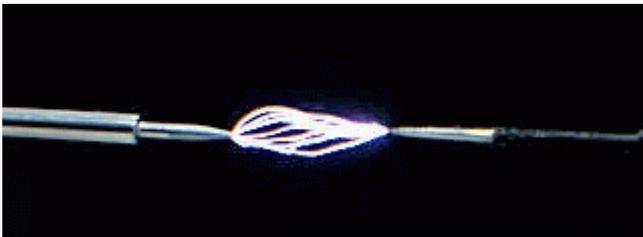
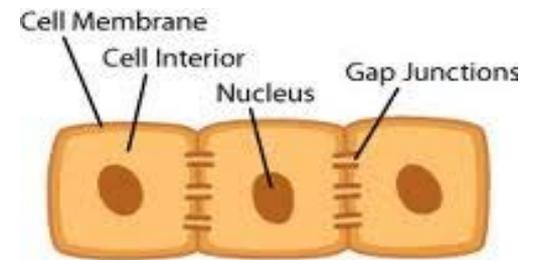


# Arkansas Water Plan Gap Analysis

February 20, 2014

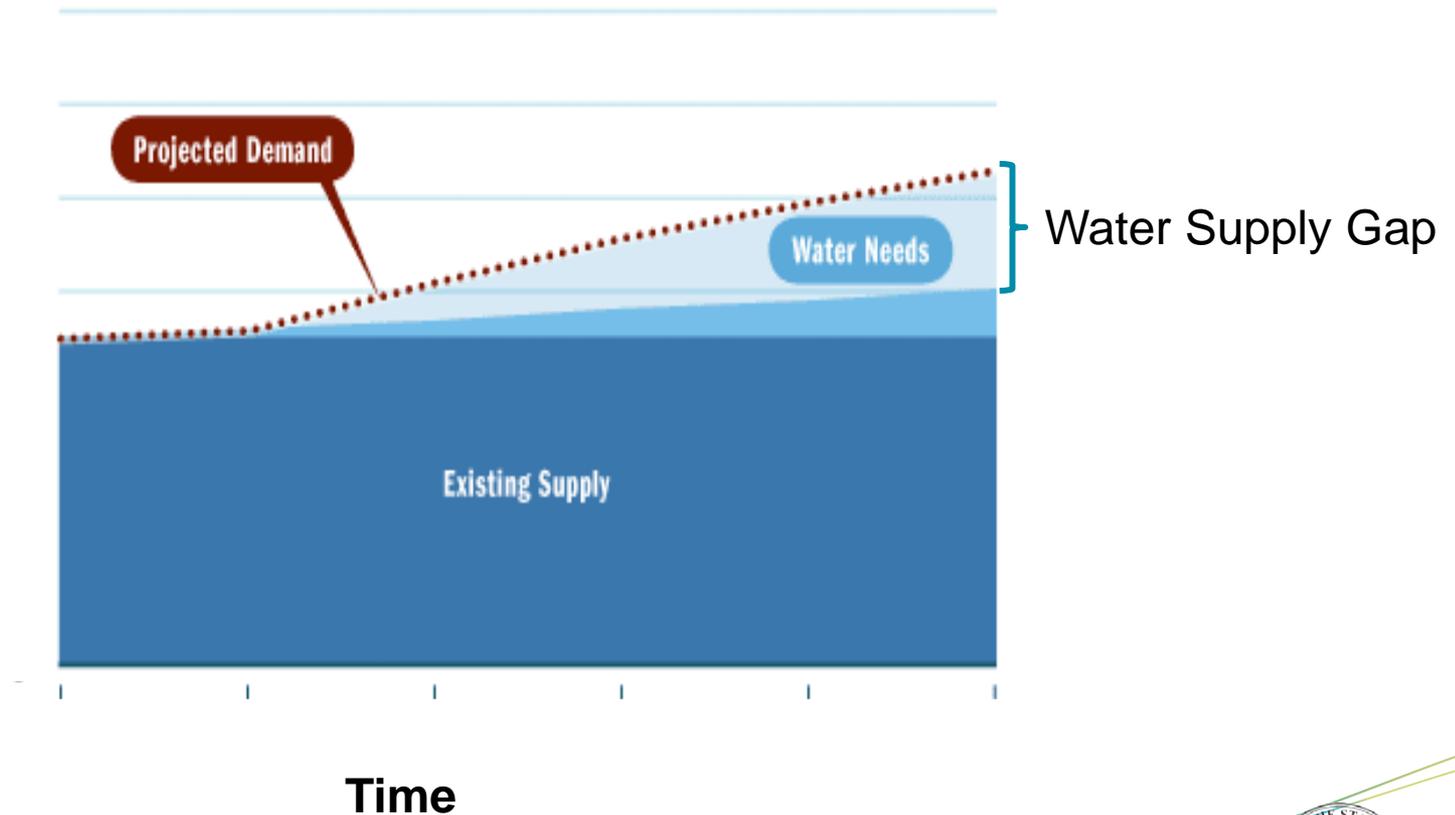
# Low Gap Arkansas



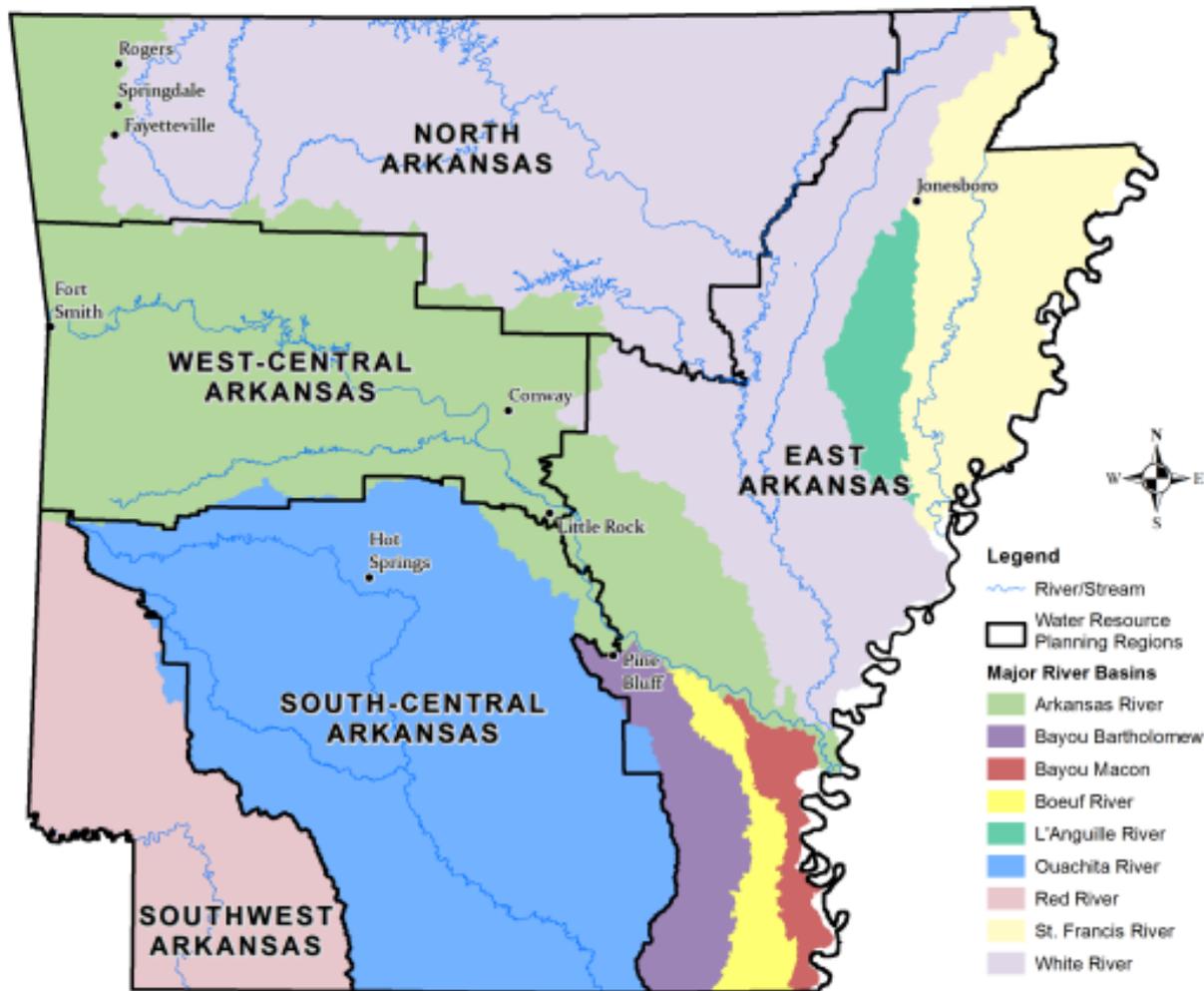
## What is a Gap?



# Example Water Supply Gap



# Arkansas Gap Analysis



# Gap Analysis Objectives

- **Objective**

- Quantify gaps in water supply associated with the 2050 planning horizon across the state
- Identify areas for which the Regional Water Resource Planning groups should consider options for addressing gaps

- **Uses Data from AWP Reports**

- Water Demand Forecast Report
- Groundwater Modeling
- Excess Surface Water Calculations

# Surface Water Availability

- Surface water currently provides about 30% of Arkansas water supply
- Available surface water quantified as “excess surface water”
- Excess Surface Water (A.C.A. § 15-22-304):  
“Twenty-five percent of that amount of water available on an average annual basis above the amount required to satisfy existing and projected needs.”

## Instream Flow Requirements Include:

- Fish & Wildlife Flows (Arkansas Method)
- Water Quality (7Q10)
- Navigation
- Interstate Compacts

**USGS Historical Gaged Streamflow**

**Instream Flow Requirements**

75%  
Unallocated

25% Available Excess Surface Water

**Future Water Demands**

## Historical Streamflow Includes:

- Existing Uses
  - Riparian and Non-riparian Uses
  - Federal Water Project Needs
  - Firm Yield of All Affected Reservoirs
- Aquifer Recharge Requirements

