Red River Valley Association Annual Convention

Craig Pierce, Deputy for Programs and Project Management and Chief, Programs and Project Management Division

Michael Biggs, P.E., CFM, PMP Chief, Hydraulics & Technical Services Branch

U.S. Army Corps of Engineers – Little Rock District

1 June 2023

U.S. ARMY

US Army Corps of Engineers®

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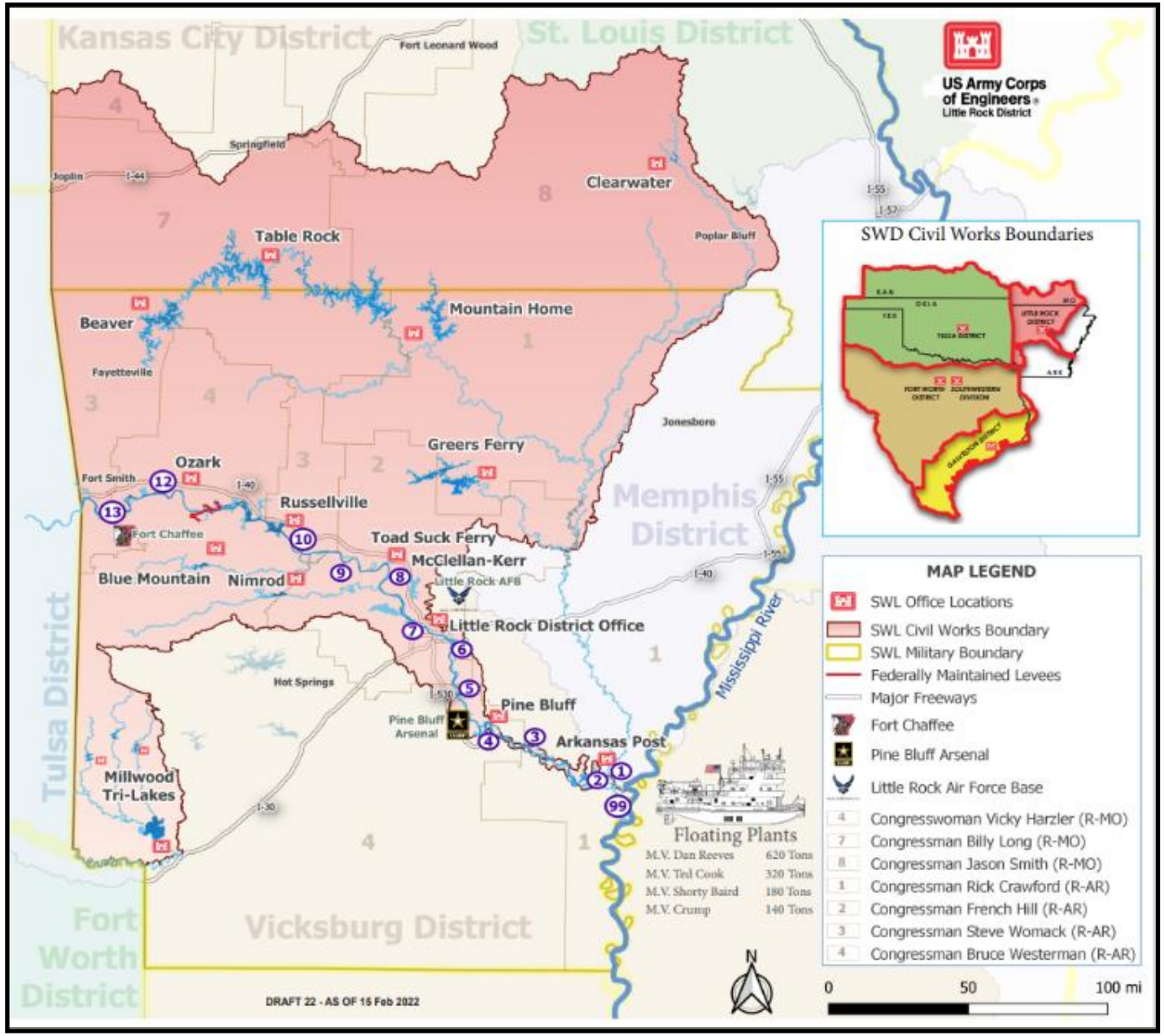
LITTLE ROCK DISTRICT

EST. 1881



LITTLE ROCK DISTRICT MISSION

U.S. ARMY

District snapshot

~800 Civilian Personnel

42% Veterans

1 of 3 Medical Support Teams in the Nation

Emergency Management

526 Disaster Response Volunteers since 2011

25 Emergency Response events since 2011

CIVIL WORKS – planning, designing, constructing, operating & maintaining critical water resource projects across the region

2 states

200+ Civil Works Projects

$105M executed FY23

NAVIGATION

11+M tons of cargo transported annually

$24B annual export / import traffic

308 miles of navigation channels

2 survey vessels
4 floating plants

FLOOD RISK REDUCTION

33+M acre-feet of flood storage

95 Sponsor maintained levee systems

REGULATORY

2,400 completed actions in FY22

$875M total flood damage prevented FY22

WATER SUPPLY

30 water supply agreements

479k acre-feet of water supply storage

$5.1M annual revenue returned to the U.S. Treasury (FY20)

