the shipwrecks was collected to facilitate future identification of these resources.

Branam (2003) provided a list of known wrecks in the Arkansas and nearby rivers. Culled from newspaper accounts and steamboat references, many of the locations are general and vague. In addition, some of the place names are no longer used. In order to locate the wrecks within the MKARNS project segments, as defined by the 2005 Arkansas River Navigation Study Environmental Impact Statement, it was necessary to run the unknown location names through the Geographic Names Information System (GNIS). The Arkansas Archeology Survey (AAS) prepared an index of the locations shown on the 1870 USACE map of the Arkansas River system. Of the 158 known wrecks in Branam's database, 89 had enough information to be assigned to 1 or 2 project segments (wrecks could be in 2 segments because the locations fell at a segment boundary, e.g., Little Rock, and Ft. Smith). One additional wreck has been identified by the Oklahoma SHPO in the project area (but has not yet been verified by fieldwork or reported as a site), bringing the known shipwreck total to 90. An additional 6 wrecks from Branam have location information found in the 1870 USACE map index, but the data is insufficient for generating project segments or NM locations at this time. None of these shipwrecks have been evaluated for the NRHP.

A survey for submerged cultural resources in the White River basin by Panamerican Consultants did not extend to the White River mouth, which is part of MKARNS (Buchner and Krivor 2001). Shipwrecks are more common in the lower reaches of the river, probably because there was more shipping activity there. Shipping in the upper portions of the river gradually extended from Ft. Smith in 1822, to the Three Forks area of Oklahoma, near present day Ft. Gibson in 1827. It was not until 1878 that the first steamboat ascended the river as far as Arkansas City, Kansas (Wright 1930:71). River flow was unpredictable, so in dry seasons, boats were often stranded and could not move upstream.

Ninety shipwrecks have known, general locations in MKARNS, but their actual remains have not been discovered.

Table 2-14. Locations of 90 Known Shipwrecks in the Arkansas River Area (after Branam 2003).

| 2005 Arkansas River Navigation Study Project Segments | Number of Wrecks |
|---|---|
| 1* Mouth To Pine Bluff | 25 |
| 2* Pine Bluff to Little Rock | 34 |
| 3* Little Rock to Dardanelle | 32 |
| 4* Dardanelle to Fort Smith | 22 |
| 5* Fort Smith to Muskogee | 6 |
| 6* Muskogee to Catoosa | 1 |
| Location Unknown | 41 |

* Wrecks at locations that could be in adjoining pools were counted in both, e.g., 11 wrecks at Pine Bluff, the boundary between project segments 1 and 2, could be in either segment, and were included in both totals.

Long Term Objectives for Cultural Resources

The 25 years since the last major cultural resource analysis of the built environment of the MKARNS has left the historic context of the MKARNS outdated with large data gaps. The research within the 2005 report and Environmental Impact Statement regarding deepening the channel needs to be updated to reflect the analysis of the system as a whole within national, state, and local contexts. To date, the MKARNS has not been formally evaluated for eligibility for listing on the NRHP. As such, USACE is treating the built environment of the MKARNS as eligible for listing on the NRHP until a formal evaluation takes place, which is expected to occur in 2023 or 2024. It is important to note that USACE has not assumed which criteria the MKARNS would be eligible for now as that might contradict or impede the findings of the survey.

As funding allows, the Little Rock District will create a Historic Properties Management Plan (HPMP) for MKARNS. The purpose of the HPMP is to provide a comprehensive program to direct the historic preservation activities and objectives at MKARNS. Completion of a full inventory of cultural resources at MKARNS is a long-term objective that is needed for compliance with Section 110 of the NHPA. Identification and evaluation of sites is an ongoing process at MKARNS.

The Archaeological Resources Protection Act (ARPA) secures the protection of archaeological resources and sites on lands owned and administered by the United States. According to ARPA, it is illegal to excavate, remove, damage, or deface archaeological resources on public lands without a permit. It is also illegal to sell or transport archaeological resources removed from public lands. Little Rock District requires permits for archaeological investigations at MKARNS 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

and summarize any potential sacred objects that existed within their archaeological collections prior to the passage of the law and to repatriate such objects to affiliated Tribes requesting their return. Additionally, there are responsibilities related to the inadvertent discovery of human remains or funerary objects that occur on federal land that require consultation and repatriation. Although NAGPRA compliance has been an ongoing focus of the Little Rock District and many consultations and repatriations have occurred in the past, there is still more work to be done.

## 2.13 Interpretation

Interpretative programs on the MKARNS are aimed at seven areas of emphasis: water and boating safety, natural resources management, wildlife management, recreation, historical, navigation, and hydroelectric. Water and boating safety remain the focus for many of the interpretive efforts. MKARNS project staff provide programs throughout the year at local schools, community events, expos, sporting events, and USACE managed parks. Overall, fishing and hunting related activities make up the majority of visitors on the MKARNS when compared to other forms of water-based recreation.

The USACE Arkansas River Visitor Center located at the Russellville Site Office, Russellville, AR provides a central location for visitors to the area to learn about the history of the river and activities of interest. The Visitor Center's theme is "Renaissance of a River". Interpretive exhibits tell the story of the development of the River Valley from the time when Native Americans were the sole occupants of this area to the present. It also offers wildlife exhibits, a locking through simulator, and hands-on exhibits.

The Lake Dardanelle State Park Visitor Center is managed by the state of Arkansas. The visitor center is a certified Trail of Tears National Historic Site that offers spectacular views of the river, along with exhibits that tell more of the removal story that played a vital role in the history of the area.

The goal of the MKARNS interpretation program is to provide educational opportunities that are understandable, meaningful, and enjoyable to the audience. Methods of interpretation include audio-visual, lecture, guided tours, interpretive panels, billboards, social media, and demonstrations to meet the following objectives:

- Promote water safety
- Aid project personnel in accomplishing management objectives
- Enhance the public's understanding of the role of the U.S. Army Corps of Engineers in development and administration of water resource projects
- Increase the public's knowledge and understanding of the purpose and mission of the USACE and operation of the project, its man-made, natural, and cultural features
- Develop public appreciation for proper use of project resources to reduce overall project O&M costs
- Generate appreciation for cultural and historical heritage
- Provide environmental education opportunities and facilities for area students and educators

## 2.14 Demographics and Socioeconomics

This section describes the demographic and socioeconomic characteristics for the geographic areas surrounding the MKARNS. The "zone of influence" (ZOI) for the purpose of this Master Plan is defined as those areas within a 50-mile-wide corridor centered on the MKARNS defined area (Figure 2-6). The area of analysis includes 18 Arkansas counties (Table 2-15). The MKARNS system under study is comprised of Dardanelle Lake, Ozark Lake, Pools 0-9, and Pool 13.

This ZOI was based primarily on historic visitation information. The demographic and socioeconomic description for the ZOI in this section of the report is summarized at the county level. The data for the counties has been aggregated into the "zone of influence" totals in the tables and figures. 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. When the ZOI is referenced in this section, it is referring to the aggregate socioeconomic and demographic data for the area. Demographic and socioeconomic data for Arkansas and the United States are provided for comparison purposes.

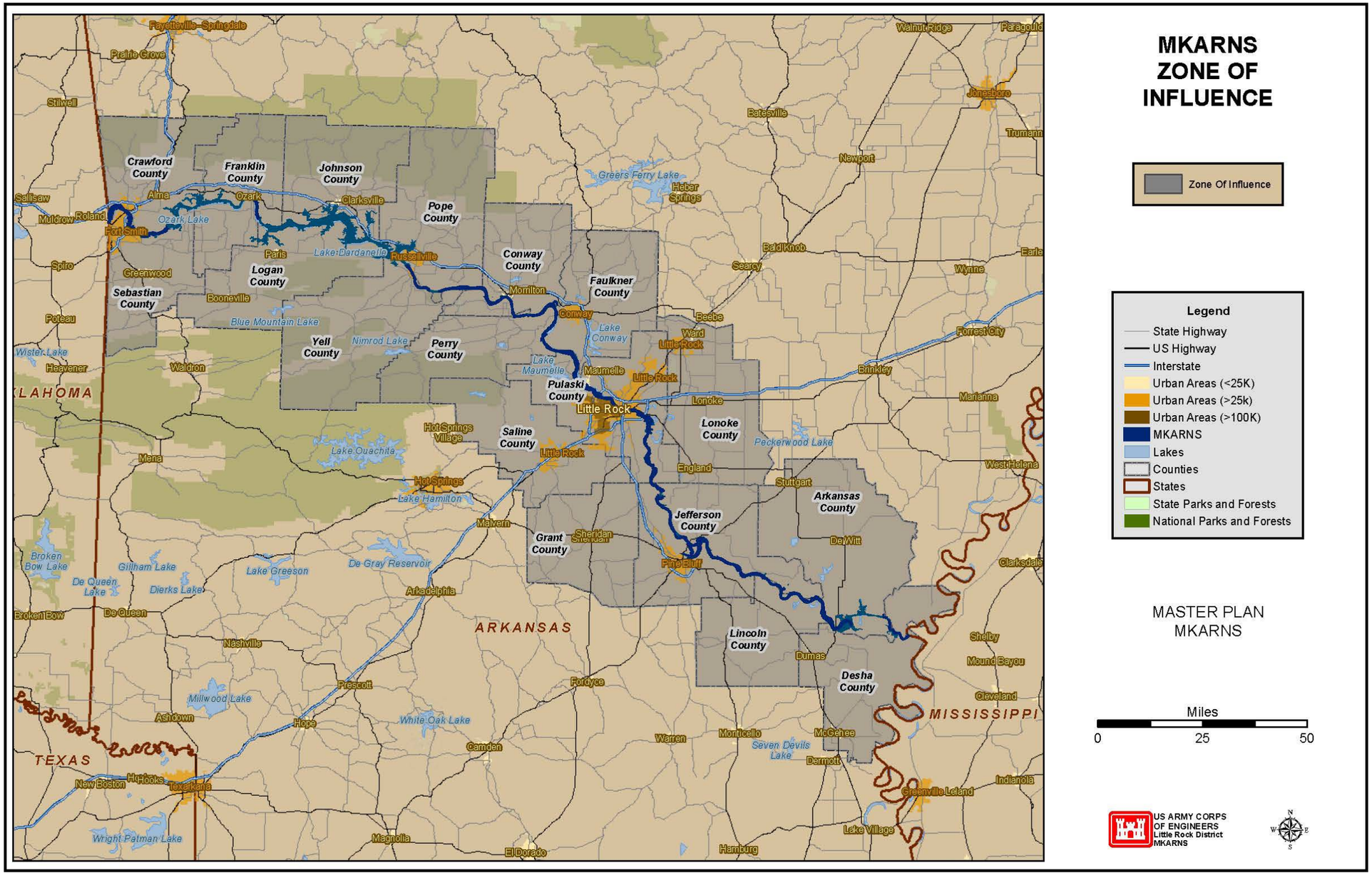



Figure 2-6 Zone of Influence for the MKARNS

Table 2-15 Arkansas Counties within the MKARNS ZOI

| Arkansas ZOI Counties | | |
|---|---|---|
| Arkansas | Grant | Perry |
| Conway | Jefferson | Pope |
| Crawford | Johnson | Pulaski |
| Desha | Lincoln | Saline |
| Faulkner | Logan | Sebastian |
| Franklin | Lonoke | Yell |

### 2.14.1 Population

Data from the 2010 Census, the U.S. Bureau of Labor Statistics, and the 2020 American Community Survey were used to summarize socioeconomic conditions in the project area. Table 2-16 shows 2010 and 2020 population estimates as well as the estimated annual growth rate for each county in the area. The annual growth rate in recent years (2010-2020) has been a mix of positive and negative in the individual counties within the ZOI, but overall was positive for the ZOI. The sum of the annual growth rate in the ZOI between 2010 and 2020 was 2.9%. During the same timeframe, the annual growth rate was 0.74% in the United States and 0.33% in Arkansas. Total ZOI population was 1,181,1751 (2010) and 215,474 (2020).

Table 2-16 Population Estimates and Trends (MKARNS)

| Population | 2010 | 2020 | Annual Growth/Decline |
|---|---|---|---|
| **United States** | 308,745,538 | 331,449,281 | 7.354% |
| **State of Arkansas** | 2,915,918 | 3,011,524 | 3.28% |
| **Arkansas** | 19,019 | 16,722 | -12.08% |
| **Conway** | 21,273 | 20,873 | -1.88% |
| **Crawford** | 61,948 | 60,378 | -2.53% |
| **Desha** | 13,008 | 11,090 | -14.74% |
| **Faulkner** | 113,237 | 125,106 | 10.48% |
| **Franklin** | 18,125 | 17,173 | -5.25% |
| **Grant** | 17,853 | 18,090 | 1.33% |
| **Jefferson** | 77,435 | 65,861 | -14.95% |
| **Johnson** | 25,540 | 25,845 | 1.19% |
| **Lincoln** | 14,134 | 13,037 | -7.76% |
| **Logan** | 22,253 | 21,215 | -4.66% |
| **Lonoke** | 68,356 | 74,722 | 9.31% |
| **Perry** | 10,445 | 9,964 | -4.61% |
| **Pope** | 61,754 | 63,789 | 3.30% |
| **Pulaski** | 382,748 | 397,821 | 3.94% |
| **Saline** | 107,118 | 125,233 | 16.91% |
| **Sebastian** | 124,744 | 128,400 | 2.93% |
| **Yell** | 22,185 | 20,155 | -9.15% |
| **Zone of Influence (avg)** | **65,621** | **67,526** | **2.90%** |

### 2.14.2 Income and Employment

Key income indicators are presented in Table 2-17. Per capita income for counties in the project area varies but the average capita income for the ZOI was $25,325 in 2020. By comparison, per capita income was $35,384 in the United States and $27,724 in the State of Arkansas. Median household income is not available for the zone of influence but ranges from a low of $31,855 in Desha County to a high of $66,876 in Saline County for an average of $47,974. The largest majority of the ZOI is employed in the Management, Business, Science, and Arts Occupations, followed by Sales and Office Occupations, Service Occupations, Production, Transportation, and Material Moving Occupations, and Natural Resources, Construction, and Maintenance Occupations being the least occupied. Compared to the Nation and the State of Arkansas, the ZOI demonstrates the same general distribution of the overall workforce.

Table 2-17 Income and Employment Bureau of the Census, American Community Survey (2020 Estimate)

| | Per Capita income | Median Income | Total Civilian Workforce | Management, Business, Science, and Arts | Service | Sales and Office Workers | Natural Resource, Construction and Maintenance | Production and Transportation |
|---|---|---|---|---|---|---|---|---|
| **United States** | $35,384 | $64,994 | 155,888,980 | 61,526,906 | 27,095,654 | 33,247,878 | 13,620,436 | 20,398,106 |
| **State of Arkansas** | $27,724 | $49,475 | 1,309,748 | 456,538 | 217,074 | 278,061 | 131,748 | 226,327 |
| **Arkansas** | $26,969 | $51,000 | 7,929 | 2,483 | 1,216 | 1,526 | 974 | 1,730 |
| **Conway** | $28,539 | $44,456 | 8,992 | 2,576 | 1,582 | 1,623 | 1,420 | 1,791 |
| **Crawford** | $25,460 | $48,980 | 25,924 | 7,596 | 4,249 | 6,129 | 2,606 | 5,344 |
| **Desha** | $19,090 | $31,855 | 4,377 | 1,236 | 889 | 946 | 535 | 771 |
| **Faulkner** | $27,414 | $54,191 | 59,134 | 23,803 | 10,129 | 12,703 | 5,084 | 7,415 |
| **Franklin** | $20,639 | $37,561 | 6,898 | 1,982 | 965 | 1,380 | 876 | 1,695 |
| **Grant** | $30,639 | $59,051 | 8,048 | 2,778 | 1,176 | 1,548 | 1,073 | 1,473 |
| **Jefferson** | $21,941 | $40,402 | 25,271 | 7,499 | 5,345 | 4,603 | 1,904 | 5,920 |
| **Johnson** | $22,077 | $39,346 | 10,398 | 2,966 | 1,601 | 1,949 | 1,100 | 2,782 |
| **Lincoln** | $14,182 | $46,554 | 3,347 | 938 | 556 | 713 | 473 | 667 |
| **Logan** | $22,632 | $44,232 | 8,991 | 2,219 | 1,568 | 1,695 | 1,105 | 2,404 |
| **Lonoke** | $28,446 | $59,278 | 33,170 | 11,876 | 4,781 | 7,679 | 4,089 | 4,745 |
| **Perry** | $23,030 | $44,962 | 3,677 | 1,074 | 531 | 728 | 557 | 787 |
| **Pope** | $27,414 | $46,004 | 26,827 | 8,670 | 5,410 | 4,880 | 2,562 | 5,305 |
| **Pulaski** | $33,773 | $52,930 | 183,975 | 78,697 | 29,390 | 42,471 | 11,484 | 21,933 |
| **Saline** | $31,973 | $66,876 | 57,987 | 22,124 | 8,266 | 14,231 | 5,659 | 7,707 |
| **Sebastian** | $28,623 | $47,878 | 58,496 | 19,612 | 9,883 | 12,591 | 5,598 | 10,812 |
| **Yell** | $23,008 | $47,981 | 9,476 | 2,115 | 1,685 | 1,958 | 1,217 | 2,501 |
| **Zone of Influence Totals** | | | 542,917 | 200,244 | 89,222 | 119,353 | 48,316 | 85,782 |

### 2.14.3 Recreation

In counties adjacent to MKARNS (ZOI study area), tourism and recreation is also an important part of local economies. Recreation within the ZOI has substantial impact to local economies based on surveys of visitor spending and attendance within the ZOI. Figure 2-7 indicates the recreation opportunities by percent within the ZOI. Total visitors for the MKARNS-ZOI area of recreation totaled approximately 2.5 million visitors for the year 2019. Visitors spent $102.6 million dollars in local economies within 30 miles of the defined area of recreation with 51.6 million in business revenues creating a total of 823 jobs with labor income totaling over 20.4 million. Figure 2-8 illustrates visitors use by activity. Sightseeing was the most popular activity with 26.81% of visitors engaging in this activity with special events being the lowest attended activity at 2.91%.

Due to a historical flooding event on the Arkansas River in 2019, availability of various recreation areas declined along the MKARNS.

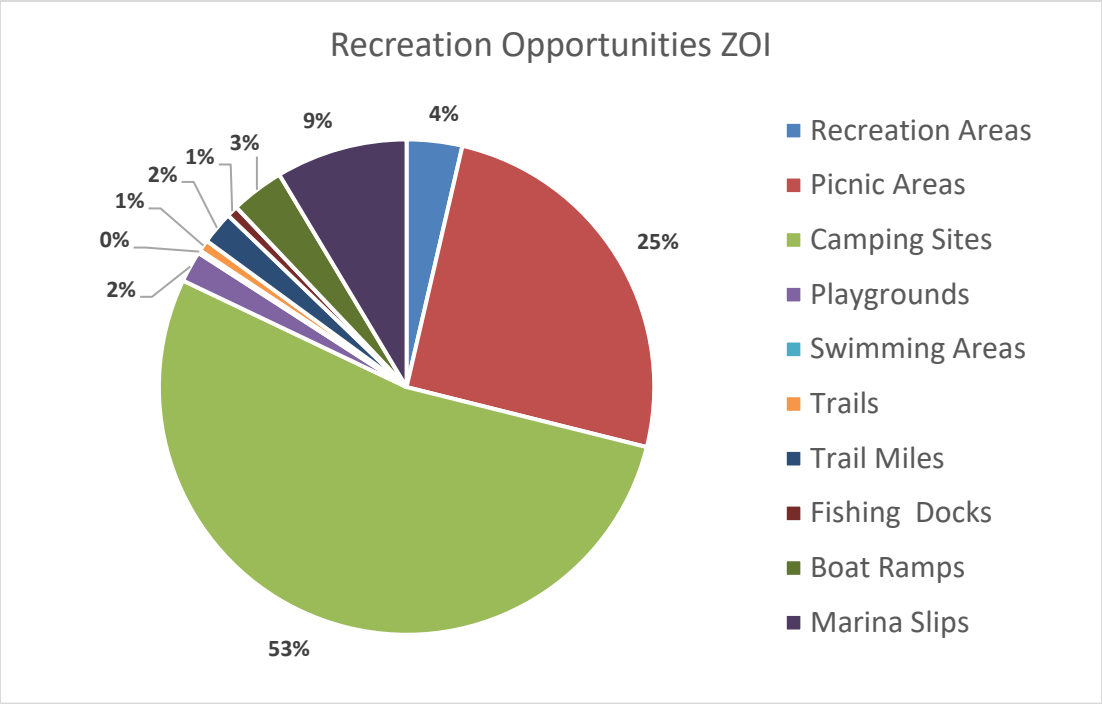



Figure 2-7 Recreation Opportunities ZOI

Source: USACE Institute for Water Resources, Value to the Nation 2019

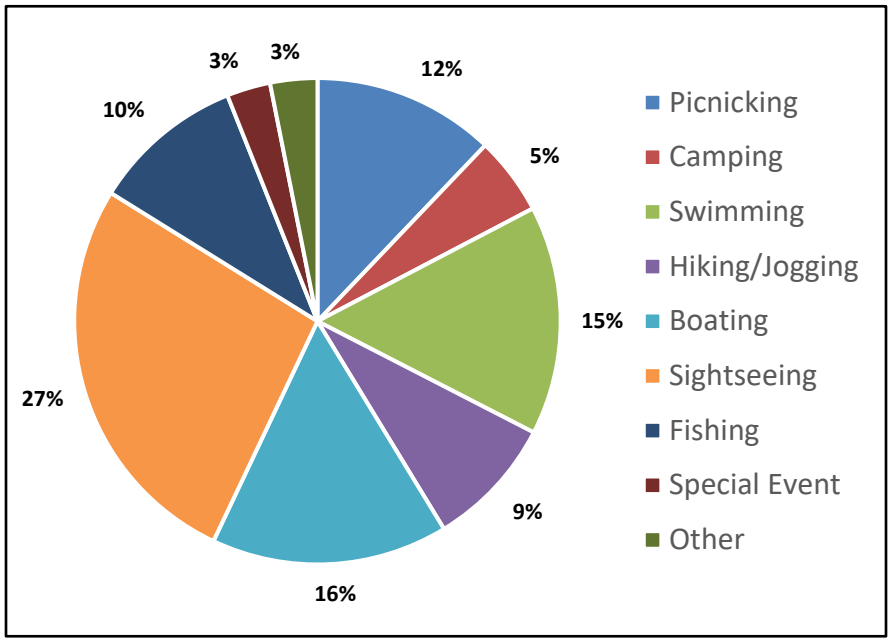



Figure 2-8 Distribution of Visitor Activities by Use ZOI

Source: USACE Institute for Water Resources, Value to the Nation

### 2.14.4 Environmental Justice

Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," addresses potential disproportionate human health and environmental impacts that a project may have on minority or low-income communities. Thus, the environmental effects of the Project on minority and low-income communities or Native American populations must be disclosed, and agencies must evaluate projects to ensure that they do not disproportionally impact any such community. If such impacts are identified, appropriate mitigation measures must be implemented.