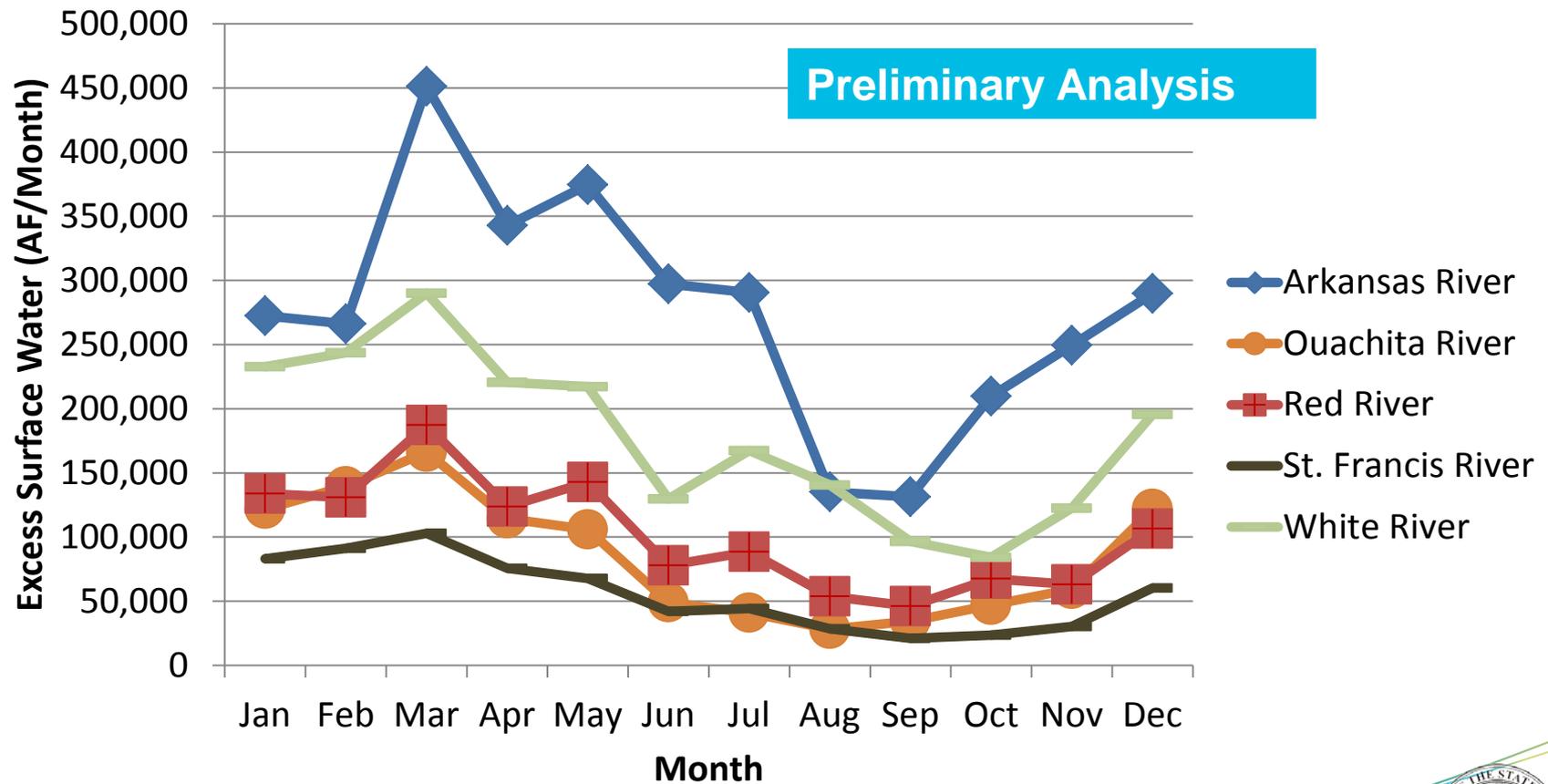
# Surface Water Gap

- Excess surface water is available in every river basin – on an average annual basis
- Excess Surface Water was recalculated at a monthly timestep to evaluate the seasonal availability of surface water in each major basin
- The summer months have lower flows, so there is less water that meets the definition of “excess”