HYDROPOWER

7 USACE-owned hydroelectric power plants

1060.3 megawatt hours produced

$221M Annual benefit to the nation

334,000 households supplied with clean, renewable energy a year

RECREATION

164 recreation areas

5,514 campsites

18.8M visits annually

313 recreation areas

MILITARY

nationally recognized knowledge and experience

Little Rock Airbase

Pine Bluff Arsenal

REAL ESTATE

$130M reported FY22 revenue for leased recreational lands

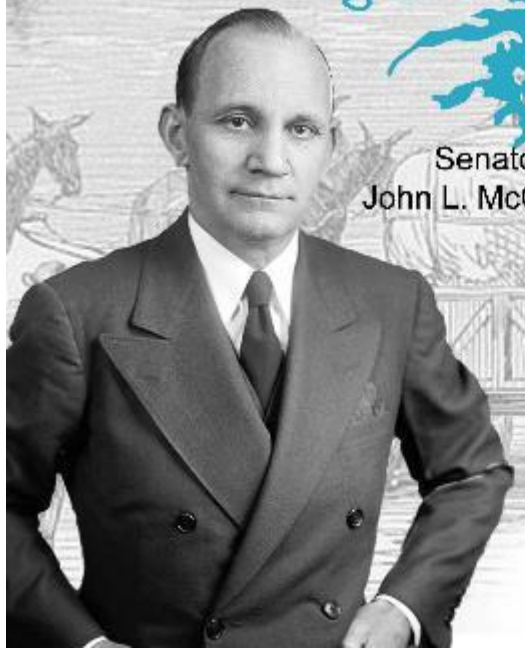
U.S. ARMY

McClellan-Kerr Arkansas River Navigation System

US Army Corps of Engineers
Little Rock and Tulsa Districts

OKLAHOMA
MISSOURI
ARKANSAS

TULSA
MUSKOGEE
FORT SMITH
RUSSELLVILLE
LITTLE ROCK
PINE BLUFF



Senator
John L. McClellan

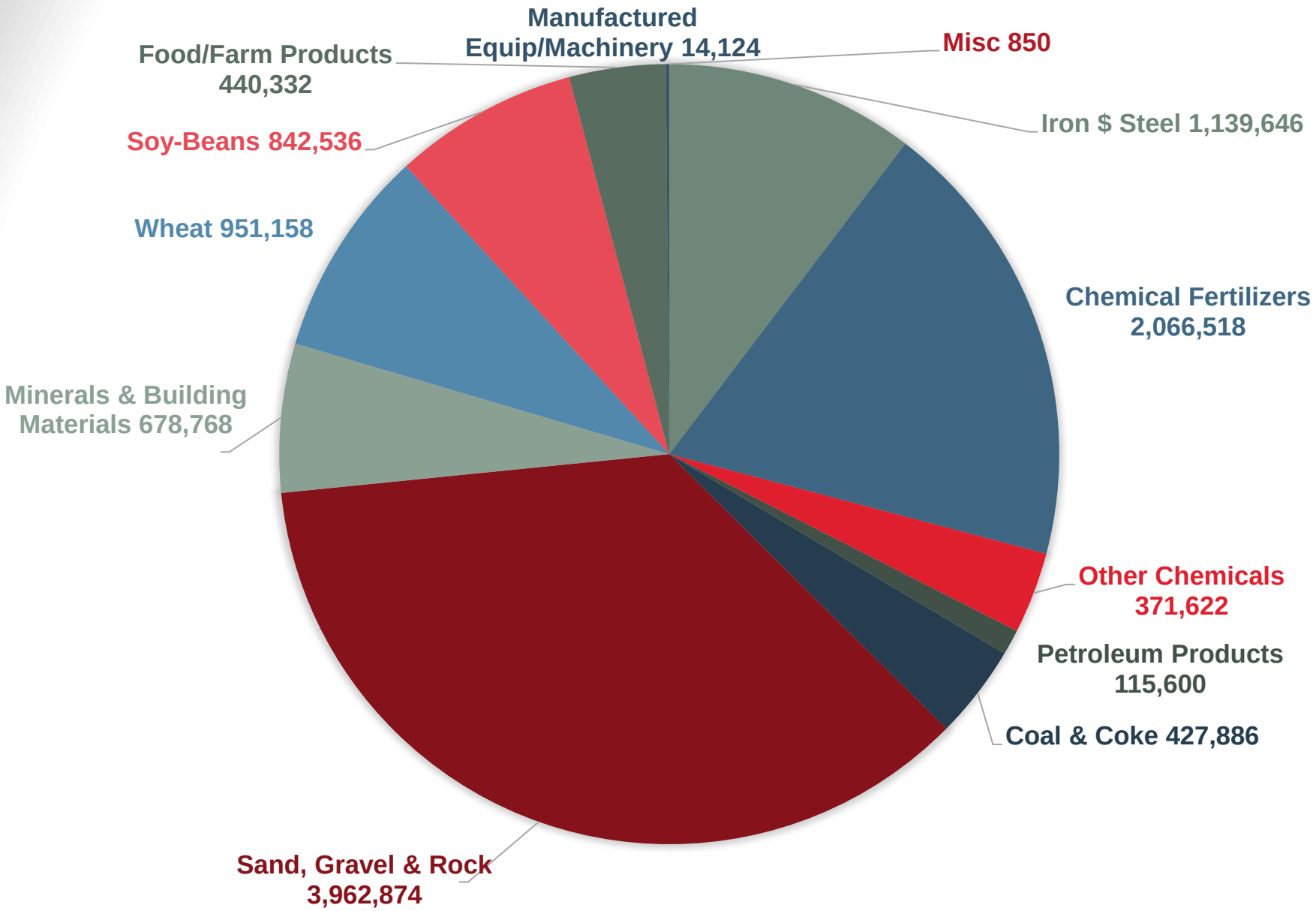
Senator
Robert S. Kerr

2015

NAVIGATION CHARTS