To determine whether a project has a disproportionate effect on potential environmental justice communities (i.e., minority or low-income population), the demographics of an affected population within the vicinity of the Project must be considered in the context of the overall region. Guidance from the Council on Environmental Quality (CEQ) states that "minority populations should be identified where either: (1) the minority population of the affected areas exceeds 50 percent, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997)."

Table 2-18 displays census data summarizing racial and ethnic characteristics of the ZOI. The purpose is to analyze whether the demographics of the affected area differ in the context of the broader region; and if so, do differences meet CEQ criteria for an Environmental Justice community. Based on guidance provided by the CEQ and the comparison of available data

collected for the study area it does not appear that minority or low-income populations in the Project area are disproportionately affected.

Table 2-18 Population Distribution by Race and Ethnicity (2019)

| Area | White Alone | Black or African American alone | American Indian and Alaska Native alone | Asian Alone | Native Hawaiian and Other Pacific Islander alone | Two or more races | Hispanic or Latino (of any race) |
|---|---|---|---|---|---|---|---|
| **United States** | 76.4% | 13.5% | 1.4% | 6.0% | 0.2% | 2.8% | 18.5% |
| **State of Arkansas** | 79.1% | 15.8% | 1.1% | 1.8% | 0.5% | 2.2% | 7.8% |
| **Arkansas County, AR** | 71.8% | 25.1% | 0.3% | 0.8% | 0.0% | 1.9% | 3.4% |
| **Conway County, AR** | 84.8% | 11.4% | 0.9% | 0.4% | 0.0% | 2.5% | 4.0% |
| **Crawford County, AR** | 90.7% | 1.7% | 2.6% | 1.5% | 0.1% | 3.3% | 8.1% |
| **Desha County, AR** | 49.4% | 47.9% | 0.5% | 0.7% | 0.1% | 1.4% | 6.4% |
| **Faulkner County, AR** | 83.6% | 12.2% | 0.7% | 1.3% | 0.1% | 2.2% | 4.2% |
| **Franklin County, AR** | 94.4% | 0.9% | 1.6% | 1.1% | 0.2% | 1.8% | 3.2% |
| **Grant County, AR** | 94.7% | 2.7% | 0.5% | 0.4% | 0.1% | 1.7% | 3.0% |
| **Jefferson County, AR** | 39.8% | 57.4% | 0.4% | 0.9% | 0.1% | 1.4% | 2.2% |
| **Johnson County, AR** | 91.6% | 2.2% | 1.2% | 2.7% | 0.1% | 2.1% | 14.3% |
| **Lincoln County, AR** | 67.6% | 30.0% | 0.6% | 0.4% | 0.0% | 1.5% | 4.2% |
| **Logan County, AR** | 93.2% | 1.5% | 1.2% | 2.3% | 0.0% | 1.9% | 3.0% |
| **Lonoke County, AR** | 89.8% | 6.3% | 0.7% | 0.9% | 0.1% | 2.1% | 4.6% |
| **Perry County, AR** | 94.5% | 2.0% | 1.0% | 0.4% | 0.0% | 2.1% | 3.1% |
| **Pope County, AR** | 92.1% | 3.3% | 1.0% | 1.2% | 10.0% | 2.3% | 9.6% |
| **Pulaski County, AR** | 57.2% | 37.9% | 0.4% | 2.3% | 0.1% | 2.2% | 6.2% |
| **Saline County, AR** | 87.9% | 8.4% | 0.6% | 1.3% | 0.1% | 1.6% | 5.1% |
| **Sebastian County, AR** | 81.8% | 7.0% | 2.4% | 4.7% | 0.2% | 3.8% | 14.8% |
| **Yell County, AR** | 93.9% | 2.1% | 1.1% | 1.4% | 0.1% | 1.5% | 20.5% |
| **Zone of Influence (avg)** | **81.0%** | **14.4%** | **1.0%** | **1.4%** | **0.6%** | **2.1%** | **6.7%** |

Table 2-19 also displays the percentage of children (individuals under the age of 18) by county in the ZOI. The purpose of the data is to assess whether the project disproportionally affects the health or safety risks to children as specified by Executive Order (E.O.) 13045 - *Protection of Children from Environmental HealthRisks and Safety Risks* (1997).

Table 2-19 Poverty Indicators and Number of Children (2019)

| Area | Unemployment Rate | Percent of population in poverty | Percent of Population Under 18 Years Old |
|---|---|---|---|
| **United States** | 3.7% | 11.4% | 18.5% |
| **Arkansas** | 3.2% | 15.2% | 23.7% |
| **Zone of Influence (avg)** | 3.5% | 15.4% | 23% |
| **Source: U.S. Bureau of the Census, American Community Survey (2019 Estimate)** | | | |

## 2.15 Recreation Facilities, Activities, and Needs

The recreational opportunities and potential of the MKARNS is of great importance to the Northwest, Central, and Lower Delta region of Arkansas. The MKARNS Project offers many recreational activities such as swimming, boating, fishing, picnicking, camping, hunting, hiking, wildlife viewing, and other sports-related activities. There are 91 public use areas on the Arkansas River. Out of these public use areas, the USACE operates 17 campgrounds, ten day-use areas, fourteen water access points, and two land access points.

No significant park operational changes from current management practices are included in this Master Plan. Since 1976 and 1977, parks have been evaluated using various efficiency review processes. In 2012, the Little Rock District prepared a Recreation Adjustment Plan that evaluated all the parks on the Arkansas River. Implementation of the plan led to full and partial closures, and/or the leasing of several public use areas along the river which included Bigelow Park, Old Ferry Landing Park, Pontoon Park, Sequoya Park, Cypress Creek Access, Sweeden Island Access, Cabin Creek Park, Cane Creek Park, Delaware Park, Dwight Mission Park, Dublin Park, Citadel Bluff, Reed Mountain Park, and River Ridge Park.

Parks chosen for closure for operational efficiencies were offered for lease through standard leasing procedures. All leased parks returned to the USACE that do not qualify for the exceptions to policy in Appendix B of ER 1130-2-550 will be closed. The criteria discussed in this section are of a basic nature to be used for the planning, development, and management of the MKARNS public use areas with consideration being given to the latest trends in recreational activities and needs. These criteria furnish guidelines for determining the type and number of facilities needed to satisfy the current and projected demand, and furnishes guidelines for serviceability, operation, and maintenance of facilities. Universal accessibility will be included in the design of new facilities. Engineering and Design Recreational Facility and Customer Service Standards can be referenced in EM 1110-1-400. This manual provides guidance for the rehabilitation of existing facilities, the design and construction of new recreation areas and facilities, and recreation program evaluation activities at recreation areas managed by USACE.

### 2.15.1 Facility Information

The setting of facilities and development of parks will be of the highest quality, safe, and promote the health, welfare, and aesthetic enjoyment of the public. The setting of each facility results in the compromise between conservation of the natural environment and providing for public use with regard to the project's primary mission. Only the most adaptable terrain is used for setting of overall facilities with consideration given to the natural features so that the most scenic parts of the site may remain undeveloped for the enjoyment of visitors. Facility setting will be in harmony as much as feasible with the environment in which they are to be placed to avoid excessive grading and clearing for site preparation.

### 2.15.2 Recreation Areas

Multiple parks, boat ramps, land access points, etc. exist on the Arkansas River. Some are USACE-operated, and some are operated by non-profit organizations, city, county, state, or federal agencies. Park maps and recreation area overview maps may 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 development may occur as identified in the park descriptions below.

During the Master Plan revision process, various name changes occurred for the recreation areas along the Arkansas River. Table 2-20 below displays the current names for the remaining Recreation Areas.

Table 2-20 Recreation Areas, Current Names

| Current Name | Previous Name |
|---|---|
| Aux Arc Park | Dam Site South Park |
| Big Bayou Meto Access | Big Bayou Meto |
| Bigelow Park | Bigelow |
| Black Point Access | N/A |
| Bluff Hole Park | Bluff Hole Park |
| Bona Dea Trails and Sanctuary | Cephas Washburn Memorial Park |
| Burns Park | Burns Park |
| Cabin Creek Slough Access | N/A |
| Cabin Creek Park | Cabin Creek |
| Cadron Settlement Park | Cadron Settlement |
| Cane Creek Park | Cane Creek |
| Cherokee Park | Cherokee |
| Citadel Bluff | Citadel Bluff Park |
| Clear Creek Park | Clear Creek Park |
| Cooks Landing Park | Cooks Landing |
| Cypress Creek Access | Cypress Creek |
| Dam Site 5 West Park | Lock and Dam No. 5 |
| Dam Site 6 East Access | Dam Site East David D. Terry |
| Dam Site 6 West Park | Dam Site West David D. Terry |
| Davis Lake Access | N/A |
| Delaware Park | Delaware |
| Dublin Park | Dublin |
| Dwight Mission Park | N/A |
| Dyer Lake Access | N/A |
| Dyer Ramp Access | N/A |
| Effluent Bay Access | N/A |
| Flat Rock Park | Flat Rock |
| Fort Smith Park | Fort Smith |
| Haroldton Access | Dam Site 13 (north) Park |
| Hartman City Park | Hartman City Park |
| Hicks Creek Access | Ozark City Park |
| Holla Bend | Holla Bend - Future |
| Horsehead Park | Horsehead |
| Huffs Island Access | Huffs Island |
| Hwy 64 Access | N/A |

| Current Name | Previous Name |
|---|---|
| Hwy 64 Cove Park | Hwy 64 Cove-Future Park |
| Illinois Bayou Park | Illinois Bayou- -Future Park |
| Jardis Point Park | Jardis Point |
| La Harpe View Park | Murray Dam Site |
| Lake Dardanelle State Park (Dardanelle) | Dardanelle |
| Lake Dardanelle State Park (Russellville) | Russellville |
| Lee Creek Access | Lee Creek |
| Little Bayou Meto Access | Little Bayou Meto |
| Lock 5 Access | N/A |
| Maumelle Park | Maumelle |
| Merrisach Lake Park | Merrisach Lake |
| Moore Bayou Park | Moore Bayou |
| Mud Creek Island Primitive Camping | N/A |
| Murray Park | Murray Dam Site |
| New Blaine Community Park | New Blaine City -Future Park |
| Notrebes Bend Park | Notrebes Bend |
| O'kane Access | O'kane |
| Old Ferry Landing Park | Toad Suck Ferry Dam Site |
| Old Post Road Park | Old Post Road |
| Ouita Park | Ouita |
| Ozark City Park | Ozark City Park |
| Palarm Creek Park | Mayflower City Landing |
| Pendleton Bend Park | Pendleton Bend |
| Piney Bay Park | Piney Bay |
| Pleasant View Park | Shiloh |
| Point Remove Park | Point Remove |
| Pontoon Park | Pontoon Park |
| Reed Mountain Park | Dam Site North Park |
| Rising Star Park | Rising Star |
| River Ridge Park | River Ridge Park |
| Riverview Park | Dam Site West |
| Roseville Access | Roseville-Future Park |
| Sequoya Park | Sequoya |
| Sheppard Drive Soccer Field | Old Post Road |
| Sheppard Island Access | Sheppard Island |
| Shiloh Park | Shiloh |
| Shoal Bay Park | Shoal Bay |
| Six Mile Access | Six Mile |
| Spadra Marina | Spadra |
| Spadra Park | Spadra |

| Current Name | Previous Name |
|---|---|
| Springhill Park | Dame Site 13 (south) Park |
| Ste Marie Park | Ste Marie |
| Subiaco Abbey Camp | Shoal Bay Boy's Camp |
| Sweeden Island Access | Sweeden Island |
| Tar Camp Park | Tar Camp |
| Thompson Bay Access | N/A |
| Toad Suck Park | Toad Suck Ferry Dam Site |
| Trulock Park | Trulock |
| Vache Grasse Park | Vache Grasse Park |
| Veterans Memorial Park | N/A |
| Vine Prairie Park | Vine Prairie Park |
| Washburn Park | Cephas Washburn Memorial Park |
| West Creek Park | West Creek |
| White Oak Access | White Oak Park |
| Wilbur D. Mills Park | Wilbur D. Mills |
| Wild Goose Bayou Access | Wild Goose Bayou |
| Willow Beach Park | Willow Beach |

The following recreation areas are listed by navigation pool due to the large geographical area covered by the Project. Under each navigation pool, areas are further split out to delineate high and low-density recreation land classifications. Only minimal development and infrastructure that supports passive recreational use can occur in low density areas; if the area is leased, operational costs are the responsibility of the lessee.

#### 2.15.2.1 POOL 1

High Density Recreation Areas

Wild Goose Bayou Access - This 22-acre water access area is situated on the right descending bank of the White River at its confluence with the Arkansas Post Canal at Norrell Lock and Dam. The site is located at the end of Wild Goose Lane and is accessed via Tichnor Blacktop Road from State Highway 44. This area contains a two-lane boat ramp and paved parking. Due to its remote location and limited facilities, much of the site's use is from local commercial and recreational fishermen. In the fall and winter, this area experiences increased utilization by the hunters of the adjoining White River National Wildlife Refuge. High water events on the White River flood the site due to its low-lying disposition. Significant fluctuations in the water elevation contribute to rapid sediment accumulation on the boat ramps, occasionally impeding usability. The land is permitted to the USACE by the U.S. Fish and Wildlife Service.

### 2.15.2.2 POOL 2

High Density Recreation Areas

Big Bayou Meto Access - This 11-acre water access is situated on the left descending bank of the Arkansas River across from NM 31.1. The site is located 6 miles southwest of Gillett, AR, accessible via Highway 144 from US Highway 165. A boat launch and small parking area are available for public use. The site is seasonally popular with recreational boaters in spring and summer.

Jardis Point Park - This 36-acre park is situated 14 miles south of Gillett, and 15 miles north of Dumas, AR. It is located adjacent to the Wilbur D. Mills Dam along the right descending bank of the Arkansas River. Access to the site is via State Highway 212 East from US Highway 165. Recreation facilities are divided between a main area along the right descending bank of the Arkansas River and an "island" between the AECC hydroelectric generating station and Wilbur D. Mills Dam. The main recreation area contains one waterborne restroom, picnic sites with utility tables and grills, one basketball court, a two-lane boat launch, paved and gravel parking areas, and handicapped-accessible walkways for fishing access to the tailwaters of the hydroelectric powerhouse. The boat launch and its paved parking area were constructed by and licensed to the AGFC. Known as "Buzzard Beach", this boat launch provides access to the Morgan Point Bendway, an oxbow lake. The "island" portion of Jardis Point is accessed via a 2-lane road across the AECC powerhouse and contains covered picnic sites with utility tables and grills, a small, paved parking area, as well as handicapped-accessible walkways for fishing access to the tailwaters of the Wilbur D. Mills Dam.

Little Bayou Meto Access - This 19-acre water access is situated on Mud Lake, which adjoins the Arkansas River's left descending bank near NM 44. The site is located at the intersection of Hannahberry Lake Road and Bayou Meto Recreation Road, 28 miles south of Stuttgart, AR via State Highway 11, and 2 miles south of Reydell, AR via Luckie Road. This area contains a boat launch and paved parking. The site is remote and retains limited facilities but remains seasonally popular with recreational boaters in the summer and duck hunters in the winter.

Merrisach Lake Park– This 243-acre park is situated 24 miles south of DeWitt, Arkansas and 10 miles south of Tichnor, AR. It is located along the Arkansas Post Canal on the eastern shore of Merrisach Lake, at NM 15. Access to the park is via Tichnor Blacktop Road from Arkansas Highway 44. The park encompasses both a campground and day-use facilities. The campground consists of five camping loops with a total of 67 campsites. The vast majority of campsites have electrical service and pressurized potable water supply. The park has four waterborne restrooms, three of which contain showers. Day use facilities include a group shelter, playground, picnic sites with grills and utility tables, a boat ramp with courtesy dock, paved and gravel parking areas, and a 1.4-mile nature trail. Other facilities include a sanitary dump station, a gatehouse, and two park attendant campsites with potable water supply, electrical service, and septic service. Both the campground and day use facilities are open year-round. The adjacent 866-acre Merrisach Lake is a popular destination for recreational anglers and hunters. The campground experiences its heaviest use from March through November.

*Future improvements could include the following: Rehabilitation and modernization of campsites, install 50-amp electrical service and make improvements in A, B, C and E Areas. Replace E Loop restroom/shower house with modern facilities. Revitalize E Loop Group Shelter and Nature Trail.*

Moore Bayou Park - This 7-acre park is situated on Moore Bayou, a tributary of the Arkansas River. This park is located 7 miles south of Gillett, AR, and 16 miles north of Dumas, AR. It is accessed via State Highway 169 from US Highway 165. This park contains a boat launch, courtesy dock, picnic sites, a pit toilet, and paved parking. The park also provides access to a 5-mile water trail named the Arkansas Post Water Trail. The location is notable for its significant bald cypress population, bird watching opportunities, and the cultural and historical significance of the areas traversed by the water trail. Due to the site's proximity to the Arkansas Post National Memorial, the site is a popular stopover for regional tourists. In the warmer months, alligator weed and water hyacinth routinely obstruct access to the boat ramp and courtesy dock.

Notrebes Bend Park - This 44-acre park is situated 15.4 miles south of Tichnor, AR. This park is located along the left descending bank of the Arkansas River, just below Wilbur D. Mills Dam. Access to the park is via Wilbur D. Mills Road from Tichnor Blacktop Road. The park contains day use facilities including a waterborne restroom, picnic sites, parking areas, and a concrete stairway providing bank fishing access to the tailwaters of the Wilbur D. Mills Dam. The area is primarily utilized by hunters and anglers, with heaviest use coinciding with favorable bank fishing conditions between April and August.

Pendleton Bend Park - This 69-acre park is situated 12 miles south of Gillett, AR and 15 miles north of Dumas, AR. This park is located along the right descending bank of the Arkansas River at NM 21. Access to the park is via State Highway 212 East from US Highway 165. The park contains a campground and day use facilities. The campground consists of 31 campsites in three camping loops. The main campground contains 28 campsites in two camping loops. The third loop is separated from the main campground by Highway 212 East. This loop contains three campsites and is situated on an elevated bank overlooking the Arkansas River. All campsites have parking pads, covered picnic tables, electrical service, and pressurized potable water supply. All roads are paved. The park has two waterborne restrooms, one with showers. Day use facilities include three picnic sites with canopies, a playground, a group shelter, a two-lane boat launch with courtesy dock, and paved parking. Other facilities include a sanitary dump station, a gatehouse, and one park attendant campsite with potable water supply, electrical service, and septic service. Pendleton Bend Park is open year-round and experiences heavy use.

