Flood of 2011

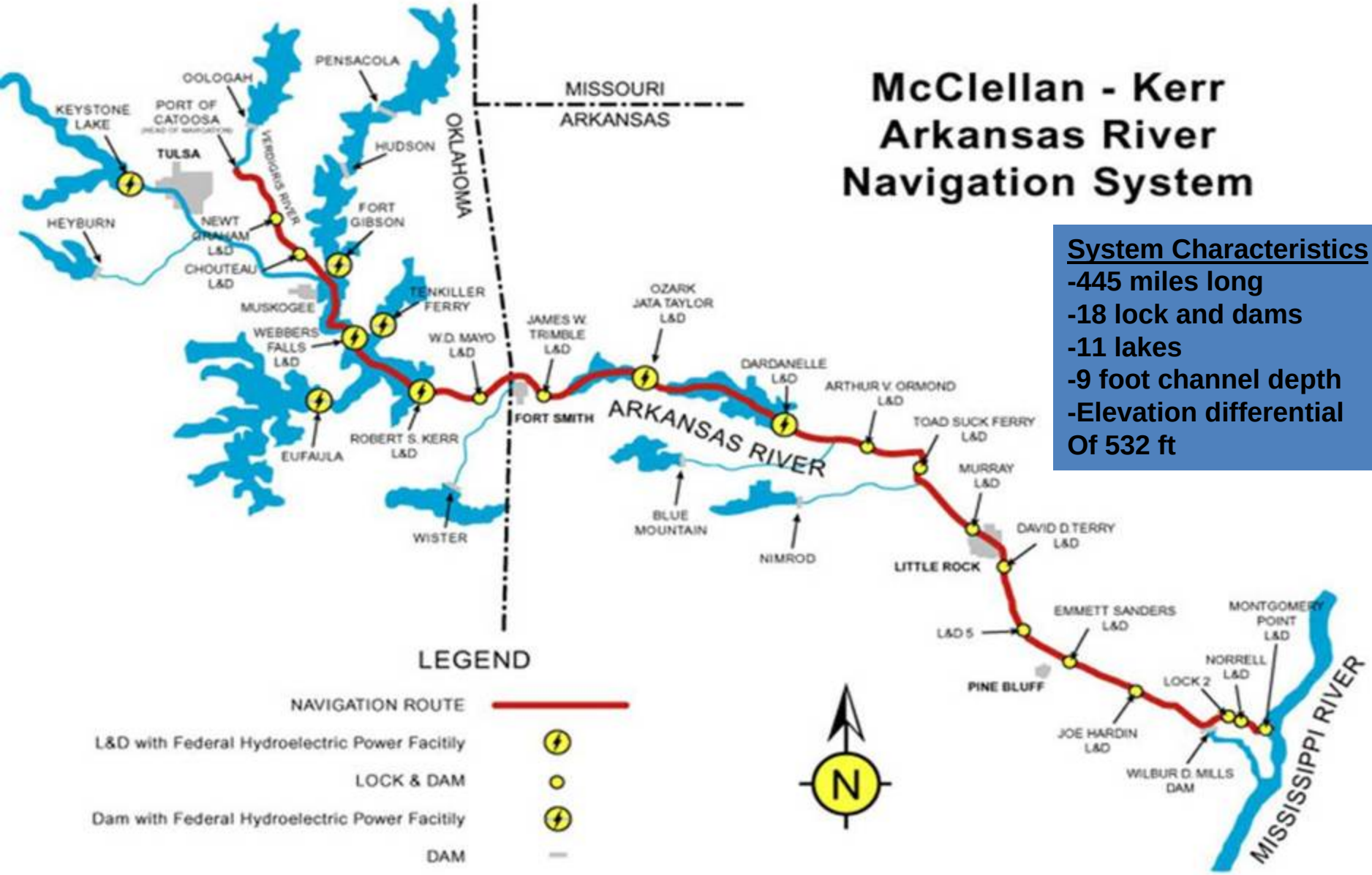
Bill Gray

Navigation and Maintenance Section

Little Rock District