CATOOSA, OKLAHOMA TO THE MISSISSIPPI RIVER

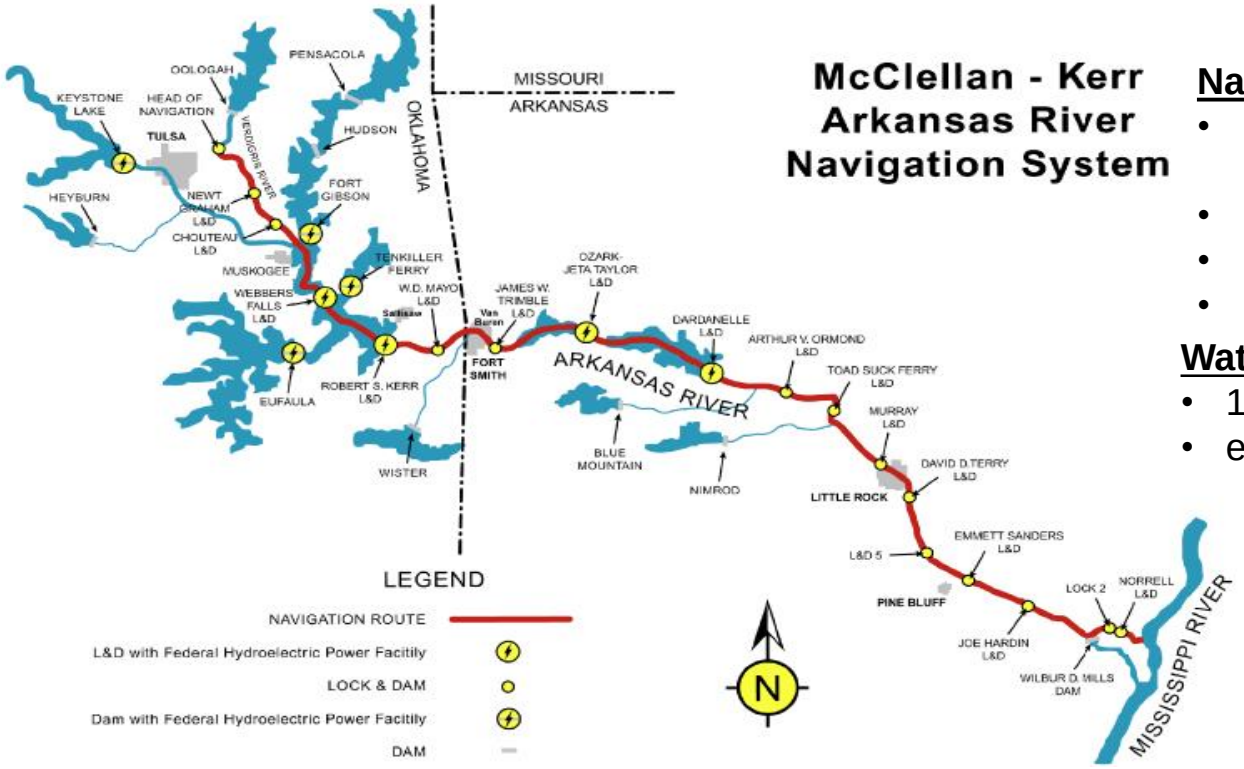
Operating the MKARNS is a collaborative effort between the U.S. Army Corps of Engineers and stakeholders to create a reliable, resilient and relevant system while promoting growth for future generations.

MKARNS Commodity Tonnage CY 22



MKARNS Calendar Year Tonnage of Commodities Shipped	
CY 22	11,011,732
CY 21	10,696,553
CY 20	10,322,279
CY 19	8,480,645
CY 18	10,932,172
CY 17	11,918,919
CY 16	11,542,149
CY 15	9,962,334
CY 14	11,719,572
CY 13	12,139,821

Project Location and Value to the Nation



Navigation numbers:

- 445-miles of navigation channel.
- 9’ depth x 150’-300’ width
- 18 Locks (110’ wide x 600’ long)
- 4 federal hydropower facilities

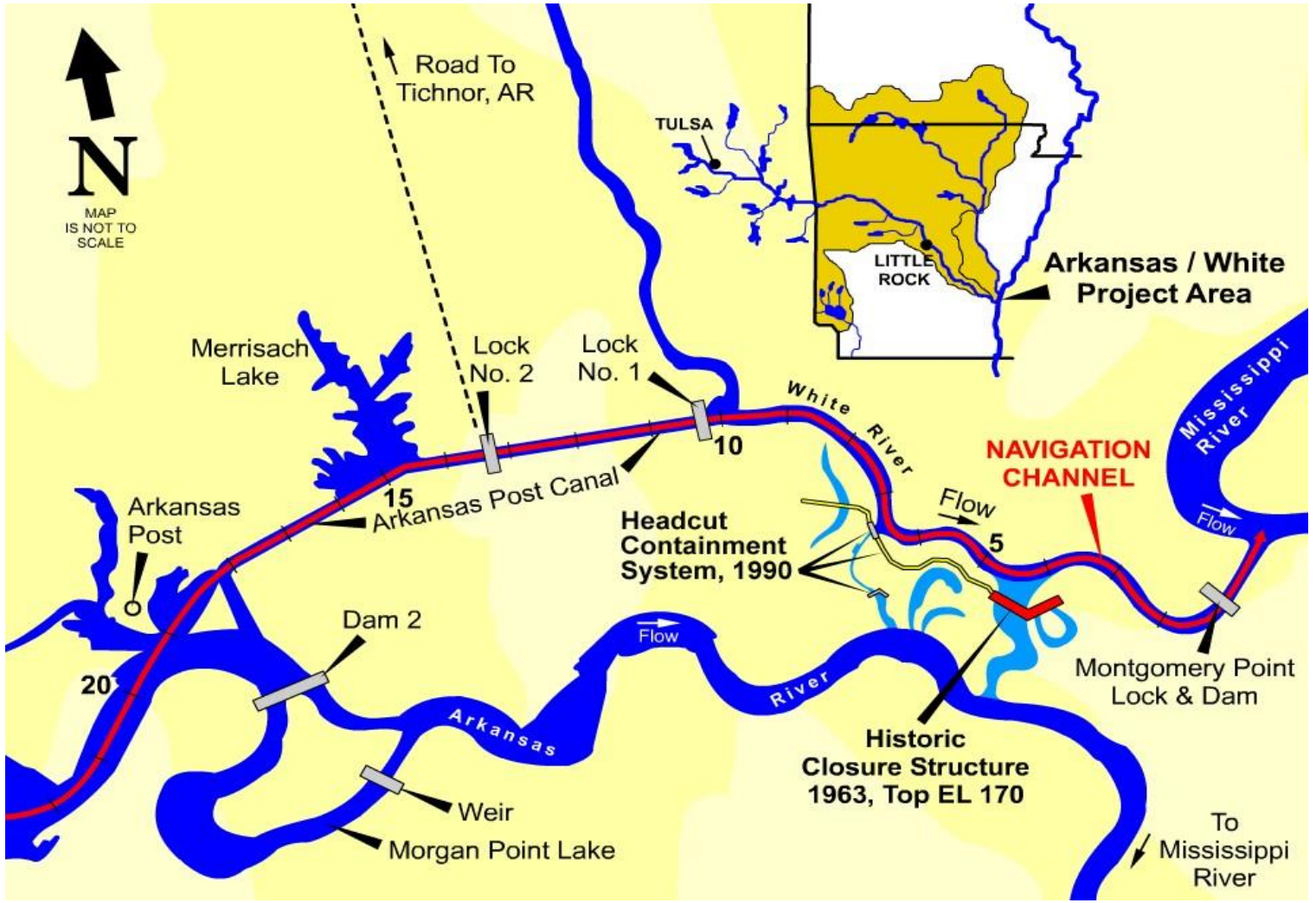
Waterborne commerce:

- 10,932,172 tons annually
- equivalent of 437,287 trucks or 109,322 railcars, respectively

MKARNS 2030

- A long-range plan to position the system to meet shipping demands for the next 50 years.
- A joint effort between USACE, stakeholders, construction and navigation industries.
- Takes into consideration major projects underway by USACE and private industry that will prepare the system for the future.
- USACE and private industry partners have a vision for the MKARNS looking beyond 2030.

MKARNS Three Rivers Project



MKARNS Three Rivers Project

- Phase I - Hydraulic weir at historic cutoff structure
  - Design-Build contract awarded July 2022
  - Design underway
  - Estimated contract completion Oct 2026
- Phase II – Hydraulic containment structure; modification of weirs/culverts
  - Design Complete 30 Sep 2022
  - Construction contract award TBD (contingent on additional funding)
  - Estimated contract duration of 4 years

MKARNS 12-foot Channel

- Authorized 2004
- Initial design/construction funding received 2022
- Little Rock and Tulsa District project
- Current Status
  - Design, Data Collection, Hydrologic Modeling
  - Cost Estimate
  - NEPA Update, Economic Update

MKARNS – Other Projects

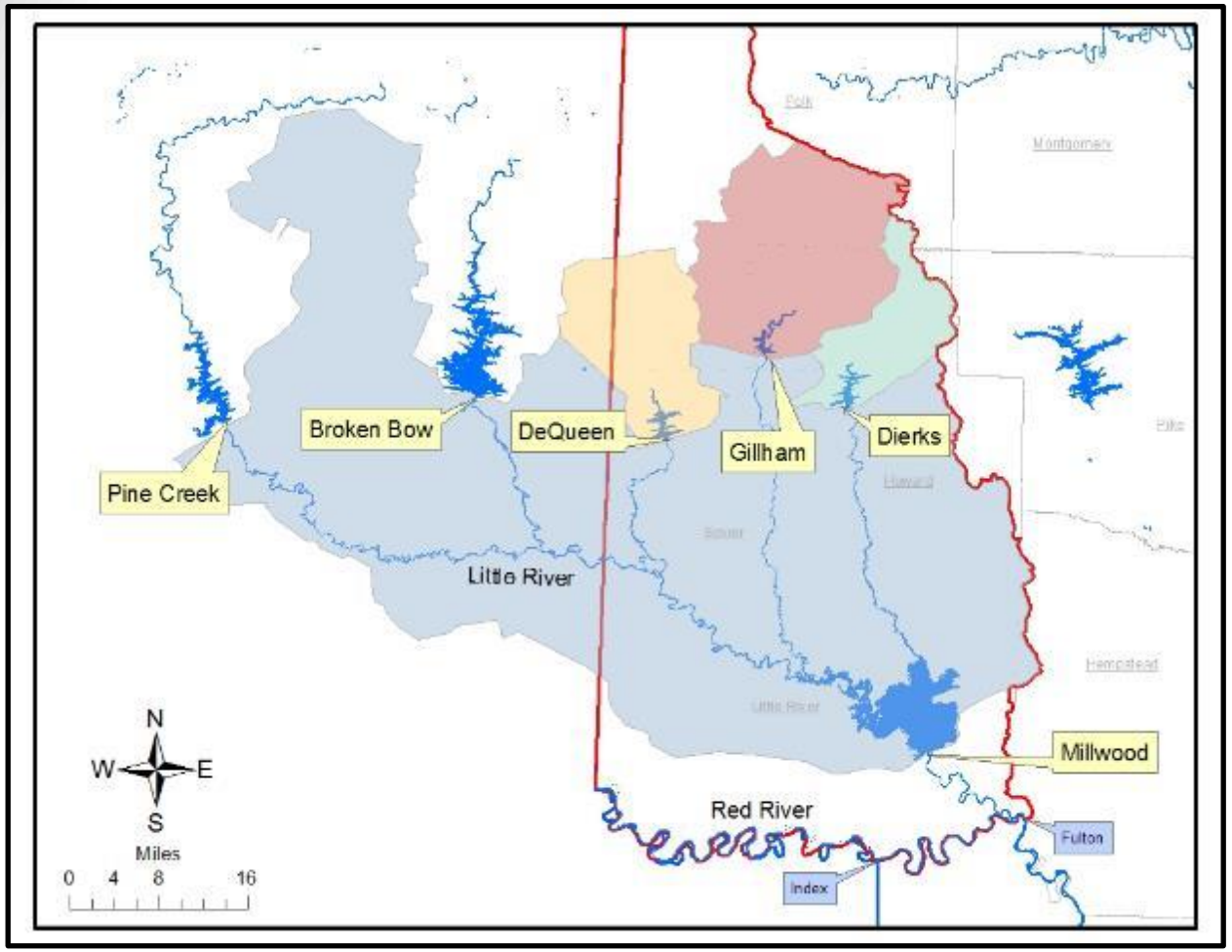
- Lock 110-ft Stoplog Slots
  - Norrell Lock – complete
  - Goal - 3 Lock Sites per year
- Tow Haulage Units: Murray Lock
  - Funded by AR Waterways Commission
  - Design complete
- Dam Tainter Gate Repairs
- Major Rehab Evaluation Reports