*Future improvements could include the following: Rehabilitation and modernization of campsites, install 50-amp electrical service in B and C Loops and make improvements in all areas of the park.*

Wilbur D. Mills Park - This 74-acre park is located 14 miles south of Gillett, AR and 16 miles north of Dumas, AR and situated one mile south of the Wilbur D. Mills Dam along the right descending bank of the Arkansas River. Access to the park is via State Highway 212 East from US Highway 165. Wilbur D. Mills Park contains a campground and day use facilities. The campground consists of 21 campsites, one of which is designed to accommodate physically

handicapped persons. All campsites have level concrete pads, covered picnic tables, pressurized potable water supply, and electrical service. All roads are paved. The park has one waterborne restroom with showers, a sanitary dump station, a gatehouse, and one park attendant campsite with potable water supply, electrical service, and septic service. Day use facilities include a 2-lane boat launch and paved parking area. The Wilbur D. Mills boat launch provides the only public access boat ramp on the lower Arkansas River below Wilbur D. Mills Dam. Therefore, both the campground and the boat launch are popular with regional anglers and experience heavy use. The continuous fluctuation of the water level below Wilbur D. Mills Dam causes excessive sediment to be deposited on the boat ramp, occasionally impeding useability.

*Future improvements could include the following: Rehabilitation and modernization of campsites, install 50-amp electrical service and improvements in all areas of the park.*

### 2.15.2.3 POOL 3

High Density Recreation Areas

Huff's Island Access - This 29-acre land access area is located 5.5 miles north of Grady, AR via Highway 11 from US Highway 65 and is situated on the right descending bank of the Arkansas River at Joe Hardin Lock and Dam NM 50. The area is The area is flat containing abundant vegetation with mixed hardwoods and willows along the shoreline. A small parking area is available for public use. The site provides access to the dam and is popular with fishermen in spring and summer.

*Future improvements could include the following: Constructing a duck blind and hosting a mobility impaired duck hunt.*

Rising Star Park - This 86-acre park is located 16 miles east southeast of Pine Bluff, AR and 7 miles north of Grady, AR and situated along the right descending bank of the Arkansas River at NM 54. Access to the park is via Blankenship Road from US Highway 65. The park is flat with vegetation of mainly large cottonwood and approximately one-half acre stand of black walnut trees on the eastern boundary near the shoreline in the developed areas with mixed hardwood elsewhere. The park contains both a campground and day use facilities. The campground consists of 24 campsites in two camping loops. The C-loop contains 15 campsites and is situated on an elevated bank overlooking the Arkansas River, the B-loop contains 9 campsites. All campsites have parking pads, covered picnic tables, pressurized potable water supply, and 20-amp, 30-amp, and 50-amp electrical service. All roads are paved. The park has one waterborne restroom with showers. Day use facilities include 11 picnic sites with canopies, a playground, a group shelter, a one-lane boat launch with courtesy dock, and paved parking. Other facilities include a sanitary dump station, a gatehouse, and one park attendant campsite with potable water supply, electrical service, and septic service.

*Future improvements could include the following: Constructing a baseball/softball field near the playground across the road from the C-loop.*

Trulock Park - This 42-acre park is located 10 miles east of Pine Bluff, AR and situated along the right descending bank of the Arkansas River at NM 61. The site is flat, vegetation is

primarily mature southern pecan in the developed area of the park and mixed hardwood throughout. Access to the park is via Atkins Lake Road from US Highway 65. This park is a day use facility that contains one waterborne restroom, 14 picnic sites, a group shelter, a two-lane boat launch with paved parking, and all roads within the park are paved.

*Future improvements could include the following: Constructing a nature trail and making improvements to picnic sites to allow for primitive camping.*

#### 2.15.2.4 POOL 4

High Density Recreation Areas

Sheppard Island Access - This 15-acre water access area is located 6 miles east of Pine Bluff, AR and situated on the left descending bank of the Arkansas River at Emmett Sanders Lock and Dam at NM 66. The site is flat, and vegetation is mixed hardwood. The area is accessed via Sheppard Island Road from Lovelace Road at US Highway 63. This area consists of a boat launch and parking lot, provides access to the dam, and is popular with fishermen.

*Future improvements could include the following: Installing a vault style restroom and picnic sites for day use visitors.*

Ste. Marie Park - This 58-acre park is located on the north side of Pine Bluff, AR and situated on the east bank of Lake Langhofer in the Pine Bluff Harbor at Arkansas River at NM 71. The park is flat, vegetation contains mixed hardwood and an 11-acre stand of Chinese chestnut on the north end. Access to the park is via Louis L. Ramsay Road from US Highway 63/79. This park is a day use facility that contains two waterborne restrooms, 22 covered picnic sites, two group shelters, a two-lane boat launch with paved parking. All roads within the park are paved.

*Future improvements could include the following: Rehabilitation/modernization of the restrooms, replacing group shelter #2, and converting picnic sites to allow for camping with full hook-ups at each site.*

#### 2.15.2.5 POOL 5

High Density Recreation Areas

Dam Site 5 West Park - This 74-acre park is located 4 miles east of Kearney, AR and situated on the right descending bank of the Arkansas River at Colonel Charles D. Maynard Lock and Dam at NM 86. Access to the park is via Bartlett Road from NCTR Road at Highway 365 in Jefferson, AR. The park is flat in the developed area with bluffs on the eastern boundary. Vegetation is mixed hardwood. This park is a day use facility with a playground, basketball court, group shelter, 12 picnic sites, and a small parking lot. The park provides access to the dam and is popular with fishermen.

Tar Camp Park - This 171-acre park is located 5 miles east of Redfield, AR, situated on the right descending bank of the Arkansas River at NM 90. This Park may be accessed via River Road. The park is flat in the developed area with bluffs on the eastern boundary. Vegetation contains

mixed hardwood, and a 15-acre stand of Sawtooth Oak on the north side of the site. The park contains both a campground and day use facilities. The campground consists of 45 campsites in three camping loops. The A-Loop contains 17 sites, the D-Loop contains 22 sites and both are situated on an elevated bank overlooking the Arkansas River. The C-Loop contains 6 campsites and is located on Tar Camp Creek. All campsites have parking pads, covered picnic tables, pressurized potable water supply, with 20-amp, 30-amp, and 50-amp electrical service. All roads are paved. The park has two waterborne restrooms with showers. Day use facilities include two group shelters, a two-lane boat ramp, a courtesy dock, a fishing dock, a playground, a basketball court, and 14 picnic sites. Other facilities include a sanitary dump station, a gatehouse, one attendant and one volunteer campsite with potable water supply, electrical service, and septic service.

*Future improvements could include the following: Replacing the restroom in D-Loop, placing additional restrooms throughout the park, making repairs to the floating dock in C-Loop, construction of a bridge over Tar Camp Creek to replace the previous one, and rehabilitation of the nature trail on White Bluff.*

Low Density Recreation Areas

Lock 5 Access - This 16-acre water access area is located 2.4 miles southwest of Wright, AR, and is accessed via Highway 256 and situated on the left descending bank of the Arkansas River at Charles D. Maynard Lock and Dam NM 86. The site is flat and vegetation is maintained as grass and scrub brush due to navigation requirements. This area consists of a one-lane boat ramp maintained by the AGFC.

### 2.15.2.6 POOL 6

High Density Recreation Areas

Dam Site 6 East Access - This 68-acre water access area is located 4 miles southwest of Scott, AR and situated on the left descending bank of the Arkansas River at David D. Terry Lock and Dam NM 108. This area is accessed via Colonel Maynard Road. The site is flat and vegetation is maintained as grass and scrub brush due to navigation requirements. This area contains two one-lane boat ramps. The ramp on the backwater on the upstream side is maintained by the USACE, the other ramp on the downstream side of the lock is operated and maintained by the AGFC.

Dam Site 6 West Park - This 196-acre park is located 5 miles southeast of the Bill and Hillary Clinton National Airport and situated on the right descending bank of the Arkansas River at David D. Terry Lock and Dam NM 108. This park is accessed via Frazier Pike. The site is flat and vegetation is heavy with mixed hardwood. This park is a day use facility that contains one vault restroom, 6 picnic sites, a one-lane boat ramp with paved parking, and all roads within the park are paved. Dam Site 6 West Park is open year-round and is currently being maintained in partnership through a Memorandum of Understanding with Pulaski County Public Works.

*Future improvements could include the following: Establishing a lease agreement for the independent management of the park by Pulaski County.*

Murray Park - This 137-acre park is located within the city limits of Little Rock, AR and situated on the right descending bank of the Arkansas River at NM 124. This park is accessed via Rebsamen Park Road. This park is a day use facility that contains two three-lane boat ramps, 31 picnic sites, three waterborne restrooms, a dog park, four soccer fields, nine volleyball courts, a playground, eight group shelters, an outdoor exercise station, and is located on the Arkansas River Trail. The vegetation is maintained as mowed turf grass with some shade trees. All roads are paved and there are numerous paved parking areas at the different features. This area is leased and managed by the City of Little Rock, AR

Willow Beach Park - This 270-acre park is located two miles west of Scott, AR, and situated on the left descending bank of the Arkansas River off the main river at NM 110. This park is accessed via Blue Heron Parkway from Colonel Maynard Road. The site is flat with vegetation on the outside of the developed park area containing a high concentration of Osage Orange and mixed hardwood. The site has two small bodies of water, one is approximately 50-acres the other is approximately 11-acres. The smaller of the two is in the AGFC Family and Community Fishing Program. This program is a partnership that allows the pond to be stocked regularly and supports an annual youth fishing derby. The park contains both a campground and day use facilities. The campground consists of 21 campsites. All campsites have parking pads, covered picnic tables, pressurized potable water supply, 20-amp, 30-amp, and 50-amp electrical service. All roads are paved. The park has two waterborne restrooms with showers and one waterborne restroom. Day use facilities include three group shelters, two-lane boat ramp, two fishing docks, playground, basketball court, and 31 picnic sites. The park has two loops of picnic sites and other picnic sites that are in various locations throughout the day use areas. The G-Loop contains 11 picnic sites the H-Loop has six picnic sites. Other facilities include a sanitary dump station, a gatehouse, one attendant and one volunteer campsite with potable water supply, electrical service, and septic service.

*Future improvements could include the following: Rehabilitation of the G and H loops to convert to camping sites, dredge the smaller pond, and replace the courtesy dock and the floating fishing dock near the boat ramp.*

Conservation Easement

Burn's Park - This 24-acre park is located within the city limits of North Little Rock, AR and situated on the left descending bank of the Arkansas River at NM 122. This park is accessed via Tournament Drive from Championship Drive. This park is a day use facility that contains a three-lane boat ramp, and 51 parking spots. Vegetation is maintained as mowed turf grass. This area is licensed to and managed by the City of North Little Rock

### 2.15.2.7 POOL 7

High Density Recreation Areas

Bigelow Park - This eight-acre day use park is located approximately two miles east of Bigelow, AR, and is situated on the right descending bank of the Arkansas River at the mouth of Taylor Creek. The site has moderate tree cover, a low bank, and a good open embayment to the

Arkansas River. Existing facilities open to the public are limited to three picnic sites, a one lane boat ramp, and paved parking area. Due to its remote location and limited facilities, the site is primarily used by local commercial and recreational fishermen. This area is leased to the City of Bigelow.

Cooks Landing Park – This 18-acre day use park is located on the north end of Murray Lock and Dam and lies within the city limits of North Little Rock, AR. Access to the area is from both Interstate 430 and Interstate 40 via Crystal Hill Road. This park experiences significant day use visitation due to the presence of the "Big Dam Bridge", a pedestrian bridge built by Pulaski County across the lock and dam to connect walking/cycling trails in North Little Rock and Little Rock via the Arkansas River Trail. Bank fishing below Murray Lock and Dam is also a highly popular activity. Existing facilities include eight picnic sites, a boat ramp, a courtesy dock, a restroom, a group shelter, and a trailhead for accessing the city of North Little Rock's Isabella Jo Trail. The lower parking lot, two picnic sites, and restroom adjacent to the "Big Dam Bridge" approach is contiguous with the park and is owned, operated, and maintained by the City of North Little Rock. Cooks Landing Park is operated and maintained by the USACE.

> *Future improvements could include the following: Rehabilitation of roadway and parking areas, upgrades to area lighting, restroom improvements or replacement, adding bike repair and support stations*

La Harpe View Park - This 14-acre day use park is located on the south end of Murray Lock and Dam, and may be accessed via Rebsamen Park Road in Little Rock, AR. This area receives significant visitation due to the presence of the "Big Dam Bridge" and the Arkansas River Trail. The proximity of the park's parking lot to the city's trail system makes it an ideal location for accessing the trail at the auxiliary entrances adjacent to the park. Existing facilities include a single parking lot adjacent to the entrance of the Murray Lock and Dam complex, an ADA accessible fishing pier, and one picnic site. All facilities southeast of the parking lot, to include the adjacent restroom, are part of Murray Park, which is leased to the City of Little Rock. This area is maintained by the City of Little Rock.

Maumelle Park - This 104-acre park is located approximately two miles from State Highway 10 in west Little Rock and situated adjacent to the mouth of the Maumelle River. This park is accessed from Pinnacle Valley Road. This highly visited and utilized park boasts the highest fee collections for a single campground in the Southwestern Division of the USACE and historically ranks in the top five nationally. Unique to this park are 10 extended stay campsites that were developed through a Challenge Partnership Agreement with the University of Arkansas for Medical Sciences (UAMS) hospital. Due to the proximity of multiple hospitals offering high quality healthcare, these sites were constructed to accommodate individuals undergoing long-term medical treatments at local hospitals. A paved path located in camping loop "A" provides ease of access to the privately operated, Little Rock Yacht Club, which adjoins the park at the northwest property line. The parks proximity to the popular Pinnacle Mountain State Park, which offers an outstanding array of hiking/biking opportunities, also brings increased visitation to the park. Existing facilities include an entrance station, 130 campsites, 10 full-hookup medical sites, 16 picnic sites, eight group shelters, four playgrounds, three trailer dump stations,

four restrooms (three with showers), a trail, basketball court, a five-lane boat ramp, and a scout group camp area. Maumelle Park is operated and maintained by the USACE.

*Future improvements could include the following: Replacement and relocation of playground equipment, electrical upgrades, improve park drainage in A camping loop, rehabilitation of campsites in A loop, constructing tent camping pads on select sites in camping loop "E", sewage system upgrades, resurfacing and extension of existing trail system, extending the boat ramp to improve launching capabilities, construct and install picnic table canopies on all medical sites, addition of amenities and tent pads to the scout group camp area, construction of two additional "full-hookup" volunteer/attendant sites.*

Palarm Creek Park - This 17-acre day use park, formerly known as "Palarm Park" or "Mayflower City Landing", is located at the confluence of Palarm Creek and the Arkansas River. The site is bisected by Palarm Creek and further divided by State Highway 365 and the Missouri Pacific Railroad which parallel the Arkansas River. The area is used for boating access to the Arkansas River and is a popular area for bank fishing. Existing facilities include two large parking lots, a one-lane boat ramp, courtesy dock, and a fishing pier. This area is leased to the City of Mayflower.

### 2.15.2.8 POOL 8

High Density Recreation Areas

Cadron Settlement Park - This 79-acre day use park is located west of Conway, AR and is accessed by highway 319 from State Highway 64. This Park is the site of a historic settlement on the Arkansas River. The heavily wooded site is situated on three ridges which form steep bluffs along the Arkansas River. Recreational facilities have been developed to preserve and interpret the historical resources of the site. A reconstruction of an 1800's era blockhouse is located as the focal point of the park. Local historical societies promote education and preservation activities year-round at this site. Existing facilities include 22 picnic sites, two vault restrooms, two group shelters, a two-lane boat ramp, and approximately six miles of hiking and mountain bike trails. This area is leased to the City of Conway.

Cypress Creek Access – This nine-acre water access area is situated on the right descending bank of the Arkansas River at Cypress Creek. Access to the park is by County Road 70 from State Highway 113 north of Houston, AR. The site provides fishing opportunities for nearby Morrilton, Arkansas, and other smaller communities. This is the only public boat ramp available on the south side of the river that provides direct access to navigation pool 8. Existing facilities consist of a paved parking area and boat ramp only. This area is operated and maintained by the USACE.

Old Ferry Landing Park - This 23-acre day use park is located just west of the Conway city limits and on the southeast side of the Highway 60 bridge. Access to the park is by taking the state highway 60 exit from Interstate 40 and driving west for 7.5 miles. This park was previously part of Toad Suck Park. The historic Toad Suck Ferry Boat, which was once used to transit the Arkansas River, is on display within the park and has become a point of interest for visitors. Facilities are also frequently used for family reunions and gatherings throughout the year.

Existing facilities include eight picnic sites, two group shelters, playgrounds, a single-lane boat ramp, a waterborne restroom, and a hiking trail. Maintenance of the boat ramp and armored portion of the riverbank remains USACE's responsibility. This area is leased to the City of Conway.

Point Remove Park - This 48-acre day use park is located on the north bank of Point Remove Creek in the southern city limits of Morrilton, AR, near the confluence of the Arkansas River. Access can be gained by heading south on Old Cherokee Road from Morrilton, AR. This area is primarily used as a quiet location for the citizens of Morrilton to walk and relax, but also provides a close and convenient location to launch boats. Existing facilities include 16 picnic sites and a single-lane boat ramp. This park is primarily operated and maintained by the City of Morrilton through a Challenge Partnership Agreement.

Toad Suck Park - This 54-acre park lies directly across the Arkansas River from Conway, AR and is situated on the right descending bank of the Arkansas River adjacent to the Toad Suck Ferry Lock and Dam. Due to its proximity to Conway and being the original location of the Toad Suck Tavern, this park draws many curious visitors every year. Numerous special events are held in the park's group shelters annually. Bank fishing below the lock and dam is a highly popular activity both day and night and fills the park on most fair-weather weekends. Existing facilities include an entrance station, trailer dump station, 48 campsites, five group shelters, two restroom/shower houses, three playgrounds, two picnic sites, basketball and volleyball courts, and a single lane boat launch. This area is operated and maintained by the USACE.

*Future improvements could include the following: Upgrade electric to 50 amp in D section camping loop, construct a new loop with 10 campsites in the southwest portion of the park, install canopies over all campsite picnic tables, construct two new pull-thru campsites in B and C area, relocation and rehab of park entrance and entrance station, replace the current 10-person picnic site with a larger 100-person shelter/bandstand with water and electric facilities to support large events.*

### 2.15.2.9 POOL 9

High Density Recreation Areas

Cherokee Park - This 44-acre park is located just outside the city limits of Morrilton, AR on the north bank of the Arkansas River at Ormond Lock and Dam. Access can be gained by heading south on Old Cherokee Road from Morrilton, AR. This relatively flat site is heavily wooded in the camping area which provides great shade, with the day use area consisting mainly of open fields. The area is not typically used as a destination location for travelers but provides excellent camping access for many local visitors. The boat ramp is also heavily used by commercial and recreational fishermen. Existing facilities include 33 campsites, 13 picnic sites, two group shelters, two restrooms (one with showers), playground, and a single-lane boat ramp. The park is operated and maintained by the USACE.

*Future improvements could include the following: Replace existing restrooms, upgrade all sites to 50-amps, replace playground, installation of a portable gatehouse to provide easy transportation during high water events, resurfacing of asphalt roadways and parking areas.*

Pontoon Park – This six-acre day use park is located on the Petit Jean River 10 miles from its confluence with the Arkansas River. The park can be accessed off Highway 154 in Pontoon, AR. This area was designed and is managed as a day-use and river-access park. Existing facilities include 10 picnic sites and a single-lane boat ramp. Due to its remote location, day use is primarily limited to usage from the local community with the boat ramp receiving moderate usage by local fishermen and duck hunters. This boat ramp is the only developed public access on the south side of the river between the City of Dardanelle and Cypress Creek Access. This area is leased to the AGFC.

Sweeden Island Access – This 3-acre water access area is located approximately 10 miles south of Atkins, AR, near Lake Atkins and the Galla Creek Wildlife Management Area on the left descending bank of the Arkansas River near NM 192.5. This park may be accessed via Highway 105. This area has been reduced from a multi-use camping facility to a paved parking lot and single-lane boat ramp only. The site is primarily used by local fishermen and hunters and is leased to the AGFC.

### 2.15.2.10 DARDANELLE

High Density Recreation Areas

Bona Dea Trails and Sanctuary – This 186-acre park can be accessed off Lake Front Drive in Russellville, AR. This area contains primarily wetlands which was initially acquired for borrow material to construct the Russellville dike. This area now serves as a sump for the Prairie Creek Pump Station. The park was constructed in 1980 and 1981. It provides a variety of recreational and educational opportunities including walking, jogging and nature study. Pump station operations result in periodic trail flooding which visitors accommodate without complaint. Access to the trail is gained at the main entrance, as well as the auxiliary entrances built in Washburn Park and Veterans Memorial Park. Existing facilities include 3.5 miles of trails, one waterborne restroom, two drinking fountains, a gazebo, and municipal water and sewage service. This area is operated and maintained by the USACE.

*Future improvements could include the following: Replace existing bridge structures.*

Cabin Creek Park - This 49-acre day use park is located near the town of Knoxville, AR on the left descending bank of Lake Dardanelle at NM 223.8. Access is by approximately two miles of paved road from U.S. Highway 64 through the town of Knoxville, AR. The majority of the developed recreation features in this park were closed in 2012 as part of the Recreation Adjustment Plan. Existing facilities that remain open for use include a paved walking trail, group shelter, two picnic sites, courtesy dock, and a single-lane boat ramp. The site receives most of its use from local fishermen and duck hunters. This area is leased to the City of Knoxville.