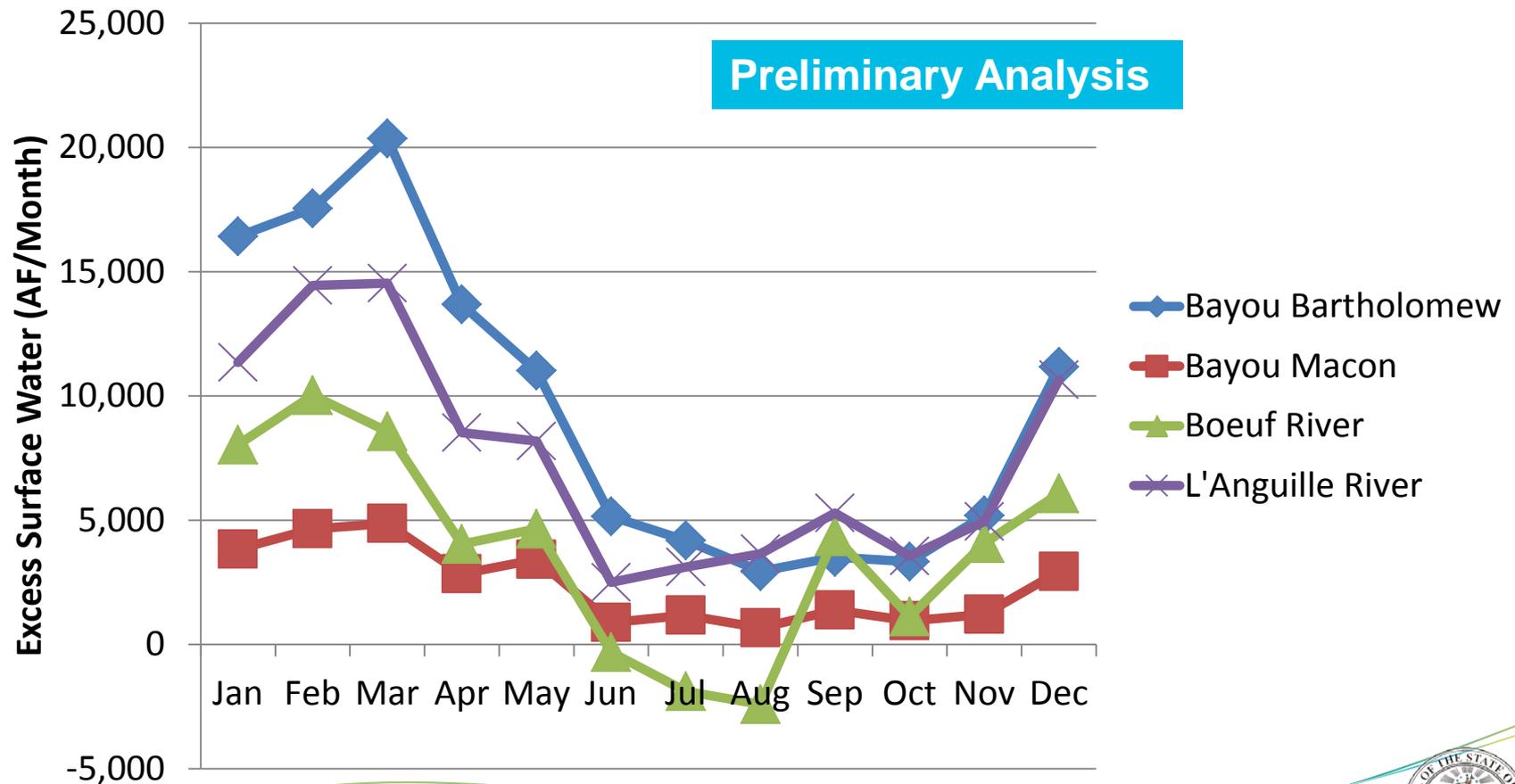
# Excess Water, by River Basin

River Basin	Excess Water (Million ac-ft/yr)
Arkansas River	3.3
Delta	1.6
Ouachita River	1.0
Red River	1.1
White River (Cache)	1.7

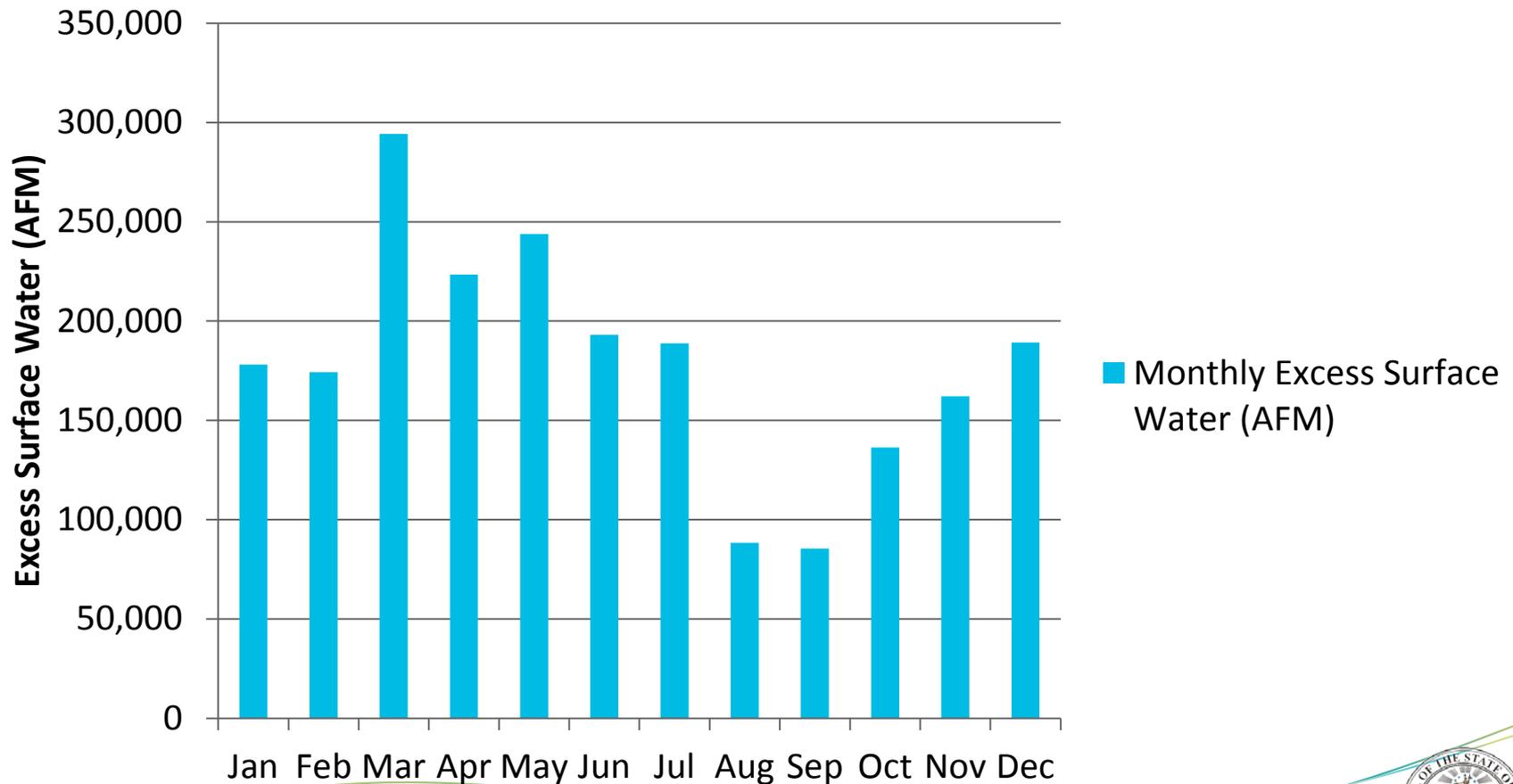
# Monthly Excess Surface Water – Large Rivers



# Monthly Excess Surface Water – Small Rivers



# West-Central Planning Region Monthly Excess Surface Water



# West-central Region Planning Area Surface Water Gap

- On an average annual basis, there is excess surface water available in all basins
- There is also excess water on a monthly basis
- For the Arkansas River Basin as a whole, not surface water gap is projected for 2050