2022 Hydrology

Little River: Less than average rainfall across the Little Rock District reached Level 1 drought. The Little River Basin received less than average rainfall across the basin, from 11.2” below normal at Gillham to 15.7” below normal at DeQueen. Only 4 weeks, in 2022, saw positive Palmer Drought Indices in SW Arkansas. However, the Little River Basin experienced two minor events in April and May with a peak releases near 20,000 cfs out of Millwood.

Arkansas River: Rainfall for the water year on the Arkansas River Basin in Arkansas was slightly above average with most locations receiving near or above average rainfall. Rainfall along the mainstem river varied from 81% of normal at Mills Dam to 123% of normal at Terry Lock and Dam with average rainfall at 106% of normal. There were 3 minor flood events for the year with a peak flow of about 250,000 cfs at Van Buren on May 6th.

LITTLE RIVER BASIN



MILLWOOD TRI-LAKES MAJOR MAINTENANCE

FY 2022 Highlights

Work Package	Project Location
Okay Levee Repairs	Millwood
Sluice Gate Rehab	Dequeen, Dierks, Gillham Control Structures
Relief Drains Installed	Millwood East Embankment
Limit Switch Installation	Millwood Control Structure

MILLWOOD TRI-LAKES RECREATION AND NATURAL RESOURCES

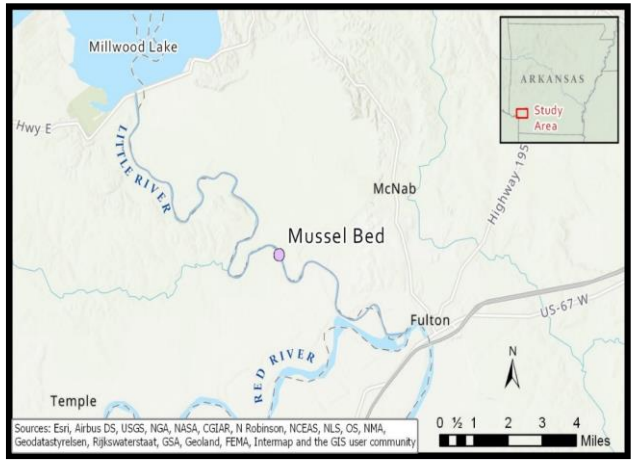
FY 2022 Highlights

Project	Visitation	Collections
Dequeen	203,546	$128,674
Dierks	241,049	$119,616
Gillham	125,643	$101,310
Millwood	357,049	$131,530

MUSSEL BED EXPOSURE D/S OF MILLWOOD LAKE

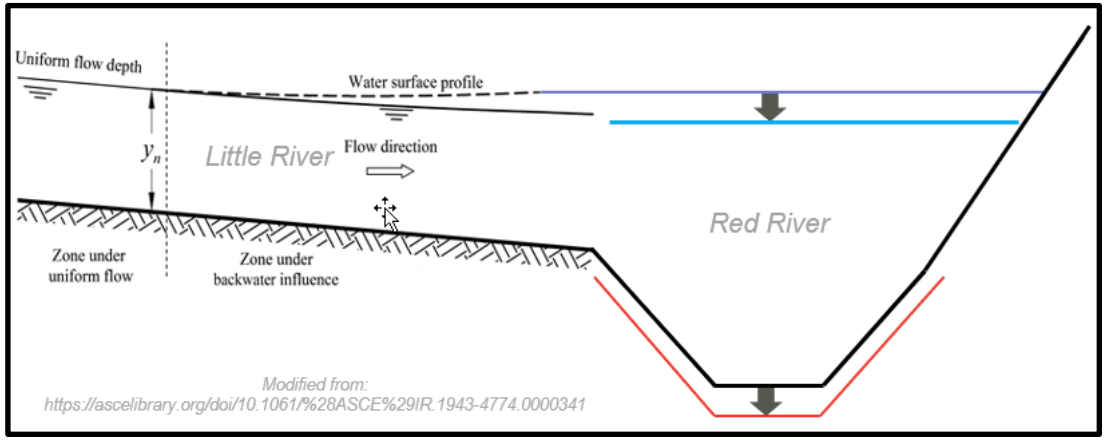
Issue:

- Dec. 2021 mortality of Ouachita Rock Pocketbook (ORP) mussels, an endangered species
- Mussel bed between Millwood Dam and confluence of Little & Red Rivers



Current Status:

- Analysis pinpointed long-term degradation of Red River as driver
- Ongoing coordination with USFWS on site conditions and MW releases



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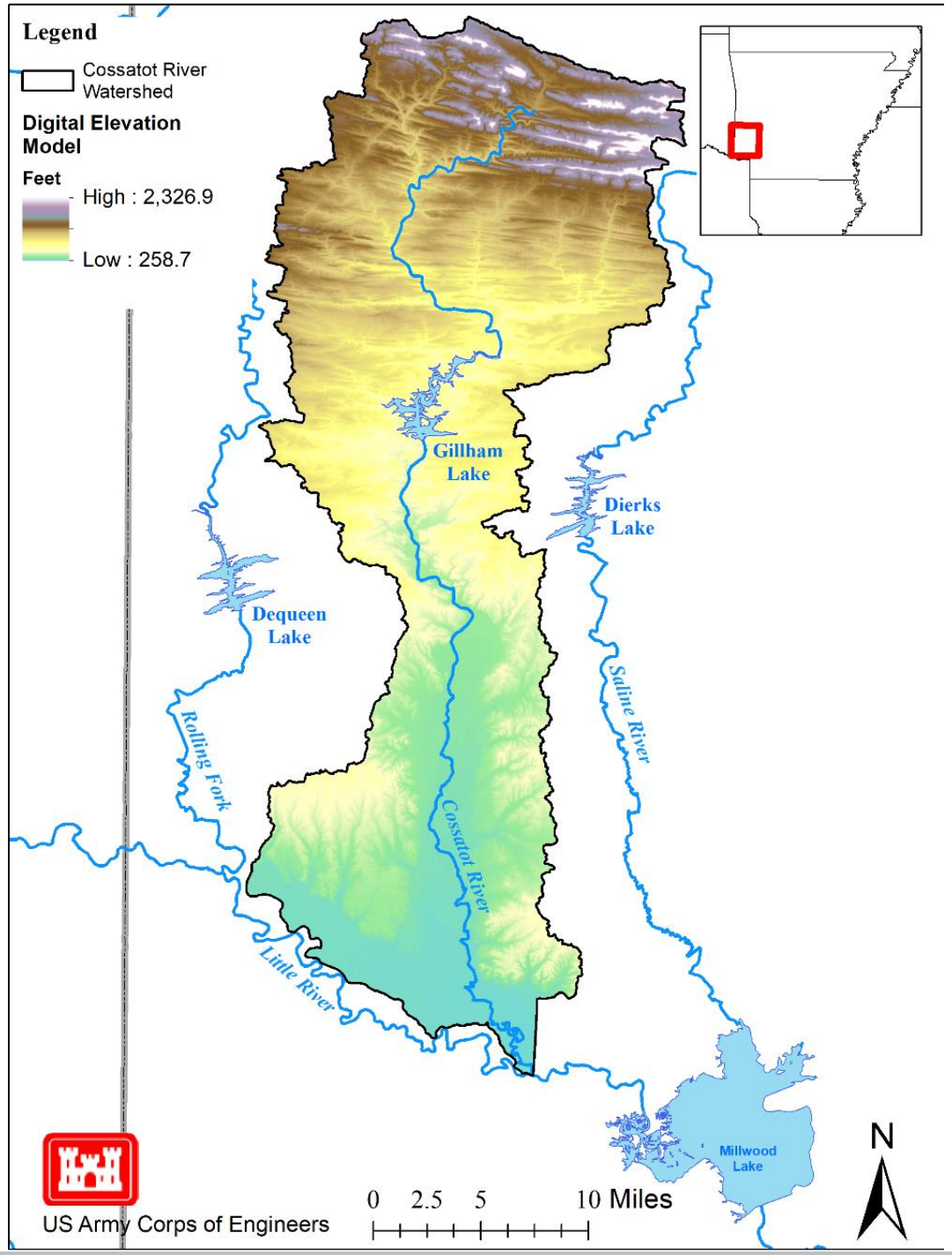
The Nature Conservancy

COSSATOT SUSTAINABLE RIVERS PROGRAM

Percina pantherine
Leopard Darter



FLOW RECOMMENDATIONS

Cossatot River, below Gillham Dam

Season	Summer	Fall	Winter	Spring
Floods		Fall Seed Dispersal ➢3,000 to 8,000 cfs ➢1:Multiple pulses within same season and from year to year ➢2-4 days •Disperse mast producing seeds onto the floodplain	Channel Restructuring ➢10,000 to 25,000 cfs ➢1:5 years ➢7 days with recession limb longer than rising limb •Sediment movement, berm renewal, and large woody debris recruitment •Create floodplain habitat through overbank erosion and deposition •High rain runoff may naturally serve as a pulse or supplement a pulse out of the dam •Magnitude based on whether it is a dry (10,000 cfs), average (~17,000 cfs), or wet year (25,000 cfs) Channel Maintenance and Oxbow Connectivity ➢8,000 to 15,000 cfs ➢1-4:1-4 years ➢7-10 days •To "clean-up" spawning beds, i.e., remove fines from interstitial spaces •Sediment movement, berm renewal, and large woody debris recruitment •"Water up" oxbows created by legacy channels to benefits fishes and other fauna that utilize oxbow habitat •High rain runoff may naturally serve as a pulse or supplement a pulse out of the dam •Magnitude based on whether it is a dry (8,000 cfs), average (~11,000 cfs), or wet year (15,000 cfs)	Spring Seed Dispersal ➢1,000 to 8,000 cfs ➢1:Multiple pulses within same season and from year to year ➢2-4 days •Disperse herbaceous seeds, such as ironwoods, elms, and cottonwoods onto the floodplain
Pulses	Flushing Flows ➢300 to 400 cfs ➢2-4:Annually ➢Recession rate of 50 cfs/day •Remove algae and regulate stream temperature •Promote Water Willow growth and Cut Grass removal •Sediment transport for bar development and new pools and riffles			
Low Flows	Rabbitsfoot Fertilization and Infestation ➢May 15-Jun 15: 150-250 cfs ➢30 days:Annually ▪ Mitigating prolonged high water and rapid releases Rabbitsfoot Excystment ➢Jun 1-Jul 1: 50-150 cfs ➢30 days:Annually ▪ Keep water levels from rising too high during this period while also preventing large releases from the reservoir	Winged Mapleleaf and Long-term Brooders Fertilization ➢Sep 21-Oct 31: 50 to 150 cfs ➢2-3 days:Annually ▪ Creating current for optimal fertilization for a duration of 2-3 days Winged Mapleleaf Host Infestation ➢Oct 20-Nov 10: 50 to 150 cfs ➢21 days:Annually ▪ Creating current for optimal fertilization for a duration of 2-3 days		Long-term Brooders Host Infestation ➢Apr 1-May 15: 100 to 500 cfs ➢7 days:Annually ▪ The duration of lower flows is more important than a high peak of a short duration with a short recession Long-term Brooders Excystment ➢May 1-Jun 1: 100 to 350 cfs ➢30 days:Annually ▪ Mitigating long duration, high flows is important Winged Mapleleaf Excystment ➢Apr 1-May 15: 100 to 350 cfs ➢30 days:Annually
	Jun Jul Aug	Sep Oct Nov	Dec Jan Feb	Mar Apr May