Delaware Park - This 134-acre park is located near the Yell-Logan County line and is accessible by a paved road 2.5 miles from State Highway 22. Most of the facilities are located along the shoreline at the base of a steep sloping ridge about 3/4-mile long and the majority of the area is heavily wooded. The upper day-use area was closed in January 1980. Existing facilities that

remain in operation include 16 campsites, two picnic sites, a group shelter, and a single-lane boat ramp with a courtesy dock. This park is leased and operated by the Friends of Delaware Park Organization.

Dublin Park - This 32-acre park is located 5.5 miles east of Scranton, AR and situated on the Pigeon Roost arm of Lake Dardanelle. This park is accessed by State Road 197. Existing facilities include 12 campsites, five picnic sites, two single-lane launch ramps, two courtesy docks, a group shelter, and a vault restroom. Rural water service was added to the park in 2001. This park is leased and operated by the City of Scranton.

Hartman City Park – This eight-acre day use park is located directly off U.S. Highway 64 in downtown Hartman, AR and situated along the banks of Horsehead Creek. This area is heavily used by the local community for day-use and fishing activities. Existing facilities include a baseball field, a batting cage, a group shelter, a playground, a picnic site, a vault restroom, and a single-lane boat ramp. This area is leased and operated by the City of Hartman.

Horsehead Park - This 113-acre day use park is located 3.10 miles southeast of Hartman, AR, and situated near the confluence of Horsehead Creek and the Arkansas River, adjacent to excellent hunting and fishing areas. This park is accessed by 1.25 miles of paved road off South Crawford Street. The site is. The upper portion of the park that followed a ridge overlooking the lake was closed in 1980. Existing facilities available for use include two picnic sites, a courtesy dock, and a single-lane boat ramp. Local volunteer groups mow portions of the park around the lower picnic tables and road shoulders. This park is operated and maintained by the USACE.

Illinois Bayou Park - The 58-acre day use park is located adjacent to, and south of, Interstate 40 about two miles west of State Highway 7 - Interstate 40 interchange. This park is moderately forested. Trail systems located within this park are heavily utilized by the local community and the students of Arkansas Tech University. Numerous bass fishing tournaments are held at this park every year. Existing facilities include 11 miles of walking/biking trails, three picnic sites, restroom, a two-lane boat ramp, and a courtesy dock. This area is leased to the City of Russellville.

*Future improvements could include the following: Courtesy dock upgrades*

Lake Dardanelle State Park (Dardanelle) - This 82-acre site is located approximately four miles west of the city of Dardanelle, AR and situated on the east shore of the Hayes Creek embayment. The terrain in the area is rolling and has heavy to moderate tree cover. Dardanelle Marina, which is embedded within the park, is a privately operated commercial concessionaire. Existing facilities include 18 campsites, 23 picnic sites, a group shelter, a playground, restroom/shower house, trailer dump station, a courtesy dock, and a two-lane boat ramp. This area is leased to the Arkansas Department of Parks, Heritage, and Tourism.

Lake Dardanelle State Park (Russellville) - This 134-acre site is located approximately two miles west of the city of Russellville and is situated near the confluence of the Illinois Bayou arm of the Arkansas River. Russellville Marina, which is embedded within the park, is a privately operated commercial concessionaire. Existing facilities include 57 campsites, 13 picnic sites, a

group shelter, four waterborne restrooms (two with showers), a tournament fishing pavilion, a visitor center, a handicap fishing pier, two boat ramps comprised of five launch lanes, two courtesy docks, a sanitary dump station, an amphitheater, a trail, a playground, a volleyball court, and a swim beach. This area is leased to the Arkansas Department of Parks & Tourism.

New Blaine Community Park – This 17-acre day use park is situated in the southeast portion of Shoal Bay on Lake Dardanelle and is centrally located in the city of New Blaine, AR off State Highway 22. This area is primarily used by the local community for day-use activities, but an annual 4th of July fireworks display held in the park draws thousands of visitors from the surrounding counties. Existing facilities include 17 picnic sites, a basketball court that also serves as an emergency helicopter landing pad, a baseball field, a concession stand, a vault toilet, and a courtesy dock. This park is leased and operated by Logan County.

Old Post Road Park – This 288-acre park is situated on the left descending bank of the Arkansas River at the northeast end of Dardanelle Lock and Dam. Access can be gained by heading west on Lock & Dam Road from State Highway 7 in Russellville, AR. Not included within the acreage but embedded within the park is the Arkansas River Visitors Center, Russellville Site Office, the Dardanelle Marine Terminal, a land maintenance compound, and the Dardanelle Lock and Dam Complex. The site also contains areas leased to the City of Russellville for soccer fields and the AGFC for their West Central Regional Office. The park is effectively split with a campground and day use area and a large number of special events are held within the park each year. Recreational facilities include an entrance station, six hard-surfaced tennis/pickleball courts, a gazebo, an amphitheater/stage, two volleyball courts, two basketball courts, a ballfield, three playgrounds, an 18-hole disc golf course, an extensive mountain bike/hiking trail system, 20 picnic sites, six group shelters, 41 campsites, a trailer dump station, an overlook structure, five restrooms (one with showers), four AGFC stocked fishing ponds for special events, and a two-lane boat ramp. This park also contains an inactive rock quarry restricted to the public. This park is operated and maintained by the USACE.

*Future improvements could include the following: Construction of 10 new campsites along the riverbank which will involve relocating two group shelters and re-routing traffic flow to group shelter 8, construction of a volunteer village to separate volunteers from campers and freeing up reservable campsites, replacement of three waterborne restrooms in the day-use area, re-surfacing of tennis and basketball courts.*

Piney Bay Park – This 113-acre park is located approximately five miles northwest of London, AR, off Highway 359 on a large embayment of the Piney Creek arm of Lake Dardanelle. Its location, along with the bay areas' popularity for fishing and water sports creates high visitation. Existing facilities include an entrance station, 91 campsites, 11 picnic sites, a trailer dump station, a group shelter, a playground, a swim beach, two waterborne restrooms with showers, and two single-lane boat ramps each with a courtesy dock nearby. This site is heavily utilized by the public for bank and boat fishing. This park is operated and maintained by the USACE.

*Future improvements could include the following: Rehabilitation and modernization to all campsites, including upgrading utilities to 50-amp electric service and adding water to each site. Construct an additional 12 campsites, relocate pavilion near swim beach, construct*

*camping loop from E section to swim beach adding an additional campsite, remove F section site and amphitheater and construct a roadway for adding 8 campsites and two volunteer sites, and shoreline improvements to increase bank fishing opportunities.*

Pleasant View Park – This 113-acre day use park is located on the north side of Pleasant View Road in Russellville, AR, approximately 1.70 miles north of the Interstate 40 - State Highway 7 interchange. This park features a large and highly utilized baseball/softball complex and numerous passive recreational opportunities. Its location, along both the east and west banks of the Illinois Bayou arm of Lake Dardanelle creates opportunity for water-based recreation. Existing facilities include a dog park, four baseball/softball fields, one concession stand, six fishing piers/docks, a playground, six picnic sites, a disc golf course, a single-lane boat ramp with nearby courtesy dock, competition ski course, a walking trail, two group shelters and a restroom. This area is leased to the City of Russellville.

*Future improvements could include the following: Add an entrance monument, provide sidewalk connection into park to internal circulation network, increase trail opportunities, add ADA accessible fishing docks, add xeriscape ground cover in parking islands, add a canoe/kayak launch, replace turf and chain link fencing, resurface parking areas, improve field conditions.*

Riverview Park - This 18-acre day-use park is located in the northwestern corner of Dardanelle, AR on the right descending bank of the Arkansas River adjacent to the Dardanelle Powerhouse. This site park can be accessed by taking N Second Street to Dardanelle Dam Road from State Highway 7 in downtown Dardanelle. This site is heavily utilized by the public for bank fishing and is a popular area among the snag fishing community. This area was originally developed as a campground and day-use area but was converted to a day-use only park following the 2019 Arkansas River flood which destroyed all the campsites constructed along the lower parking area. Existing facilities include 12 picnic sites, large parking areas, and a group shelter. The access road leading into the park also serves as the sole access road to the Dardanelle Powerhouse. The park is operated and maintained by the USACE.

*Future improvements could include the following: Relocate group shelter to a park with higher visitation, construct a safe access path for powerhouse tailrace fishing access.*

Sheppard Drive Soccer Field - This 7-acre site is located within the boundaries of Old Post Road Park and can be accessed directly off Sheppard Drive in Russellville, AR. This site is an open field which has been used in the past for numerous events such as overflow for soccer games and Reserved Officers Training Corps (ROTC) training. This area is leased and operated by the City of Russellville.

Shiloh Park – This 117-acre day use park is located on the south side of Pleasant View Road in Russellville, AR, approximately one mile north of the State Highway 7 - Interstate 40 interchange. The park is uniquely situated on both the east and west banks of the Illinois Bayou arm of Lake Dardanelle. The portion of the park located on the east bank of the bayou is surrounded by water on three sides which enhances the parks natural aesthetics. The portion of the park located on the west bank of the bayou was once a coal strip mine, but the city leveled

and landscaped a portion of the spoil area, turning it into usable terrain. Existing facilities include two multipurpose courts for basketball, tennis and pickleball, a two-field baseball/softball complex, a multipurpose practice field, a concession stand, two single-lane boat ramps, playground, three picnic sites, two group shelters, a restroom, a 1.1-mile walking trail (Orbit Trail), and a radio control airfield & raceway. This area is leased and operated by the City of Russellville.

*Future improvements could include the following: Transition to LED lighting, fence improvements, restroom upgrade, adding a gravel trail loop, and establish dedicated outdoor pickleball courts.*

Shoal Bay Park - This 86-acres park is located approximately two miles north of New Blaine, AR on Highway 197. This area is heavily utilized by the public for bank and boat fishing and is also a popular destination for camping. In the northern end of the park, Bridge Rock Trail has been constructed by the Green Thumb Project Forces. This is a one mile self-guiding, interpretive trail that incorporates three separate routes of increasing length and difficulty. Additionally, this trail offers a variety of plant life and geological formations, some unique to the area. Existing park facilities include an entrance station, 77 campsites, two boat ramps with nearby courtesy docks, three waterborne restrooms (two with showers), a trailer dump station, a swim beach, a playground, overflow parking areas, and two group shelters. This park is operated and maintained by USACE.

*Future improvements could include the following: Rehabilitation and modernization to all campsites and facilities, including upgrading utilities to 50-amp electric service and adding water to each site. Construct an additional five campsites filling in old marina embayment. Removal of Amphitheatre. Rehabilitation to sites and roadways in the G and H camp loops.*

Spadra Park – This 40-acre park is located on the left descending bank of the lake at the mouth of Spadra Creek approximately three miles south of the city of Clarksville, AR. This park is scenic and historically significant; it was the site of a riverboat landing and a Federal fur trading post between 1819 and 1822. No physical evidence of the post remains. Along the entire length of the park, the lake shoreline is a vertical rock bluff with overhanging rock ledges. Existing facilities include 24 campsites, two waterborne restrooms (one with showers), trailer dump station, a group shelter, a playground, two boat ramps comprised of three launch lanes, four courtesy docks (one ADA accessible), and a fishing dock. This site is heavily utilized by the public for bank and boat fishing. The park is also very popular during the winter months due to the exceptional waterfowl hunting opportunities present along this stretch of the lake. This park is operated and maintained by the USACE. Spadra Marina is a privately operated commercial concessionaire that is located adjacent to the park on the northwest boundary.

*Future improvements could include the following: Renovate/Modernize the picnic pavilion to accommodate the numerous fishing tournaments at the east boat ramp, modernize campsites to include adding water to each site and upgrading electric to 50+ amps, and add 6 additional campsites.*

Veterans Memorial Park – This six-acre day use park is located approximately three miles from the center of the City of Russellville and situated on the south shore of the Illinois Bayou arm of the lake adjacent to U.S. Highway 64. Access can be gained off Lake Front Drive in Russellville, AR. This site, once known as the "Old Shorty" portion of Bona Dea Trails and Sanctuary, was established in 2015 after the city of Russellville saw a need to develop a memorial site for local veterans. Existing facilities include one gazebo that serves as the memorial site, 0.5 miles of asphalt paved walking trails, and a large parking area. This area is leased to the City of Russellville.

Washburn Park – This 14-acre day-use park is located approximately three miles from the center of the City of Russellville, AR on the south shore of the Illinois Bayou arm of the lake adjacent to U.S. Highway 64 about. Access can be gained by a paved road from U.S. Highway 64 and State Highway 7. This area was previously known as "Cephas Washburn Memorial Park". This is a popular day-use area that is heavily used by the local community. A large number of family gathering are also held in the parks group shelter throughout the year. Existing facilities include a playground, 17 picnic sites, a group shelter, and a restroom. Washburn Park provides parking and a trail head for the nearby Bona Dea Trails. This area is leased and operated by the City of Russellville.

*Future improvements could include the following: Playground, group shelter, and picnic table upgrades.*

Low Density Recreation Areas

Black Point Access – This eight-acre water access area is located 5.3 miles southwest of Hartman, AR and is situated on the left descending bank of the Arkansas River at an area known as the McClean Bottom Cut Off near NM 242.5. Access to the area can be gained by heading south on River Road and crossing over the levee in the Hartman Bottoms. This area contains a ramp and gravel parking lot. Due to its remote location and limited facilities, much of the use is from local commercial and recreational fishermen. This area is leased to the AGFC

Cabin Creek Slough Access – This six-acre water access area is located on the left descending bank of the Arkansas River at Cabin Creek, NM 226.6. Access can be gained by taking the Lamar exit from Interstate 40, then heading west on Red Oak Road to its termination. In addition to being a popular bank fishing location, this access is moderately used by recreational and commercial fishermen, and duck hunters. Existing facilities are limited to a single-lane boat ramp and gravel parking area. This area is leased to the AGFC.

Cane Creek Park – This 44-acre day-use park is located 2.5 miles northeast of Scranton, AR and is situated on Cane Creek near its confluence with Lake Dardanelle. The park can be accessed via Cane Creek Recreation Road off State Road 197. This area is very popular with fishermen since it offers both stream and lake fishing. The park's road is used to access the AGFC's McKennon Bottoms Waterfowl Area which is built on project lands adjoining the park. Existing facilities include 14 picnic sites, a single-lane boat ramp, and a courtesy dock. This area is leased to the AGFC.

Davis Lake Access - This 10-acre water access area is located approximately four miles south of Altus, AR on the north side of Davis Lake, which is just north of NM 248.4 and. Access can be gained by heading south on Plum Street out of Altus, AR. Davis Lake is an oxbow lake formed by the Arkansas River. This access is solely for Davis Lake and does not have a connecting channel to the Arkansas River. Due to the remote location of this site, much of the usage is from local hunters and fishermen. Existing facilities include a single-lane boat ramp and gravel parking area. This area is leased to the AGFC.

Dwight Mission Park - This one-acre day use park and historic site is located on Highway 64 just west of Russellville, AR on the Illinois Bayou arm of Lake Dardanelle. Due to the park's vicinity to Russellville and its easy access, it regularly reaches maximum capacity by the boating public. This park remains open year-round. Existing facilities include a parking lot, single-lane boat ramp and three picnic sites. This park is leased to the City of Russellville.

Effluent Bay Access (ANO) - This one-acre water access area is located on the left descending bank of Lake Dardanelle at NM 211.9. Access can be gained by taking Highway 333 out of London, AR then heading south on May Road until reaching its termination at the access area. Existing facilities are limited to a paved parking area and single-lane boat ramp. This area is leased to the AGFC.

Highway 64 Access - This 2.5-acre water access area is located approximately three miles southeast of Knoxville, AR near the mouth of Big Piney Creek. This area can be accessed directly from U.S. Highway 64. This access point is heavily utilized by the public for boat access and is also a popular destination for bank fishing. Existing facilities are limited to a single-lane boat ramp, a large parking lot, and a courtesy dock. This area is leased to the AGFC.

Mud Creek Island Primitive Camping- This 55-acre proposed primitive camping area is located on the right descending bank of Lake Dardanelle near the mouth of Shoal and Mud Creek at NM 220.9. Over the years, the project has seen a need to improve primitive camping opportunities on the project. This island has higher elevations, making it suitable for designation as a primitive camping area. Access to the island is by way of water only. USACE will be responsible for operations and maintenance of this area.

> *Future development could include the following: Construction of tent camping pads and removal of understory vegetation.*

0'Kane Access - This eight-acre water access area is located approximately 5 miles north of the City of Paris AR on a diversion channel connecting Six Mile Creek to Lake Dardanelle. Access to the park can be gained from State Highway 309. The site is primarily flat bottomland which has been reforested in shortleaf pine. The area is mostly utilized for fishing and waterfowl hunting. The boat ramp was completely rebuilt in a cooperative effort between the AGFC, Logan County Road Department, USACE, and local sportsmen in 2005. This single-lane boat ramp is the only facility that remains open for public use. This area is operated and maintained by the USACE.

Ouita Park – This 19-acre day use park is located within the City of Russellville, AR. Access can be gained off Lake Front Drive. Existing facilities include two courtesy docks, two picnic sites, and two single-lane boat ramps with adequate parking. The island located just north of the launch ramp known as "Ouita Island" is part of this recreation area, but currently remains undeveloped. This area is leased and operated by the City of Russellville.

*Future improvements could include the following: upgrades to the launch ramps and courtesy docks.*

Roseville Access - This 3.5-acre water access area is centrally located in Roseville, AR, off Highway 309. This area was previously designated as a future park, provides direct access to the river channel of Lake Dardanelle at NM 249.9. Existing facilities are limited to a single lane boat ramp only. The USACE is responsible for operations and maintenance of this area.

Six Mile Access - This 8-acre water access area is located approximately five miles west of Scranton, AR and situated just below the McLean Pumping Station and approximately 1.5 miles up Six Mile Creek. This area can be accessed via a 0.5-mile gravel road off Cottontown Road. The majority of the recreation facilities within this park were closed in 1980, with the only facility that remains open for public use being a single-lane boat ramp and small parking area. The USACE is responsible for operations and maintenance of this area.

Subiaco Abbey Camp- This nine-acre area is situated on the right descending bank of the lake at the mouth of Pigeon Roost Creek, NM 220.9. This area became known as the Subiaco Abbey Camp after a lease agreement for recreation development was established between New Subiaco Abbey and the USACE in 1964. There is no public access by way of road to the area. An entrance road has been established for vehicular access to the area, however, the road is gated and located on private property. Gravel roads have been established in the area, but existing facilities are limited to a swim dock only. This area is leased to New Subiaco Abbey, a non-profit organization. The New Subiaco Abbey is responsible for operations and maintenance of this area.

Thompson Bay Access – This 1-acre water access area is located approximately three miles north of New Blaine, AR, on Thompson Bay Loop. This area contains a single-lane boat ramp and a gravel parking area. Due to its location and limited facilities, much of the site's use is from the Thompson Bay community. This area is leased to the AGFC.

### 2.15.2.11 OZARK

High Density Recreation Areas

Aux Arc Park - This 96-acre park is located approximately two miles south of Ozark, AR. Access to this park is provided by paved access off Highway 309. This area is a popular fishing access and is heavily used for both camping and day use during the spring, summer, and early fall months. Existing facilities include an entrance station, 88 campsites, three group shelters, three restroom/shower houses, four fishing piers, two playgrounds, two courtesy docks, two trailer dump stations, a single-lane boat ramp, and a bridge for fishing access to the Ozark Jetta-

Taylor Lock and Dam tailwaters. The USACE is responsible for operations and maintenance of this area.

*Future improvements could include the following: adding electric to the old volunteer site in C section, upgrading electricity for all the campsites, upgrading restroom on the east end of the park to a 4-pack shower/restroom combination facility, upgrading restroom near F and B sections to a 4-pack shower/restroom combination facility.*

Bluff Hole Park - This nine-acre day use park is located one mile east of Mulberry, AR on the scenic Mulberry River off U.S. Highway 64. This area has long been a popular canoeist access point and unofficial swimming hole that attracts a large number of visitors from as far away as Oklahoma. Bluff Hole Park was developed for day-use activities only. The park has moderate tree cover and a gentle slope to the river. Existing facilities include 14 picnic sites, a group shelter, a restroom, and a bank fishing access area. This area is leased to the City of Mulberry.

Citadel Bluff - This 173-acre water access area is located approximately two miles north of Cecil, AR and is situated on the right descending bank of the Arkansas River at NM 266.3. Access to the water access area is provided by paved access from State Highways 96 and 41 North. The area has gentle to severe slopes and moderate to heavy tree cover. A large rock bluff divides the park into two distinct areas, an upper overlook area and a riverbank site. The majority of the park is closed. The "A" Area was closed in 1992 under the POER, with the "B" & "C" Area closing in 2012 under the Recreation Adjustment Plan. Unique to this park is a protected cove sheltered from the main channel of the river, which is where the boat ramp is located. Existing facilities that remain open to the public are limited to a single-lane boat ramp, a paved parking area, and a courtesy dock. Federal, State and/or local government leasing of this park would be welcomed by the Project Office. The USACE is responsible for operations and maintenance of this area.