# Groundwater Gap Analysis

**Groundwater Gap =**

**Groundwater Demand – Groundwater Yield**

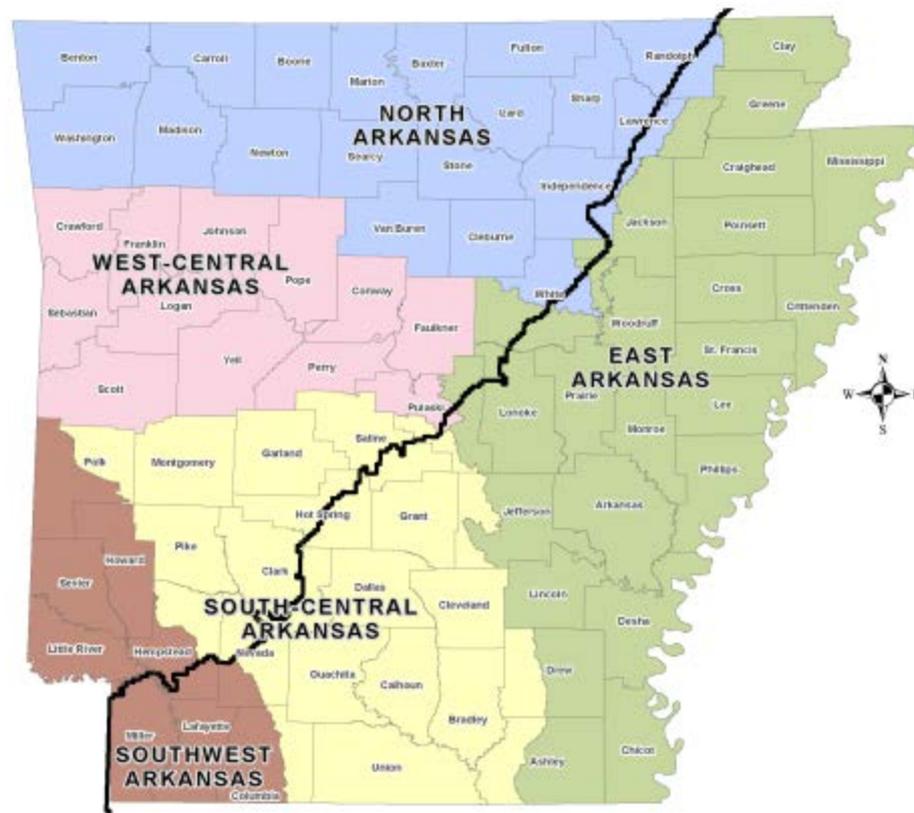
**Groundwater Demand** is calculated as the sum of 11 demand sectors from the Water Demand Forecast Report

**Groundwater Yield** is projected from the Mississippi Embayment Regional Aquifer Study (MERAS) model developed by the USGS for East Regional Planning Area

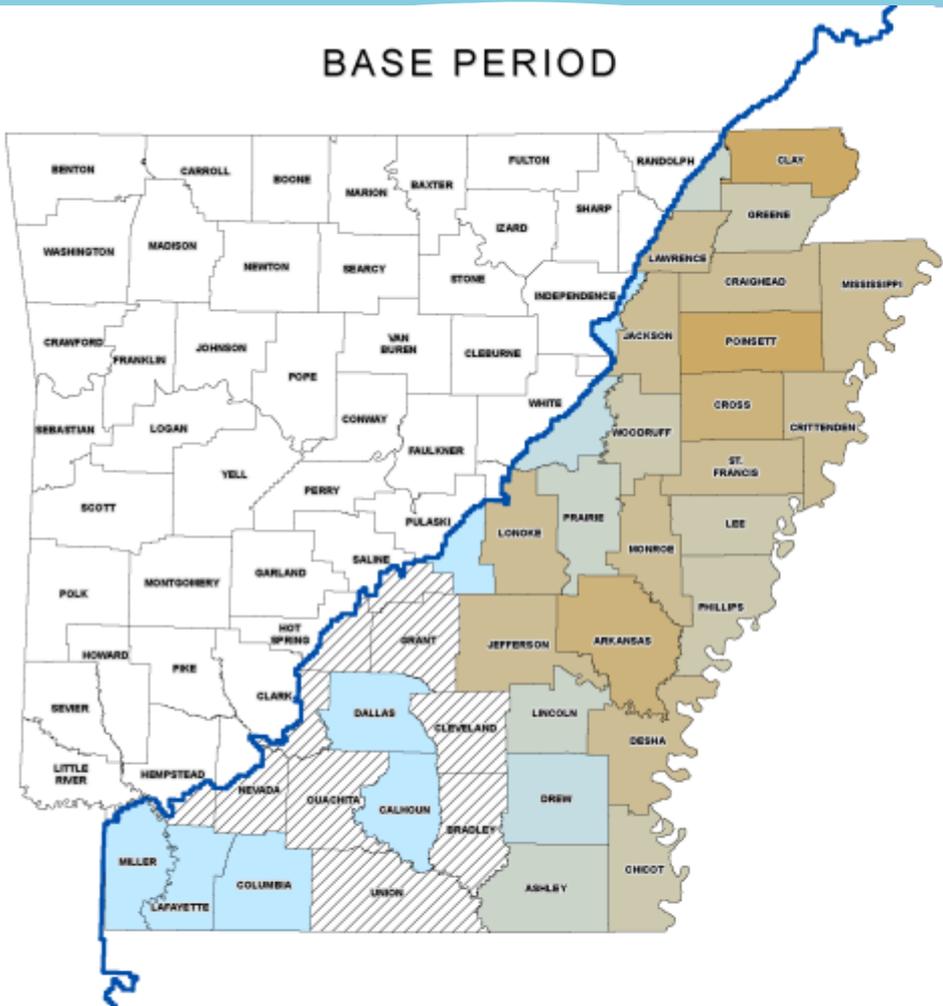
**Groundwater Yield** is assumed to be equal to 2010 groundwater demands for other planning regions  
= 2050 Demand – 2010 Demand