US Army Corps of Engineers
BUILDING STRONG®

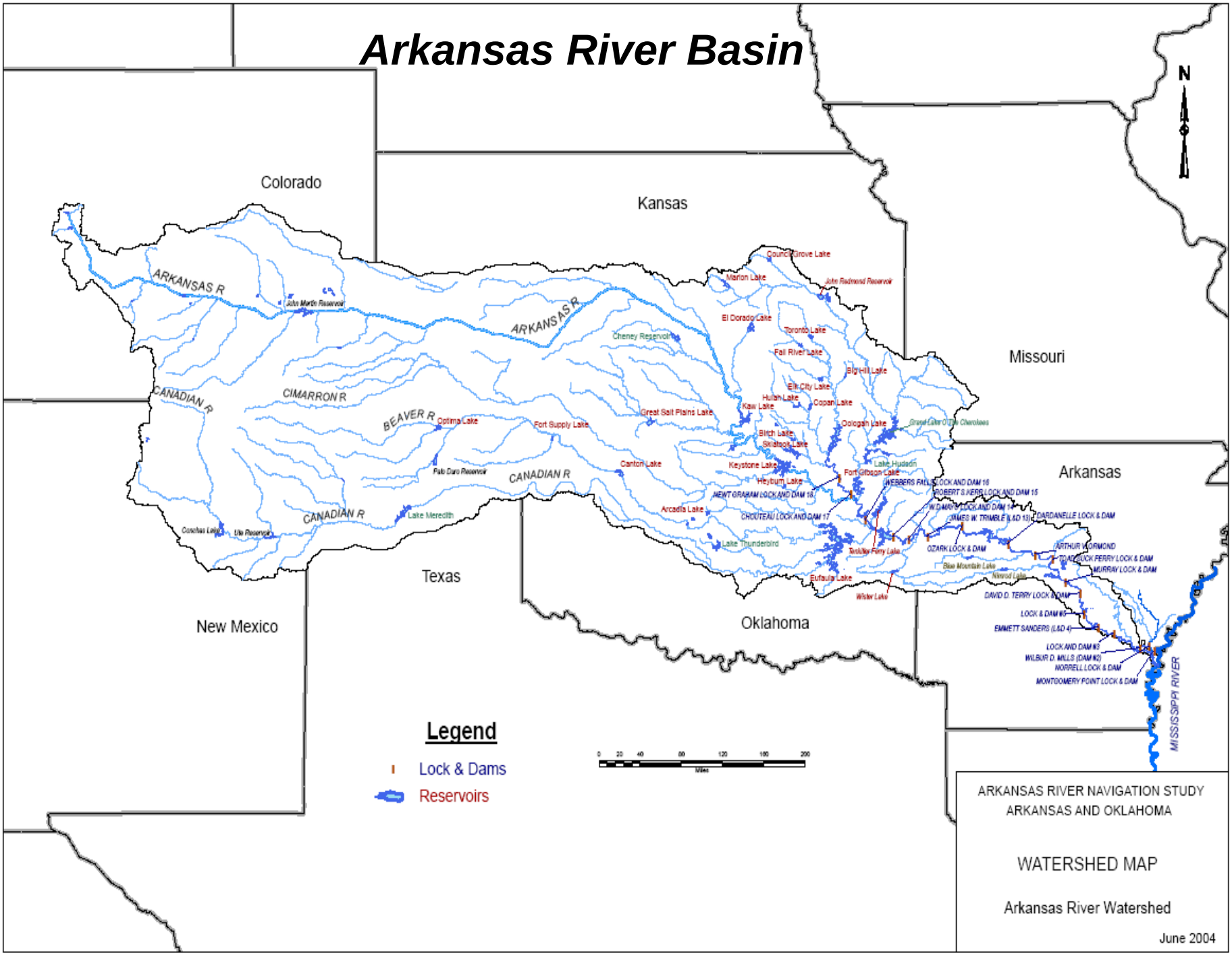
McClellan - Kerr Arkansas River Navigation System