*Future improvements could include the following: remove silt from the mouth of the inlet as needed so boats can access the river, potentially relocate several of the closed/flood prone sites from Clear Creek Park to Citadel Park, add electricity and water to the 25 lower campground sites,; it is anticipated that the new Interstate 49 river crossing at Springhill Park may increase the need for additional recreation opportunities in the vicinity of Aux Arc, which could potentially lead to reopening and improving camping and day use facilities.*

Clear Creek Park - This 131-acre park is located four miles south of Alma, AR at the mouth of Frog Bayou near Arbuckle Island bend. Access to this area is off Interstate 40 at Exit 13 by State Highway 162, then four miles east of Kibler, AR, on a paved county road. This park is a favorite access point for fishermen and boaters due to clear water conditions resulting from the Arbuckle Island cutoff of the MKARNS. The boat ramp in this park receives heavy usage. The terrain consists of gentle to steep slopes with moderate tree cover. A major portion of the developed facilities are located within a frequent flood plain area. In the summer of 2021, the project decided to close flood prone sites in both A and B Area to reduce safety concerns during flash flood events and high river conditions. Existing facilities include 40 campsites, a group shelter, two restrooms (one with showers), a short walking/hiking trail, a single-lane boat ramp, a trailer

dump station, and a courtesy dock. The USACE is responsible for operations and maintenance of this area.

*Future improvements could include the following: relocate 10 to 15 of the flood prone sites from below the hill and construct new campsites on the upper area of the park, install an additional restroom/shower house facility, convert the current septic system to a dump station, relocate electrical building currently in overflow area to an area of higher elevation, add a playground.*

Ozark City Park – This five-acre day use park is located downtown area of Ozark, AR on the west side of Gar Creek, off U.S. Highway 64. This area receives high usage from the local community and is a popular location for group gatherings. Existing facilities include seven picnic sites, two tennis courts, a playground, a volleyball court, a basketball court, a restroom, a concert stage, a fishing pier, and a two-lane boat ramp with a courtesy dock. This area is leased to the City of Ozark.

Reed Mountain Park - This 92-acre day use park is approximately three miles east of Ozark, AR. This area may be accessed via U.S. Highway 64 East and Lock & Dam Road. This is a popular park for picnicking, hiking, and other group outdoor activities for the community of Ozark. An overlook structure has been constructed along a bluff in the park that sits approximately 300 ft above the Ozark Lock and Dam. Existing facilities include 14 picnic sites, a volleyball court, a playground, two restrooms, a group shelter, an overlook structure, the River Bluff Nature Trail, and one remotely located single-lane boat ramp. This area is leased to the City of Ozark.

River Ridge Park - This 34-acre park is located approximately six miles west of Cecil, AR along a high ridge on the right descending bank of the Arkansas River at NM 274. Access to the park is via a one mile paved county road from State Highway 96. The terrain consists of steep slopes with a heavy tree cover. The high ridge that the park sits on provides commanding views of the Arkansas River. This area is a historical site that was once the original location of the county seat of Crawford County, AR. The park's main attraction is primitive camping, fishing, and boating. Existing facilities include 18 campsites, a vault restroom, and a single-lane boat ramp. The "A" Area camping loop closed as a result of the Park Operation Efficiency Review (POER). This area is leased to The Friends of River Ridge Organization.

Vache Grasse Park - This 130-acre day use park is located six miles east of the city of Fort Smith and is situated in the upper portion of the Ozark navigation pool and at the confluence of Vache Grasse Creek and Little Vache Grasse Creek. Access to this park is via one-mile of paved county road off State Highway 255. The terrain is predominately gentle with light to moderate tree cover. This area is primarily utilized by fishermen. The majority of the facilities within the park were closed under the POER. Existing facilities open for public use are limited to four picnic sites, a single-lane boat ramp, and a parking lot. This area is leased to the AGFC.

Vine Prairie Park - This 99-acre park is located on the Little Mulberry Creek with easy access to the Arkansas River. The park has been annexed into the City of Mulberry who serves water and electricity to the park. Access can be gained by heading south on Main St. off U.S. Highway 64 in Mulberry, AR, which turns into Vine Prairie Road prior to reaching the park. The terrain

consists of gentle to moderately steep slopes with light to medium tree cover. Numerous fishing tournaments are conducted from the parks boat launching facility, and waterfowl hunters use the park for access. Existing facilities include 14 campsites, seven picnic sites, three restrooms (one with showers), a group shelter, an archery range, a trailer dump station, two courtesy docks, and a two-lane boat ramp. This area is leased to the City of Mulberry.

White Oak Access - This 96-acre water access area is located on White Oak Creek tributary of Ozark Lake two miles south of Highway 64. This access attracts many fishing enthusiasts and waterfowl hunters due to the small embayment formed by White Oak Creek, which is located off the main channel of the Arkansas River. The terrain consists of gentle to steep slopes with moderately heavy tree cover. The majority of the facilities within the park were closed in response to the POER. Existing facilities open for public use are limited to a single-lane boat launch, a courtesy dock, and a parking lot. The USACE is responsible for operations and maintenance of this area.

*Future improvements could include the following: continue to repair roadway as needed, resurface boat ramp parking lot.*

Low Density Recreation Areas

Dyer Lake Access - This nine-acre water access area is located approximately three miles southwest of Mulberry, AR. A gravel road off South Gin Town Road provides access to this area. This area only provides boat access to the impoundment known as Dyer Lake Waterfowl Unit with no connecting channel for access to the Mulberry or Arkansas River. This is a popular hunting and fishing site. This area is leased to the AGFC.

Dyer Ramp Access - This 26-acre water access area is located 2.25 miles south of Dyer, AR, near the intersection of South River Road and Denman Road. This access area is situated on the left descending bank of the Arkansas River at NM 277.2 and provides direct access to the river. This area is leased to the AGFC.

Hicks Creek Access - This 0.4-acre water access area is located 0.5 miles east of Ozark, AR, just off U.S. Highway 64 on the east side of the Butterball LLC poultry plant. Existing facilities are limited to a single-lane boat ramp and a small parking area. This area is leased to the City of Ozark.

### 2.15.2.12 POOL 13

High Density Recreation Areas

Fort Smith Park - This 45-acre day use park is located in northern most portion of Fort Smith, AR, on the right descending bank of the Arkansas River near NM 301.2. Access to this park is off State Highway 255, also known as Clayton Expressway from U.S. Highway 64. The area is used heavily by locals who frequent the park for its day-use activities. It is also a popular area for groups to conduct large special events. The park was originally developed for camping and day-use but is now only a day-use park. The site is relatively flat with moderate tree cover. This area is also subject to being completely inundated with floodwaters during extreme high river

flows, causing damage to facilities, erosion and large deposits of sand and drift being deposited. Existing facilities include 32 picnic sites, one restroom, two group shelters, a dog park, a playground, a soccer field, a volleyball court, a trail, a fish weigh-in facility, a three-lane boat ramp, and a courtesy dock. This area is leased to the City of Fort Smith.

Lee Creek Access - This 116-acre water access area is situated on the left descending bank of the Arkansas River at the mouth of Lee Creek, approximately 1.5 miles south of Interstate 40. The park has access through a commercial poultry-processing plant by State Highway 59, or Main Street to Water Street. The two-mile-long riverbank access is relatively flat with moderate trees and large areas of wetlands. The area is subject to complete inundation of flood water during extreme high river flows, causing damage to facilities, erosion, and large deposits of sand and drift material being deposited. The Missouri-Pacific Railroad tracks are the northern boundary of the park, separating it from the steep bluffs of Van Buren. Existing facilities are limited to a two-lane boat ramp, a courtesy dock, and a paved parking lot. This area is leased to the City of Van Buren.

Springhill Park - This 234-acre park is located on the right descending bank of the Arkansas River at the James W. Trimble Lock and Dam., approximately five miles east of Fort Smith, AR and two miles north of Barling, AR. Access to the park is adjacent to State Highway 59. The park provides approximately 1.75 miles of riverfront recreation development. Unique to this park is a nationally known mountain bike trail that was developed in 2000 that is maintained by volunteer groups. This park receives heavy camping and day-use activity. The eastern portion of this park was reduced by approximately 103 acres as part of the master plan revision due to the Interstate-49 bridge crossing proposal, which would ultimately eliminate future high density recreation development in the area. Existing facilities include an entrance station, five group shelters, 47 campsites, two boat ramps comprised of three launch lanes, two playgrounds, five restrooms (one with showers), a stand-alone shower house, a basketball court, a trailer dump station, and a multi-purpose trail. The USACE is responsible for operations and maintenance of this area.

> *Future improvements could include the following: Construct 8 to 10 new campsites along the west end of the park, replace and relocate the stand-alone shower house with new restroom/shower combo facility, relocate one group shelter, add two Full hook-up volunteer/park host sites in the east end of the park, electrical upgrades in the western loop of the park, overlay roadways and parking areas, upgrade plumbing system.*

Low Density Recreation Areas

Haroldton Access - This 84-acre fishing access area is located approximately 5 miles east of Fort Smith, AR and 6.5 miles south of I-49 in Van Buren, AR. and situated on the left descending bank of the Arkansas River at James W. Trimble Lock and Dam. The park is located adjacent to State Highway 59. The area is flat bottomland, sandy soil with little tree growth, except for willow flats. This area is solely a land access point for fishing. Existing facilities are limited to a large parking area and a paved fishing path for ADA accessibility. The USACE is responsible for operations and maintenance of this area with Arkansas Electric Cooperative Company performing all mowing services under a cooperative agreement.

### 2.15.2.13 Future or Inactive Recreation Areas

If future recreation development is needed, development will be accommodated within the existing High Density Recreation classified land areas. The following areas have been identified as future/inactive recreation areas, exhibiting characteristics suitable for future development. These recreation areas may be available for leasing opportunities.

Flat Rock Park - This 56-acres park is located on the left bank of the Piney Creek arm near its confluence with the main lake. Access is by paved road off highway 359 south of Piney Bay, and the terrain has gentle to steep slopes with moderate to heavy timber growth. This is a scenic area with steep cliffs along both shores of the Piney Creek arm. Existing facilities that are no longer in operation consist of 15 campsites, one group shelter, three vault restrooms, rural water, and one boat ramp with adjacent parking and courtesy dock. This park was closed as a result of a POER. The park is closed and reserved for future consideration.

Highway 64 Cove Park - This 137-acre future park is located at the end of Old Highway 64, approximately 1.75-miles southeast of Knoxville, AR. At the time of the writing of this document, the USACE does not have plans for development of this park.

Holla Bend - This 15-acre future recreation area is located off Holla Bend Road in Dardanelle, AR, just beyond the entrance to Holla Bend National Wildlife Refuge at NM 196.9. The park lies directly on the right descending bank of the Arkansas River with the western portion of the park having dense tree cover and the eastern portion tapering off to sand with little to no vegetation. There is an existing easement to the park, however, no development has occurred within the existing right-of-way. At the time of the writing of this document, the USACE does not have plans for any development of this area.

Sequoya Park - This 41-acre park is located 2 miles from Oppelo, Arkansas and occupies an open site on the South bank of the Arkansas River at Arthur V. Ormond Lock and Dam. Access to the park is via county road from State Highway 9 south of Morrilton, AR. Existing facilities include campsites with water and electric hookups, restrooms, picnic sites, and a trailer dump station. The park is closed and reserved for future consideration.

West Creek Park - This 71-acres park is located just outside the city of Altus, AR , and is situated on the left descending bank of the lake approximately five miles downstream from Ozark Jetta-Taylor Dam. The park can be accessed from Carbon Plant Road. This relatively undeveloped park was maintained by the city of Altus until its closure in 1986. Developed facilities that are no longer in operation include five picnic sites, a vault restroom, a drinking water well, and a launch ramp that is no longer usable due to years of siltation. The park is currently closed and reserved for future consideration.

### 2.15.3 Visitation Profiles (OMBIL)

Table 2-21 shows visitation trends as tabulated by USACE personnel and recorded in the USACE nationwide Operation and Maintenance Business Information Link (OMBIL) database for the MKARNS recreation areas within the Little Rock District. The methodology used to capture the information in the following table has varied over the period of record shown and cannot be relied upon for precise enumeration.

Table 2-21 Annual Attendance Between 2011-2021

| MKARNS Visitation 2011-2021 | |
|---|---|
| 2011 | 4,942,819 |
| *2012 | 4,861,848 |
| 2013 | 4,295,239 |
| 2014 | 3,728,630 |
| 2015 | 3,208,696 |
| 2016 | 3,502,271 |
| 2017 | 4,488,633 |
| 2018 | 3,641,910 |
| **2019 | 2,684,746 |
| 2020 | 3,826,215 |
| 2021 | 3,529,217 |

*New visitation tracking program launched
**Visitation impacted by flooding of the Arkansas River

### 2.15.4 Recreation Analysis

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) is an integral part of capturing the history and popular activities to enhance recreation opportunities in Arkansas. The SCORP ties together voices from the users of recreation sites, planners and developers, government officials, agency managers and elected officials. This collaborative effort is in place to formulate a plan to guide recreation development in a useful, beneficial, and sustainable manner. SCORP data may be found on the American Planning Association, Society of Outdoor Recreation Professionals website.

#### 2.15.4.1.1 Arkansas SCORP Data (2019-2023):

According to the Arkansas SCORP (2019-2023), Arkansas citizens enjoy the outdoors with 92% stating they are involved in some type of outdoor recreation throughout the year. The primary outdoor recreational activities that Arkansans prefer has not changed substantially over the past three decades. According to a recent survey administered by the state, walking for pleasure tops the list for the most participation by Arkansans, along with 75% participating in some type of water-related recreation. Sightseeing by car, cooking-out, visiting lakes and rivers, relaxing, family gathering, swimming/wading in freshwater, swimming in pools, fishing, and farmers

markets round out the top ten most popular recreational activities. Trails are often shown as good tools to get people outside and involved in activities, especially for bicycling, walking, hiking, or nature viewing and photography. Access to parks and the bodies of water within the state is a high priority for Arkansans. The traditional outdoor activities of fishing, motor boating, hunting, swimming, diving, and camping are still highly participated in and considered important by Arkansans.

Table 2-22 Top Individual Activities, Gender and Age (2019-2023 Arkansas SCORP)

| | TOTAL | Male | Female | 18-34 | 35-54 | 55-74 | 75+ |
|---|---|---|---|---|---|---|---|
| Walking | 77.2% | 72.0% | 81.6% | 86.7% | 82.2% | 75.2% | 52.8% |
| Sightseeing by car | 67.3% | 67.7% | 67.3% | 73.3% | 65.5% | 66.7% | 59.9% |
| Picnic, BBQ, cook-out | 66.6% | 65.0% | 68.5% | 76.5% | 71.0% | 61.7% | 49.4% |
| Visit lakes, rivers, etc. | 58.2% | 62.6% | 54.5% | 71.7% | 62.6% | 51.5% | 32.9% |
| Relax | 54.7% | 48.5% | 61.0% | 61.8% | 56.9% | 54.5% | 48.5% |
| Family Gathering | 53.3% | 50.8% | 56.0% | 58.5% | 53.9% | 54.5% | 45.3% |
| Swim/Wade in freshwater | 50.2% | 51.4% | 49.0% | 73.0% | 58.0% | 39.2% | 15.3% |
| Swim/Wade in outdoor pool | 46.4% | 42.7% | 50.2% | 69.1% | 55.7% | 34.9% | 19.8% |
| Fishing | 46.0% | 54.8% | 38.3% | 52.7% | 52.3% | 39.0% | 26.0% |
| Farmers Market | 46.0% | 41.6% | 50.4% | 44.8% | 45.8% | 49.2% | 38.2% |
| Outdoor concert/event | 38.6% | 34.0% | 43.4% | 52.2% | 44.1% | 32.9% | 15.8% |
| Wildlife / bird / nature viewing | 37.4% | 39.9% | 35.1% | 34.0% | 37.2% | 42.4% | 25.4% |
| Camping | 36.9% | 43.3% | 30.9% | 49.1% | 43.0% | 27.7% | 11.4% |
| Off-road vehicle | 35.4% | 45.4% | 26.3% | 44.2% | 45.4% | 24.8% | 12.2% |
| Zoo, garden, arboretum | 34.3% | 28.3% | 40.1% | 49.9% | 38.4% | 26.2% | 20.9% |
| Yard games | 33.8% | 33.2% | 34.6% | 54.4% | 39.7% | 24.2% | 11.1% |
| Playground | 33.7% | 29.0% | 38.4% | 57.2% | 35.8% | 26.9% | 13.7% |
| Day Hiking | 32.6% | 35.5% | 30.0% | 48.3% | 40.7% | 21.5% | 7.5% |
| Motor boating | 30.7% | 38.1% | 23.9% | 35.1% | 33.9% | 25.6% | 12.9% |
| Target Shooting | 27.9% | 37.8% | 18.9% | 37.0% | 31.7% | 20.9% | 7.0% |
| Hunting | 26.8% | 40.1% | 14.6% | 30.0% | 30.5% | 21.9% | 11.2% |
| Nature interpretive center | 25.6% | 27.3% | 24.0% | 26.0% | 26.7% | 24.6% | 23.5% |
| Paddling | 22.7% | 25.0% | 20.9% | 33.0% | 26.7% | 17.1% | 3.3% |
| Arts outside | 22.3% | 18.5% | 25.8% | 26.3% | 22.6% | 20.8% | 14.5% |
| Cycling | 21.9% | 24.4% | 19.7% | 23.9% | 29.3% | 15.8% | 7.6% |
| Running | 19.7% | 19.5% | 19.5% | 41.4% | 24.4% | 8.4% | 2.4% |

### 2.15.5 Recreational Carrying Capacity

The McClellan-Kerr Project Occupancy Percentage report is based on occupancy rates in 2021. Due to the 2019 Arkansas River flood resulting in widespread damages to park infrastructure and grounds, several areas remained closed or partially closed into the 2021 season for flood repairs. Consequently, occupancy percentages for parks that remained fully or partially closed during the 2021 season do not accurately reflect that of which would be seen in a normal year. Table 2-23 lists the occupancy percentages for parks that are operated by the USACE. 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 is at 35%.

Table 2-23 McClellan-Kerr Project Occupancy Percentage

| McClellan-Kerr Project Occupancy Percentage | | | | |
|---|---|---|---|---|
| Park Name | # of Sites | Fiscal Year 2021 | | |
| | | # of Available Nights | Occupancy | Percent |
| Aux Arc Park | 88 | 28,916 | 15,188 | 52.52% |
| Cherokee Park | 33 | 7,389 | 1,137 | 15.38% |
| Clear Creek Park | 40 | 8,103 | 1,367 | 16.87% |
| Merrisach Lake Park | 67 | 19,234 | 5,404 | 28.10% |
| Maumelle Park | 140 | 47,890 | 33,402 | 69.74% |
| Old Post Road Park | 41 | 10,669 | 5,985 | 56.09% |
| Pendleton Bend Park | 31 | 10,582 | 3,022 | 28.56% |
| Piney Bay Park | 91 | 24,041 | 10,484 | 43.60% |
| Rising Star Park | 24 | 2,188 | 732 | 33.46% |
| Shoal Bay Park | 77 | 18,677 | 7,947 | 42.54% |
| Spadra Park | 24 | 8,212 | 3,645 | 44.38% |
| Springhill Park | 47 | 15,519 | 9,008 | 58.04% |
| Toad Suck Park | 48 | 13,197 | 8,185 | 62.02% |
| Wilbur D. Mills Park | 21 | 5,031 | 1,330 | 26.44% |
| Willow Beach Park | 21 | 7,597 | 5,632 | 74.13% |
| **Total:** | **834** | **227,245** | **112,468** | **49%** |

## 2.16 Real Estate

Real Estate is responsible for the administration of outgrants. An outgrant is a real estate instrument that authorizes a private or public entity, that is not USACE, to access Federally controlled property for non-mission related purposes. Outgrants include leases, easements, licenses, and permits.

Encroachments and trespass on public lands are typically found in areas with adjacent active private development including homes, yards, sheds, and other development. The term "encroachment" pertains to a structure or permanent improvement built or installed on Project

lands without an outgrant being issued. The term "trespass" pertains to unauthorized transient use and occupancy of Project lands, including but not limited to, livestock grazing, mowing, planting crops, timber cutting, along with temporary use in violation of Title 36 Code of Federal Regulations such as dumping, parking equipment, and other use.

### 2.16.1 Acquisition Policy

As previously stated, the locks and dams on the Arkansas River were authorized by the River and Harbor Act of July 24, 1946, for navigation. Each lock and dam are a unit of the multipurpose plan for development of the of the lower Arkansas River Basin in Arkansas and Oklahoma. The Arkansas River Project was named the McClellan-Kerr Arkansas River Navigation System, honoring Senator John L. McClellan from Arkansas and Senator Robert S. Kerr from Oklahoma. The River and Harbor Act approved the multi-purpose plan recommended in the report to the Chief of Engineers dated September 20, 1945, and the letter of the Chief of Engineers dated March 19, 1946. The report and letter are contained in House Document No. 758, 79th Congress, second session.