# MERAS Model Boundary

MERAS Model covers the area south of the boundary line



# BASE PERIOD



# YEAR 2050



- Legend**
- MERAS Outline
  - County Boundary
  - Demand**
  - No significant demand
  - < 50 MGD
  - 50 - 100 MGD
  - 100 - 200 MGD
  - 200 - 300 MGD
  - 300 - 400 MGD
  - 400 - 500 MGD
  - > 500 MGD

**Figure 5-12**  
**Distribution of Demand in the Alluvial Aquifer in Base Period and 2050**

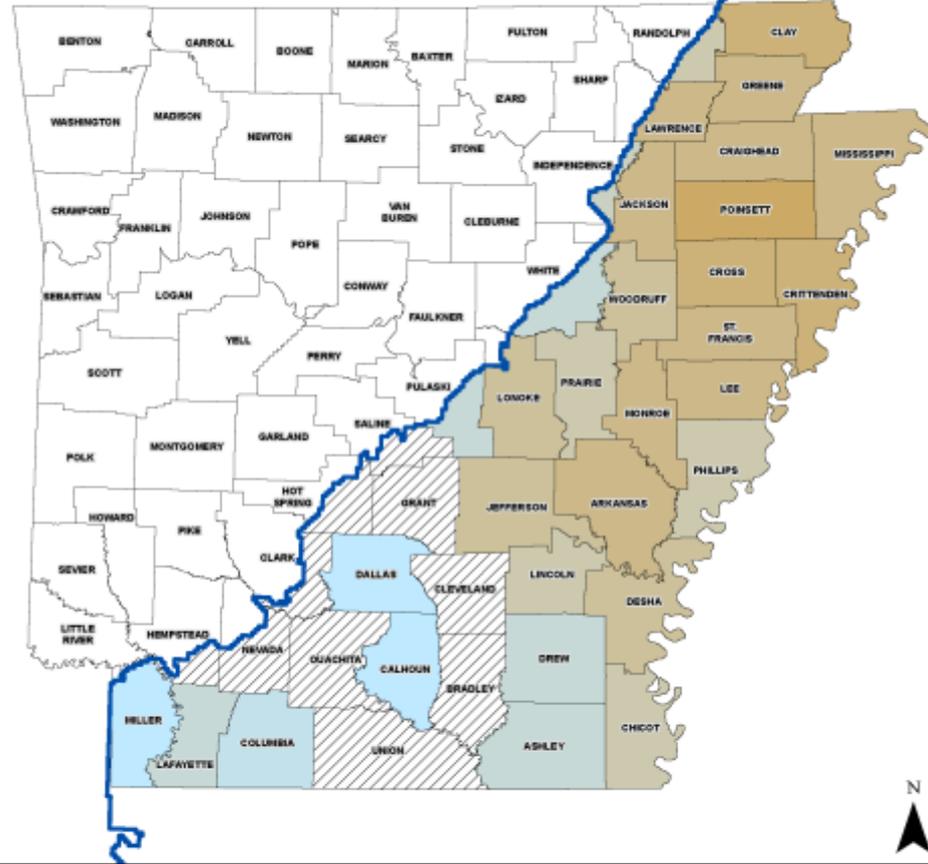
Arkansas State Water Plan Update  
 Groundwater Availability



# BASE PERIOD



# YEAR 2050



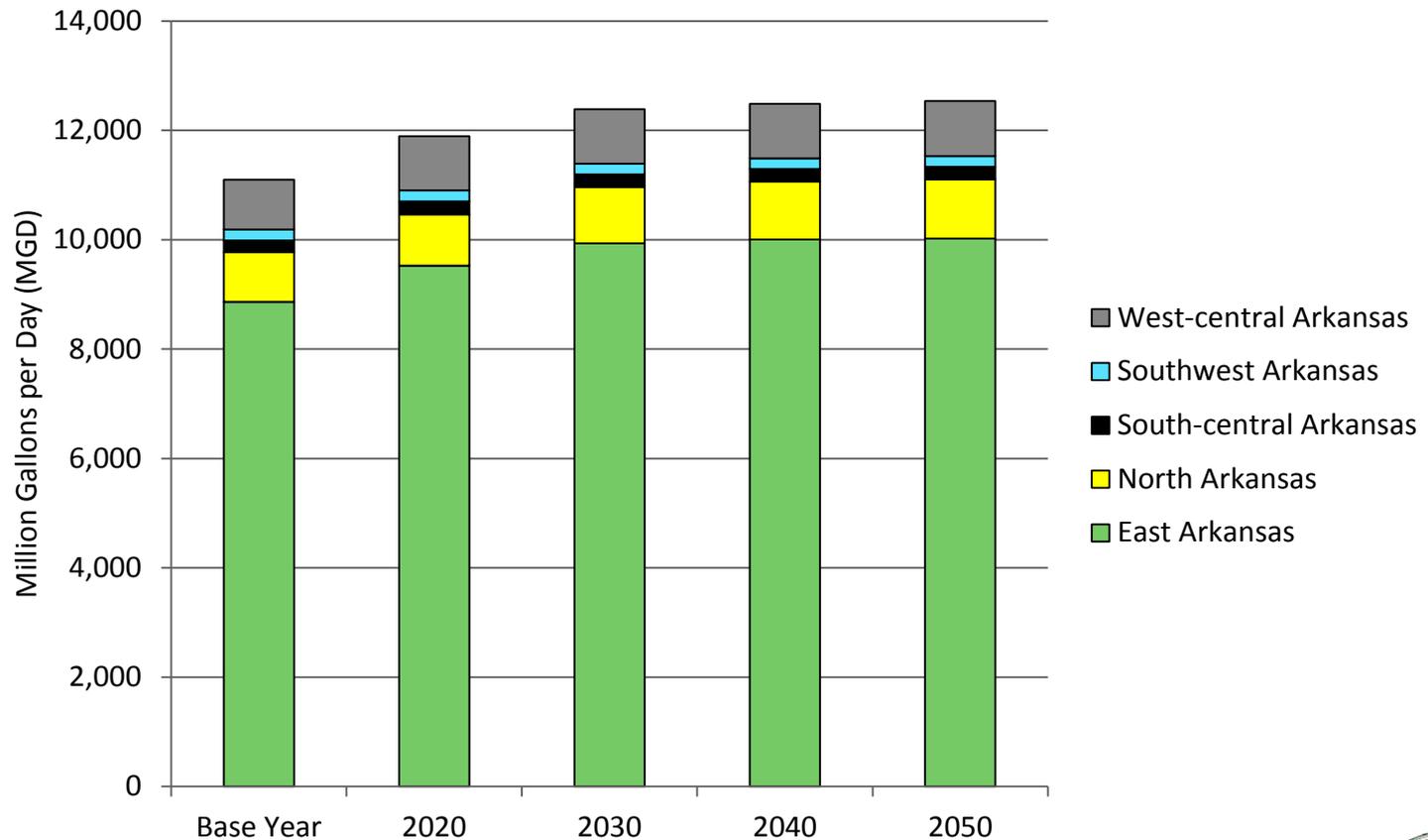
- Legend**
- MERAS Outline
  - County Boundary
  - Supply Gap
  - No significant supply gap
  - < 1 MGD
  - 1 - 10 MGD
  - 10 - 50 MGD
  - 50 - 100 MGD
  - 100 - 200 MGD
  - 200 - 300 MGD
  - 300 - 400 MGD
  - 400 - 500 MGD
  - > 500 MGD