Publications

Photograph looking downstream from Gillham Dam,
taken by Victor Kuykendall (U.S. Army Corps of Engineers).

The Nature Conservancy

COSSATOT RIVER AND GILLHAM LAKE, ARKANSAS

Sustainable Rivers Program 2022

Abstract

This report details the current available data and literature for the Cossatot River to identify flow-dependent fish, mussels, and other species in the River, examine changes in these species over time, and look at alterations in the flow regime that potentially could have caused these changes.

Hart, R.M., Quinn, J., Lynch, D., Moles, K., Witsell, T., and Phillip, C.L.

Photograph of the Cossatot River, taken by Dustin Lynch (Arkansas Natural Heritage Commission).

COSSATOT RIVER AND GILLHAM LAKE, ARKANSAS, FLOW RECOMMENDATIONS AND WORKSHOP SUMMARY

Sustainable Rivers Program 2022

Hart, R.M.[1], Quinn, J.[2], Lynch, D.[3], Moles, K.[2], Posey, W.[2], Davidson, C.[4], Wentz, T.[5], Fore, J.[6], Keen, N.[1], and Bostwick, D.[1]

[1]U.S. Army Corp of Engineers; [2]Arkansas Game and Fish Commission; [3]Arkansas Natural Heritage Commission; [4]U.S. Fish and Wildlife Service; [5]Arkansas Department of Agriculture - Natural Resource Division; [6]The Nature Conservancy

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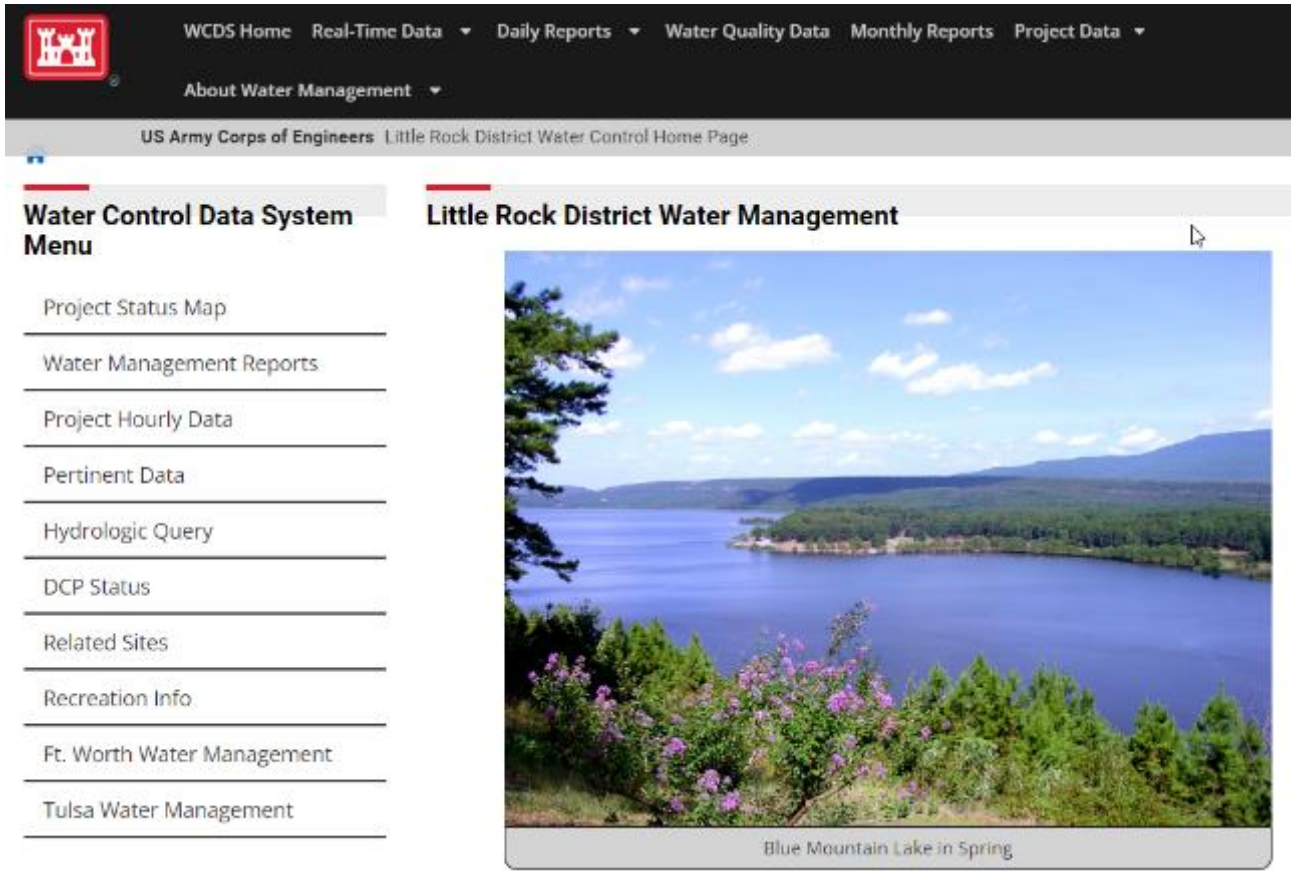
- Michael Biggs, P.E., CFM, Chief, Hydraulics & Technical Services Br, 501-324-6232