Design memorandums were completed, identifying all land and interests in land that would be necessary for the operation, maintenance, and control of the reservoirs. Fee lands were acquired on an as-needed basis for operational and recreational purposes. The USACE was authorized to acquire occasional and permanent flowage easements as required by each pool of the project. Flowage easement elevations at each pool were acquired up to the following elevations:

- Pool 1: 142 ft
- Pool 2: 162 ft
- Pool 3: 182 ft
- Pool 4: 196 ft
- Pool 5: 213 ft
- Pool 6: 231 ft
- Pool 7: 249 ft
- Pool 8: 265 ft
- Winthrop Rockefeller Lake: 287 ft
- Lake Dardanelle: 343-364 ft
- Ozark Lake: 390 ft
- John Paul Hammerschmidt Lake: 395 ft

Due to the complexity of the elevations of flowage easements associated with each pool along the MKARNS, specific inquiries about these areas will be deferred to the Southwest Division, Little Rock District (SWL) Real Estate Division.

#### 2.16.1.1 Arkansas River Additional Land Acquisition (ARALA)

Land acquisition studies were conducted under the Arkansas River Additional Land Acquisition (ARALA) program. Some of the real property interests identified in the studies were acquired but others were not due to a lack of funding.

### 2.16.2 Management and Disposal Policy

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

## 2.17 Pertinent Public Laws

**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.

**Water Resource Protection and Flood Risk Management**

A number of 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 the MKARNS:

- 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. Authorized and appropriated funds for Dardanelle Lock and Dam.
- 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.
- Energy and Water Development Appropriations Act. In 1999, this act appropriated $100,000 to the USACE to initiate and complete a reconnaissance study of flooding in unprotected areas outside the existing flood control levees at Fort Smith, AR. As a result of this study, additional language was included in the Energy and Water Development Appropriations Act of 2004 (Public Law 108-137) that authorized a project depth of 12 feet to reduce flooding and expand the number of days that barges could operate on the MKARNS. New language was included in the Energy and Water Development Appropriations Act of 2020 (Public Law 116-260), which authorized the Arkansas River Project to not require a new investigation decision, stating: "Any federal funds, regardless of the account from which the funds were provided, used to carry out construction of the modification of the [MKARNS] shall be considered by the Secretary as initiating construction of the project such that future funds will not require a new investment decision.
- Executive Order 11752 of the President, Prevention. Control and Abatement of Environmental Pollution at Federal Facilities (17 December 1973). This order directs

that the Federal Government shall provide leadership in the nationwide effort to protect and enhance the quality of our air, water, and land resources and in the prevention of environmental pollution.

**Fish and Wildlife Resources**

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

- 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 December1973). 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)*, including their nests or eggs.

**Forest Resources**

The following law pertains to management of forested lands and is pertinent to the MKARNS project:

- 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."

**Cultural Resources**

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

- 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.

**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 MKARNS:

- 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.
- Lease or Exchange of Historic Property, 16 U.S.C. §§ 470h-3, (12 December 1980). Applies to historic properties.
- 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.

**Hydropower Mission**

Two projects along the MKARNS system have been authorized for a hydropower mission: Dardanelle Lock and Dam and Ozark Lock and Dam,

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

**Additional Laws and Regulations**

The following is a list of additional pertinent laws regulating the use and enjoyment of public lands and water located along the MKARNS system:

- 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 regulates the use of pesticides to protect man and his environment.
- 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 MKARNS Master Plan Vision Statement

The MKARNS Master Plan Revision Project Delivery Team (PDT) developed the following vision statement to help guide the process of revising and combining the preceding MKARNS Master Plans into one plan:

***"Promote land use and water resource management compatible with navigation and electric power generation along the Arkansas River that maximizes outdoor recreation opportunities and promotes environmental sustainability."***

## 3.2 Master Plan Revision Policy

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.

## 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 MKARNS Master Plan.

**GOAL A.** Provide the best management practices to respond to regional needs, resource capabilities and suitabilities 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, McClellan-Kerr 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. These objectives 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 Arkansas State Comprehensive Outdoor Recreation Plans (SCORP) was also considered during the process. The objectives in this Master Plan to the best extent possible aim to maximize project benefits, meet public needs, and foster environmental sustainability for the MKARNS. and facilities.

| 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 and facilities. | * | | * | * | * |
| Evaluate the demand for improved recreation facilities and increased public access on USACE-managed public lands and water for recreational activities and facilities. | * | | * | * | * |
| Provide a unique natural resource and aesthetic based recreation experience on the MKARNS within the Little Rock District. | * | * | * | * | * |
| Evaluate recreational use and regulations 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 universally accessible facilities on the MKARNS. | * | | * | | * |
| Evaluate need for commercial facilities on public lands and waters. | * | | * | * | |
| Consider high water and low water events to address potential impact to recreational facilities. | * | * | * | * | |
| Ensure consistency with USACE Natural Resources Management Strategic Plan. | | | | | * |
| Reference the Arkansas Statewide Comprehensive Outdoor Recreation Plan (SCORP) to ensure consistency in achieving recreation goals. | | | | | * |

| Recreational Objectives | Goals | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| Assess current public use levels (i.e., with focus on boating, camping, and day use trends) and evaluate impacts from underuse, overuse and crowding. As budget and personnel resources allow, take action to prevent underuse, overuse, conflict, and public safety concerns. | * | | * | | * |
| Work with state and local communities to promote tourism and recreational use of the MKARNS. | * | * | * | * | * |

| Natural Resource Management Objectives | Goals | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| Actively manage and conserve forest, fish, and wildlife resources, special status species, by implementing ecosystem management principles and best management practices to ensure sustainability and enhance biodiversity. | * | * | * | * | * |
| Consider a multi-mission approach during decision-making process. | | | | | * |
| Optimize resources, labor, funds, and 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 the MKARNS. | | * | | | |
| Identify and protect unique or sensitive habitat areas. | * | * | | * | * |
| Stop unauthorized uses of public lands such as agricultural trespass, timber theft, unpermitted docks and other structures, clearing of vegetation, unauthorized roadways, off-road vehicle (ORV) use, trash dumping, and placement of advertising signs that create negative environmental impacts. | * | * | * | * | * |
| Promote forest health through timber resource management actions to create a diverse and sustainable suite of forest habitats. | * | * | | * | |
| Enhance aquatic habitat and associated fisheries management improvement projects. | * | * | * | * | |
| Identify, restore, and manage ecological land types. | * | * | | * | * |
| Encourage State and Federal natural resource partnerships to continue sustaining project lands and waters. | * | * | * | | * |

| Environmental Compliance | Goals | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 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 MKARNS facilities. | * | * | | | * |
| Eliminate Privately Owned Domestic Sewer Systems (PODSS) on Federal lands. | * | * | | | |

| Visitor Information, Education and Outreach Objectives | Goals | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| Provide opportunities (i.e., town hall meetings) for communication between agencies, special interest groups, and the general public. | * | | | * | * |
| Ensure effective educational and outreach programs occur on the MKARNS. Topics to include Project operations, history, cultural resources, water safety, recreation, nature, and ecology. | * | * | * | * | * |
| Adapt and improve the network among local, state, and federal agencies concerning the exchange of system-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 MKARNS. | * | * | * | | |
| Capture trends concerning boating accidents and other incidents on public lands and waters and coordinate data collection with other public safety officials. | * | | * | * | * |
| Promote USACE Water Safety message. | * | | * | * | * |
| Educate adjacent landowners on public land and shoreline use policies. | * | * | * | * | * |
| Educate the public on Master Plans, Operational Management Plans, Shoreline Management Plans and other associated plans. | * | | * | * | * |

| General Management Objectives | Goals | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| Maintain the public lands boundary lines to ensure it is clearly marked and recognized in all areas. | * | * | | * | |
| Secure sustainable funding for the environmental stewardship program. | * | * | * | * | * |
| Ensure consistency with USACE Campaign and Implementation Plans. | | | | | * |
| Adapt to funding level changes in future years. | | | | | * |
| Ensure consistency with Executive Order 13990 'Protecting Public health and the Environment and Restoring Science to Tackle the Climate Crisis' (20 January 2021). | | | | | * |
| Ensure consistency with Executive Order 14057 "Catalyzing Clean Energy Industries and Jobs through Federal Sustainability" (8 December 2021). | | | | | * |
| Manage non-recreation outgrants, such as utility easements, 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 MKARNS development and the protection of cultural resources with State Historic Preservation Offices and federally recognized Tribes. | * | * | | * | * |
| Inventory cultural resources on the project. | * | * | | * | * |
| Increase public awareness and education of regional history. | | * | | * | * |
| Maintain compliance with Sections 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act; and the Native American Graves Protection and Repatriation Act on public lands surrounding the MKARNS. | | * | | * | * |
| Prevent unauthorized or illegal excavation and removal of cultural resources on project lands. | | * | | * | * |

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

## 4.1 Introduction

The MKARNS is a multipurpose project constructed primarily for Navigation. Hydropower, Management of Fish and Wildlife, Water Supply, Irrigation, and Recreation are also project purposes resulting primarily from the development of navigation pools and the presence of public land. Management of recreational resources must not conflict with the regulation of the river for the primary purpose for which it was authorized. Fish and Wildlife enhancement of project lands and waters is also an important project purpose and must be taken into consideration in all project management activities. The principal concept in planning the MKARNS was for public use and benefit. 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.

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 river across Government-owned land. To satisfy public demand for access to the river system, access roads and docks of quasi-public nature are permitted provided that the nature and extent of these facilities satisfy a valid public need. This need will be in harmony with the overall development of the river and not in conflict with management practices as determined by the USACE District Engineer.

The existing lands required for project operation purposes and recreation have been indicated on park maps and land classification maps found in Appendix C and Appendix E to this master plan. The lands described in the various designations throughout the Project are very similar in general characteristics of soil, topography, and vegetative cover typical of the Arkansas Valley, Mississippi Alluvial Plains and Ouachita Mountains Ecoregions.

Project lands and waters total 92,594.3 acres. There are an additional 88,194.8 acres of flowage easement lands. Flowage easement lands are indicated by the purple color on the land classification maps found in Appendix D.

## 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. Operation: These are the lands acquired for the congressionally authorized purpose of constructing and operating the project. Most project lands 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”.

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".

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".

All MKARNS Project lands are allocated as project operations to provide for safe, efficient operation of the project. Project operations lands reserved for recreational purposes and lands reserved for preservation of natural resources are indicated by color coding on the land classification maps. Land use classifications are discussed as follows.

## 4.3 Land Classifications

Land classification designates 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.

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.

   Acreage: 2,115.0 acres

2. High Density Recreation: Lands developed for intensive recreational activities for the visiting public including day use areas and/or campgrounds. These could include areas for concessions (marinas, comprehensive resorts, etc.), and quasi-public development.

   Acreage: 4,965.4 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.

   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 statues. 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.

Acreage: 2,500.9 acres (*Preceding Master Plans referred to these areas as 'Natural Areas')

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 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.).

        Acreage: 5,418.0 acres

    b. Wildlife Management: Lands designated for stewardship of fish and wildlife resources.

        Acreage: 31,111.5 acres

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

        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.

        Acreage: 320.0 acres

## 4.4 Water Surface Classifications

The MKARNS does not administer a surface water zoning program, and therefore is not included in this master plan, however, water has been classified in three of the four following classifications:

1. Restricted: Water areas restricted for project operations, safety, and security purposes.

    Acreage: 68.6 water surface acres

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

   Acreage: None

3. 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.

   Acreage: 342.7 water surface acres

4. Open Recreation: Those waters available for year-round or seasonal water-based recreational use.

   Acreage: 45,752.2 water surface acres

## 4.5 Project Easement Lands

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 Corps as other lands.

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

   Acreage: 7,883.9 acres

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

   Acreage: 88,194.8 acres

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

   Acreage: 19.6 acres

# Chapter 5 Resource Plan

This chapter describes in broad terms how project lands and water surface will be managed. For the MKARNS, the Management by Classification approach was used as set forth in EP 1130-2-550. This chapter is reflective of the USACE' Preferred Alternative.

This Draft Master Plan contains land classifications proposed for Alternative 2, the "Preferred Alternative". The accompanying Final Environmental Assessment evaluated 3 alternatives: Alternative 1 (No Action); Alternative 2 (Preferred); and Alternative 3.

The large increase in Wildlife Management acreage is the primary result of reclassifying areas previously classified as High-Density Recreation, Low-Density Recreation, and unclassified lands to Wildlife Management Areas to coincide with the Ozark and Dardanelle Wildlife Management Area (WMA) boundaries where feasible. Not all lands within the boundary of the Ozark and Dardanelle WMAs have a primary use of Wildlife Management. Therefore, not all lands within this WMA boundaries have been assigned a land classification of Wildlife Management as identified in EP 1130-2-550. These areas have been classified to best suit the needs of current and future management of the project as a whole.

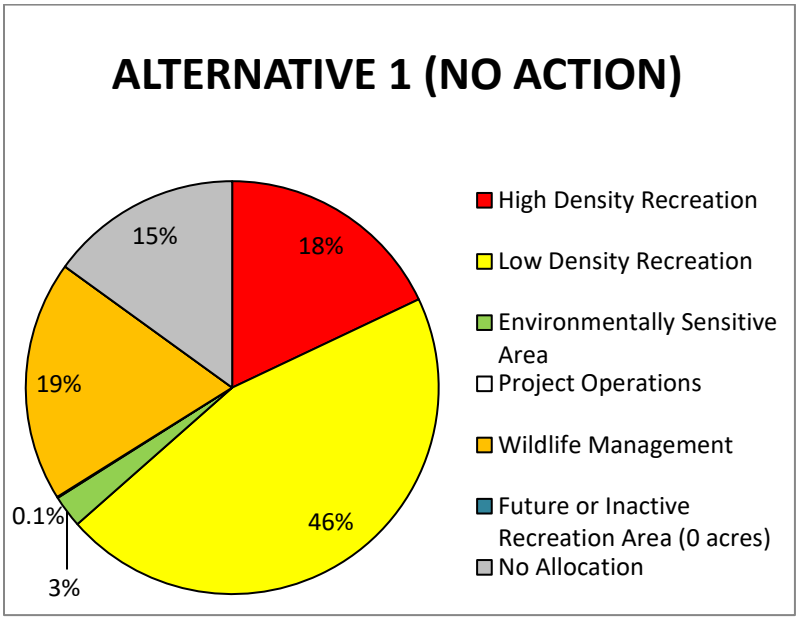
## 5.1 Alternatives Developed During the Master Plan Revision Process

A brief description for each alternative is presented below. A more detailed description is provided in the accompanying Environmental Assessment, Appendix A to this document. Each land classification provides a justification paragraph that outlines the methodology used in developing the preferred alternative.

### 5.1.1 Alternative 1 – No Action

The No Action Alternative involves utilizing the MKARNS Master Plans from 1976 and 1977 so that, land use classifications remain the same and none of the 46,430.7 acres of land along the river will be reclassified. This alternative has the potential to allow for increased land and water-based impacts within the High Density and Low Density land classifications and does not recognize the Dardanelle and Ozark WMA.

Figure 5-1 Alternative 1 (No Action)



### 5.1.2 Alternative 2 – Preferred

Alternative 2 (Preferred) land classifications were mapped to reflect current land and resource management practices and in response to agency and public comments received during the revision process. These maps can be found in Appendix D. Changes include reclassifying undeveloped High Density and Low Density Recreation land classifications to other land classifications, reclassifying undeveloped Low Density Recreation land to High Density Recreation, Wildlife Management, Project Operations, or Environmentally Sensitive Area land classifications, and reclassifying some lands that contain active shoreline use permits or outgrants to Low Density Recreation. A large increase in Wildlife Management land classification is attributed to the Dardanelle and Ozark WMA lands.

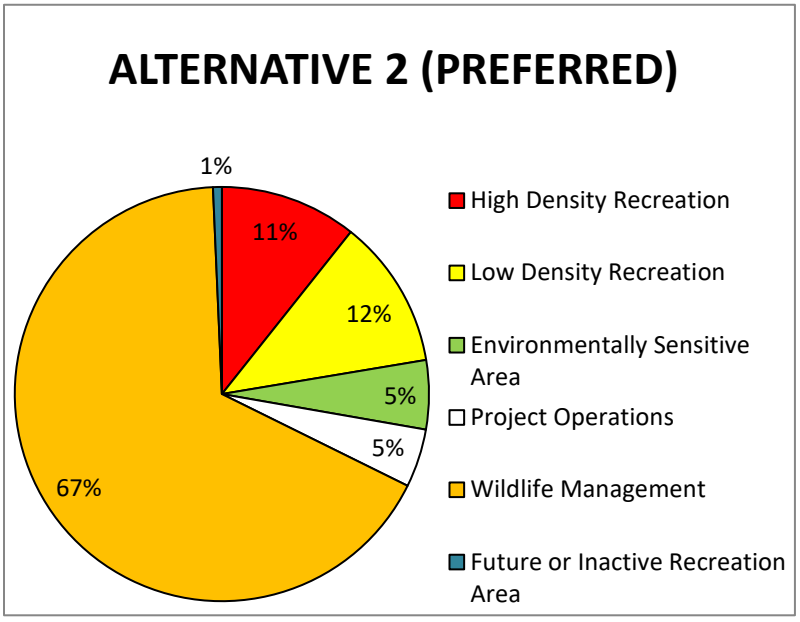



Figure 5-2 Alternative 2

| No Action (1976/1977 MP) | Converted to | Alternative 2 | Acres | % from No Action |
|---|---|---|---|---|
| No Allocation | Converted to | High Density Recreation | 92 | 1% |
| | | Low Density Recreation | 142 | 2% |
| | | Wildlife Management Areas | 5,230 | 75% |
| | | Environmentally Sensitive Areas | 564 | 8% |
| | | Project Operations | 949 | 14% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| High Density Recreation | Converted to | High Density Recreation | 4,690 | 56% |
| | | Low Density Recreation | 807 | 10% |
| | | Wildlife Management Areas | 2,005 | 24% |
| | | Environmentally Sensitive Areas | 237 | 3% |
| | | Project Operations | 282 | 3% |
| | | Future or Inactive Recreation Areas | 320 | 0% |
| Low Density Recreation | Converted to | High Density Recreation | 170 | 1% |
| | | Low Density Recreation | 3,732 | 18% |
| | | Wildlife Management Areas | 15,248 | 72% |
| | | Environmentally Sensitive Areas | 1,216 | 6% |
| | | Project Operations | 775 | 4% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Wildlife Management Areas | Converted to | High Density Recreation | 11 | 0.1% |
| | | Low Density Recreation | 728 | 8% |
| | | Wildlife Management Areas | 7,926 | 91% |
| | | Environmentally Sensitive Areas | 44 | 1% |
| | | Project Operations | 47 | 1% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Environmentally Sensitive Areas | Converted to | High Density Recreation | -- | 0% |
| | | Low Density Recreation | 1 | 0.1% |
| | | Wildlife Management Areas | 702 | 60% |
| | | Environmentally Sensitive Areas | 440 | 37% |
| | | Project Operations | 33 | 3% |
| | | Future or Inactive Recreation Areas | 0.1 | 0% |
| Project Operations | Converted to | High Density Recreation | 2 | 5% |
| | | Low Density Recreation | 8 | 20% |
| | | Wildlife Management Areas | -- | 0% |
| | | Environmentally Sensitive Areas | -- | 0% |
| | | Project Operations | 30 | 75% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| | | Total= | 46,430.7 acres | |

Table 5-1 Land Classification Changes from No Action to Alternative 2

### 5.1.3 Alternative 3

Land Classifications within Alternative 3 are similar to those found in Alternative 2, with modifications to develop an alternative that maintained more High Density Recreation lands than in Alternative 2. Additionally, some lands that are within the WMA lands that did not exhibit characteristics suitable for potential wildlife habitat improvements remained or were reclassified to Low Density recreation to allow potential future shoreline use under the Shoreline Management Plan for Lake Dardanelle.