**Figure 5-19**  
**Supply Gap Map for Alluvial Aquifer Scenario 3 Base Period and 2050**

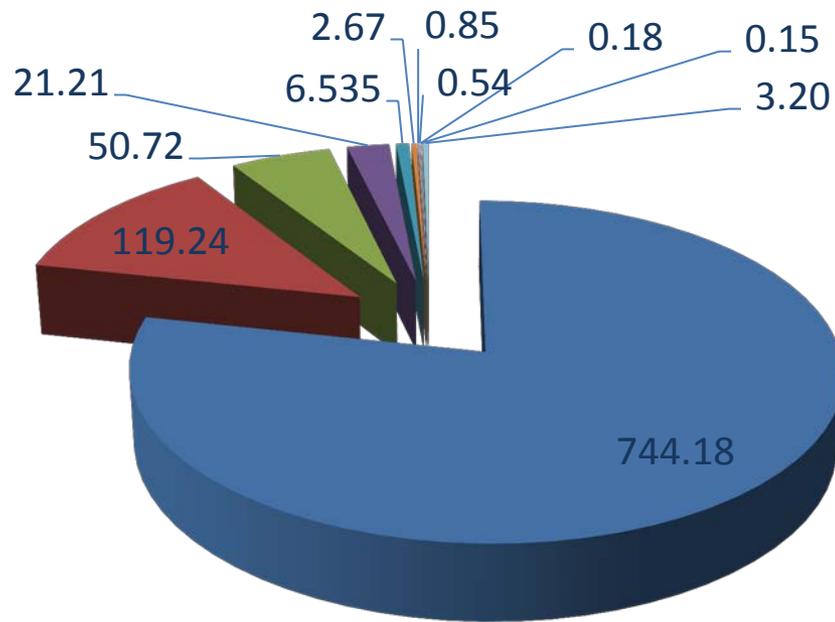
Arkansas State Water Plan Update  
 Groundwater Availability