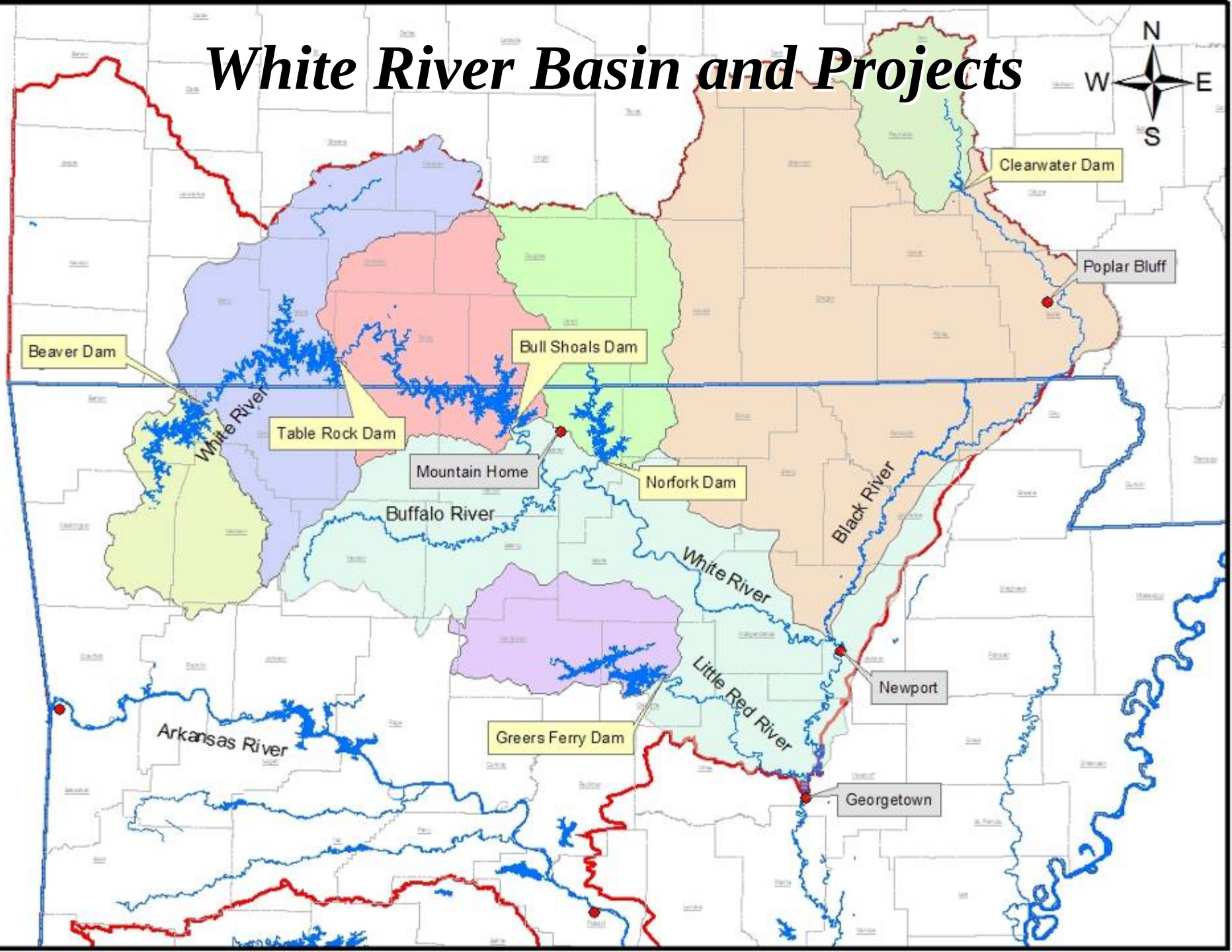
System Characteristics

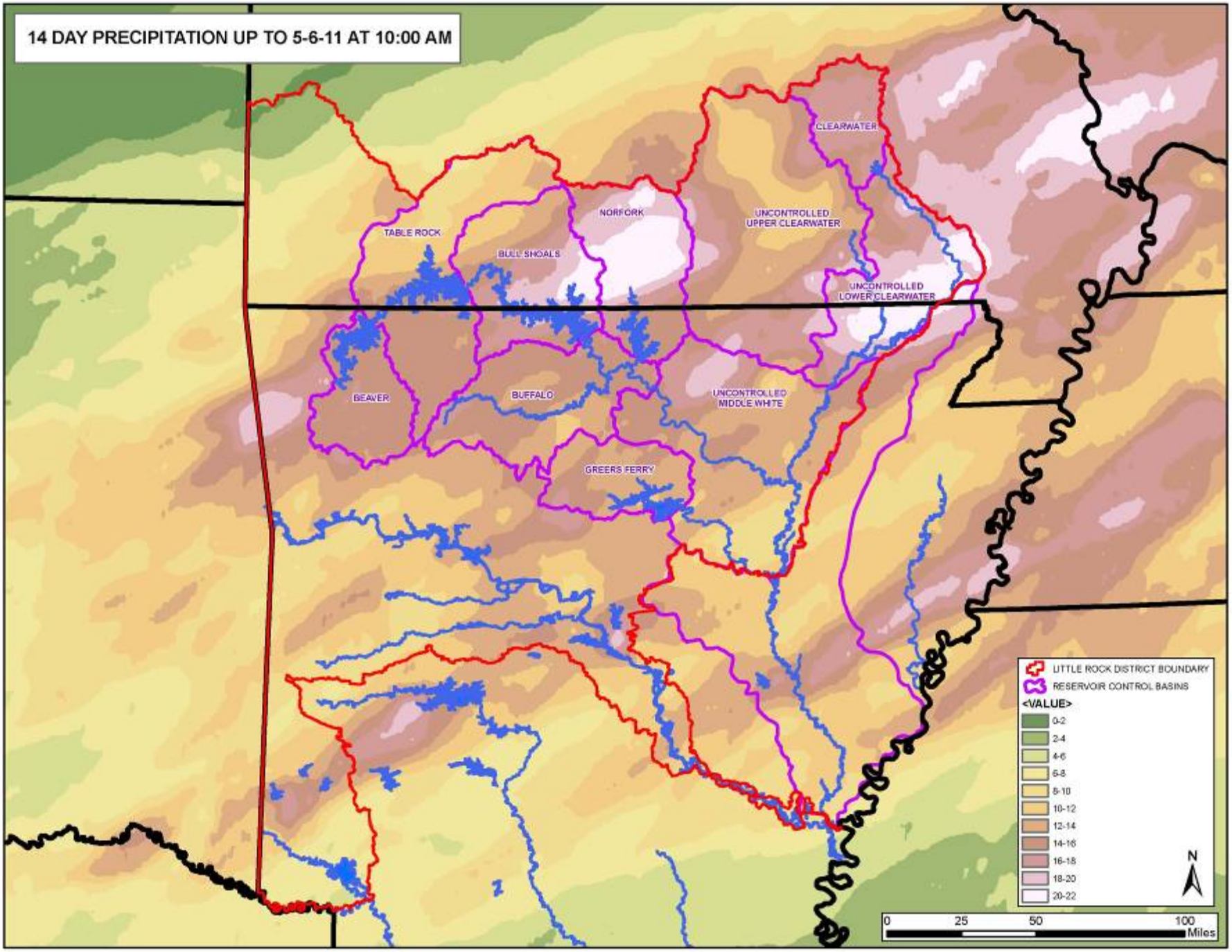
- -445 miles long
- -18 lock and dams
- -11 lakes
- -9 foot channel depth
- -Elevation differential Of 532 ft

Arkansas River Basin



White River Basin and Projects




14 DAY PRECIPITATION UP TO 5-6-11 AT 10:00 AM
CLEARWATER
NORFORK
UNCONTROLLED UPPER CLEARWATER
TABLE ROCK
BULL SHOALS
UNCONTROLLED LOWER CLEARWATER
BEAVER
BUFFALO
UNCONTROLLED MIDDLE WHITE
GREERS FERRY
LITTLE ROCK DISTRICT BOUNDARY
RESERVOIR CONTROL BASINS
<VALUE>
0-2
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
20-22
N
0
25
50
100
Miles

2011 Flood Event

- Third wettest spring in AR history with 3-4 times normal average rainfall for month of April.
- Record lake levels and record discharges from White River lakes
- New flood of record along the Black River in MO & AR
- $189M losses prevented in the White River Basin
- $177K FCCE funds used during flood fight in SWL. Funding provided technical assistance and support to communities to install:
  - 453,300 sandbags (SWD & MVD)
  - 2,900 ft HESCOs
  - 4 pumps
- The District will receive approximately $27.9M in supplemental funds to repair damaged Corps facilities

Upper White River Great Flood of 2011

Table Rock Dam, MO Pool of Record: 935.47 ft Record Release: 69,000 cfs

2011 Floods

- 21 April 2011, Flows on the MKARNS ranged from 0 cfs at lock 13 to 51,500 cfs at Dam 2.

- 10 to 12 inches was widespread, 12 to 14 inches was common, 16 to 18 inches amounts locally, Most rain fell in a 72-hour period

Lake	Basin Ave April	4/2011	22-28 Apr 11	3/2008	4/2008
BV	4.5”	15.1”	11.57”	11.77”	9.16”
TR	4.1	13.6	10.43	10.04	7.90
BS	3.9	15.3	12.06	12.85	7.90
NF	4.1	16.8	13.23	15.06	8.15
GF	4.9	10.6	7.40	10.33	9.21

- 26 April closed Locks 8, 9 and 13.

- 27 April Lock 4 closed. Arkansas River Flows were high, 300,000 cfs range.

- Reservoir Control Section notified us that the Mississippi River was forecasted to rise and the Arkansas River was forecasted to peak and then start falling.