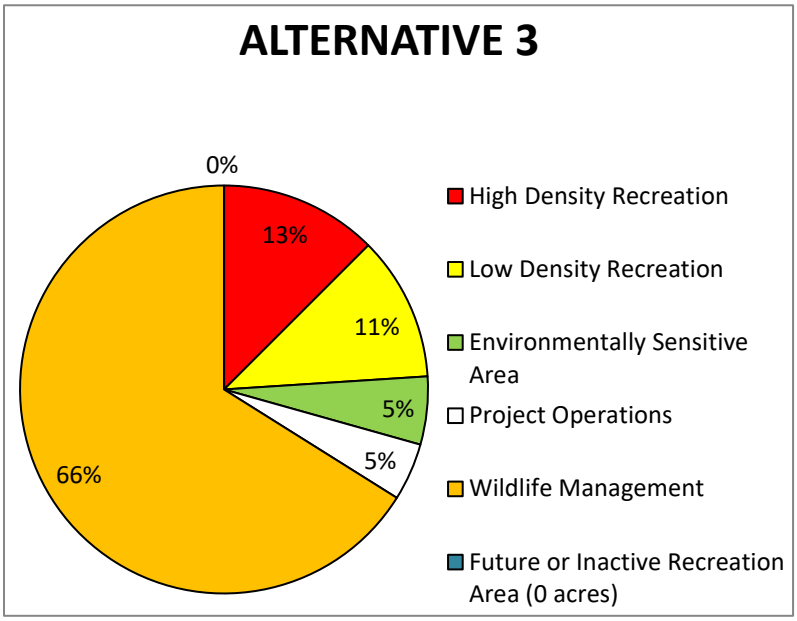



Figure 5-3 Alternative 3

| No Action | Converted to | Alternative 3 | Acres | % from No Action |
|---|---|---|---|---|
| No Allocation | Converted to | High Density Recreation | 92 | 1% |
| | | Low Density Recreation | 176 | 3% |
| | | Wildlife Management Areas | 5,196 | 74% |
| | | Environmentally Sensitive Areas | 564 | 8% |
| | | Project Operations | 949 | 14% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| High Density Recreation | Converted to | High Density Recreation | 5,523 | 66% |
| | | Low Density Recreation | 613 | 7% |
| | | Wildlife Management Areas | 1,685 | 20% |
| | | Environmentally Sensitive Areas | 237 | 3% |
| | | Project Operations | 282 | 3% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Low Density Recreation | Converted to | High Density Recreation | 178 | 1% |
| | | Low Density Recreation | 3,733 | 18% |
| | | Wildlife Management Areas | 15,226 | 72% |
| | | Environmentally Sensitive Areas | 1,216 | 6% |
| | | Project Operations | 775 | 4% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Wildlife Management Areas | Converted to | High Density Recreation | 11 | 0.1% |
| | | Low Density Recreation | 779 | 9% |
| | | Wildlife Management Areas | 7,875 | 90% |
| | | Environmentally Sensitive Areas | 44 | 0.5% |
| | | Project Operations | 47 | 0.5% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Environmentally Sensitive Areas | Converted to | High Density Recreation | 0.1 | 0% |
| | | Low Density Recreation | 1 | 0.1% |
| | | Wildlife Management Areas | 702 | 60% |
| | | Environmentally Sensitive Areas | 440 | 37% |
| | | Project Operations | 33 | 3% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Project Operations | Converted to | High Density Recreation | 2 | 5% |
| | | Low Density Recreation | 8 | 20% |
| | | Wildlife Management Areas | -- | 0% |
| | | Environmentally Sensitive Areas | -- | 0% |
| | | Project Operations | 30 | 75% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| | | Total = | 46,430.7 acres | |

Table 5-2 Land Classification Changes from No Action to Alternative 3

### 5.1.4 Selected Alternative

The selected alternative was Alternative 2 (Preferred) with no modifications. Maps can be found in Appendix D. The reason for no modifications to Alternative 2 was due to the lack of public input requesting any variation from Alternative 2 (Preferred).

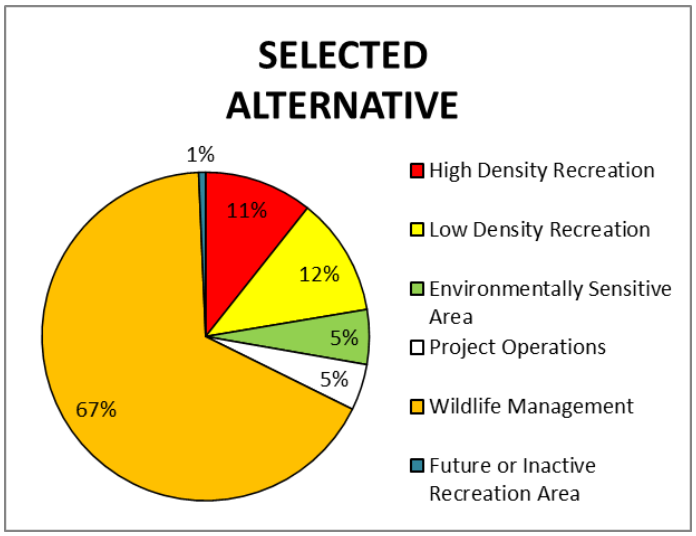



Figure 5-4 Selected Alternative

Table 5-3 Land Classification Changes from No Action to Selected Alternative

| No Action (1976/1977 MP) | Converted to | Selected Alternative | Acres | % from No Action |
|---|---|---|---|---|
| No Allocation | Converted to | High Density Recreation | 92 | 1% |
| | | Low Density Recreation | 142 | 2% |
| | | Wildlife Management Areas | 5,230 | 75% |
| | | Environmentally Sensitive Areas | 564 | 8% |
| | | Project Operations | 949 | 14% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| High Density Recreation | Converted to | High Density Recreation | 4,690 | 56% |
| | | Low Density Recreation | 807 | 10% |
| | | Wildlife Management Areas | 2,005 | 24% |
| | | Environmentally Sensitive Areas | 237 | 3% |
| | | Project Operations | 282 | 3% |
| | | Future or Inactive Recreation Areas | 320 | 0% |
| Low Density Recreation | Converted to | High Density Recreation | 170 | 1% |
| | | Low Density Recreation | 3,732 | 18% |
| | | Wildlife Management Areas | 15,248 | 72% |
| | | Environmentally Sensitive Areas | 1,216 | 6% |
| | | Project Operations | 775 | 4% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Wildlife Management Areas | Converted to | High Density Recreation | 11 | 0.1% |
| | | Low Density Recreation | 728 | 8% |
| | | Wildlife Management Areas | 7,926 | 91% |
| | | Environmentally Sensitive Areas | 44 | 1% |
| | | Project Operations | 47 | 1% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| Environmentally Sensitive Areas | Converted to | High Density Recreation | -- | 0% |
| | | Low Density Recreation | 1 | 0.1% |
| | | Wildlife Management Areas | 702 | 60% |
| | | Environmentally Sensitive Areas | 440 | 37% |
| | | Project Operations | 33 | 3% |
| | | Future or Inactive Recreation Areas | 0.1 | 0% |
| Project Operations | Converted to | High Density Recreation | 2 | 5% |
| | | Low Density Recreation | 8 | 20% |
| | | Wildlife Management Areas | -- | 0% |
| | | Environmentally Sensitive Areas | -- | 0% |
| | | Project Operations | 30 | 75% |
| | | Future or Inactive Recreation Areas | -- | 0% |
| | | Total= | 46,430.7 acres | |

### 5.1.5 Summary of Alternatives

Table 5-4 Comparison of Classifications by Alternative

| Classification | Alternative 1 – (No Action) | | Alternative 2 – (Preferred) | | Alternative 3 | | Selected Alternative | |
|---|---|---|---|---|---|---|---|---|
| | Acres | Percentage of land | Acres | Percentage of land | Acres | Percentage of land | Acres | Percentage of land |
| High Density | 8,340.5 | 18% | 4,965.4 | 11% | 5,806.5 | 13% | 4,965.4 | 11% |
| Low Density | 21,141.6 | 46% | 5,418.0 | 12% | 5,324.9 | 11% | 5,418.0 | 12% |
| Environmentally Sensitive Areas | 1,175.9 | 3% | 2,500.9 | 5% | 2,500.9 | 5% | 2,500.9 | 5% |
| Project Operations | 39.4 | 0.1% | 2,115.0 | 5% | 2,115.0 | 5% | 2,115.0 | 5% |
| Wildlife Management | 8,756.4 | 19% | 31,111.5 | 67% | 30,683.5 | 66% | 31,111.5 | 67% |
| Future or Inactive Recreation Areas | 0 | 0% | 320.0 | 1% | 0 | 0% | 320.0 | 1% |
| Not Classified | 6,976.8 | 15% | 0 | 0% | 0 | 0% | 0 | 0% |
| Open Recreation (water) | 45,752.2 | NA | 45,752.2 | NA | 45,752.2 | NA | 45,752.2 | NA |
| Restricted (water) | 68.6 | NA | 68.6 | NA | 68.6 | NA | 68.6 | NA |
| Fish and Wildlife Sanctuary | 0 | -- | 342.7 | -- | 342.7 | -- | 342.7 | -- |

## 5.2 Classification and Justification

The PDT made general assumptions during the land classification review process. Those assumptions include:

- Valid boat dock permits would be located in the Low Density Recreation land classification.
- The 200 ft. access rule in the current Lake Dardanelle Shoreline Management Plan would remain the same.
- The five physical criteria for placing a boat dock on Lake Dardanelle would remain the same (200 ft., water depth, lateral spacing, 1/3 cove rule, and legal access to shoreline).
- Past classification lines, legal access points to the Limited Development Area, edges of zoning and shoreline use permits, USACE boundary monuments and corners, edges of roads, and terrain such as drainage inlets were used as boundaries between classifications.

In addition, during the revision process, consideration was given to previous land classification from the 1976 and 1977 master plans, the feasibility of keeping or changing the existing land classification, potential future development needs along the MKARNS, and all agency and public comments received. Maps showing land classifications and easements listed below may be found in Appendix ED.

### 5.2.1 Project Operations

Project Operations land classification 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.

*Justification:* On the MKARNS, the lands classified as Project Operations have been classified by definition. Areas adjacent to the locks, dams, and powerhouse were reclassified from High Density and Low Density Recreation to Project Operations. Some lands around these structures were previously unclassified and have been classified as Project Operations. Additionally, restricted areas adjacent to Arkansas Nuclear One and River Mountain Quarry lease areas were reclassified to Project Operations.

Resource Objectives: General Management

Acreage: 2,115.0 acres or 5% of USACE managed land

### 5.2.2 High Density Recreation

High Density Recreation land classification includes those lands intended to be developed or are currently developed for intensive recreational activities for the visiting public including day use areas, parking and launch areas, and/or campgrounds. These could include areas for commercial concessions (marinas, comprehensive resorts, etc.) and quasi-public development.

*Justification:* There were various undeveloped future-use and closed USACE parks along the MKARNS in the previous Master Plans that have been reclassified from High Density to Wildlife Management, Environmentally Sensitive Areas, or Low Density Recreation land classifications. That list includes:

1. Bectum Hill Park - Future (153.3 acres)
2. Boyd Point - Future (178.3 acres)
3. Brodie - Future (332.5 acres)
4. Cadron Creek – Future (41.4 acres)
5. Fletcher Bend - Future (133.7 acres)
6. Logan County – Proposed Park (42.4 acres)
7. Wrightsville (138.6 acres)

Numerous areas identified in the 1976 and 1977 master plans for the MKARNS as High Density Recreation land classification are reduced in size. Lands removed from the High Density Recreation classification were reclassified to Project Operations, Environmentally Sensitive Areas, Low Density Recreation, Future or Inactive Recreation Areas, and Wildlife Management Areas. These changes are in response to current and expected future land use.

Five recreation areas along the MKARNS previously classified as High Density Recreation lands have been reclassified to Future or Inactive Recreation Areas and identified as having characteristics compatible with potential future recreational development but are not currently in operation or have not been developed. These areas include Sequoya, Holla Bend, Flat Rock, HWY 64 Cove, and West Creek.

*Resource Objectives:* Recreation, General Management

Acreage: 4,965.4 or 11% of USACE managed lands

### 5.2.3 Mitigation

Mitigation land classification includes lands with an allocation of Mitigation that were acquired specifically for the purpose of offsetting losses associated with development of the project.

When the MKARNS project was established, the requirement for mitigation lands was not established. Therefore, there are currently no lands classified as mitigation land along the MKARNS project.

### 5.2.4 Environmentally Sensitive Area (ESA)

ESA 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

facilities is allowed on these lands. Examples of permits that could be issued on ESA lands are unimproved walking paths, specific erosion control measures, and removal of invasive species.

Along the MKARNS, approximately 0.7% of ESA lands have permitted residential and municipal amenities. These areas include shoreline use permits, utility crossings, roads, and county roads.

No agricultural, grazing, or mowing for residential/commercial uses are permitted on these lands unless necessary for a specific resource management benefit, such as prairie restoration.

*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 of habitat for threatened, endangered, and state listed species of concern along the Arkansas River. The classification of ESA also considers locations of significant cultural or historic resource sites, resource protection (i.e., glade restoration areas, fragile habitats, bluffs), and aesthetics. Typically, areas that were classified as Natural Areas in the previous master plans and have no active boat dock permits remained as ESA or have been reclassified to Wildlife Management or Project Operations where applicable. Areas that were previously classified as Natural Areas and have bridges, utility crossings, active shoreline permits and/or have a limited development area (LDA) shoreline allocation designation have been classified as Low Density Recreation. Areas that have developed infrastructure to include navigation and rock and gravel quarry development was reclassified to Project Operations to maintain contiguous land classifications. If small portions of land were previously classified as a different land classification than the neighboring land classification, the land classification was changed. When feasible, areas located in the back of coves were changed to ESA for the purpose of protecting water quality due to run off. Islands that were located near adjacent shoreline classified as ESA or contained cultural resources, species of concern, or exhibited characteristics that have the potential to host species of concern were classified to ESA.

There are public utilities and residential amenities (i.e., power lines, roads, etc.) that are found in ESA land classifications, which will be allowed to remain. As stated previously, generally, future right-of-ways for public utilities in ESA will not be considered.

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

Acreage: 2,500.9 or 5 % of USACE managed lands

### 5.2.5 Multiple Resource Management

Multiple Resource Management land 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. Right-of-ways for public utilities in Multiple Resource Management land classifications will be considered and reviewed on a case-by-case basis.

#### 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, shoreline use permits etc.). Low Density Recreation lands may contain Limited Development Areas within the context of the Shoreline Management Plan (SMP).

*Justification:* Areas that were previously classified as Low Density Recreation with no active shoreline permits, no existing passive recreation, and no limited development area, were typically reclassified as ESA or Wildlife Management to allow for habitat improvements and/or to preserve the scenic, historical, archaeological, scientific, water quality, or ecological value of the overall project.

Mud Island – Primitive Camping Island – This area, previously unclassified, has now been classified as Low Density Recreation for the potential for future development of primitive camping sites due to its location and site characteristics suitable to attract hunting and fishing enthusiasts.

Areas previously classified as High Density Recreation that had no planned development or did not exhibit characteristics suitable for future development consistent with High Density Recreation land classification were typically reclassified as Low Density Recreation to allow for continued passive recreation. Additionally, some areas that were previously not assigned a land classification were classified as Low Density Recreation to remain contiguous with the surrounding land usage.

Whereas many of the lands that contained existing agriculture leases were classified as Wildlife Management Areas, some lands do not exhibit favorable conditions for future habitat improvement efforts and therefore were classified as Low Density Recreation to allow for potential future shoreline use permits and/or minimal development.

Areas with a dock and path existing on land that was previously classified as Natural Area were changed to Low Density Recreation. Areas with a dock were reclassified to or remained Low Density Recreation. Some lands adjacent to docks located outside of an LDA have been reclassified as Low Density Recreation to provide opportunities for future shoreline use. While the current SMP designations were evaluated, the Master Plan takes precedence over the SMP.

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

Acreage: 5,418.0 or 12% of USACE managed lands

#### 5.2.5.2 Wildlife Management

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

*Justification:* On the MKARNS, areas that have been 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 have been determined to contain sustainable habitat for native wildlife and will be managed for this purpose. The majority of these areas have been established in locations that are accessible to the public by road or water. In addition, areas that contained an active agriculture lease and where the land is suitable for potential future habitat improvement efforts were also classified as Wildlife Management Areas.

The States of Arkansas actively manages numerous areas for the purpose of Wildlife Management on lands along the river; the master plan land classifications revisions now coincide with this management approach.

Resource Objectives: Natural Resource Management, Recreation, Environmental Compliance

Acreage: 31,111.5 or 67% of USACE managed lands

#### 5.2.5.3 Future or Inactive Recreation Areas

Future or Inactive Recreation Areas 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.

*Justification*: Various areas along the river exhibit characteristics compatible with potential future development. This includes areas previously developed and areas that were identified as potential recreation sites but have been closed or remain undeveloped. These areas have been classified as Future or Inactive Recreation Areas to retain the land for future recreational usage and may be managed as a Multiple Resource Land Classification until such time these areas are active recreation areas.

These areas include:

- Sequoya Park
- Holla Bend Park
- Flat Rock Park
- Hwy 64 Cove Park
- West Creek Park

Resource Objectives: Natural Resource Management, Recreation, Environmental Compliance

(Acreage: 320.0 or 1% of USACE managed lands)

## 5.2.6 Water Surface

Water surface is for those waters classified for particular purposes when the project administers a surface water zoning program. The MKARNS did not have water surface classifications in prior master plans.

### 5.2.6.1 Restricted

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

*Justification:* Restricted water surface classifications are areas restricted due to USACE policy for safety and security. These areas include immediately above and below the dam and areas around water intake structures. Access restrictions apply to the water intake structures and outfall areas around Arkansas Nuclear One and are classified as restricted.

Resource Objectives: General Management

(Acreage: 68.6 water surface acres; less than 1% of surface water)

In addition, it is generally understood that areas near designated swim beaches are considered "restricted" for swimmer safety.

### 5.2.6.2 Designated No Wake

Designated "No Wake" surface waters are established to protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and for public safety. The MKARNS has no water surface area in this classification category; however, it is generally understood (i.e., posted and/or buoyed) that areas near bridges, boat ramps, designated swim areas, and marinas are considered "no wake" for visitor safety.

### 5.2.6.3 Fish and Wildlife Sanctuary

Fish and Wildlife Sanctuary surface waters are areas where annual or seasonal restrictions are in place to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and or spawning.

*Justification:* A portion of the water surface acreages on Lake Dardanelle and within the Dardanelle WMA have specific hunting restrictions enforced by the AGFC for waterfowl. These areas include the Johnson County, Horsehead, and Bob Young Waterfowl Rest Areas. In the past the AGFC operated a nursery pond near Knoxville, Arkansas that was constructed on Lake Dardanelle. Potential plans for this area may include consideration for other restricted fishing and hunting purposes

Resource Objectives: Species Protection, Environmental Compliance, Natural Resource Management

(Acreage: 342.7 water surface acres; less than 1% of surface water)

#### 5.2.6.4 Open Recreation Areas

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

*Justification:* On the Arkansas River all water surface acres managed by USACE are classified as open recreation, with the exception of restricted areas immediately above and below the lock and dam structures, areas near water intake structures, or areas set aside for Fish and Wildlife Sanctuaries.

Resource Objectives: Recreation, Natural Resources Management, General Management

Acreage: 45,752.2 water surface acres; more than 99% of the surface water

### 5.2.7 Project Easements

Project Easement land classification is 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 MKARNS Project.

#### 5.2.7.1 Operations Easement

The USACE retains the rights to these lands in order to complete necessary Project operations (e.g., access).

*Justification*: The Corps retains rights to these lands necessary for Project Operations. This includes roadway easements to allow the government to operate and maintain a roadway and sometimes a utility corridor to allow government and public access to Federal lands. It also includes easements for placement and storage of dredged material.

Resource Objectives: General Management

Acreages: 7,883.9 acres

#### 5.2.7.2 Flowage Easement

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

*Justification:* A flowage easement is an easement that the USACE acquired either before construction of its operating projects or after a need was identified to perform certain actions on private land not owned by the Government. The USACE has only purchased certain rights associated with periodic water storage on private property and does not exercise absolute control. Normally, terms of these types of easements dictate that no structure for human habitation shall be constructed or maintained on the land, and that no other structure shall be constructed or

maintained on the land. Elevation varies among flowage easements acquired for the operation of the MKARNS from pool to pool. Real Estate may consent to the use of an easement, subject to any conditions required to protect the Government's interest.

Resource Objectives: General Management

Acreage: 88,194.8 acres

#### 5.2.7.3 Conservation Easement

The Corps retains the rights to lands for aesthetic, recreation, and environmental benefits.

*Justification*: The only conservation easement along the MKARNS is Burns Park, located near David D. Terry Lock and Dam. The USACE was granted an easement by the City of North Little Rock to plan, design, and build facilities, and in return, license the area back to the city to manage. This is the only area along the MKARNS with this kind of agreement.

Resource Objectives: General Management

Acreage: 19.6 acres

# Chapter 6 Special Topics/Issues/Considerations

This chapter discusses the special topics, issues, and considerations identified as critical to the future management of the MKARNS. 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 Little Rock District Area of Responsibility (AOR). For simplicity, the topics are discussed below under generalized headings.

## 6.1 Revetments and Training Structures

An extensive system of rock dikes, jetties, revetments, and bank stabilization (river training structures) was included with the original construction of the Arkansas River navigation system. The purpose of this network of rock river training structures is to prevent channel meandering, direct flow patterns for ease of navigation, and to promote channel scour at critical points to minimize shoaling. The tops of the dikes and revetments which were constructed in the river channel are generally designed to be inundated at discharges of 30,000 cfs to 75,000 cfs in the upper reaches of the pool and permanently in the lower reaches. The structures which were constructed on the banks were set 15 feet above a low water profile (10,000 cfs pre-project) or three feet above the navigation pool, whichever is higher. Anticipated changes to the navigation channel and infrastructure (i.e.,12' River Channel modifications) may impact these design standards.

## 6.2 MKARNS, 12 foot Channel

Funds were appropriated in the Energy and Water Development Appropriations Act of 1999, which provided $100,000 for the USACE to initiate and complete a reconnaissance study of flooding in unprotected areas outside the existing flood control levees at Fort Smith, Arkansas. As a result of the reconnaissance study, a Section 905(b) (WRDA 86) Analysis, dated September 1999 was prepared and approved in January 2000. The report recommended a navigation study that would incidentally help flood control and included a recommendation for a feasibility study with two phases.