Website: www.swl.usace.army.mil

Face book: https://www.facebook.com/littlerockusace

Little Rock District Water Management Webpage

http://www.swl-wc.usace.army.mil/



New Format
Same information; easier to use on mobile devices

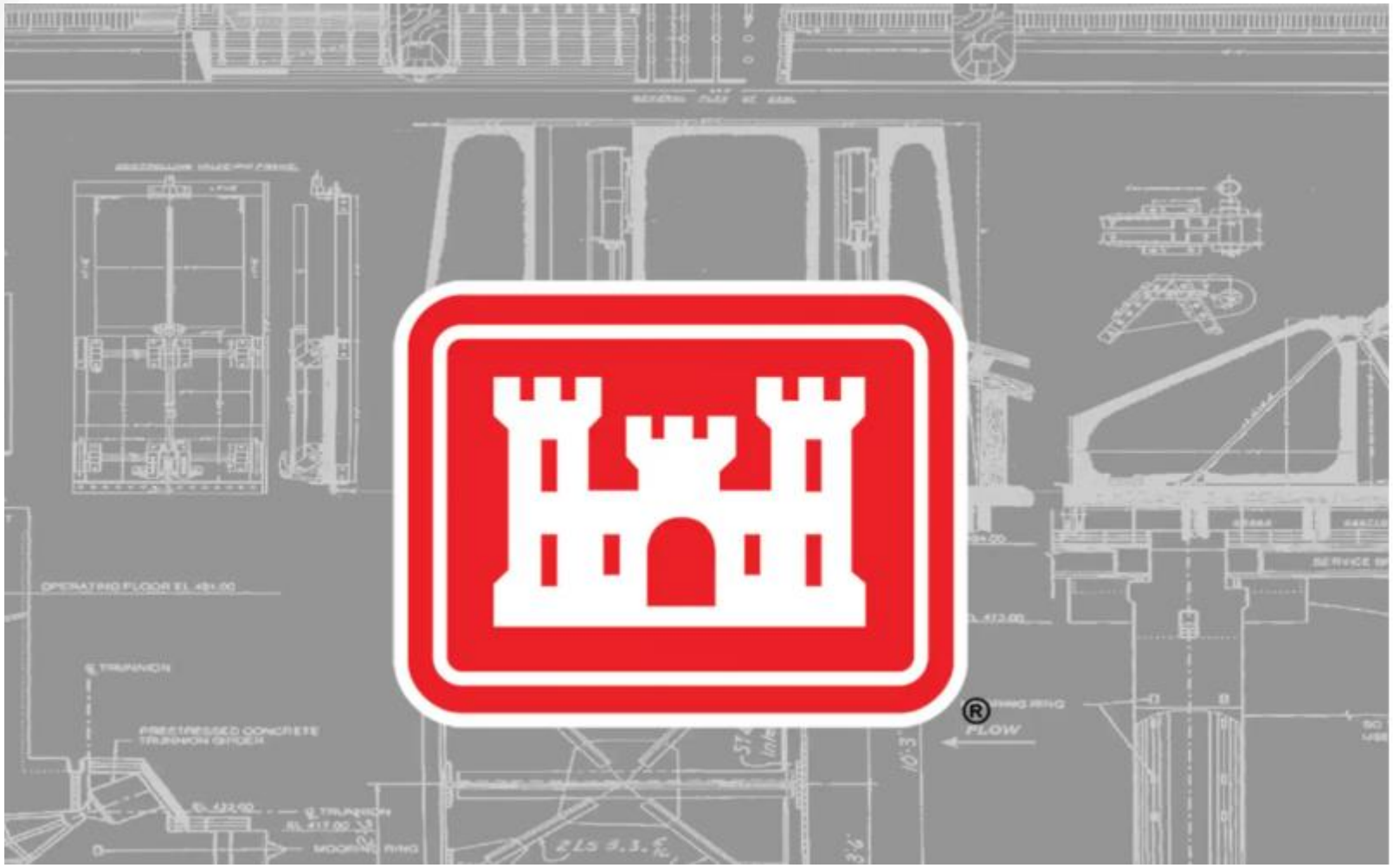
Current Conditions:
Summary of lake elevations, flood storage in use, and trend For SWL lakes; and river stage flood stage, and regulating stage,
with trend for key river gage stations.

Daily Reports:
Current forecasts for ***Lakes*** and the ***Arkansas River*** (MKARNs)

Real-Time Data:
Graphical or tabular data for reservoirs, MKARNS, or stream
gages

Little Rock District Online

www.swl.usace.army.mil



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LITTLE ROCK DISTRICT

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Little Rock District

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- Use the SWPA icon to view hydropower generation schedules for the next day or the USGS icon to view stream gage forecasts.

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