- 28 April 2011, Lock 13 opened. Flows ranged from 145,000 cfs at Lock 13 to 285,000 cfs in Little Rock to 250,000 cfs at Dam 2. Montgomery Point water elevation was 153.00. Forecasts showed Mississippi River elevations being 163.1 and Dam 2 being 162.8 on 7 May.

2011 Floods

- 2 May, Locks 8 and 9 reopened and Lock 7 remained closed due to debree in front of the miter gates.
- 3 May, Locks 8 and 9 closed. Water elevation came up on the canal that reduced bridge clearance.
- 5 May, Locks 8 and 9 reopened and Lock 2 closed.
- 6 May, Lock 4 reopened. Started cleaning stoplog recess & tried to set stoplogs.
- 7 May, Mississippi River (164.0) & Arkansas River at Dam 2 (164.3). Set stoplogs at Lock 2 (HW=165.7 & TW =163.8). Top of stoplogs at 163.75. Tied top of stoplog to lock wall. Mississippi River projected to rise to 167.5 on 13 May.
- 8 May, Mississippi River elevations 164.6 and Dam 2 164.8.
- 11 May, Lock 2 D/S gates came open. Opened U/S and D/S tainter valves. Able to see flow moving upstream over stoplogs.
- 12 May, Reservoir Control Section forecasted that Lock 1 el would fall to 164 about 23 May where stoplogs can be pulled.
- 13 May, Mississippi River at 167.8.
- 19 May, Water flowing upstream over stoplogs about 1 foot. Mississippi River elevation going down (166.4).
- 22 May, Dam 2 elev falling and could fall to 163.5 -164.0. Flows on Arkansas River stating to come down but in reality they came up. Mississippi River elevation at 164.5.
- 23 May, Lock 2 HW = 164.3 & TW = 164.0 Planning on pulling stoplogs.
- 24 May, 12 tows locked thru Lock 2 after opening.
- Lock 2 was closed from May 5-23.

2011 MKARNS High Water

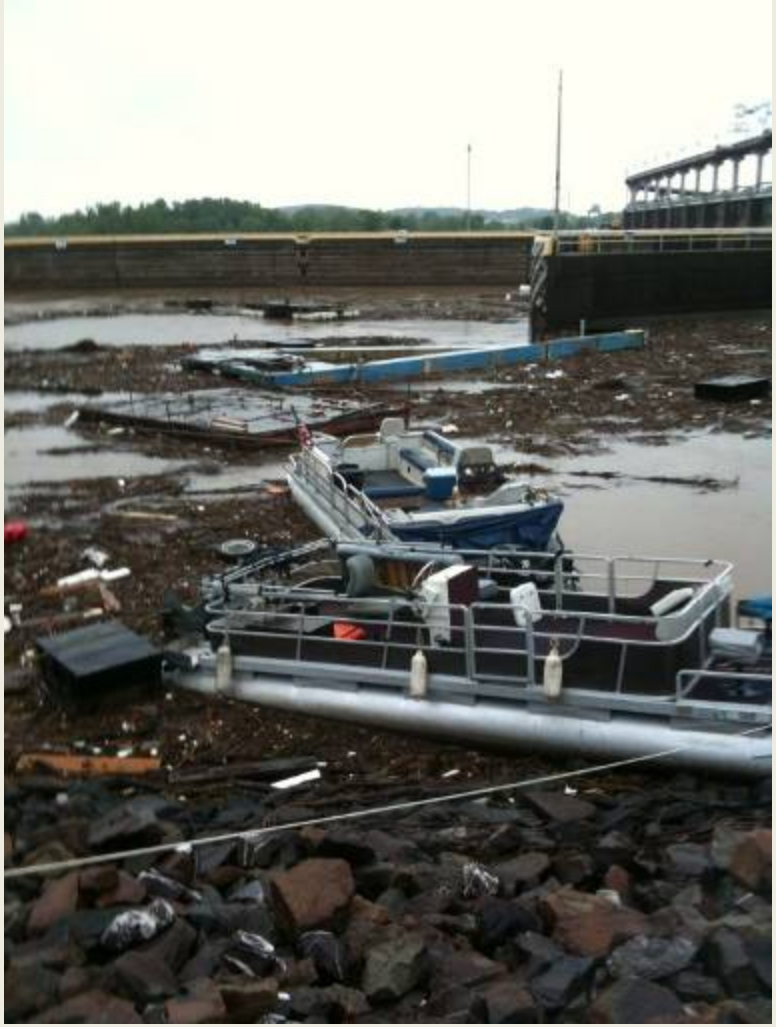
- Heavy rainfall in April and May resulted in significant flooding that adversely impacted navigation on the Arkansas. Some basins experienced the heaviest April/May rainfall on record.