The USACE maintains a minimum 9-ft channel depth on the MKARNS. In addition to the minimum 9-ft depth, the USACE maintains channel width varying from 300 ft along the White River, Lake Langhofer, and the Arkansas Post Canal, to 250 ft on the Arkansas River. Additional language was included in Section 136 of the Energy and Water Development Appropriations Act of 2004, which authorized a project depth of 12 ft. This will be a multi-phased project, with the first phase (Phase I) examining how to reduce flooding and expand the number of days barges could operate on the river. The second phase (Phase II) will investigate deepening the channel over its entire length and widening the Verdigris River in Oklahoma.

Deepening the channel would provide a 40 percent increase in the capacity of river barges to transport products for Arkansas farmers and factories and reduce the price of goods for consumers across the country.

In 2022, the Environmental Assessment began for the 12 ft River Channel Project, and it is unknown if any significant impacts will be associated to any threatened or endangered species. Consultation ranges for certain T&E species are within the proposed action area. Some species include the rabbitsfoot (*Quadrula cylindrica cylindrica),* pallid sturgeon (*Scaphirhynchus albus*), and fat pocketbook (*Potamilus capax).* Some of these species have been found within the USFWS consultation area.

## 6.3 Three Rivers Project

The project area known as "Three Rivers" is near the confluence of the Mississippi, White, and Arkansas Rivers in Desha and Arkansas Counties, Arkansas, along the MKARNS. Here, the Arkansas and White rivers have the potential to merge, threatening the entire MKARNS, the loss of large areas of bottomland hardwoods, and destruction of habitat for numerous threatened and endangered species. The authorized project is a plan to promote a long-term sustainable navigation system by reducing the risk of a cutoff forming near the entrance channel of the MKARNS between the Arkansas and White rivers, particularly if the existing containment structure fails or breaches.

## 6.4 Ownership of Islands along the Arkansas River

Ownership boundaries on the Arkansas River can be somewhat of a moving target. Over time rivers move, and thus boundaries move. Even section and township lines are "adjusted" at the Arkansas River to make a square geographical system fit over a round earth. According to Arkansas law, landowners can own the bed of a stream unless it has been determined that the stream is navigable. (In 1980, the Arkansas Supreme Court expanded the definition of navigability to include recreational use. {State v. McIlroy 268 Ark. 277}). On a navigable stream of river, the riverbed up to the high-water mark belongs to the State of Arkansas to hold in trust for the public for both commercial and recreational activities.

As the Arkansas River is easily defined as Navigable, all lands formed in the riverbed are considered state owned. Arkansas Code (§ 22-6-202) states:

"Except as provided in § 22-6-204, islands formed or that may form in the navigable waters of this state are the property of the state and subject to sale and disposition in the manner and form provided in this subchapter."

In reference to Arkansas Code (§ 22-6-204) as stated above, it states:

"All sales made by the Commissioner of State Lands pursuant to this subchapter prior to July 1, 1991, are confirmed, and the title of all purchases under the deeds from the commissioner of State Lands are quieted, established, and confirmed."

Therefore, except for a few possible exceptions, all true islands that form on the Arkansas River are considered state lands. However, the USACE purchased large tracts of land adjacent to the Arkansas River in the late 50's for the establishment of the McClellan-Kerr Arkansas River Navigation System (MKARNS). As these lands were in ownership by the government before the flooding of Lake Dardanelle and Ozark Lake, islands formed over these tracts of land in Lake Dardanelle and Ozark Lake belong to the USACE.

Arkansas Code (§ 22-5-403) states:

> "All land which has formed or may form in the navigable waters of this state, and within the original boundaries of a former owner of land upon such waters, shall belong to and the title thereto shall vest in the former owner, his or her heirs or assigns, or in whoever may have lawfully succeeded to the right of the former owner therein."

Islands that accrete to the point of "land bridging" back to the natural banks of the river, then become the lands of the adjacent landowner and can be treated as private property (or government property if islands bridge back to government owned riparian lands).

Given these guidelines and the fact that the U.S. government purchased most riparian lands before impoundment for Lake Dardanelle and Ozark Lake (pools 10 and 12), islands within pools 10 and 12 are considered USACE Property. Arkansas River Islands that form on all other pools are considered state owned unless the state of Arkansas has deeded specific islands over for private use. Updated records would need to be obtained from the state to determine which of these islands have been sold.

## 6.5 Regulatory Permits

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. Code 403) establishes that a permit is required for any project that would involve work on, over, or under a Navigable Waterway as determined by the USACE. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, re-channelization, or any other modification of a navigable water of the United States, and applies to all structures, from the smallest floating dock to the largest commercial undertaking. It further includes, without limitation, any wharf, dolphin, weir, boom breakwater, jetty, groin, bank protection (e.g., riprap, revetment, bulkhead), mooring structures such as pilings, aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent, or semi-permanent obstacle or obstruction.

Additionally, if any of the above work would place dredged or fill material below the Ordinary High Water Mark of the aquatic resource a separate Section 404 of the Clean Water Act (33 U.S. Code 1344) permit would also be required.

# Chapter 7 Agency and Public Coordination

## 7.1 Introduction

No single agency has complete oversight of stewardship activities on the public lands and waters along the MKARNS. 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 the MKARNS, 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 the MKARNS 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 the USACE and with other affected agencies and organizations is a critical feature required in developing or revising a Project Master Plan. Agency and public involvement and coordination has been a key element in every phase of the MKARNS 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. In March of 2020, a global coronavirus pandemic (COVID-19) was declared. This prompted changes in the workforce, including USACE implementing telework schedules to keep employees safe and socially distanced. In addition, and due to the evolving federal, state, and local policies designed to address the spread of COVID-19, the project delivery team (PDT) determined that no in-person agency or public scoping workshops would occur until the threat of the virus subsided. As an alternative, the MKARNS 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 for more information about the Master Plan revision process, to solicit comments for scoping, and to communicate to the public the reason behind changing the traditional USACE scoping process in response to the global pandemic. As part of the initial phase of the environmental process, an extended public scoping comment period was held between June 15, 2021, and August 27, 2021, to gather agency and public comments on the Master Plan and issues that will be examined as part of the environmental analysis. The extension to the comment period was one of many responses to the change in the traditional USACE scoping process due to the pandemic.

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 will 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 the MKARNS in 20 years?
- What changes, if any, would you like to see along the MKARNS?
- What about the MKARNS is most and least important to you?
- Additional comments on the Master Plan revision or about issues to be studied?

Thirty-five comments were received during the comment period. A full breakdown of comments and analysis is available in the Scoping Report, which may be found in Appendix A.

## 7.3 Draft Master Plan/Draft Environmental Assessment

The Draft Master Plan and EA were released to the public on January 16, 2023. Notification of the draft review comment period and public workshops was completed via several forms of media as described in Appendix B of the EA within the Draft Release Comments Report. As part of the draft plans release phase of the environmental process, a 45-day comment period was held from January 16 to March 2, 2023. During this time, the public, resource agencies, and Tribal Nations had the opportunity to review the draft documents and provide comments.

Public workshops were held on January 30, 2023, in Russellville, AR and February 2, 2023, in Pine Bluff, AR. An additional public workshop was scheduled to be held in Little Rock on January 31, 2023, but was canceled due to inclement weather. These workshops gave the public an opportunity to learn about the alternatives and provide input on the Draft Master Plan and Draft EA. A hybrid in-person and online resource agency meeting was also held on January 31, 2023, in Little Rock, AR and over Webex to provide information to agencies, answer questions, and hear feedback.

In total, four comment submittals from members of the public and four comment submittals from resource agencies were received by the end of the draft release period. A full breakdown of comments and analysis are available in the Draft Release Comments Report, which may be found in Appendix B of the EA.

## 7.4 Final Master Plan/Final Environmental Assessment

The Final MKARNS Master Plan, EA, and FONSI were completed in July 2023. No public workshops were held for the final master plan release. The Final MKARNS Master Plan, EA, and FONSI were posted on the MKARNS Master Plan Revision website once signed by the District Commander.

# Chapter 8 Summary of Recommendations

## 8.1 Summary Overview

The proposals made in previous chapters of this MP are for the courses of action necessary to manage the MKARNS current and future challenges. Actions set forth in this plan can ensure the future health and sustainability of the MKARNS 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 establishes the basic direction for development and management of the MKARNS project consistent with the capabilities of the resource and public needs. The plan is flexible in that supplementation can be achieved through a formal 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 MP, for the MKARNS, will continue to provide for and enhance recreational opportunities for the public, improve the environmental quality and sustain the management philosophy in place.

## 8.2 Land Classifications

As described in detail in Chapter 5, the current management and philosophy approach was used in the land classification decisions made during this revision. Numerous factors and expressed public concerns were considered when determining land classification for the 2023 MKARNS Master Plan revision, which included but are not limited to: how lands were previously classified between 1976 and 1977; what kind of development or non-development was taking place adjacent to USACE property; if there are existing shoreline use permits and what SMP shoreline allocations existed in the prior land classification; and existing activities on project lands.

## 8.3 Recommendation

This revised 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 (required 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 MKARNS land and water resources.

# Chapter 9 **Bibliography**

Almy, Marion, Elizabeth A. Horvath, Della Fahnestock, Nicholas Bourgeois and Philip Jungeblut. 2018. *Cultural Resource Assessment Survey, Lake Dardanelle and Ozark Lake, FY17-MK-D-1, Johnson County Ducks; FY17-MK-D-2, Johnson County Waterfowl Rest Area; FY17-MK-D-3, Horsehead WRA; and FY17-MK-O-1, Mulberry Bottom.* Archaeological Consultants, Inc., Sarasota, Florida and Coastal Environments, Inc., Baton Rouge, Louisiana. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Almy, Marion, Elizabeth A. Horvath, Della Fahnestock, and Aden Jenkins. 2019. *Cultural Resource Assessment Survey Ozark Lake and Lake Dardanelle Mk-Ozark, Fy18-Mk-O-1, Bectum Hill Mk-Dardanelle, Fy18-D-1, O'kane Island Franklin County, Arkansas.* Archaeological Consultants, Inc., Sarasota, Florida and Coastal Environments, Inc., Baton Rouge, Louisiana. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Almy, Marion, Elizabeth A. Horvath, and Aden Jenkins. 2020. *Cultural Resource Assessment Survey Mcclellan-Kerr Arkansas River Navigation System (Mkarns) Haroldton Access (Fy19.1-Mk-1), Sweeden (Fy19.1-Mk-2), Fletcher Bend (Fy19.1-Mk-3), Maumell Day Use Area (Fy19.1-Mk-4), Merrisach (Fy19.1-Mk-5), and Rifle Pit (Fy19.1-Mk-6) Crawford, Pope, Faulkner, Pulaski, And Arkansas Counties, Arkansas*. Archaeological Consultants, Inc., Sarasota, Florida and Coastal Environments, Inc., Baton Rouge, Louisiana. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Arkansas Multi-Agency Wetland Planning Team website. Accessed at: www.mawpt.org

Bennett, W.J., Jr., Anne Frances Gettys. Aubra lee, Lawson M. Smith, and Beverly Watkins. 1986. *Archeology in the Arkansas River Valley: A Cultural Resources Survey in the Central Arkansas River Valley, Lake Dardanelle and Ozark Lake Arkansas.* Archeological Assessments, Inc., Nashville, Arkansas. Archeological Assessments Report No 47. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Bennett, W.J., Jr., Phyllis L. Breland, and Lawson M. Smith. 1989a. *Cultural Resources and Geomorphological Reconaissance of the McClellan-Kerr Arkansas River Navigation System Pools 1 through 9*. Archeological Assessments Report No. 79, Nashville, Arkansas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Bennett, W.J., Jr., Beverly Watkins, Joe Dunbar, and Robert Brinkmann. 1989b. *Archeological Investigations at Montgomery Point Desha County, Arkansas.* Archeological Assessments Report No. 116, Nashville, Arkansas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Branam, Chris. 2003. *Database of Steamboat Wrecks on the Arkansas River, Arkansas, between 1830-1900*. Unpublished M.A. thesis, Department of Anthropology, University of Arkansas at Little Rock.

Buchner, C. Andrew and Michael Krivor. 2001. *Cultural Resources Reconnaissance Study of the White River Navigation Project.* Panamerican Consultants, Inc., Memphis, Tennessee. Report submitted to the U.S. Army Corps of Engineers, Memphis District.

Caldwell, Warren W. 1960. *Archeological Investigations in the Dardanelle Reservoir, West-Central Arkansas*. Smithsonian Institution.

Cole, Kenneth W. 1969. *Archeological Survey of the Arkansas Power and Light Company Nuclear Power Plant Construction Area, Pope County, Arkansas, 1969*. Arkansas Archeological Survey.

Davis, Hester A., and Charles M. Baker. 1975. *Emergency Survey and Testing in the Lower White River and Arkansas Post Canal Area.* Arkansas Archeological Survey Research Report No. 21, Fayetteville.

Early, Anne M. 2012. *Prehistoric Caddo*. Electronic document https://encyclopediaofarkansas.net/entries/prehistoric-caddo-548/, accessed July 12, 2021.

Executive Order No. 13112. Invasive Species. 3 February 1999.

Executive Order No. 11987. Exotic Organisms. 24 May 1977.

Executive Order No. 13148. Greening the Government Through Leadership in Environmental Management. 21 April 2000.

Executive Order No. 13423. Strengthening Federal Environmental, Energy, and Transportation Management. 24 January 2007.

Executive Order No. 13514. Federal Leadership in Environmental, Energy, and Economic Performance. 5 October 2009.

Fenneman, N. M. (1916). Physiographic Boundaries within the United States. Annals of the Association of American Geographers, 4, 84–134. https://doi.org/10.2307/2560742.

Gibson, Jon L. 2001. *The Ancient Mounds of Poverty Point: Place of Rings*. University Press of Florida, Gainesville.

Greengo, Robert E. 1957. *Appraisal of the Archeological Resources of the Dardanelle Reservoir, Arkansas.* Smithsonian Institution.

Henry, Donald O. 1978. *Big Hawk Shelter in Northeastern Oklahoma: Environmental. Economic, and Cultural Changes*. *Journal of Field Archaeology* 5:269-287.

Hogan, Maura, Adam Parker, Bryan Heisinger, Sara Mackenzie Parkin, and Katherine Seikel. 2021. *Cultural Resource Assessment Survey of 403 Acres at Lake Dardanelle In Franklin and*

*Johnson Counties, Arkansas.* AmaTerra Environmental, Inc, Austin, Texas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Hunter, Andrea A, James Munkres, and Barker Fariss. 2013. *Osage Nation NAGPRA Claim for Human Remains Removed from the Clarksville Mound Group (23PI6), Pike County, Missouri*. Osage Nation Historic Preservation Office, Pawhuska, Oklahoma.

Jeter, Marvin D. and G. Ishmael Williams, Jr. 1989. *Lithic Horizons and Early Cultures. In Archeology and Bioarcheology of the Lower Mississippi Valley and Trans-Mississippi South in Arkansas and Louisiana*, edited by Marvin D. Jeter, Jerome C. Rose, G. Ishmael Williams, Jr., and Anna M. Harmon, pp. 71-110. Arkansas Archeological Survey Research Series No. 37, Fayetteville.

Key, Joseph. 2019. Quapaw. Electronic document https://encyclopediaofarkansas.net/entries/quapaw-550/#:~:text=The%20Quapaw%20are%20members%20of,Jacques%20Marquette%20and%20Louis%20Joliet., accessed August 17, 2022.

Klinger, Timothy C., James A. Ross, and John L. Gray, IV. 2001. *Entergy Arkansas Nuclear One Records Review*. Historic Preservation Associates, Inc., Fayetteville, Arkansas.
Klinger, Timothy C. 2008. *City of London Wastewater Treatment Plant (Pope County) Identification of Historic Properties.* Historic Preservation Associates, Inc., Fayetteville, Arkansas.

Lopinot, Neal H., Edwin R. Hajic, and Jack H. Ray. 2022. *Phase I Cultural Resource Survey And Geoarchaological Investigations, Three Rivers Project, Arkansas And Desha Counties, Arkansas.* Bernice S. Warren Center for Archaeological Research, Missouri State University. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

McFarland, J.D. (1998). Stratigraphic Summary of Arkansas. Arkansas Geological Commission Information Circular 36, 38 p. https://www.geology.arkansas.gov/docs/pdf/publication/information-circulars/IC-36.pdf.

Northrip, John D. and W.J. Bennet, Jr. 1988 *Archeological Site Location and Evaluation in Lake Dardanelle and Ozark Lake, McClellan-Kerr Arkansas River Navigation System, West-Central Arkansas.* Archeological Assessments Report No. 82, Nashville, Arkansas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

O'Brien, Michael J. and W. Raymond Wood. 1998. *The Prehistory of Missouri*. University of Missouri, Columbia.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. U.S. (2022a). General Soil Map (STATSGO2). Available online at https://sdmdataaccess.sc.egov.usda.gov. Accessed 4/20/2022.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. (2022b). Official Soil Series Descriptions. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/data/?cid=nrcs142p2_053587. Accessed 4/20/2022.

State of Arkansas, Statewide Comprehensive Outdoor Recreation Plan. (2019-2023). Accessed at: http://www.recpro.org/assets/Library/SCORPs/ar_scorp_2019.pdf.

Sabo, George R., III, A.M. Early, J.C. Rose, B.A. Burnett, L. Vogele, and J.P. Harcourt. 1990. *Human Adaptation in the Ozarks and Ouachita Mountains*. Arkansas Archeological Survey Research Series No. 31, Fayetteville.

Scholz, James A. and Michael P. Hoffman. 1968. *An Archeological Survey of the Arkansas River Navigation Projects in Arkansas.* University of Arkansas Museum, Fayetteville.

Thomas, Sunshine, Adam K. Parker, and Kurt Korfmacher. 2022a. *Cultural Resources Assessment Survey Of 449 Acres at Ozark Lake In Crawford, Franklin, And Sebastian Counties, Arkansas*. AmaTerra Environmental, Inc, Austin, Texas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Thomas, Sunshine, Adam K. Parker, Matthew R. Carter, and Kurt Korfmacher. 2022b. *Cultural Resources Assessment Survey Of 551 Acres at Lake Dardanelle In Franklin, Johnson, And Logan Counties, Arkansas*. AmaTerra Environmental, Inc, Austin, Texas. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

Weinstein, Richard A., Erin E. Phillips, Michael Carpenter, August G. Costa, Sara A. Hahn, Ashley E. Jones, David B. Kelley, Haley Streuding, and Douglas C. Wells. 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. Report submitted to the U.S. Army Corps of Engineers, Little Rock District.

USACE. 1976, Locks and Dams Norrell, Nos. 2, 3, 3 and 5 and David D. Terry, Design Memorandum No. 8. Updated Master Recreation Plan for Navigation Pool Development and Management.

USACE. 1976, Locks and Dams Murray, Toad Suck Ferry, and Nos. 9 and 13, Design Memorandum No. 9. Updated Master Recreation Plan for Navigation Pool Development and Management.

USACE. 1977, Dardanelle Dam and Lake, Design Memorandum No. 13-4, Updated Master Recreation Plan for Development and Management of Lake Dardanelle.

USACE. 1977, Ozark-Jeta Taylor Lock and Dam, Design Memorandum No. 6-3, Updated Master Plan for Development and Management of Ozark Lake.

USACE. 2013. Engineer Regulation 1130-2-550, Project Operations, Recreation Operations and Maintenance, Guidance and Procedures. HQUSACE.

USACE. 2013. Engineer Pamphlet 1130-2-550, Project Operations, Recreation Operations and Maintenance, Guidance and Procedures. HQUSACE.

USACE. 2008. ER 1130-2-540, Environmental Stewardship Operations and Maintenance Guidance and Procedures. HQUSACE.

USACE. 2008. EP 1130-2-540, Environmental Stewardship Operations and Maintenance Guidance and Procedures. HQUSACE.

U.S. Soil Conservation Service. (1982) Arkansas Agricultural Experiment Station. University of Arkansas, Fayetteville. Cooperative Extension Service.

USACE, 2004. EM 1110-1-400, Engineering and Design Recreational Facility and Customer Service Standards. HQUSACE.

USACE. 2015. USACE Dam Safety Program. Accessed at: www.usace.army.mil/Missions/CivilWorks/DamSafetyProgram/ProgramActivities.aspx.

USACE. 2015. Little Rock District Water Management website. Accessed at: www.swl-wc.usace.army.mil.

United States Census Bureau. 2020. 2020 Census. Accessed at: https://www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-main.html.

Wright, Muriel H. 1930. Early Navigation and Commerce along the Arkansas and Red Rivers in Oklahoma. *Chronicles of Oklahoma* 8(1):65-88.

# Appendix A NEPA Documents

Reserved for the MKARNS Master Plan Revision Environmental Assessment and associated appendices

# Appendix B MKARNS Prior Design Memorandums and Supplements

# Appendix C Park Maps

# Appendix D Land Classification and Easement Maps

# Appendix E Geology Maps

# Appendix F USFWS, Official Species List, IPaC Report