- The Arkansas River experienced flows above 300k cfs from rainfall in Oklahoma and Western Arkansas and shut down Murray Lock for 4 days (2 – 6 May).

- In May record Mississippi River flows (highest since 1973) overtopped Lock No. 2, shutting down navigation on MKARNS for 18 days (5 through 23 May).

2011 MKARNS High Water

High water during May historic flood. Shutdown of Lock 7 caused by debris and concern of damage to the miter gates.



2011 MKARNS High Water

Montgomery Point Lock - Normal Flow and Pool. Mississippi River on top.

2011 MKARNS High Water

Montgomery Point Lock Control Tower - Normal Flow & Pool

2011 MKARNS High Water

Montgomery Point Lock Control Tower - High Flow & High Pool

Taken:
13 May 2011

2011 MKARNS High Water

Montgomery Point Lock looking downstream at floating guidewall and Mississippi River

Taken:
13 May 2011

2011 MKARNS High Water

MS River backed up White River, flooded Lock 1 and up the Post Canal to Lock 2

M/V Ted Cook and Mike Hendricks Crane Setting stoplogs upstream at Lock 2.

2011 MKARNS High Water

Lock 1
As seen from road

Taken:
16 May 2011

2011 MKARNS High Water

Lock 2
Preparing to
set stoplogs

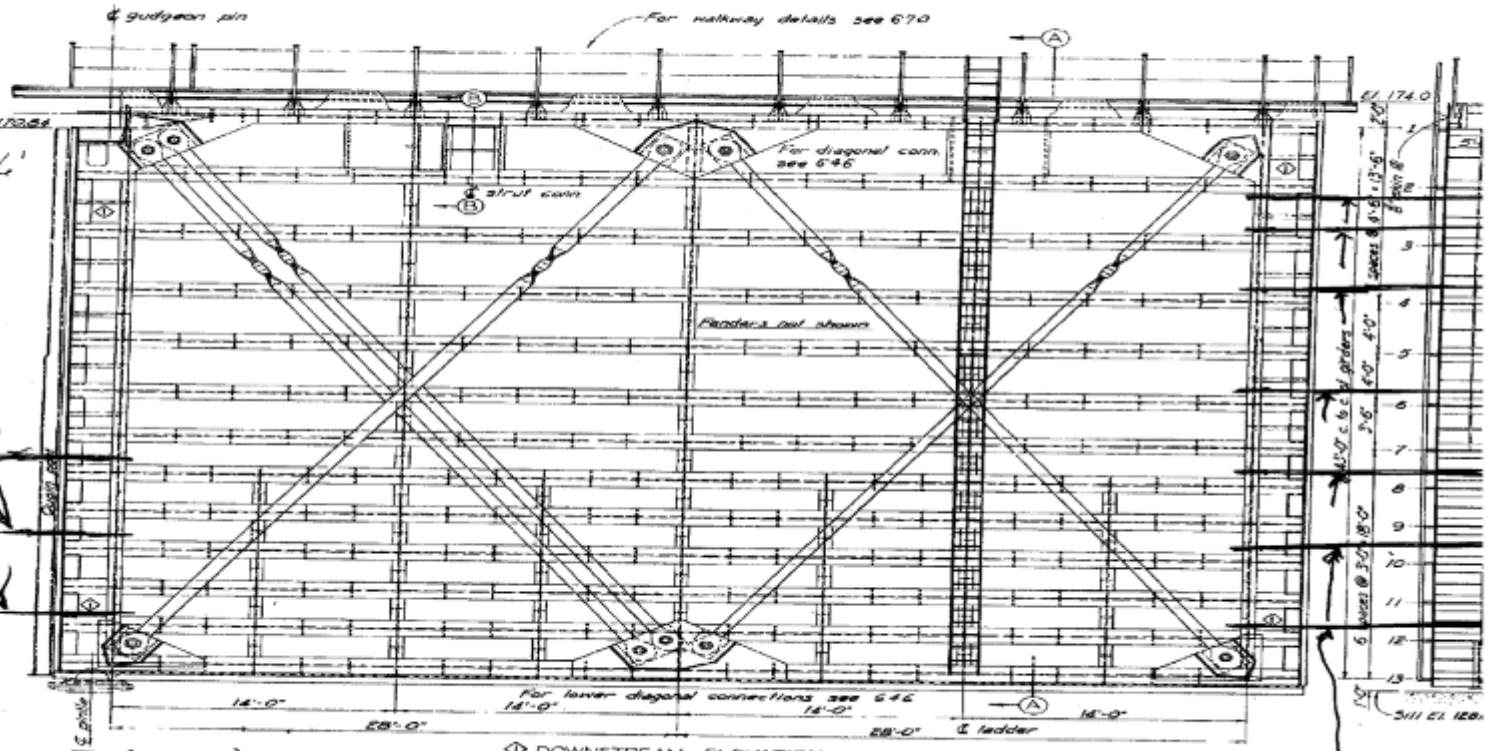
Plan A – Install stoplogs.

CORPS OF ENGINEERS

Lock 2 DS Gates

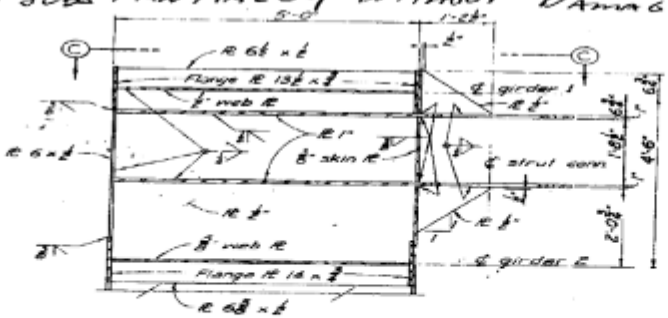
Each side.

3 Wedge Anchors with Forged Eye Nuts

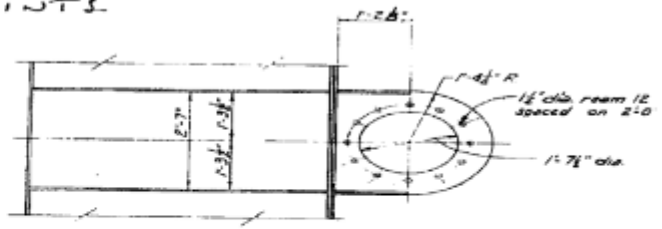


DOWNSTREAM ELEVATION
SCALE: 1/8" = 1'-0"

NEED 7 (MIN) - 10 TON (PREFERRED) CHAIN FALL COMO-ALONGS ATTACHED ALONG HEIGHT OF MITER AT SPACINGS APPROX AS SHOWN TIGHTEN SUBSTANTIALLY WITHOUT DAMAGING VERT. FLANGES. ATTACH AT CORNERS OF VERT TO HORIZ. JOINTS.



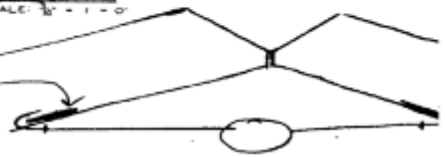
SECTION B-B
SCALE: 1/8" = 1'-0"



VIEW C-C
SCALE: 1/8" = 1'-0"

STRUT CONNECTION

CLAMP TO 1" THK VERT FLGS



Plan C – Open both set of miter gates. Watch the flow and water elevation. When the water peaks and the water flow stops, close the gates right before the water starts flowing back toward the Mississippi River.

2011 MKARNS High Water

Lock 2 Setting Centerpost & Divers Cleaning Recess.

Taken:
7 May 2011

2011 MKARNS High Water

Lock 2 Setting Centerpost & Divers Cleaning Recess.

Taken:
7 May 2011

2011 MKARNS High Water

Lock 2
Attaching
Cables to top
of Centerpost

Taken:
7 May 2011

2011 MKARNS High Water

Lock 2
Attaching
Cables to top
of Centerpost

Taken:
7 May 2011

2011 MKARNS High Water

Lock 2 Cables Attached to Top of Centerpost and Flow Upstream

Taken:
11 May 2011

2011 MKARNS High Water

Lock 2
Looking from upstream, note direction of water flow.

Taken:
16 May 2011

2011 MKARNS High Water

Lock 2
Flow is from canal on left to Arkansas River on right

Taken:
19 May 2011

2011 MKARNS High Water

Lock 2
Flow is from canal on left to Arkansas River on right

Taken:
19 May 2011

2011 MKARNS High Water

Lock 2
Looking from upstream, note direction of water flow.

Taken:
19 May 2011

2011 MKARNS High Water

Road to Dam 2 showing water on Navigation Pass at Elevation 164

Taken:
13 May 2011

2011 MKARNS High Water

Lock 2
Flow is from Arkansas River on right to canal on left. Set Top Stoplogs, Closed D/S Miter Gates, Pulling All Stoplogs & Centerpost
Taken:
23 May 2011

2011 MKARNS High Water

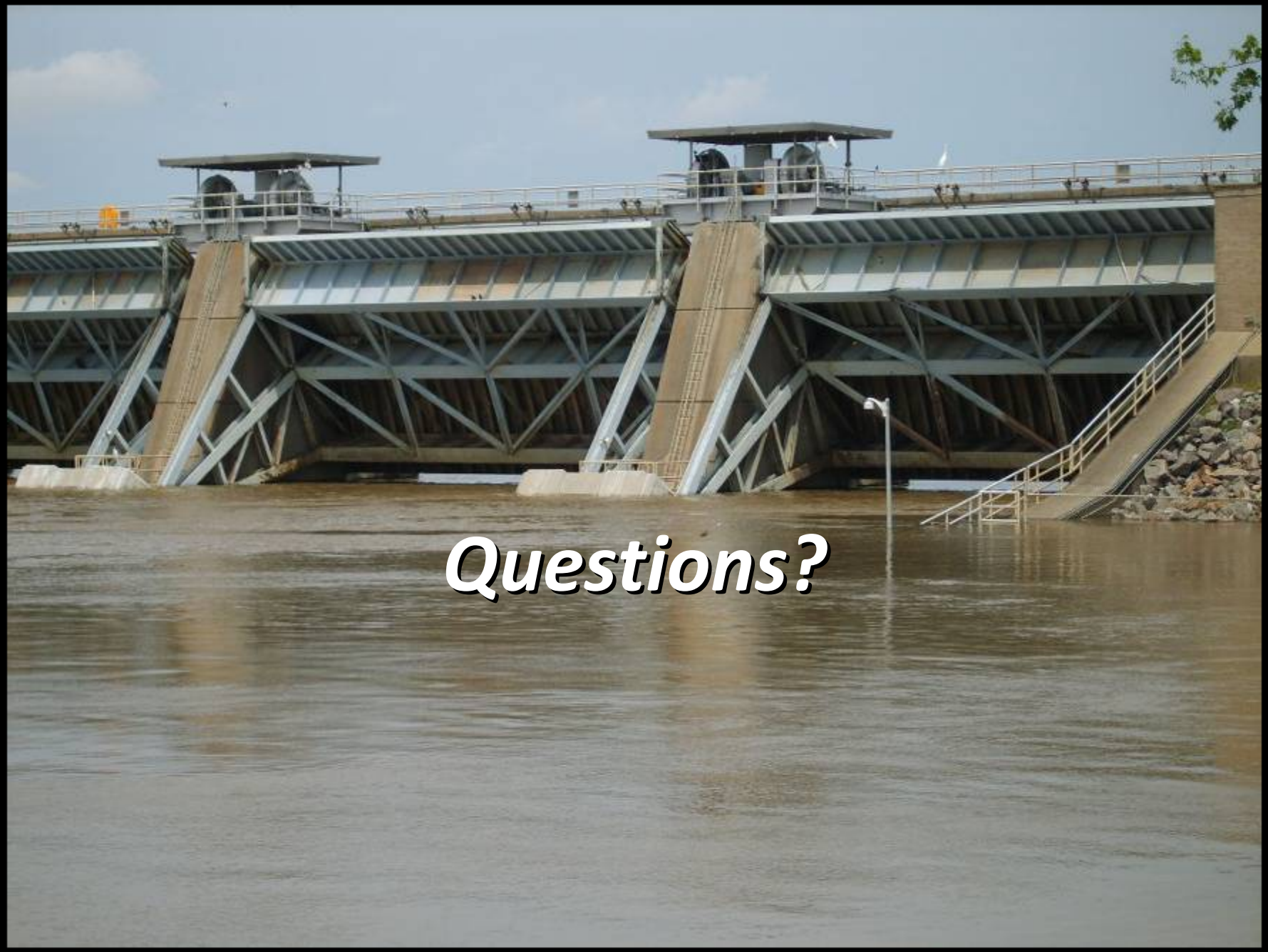
Lock 2
Pulling
Stoplogs and
Centerpost

Taken:
23 May 2011

2011 MKARNS High Water

Lock 2
Tow Ready
to lock
through

Taken:
23 May 2011


Questions?