# Total Water Demands by Water Planning Region

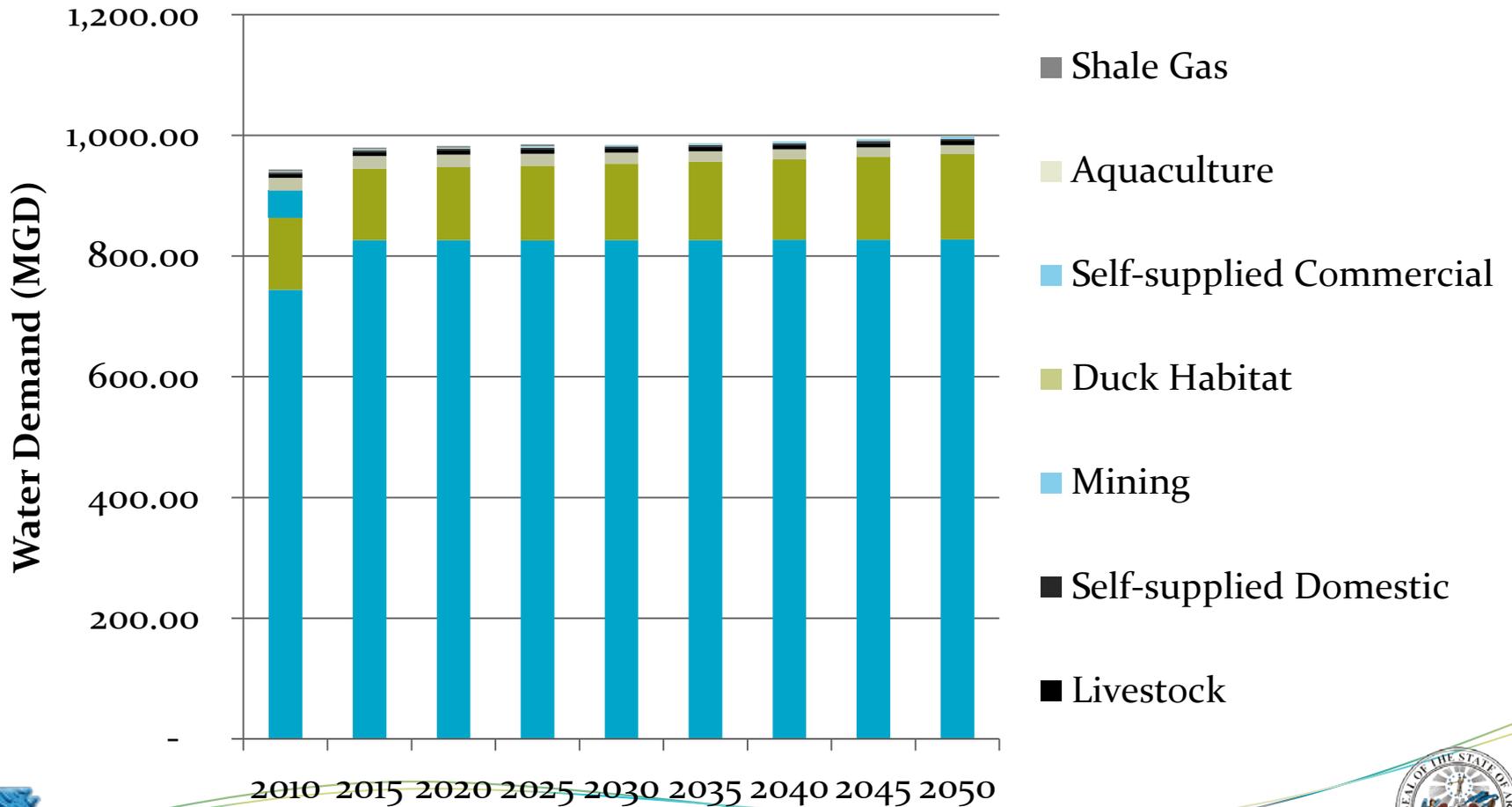


# West-central 2010 Water Demand Distribution (MGD)



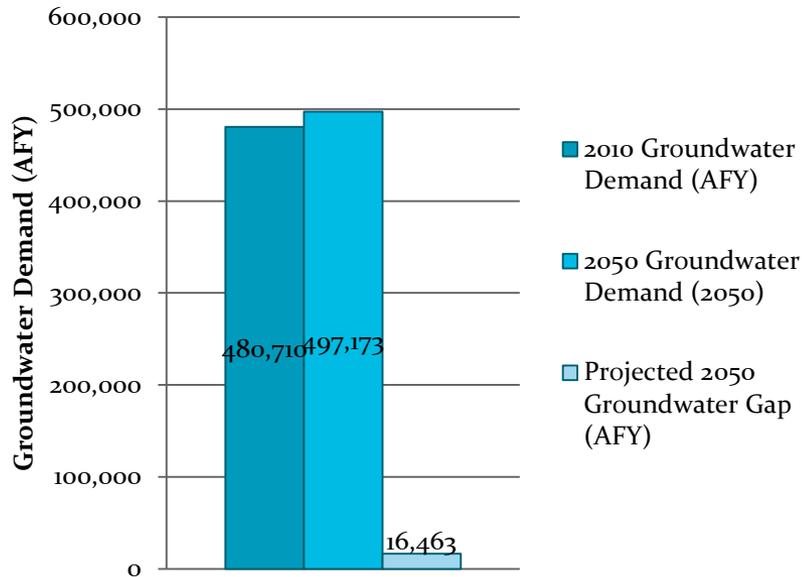
- Thermolectric Withdrawals
- Municipal
- Crop Irrigation
- Industrial
- Livestock
- Self-supplied Domestic
- Mining
- Duck Habitat
- Self-supplied Commercial
- Aquaculture
- Shale Gas

# West-central Demand Projection

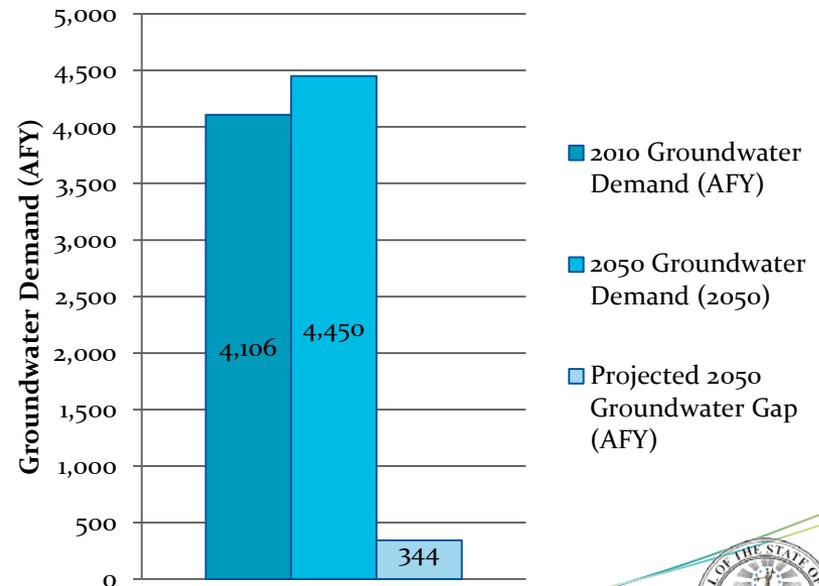


# West-central Planning Region

**West-central Planning Area  
Projected 2050 Groundwater  
Gap (with areas included in  
MERAS Model**



**West-central Planning Area  
Projected 2050 Groundwater  
Gap (without areas included  
in MERAS Model**



# West-central Planning Region Groundwater Gap Summary

- The projected 2050 groundwater gap is about 300 AFY (3% of total 2050 demand) excluding areas in the MERAS Model Boundary (portions of Pulaski and Saline Counties)
- The projected 2050 groundwater gap is about 16,000 AFY (7% of total 2050 demand) including areas in the MERAS Model Boundary (portions of Pulaski and Saline Counties)

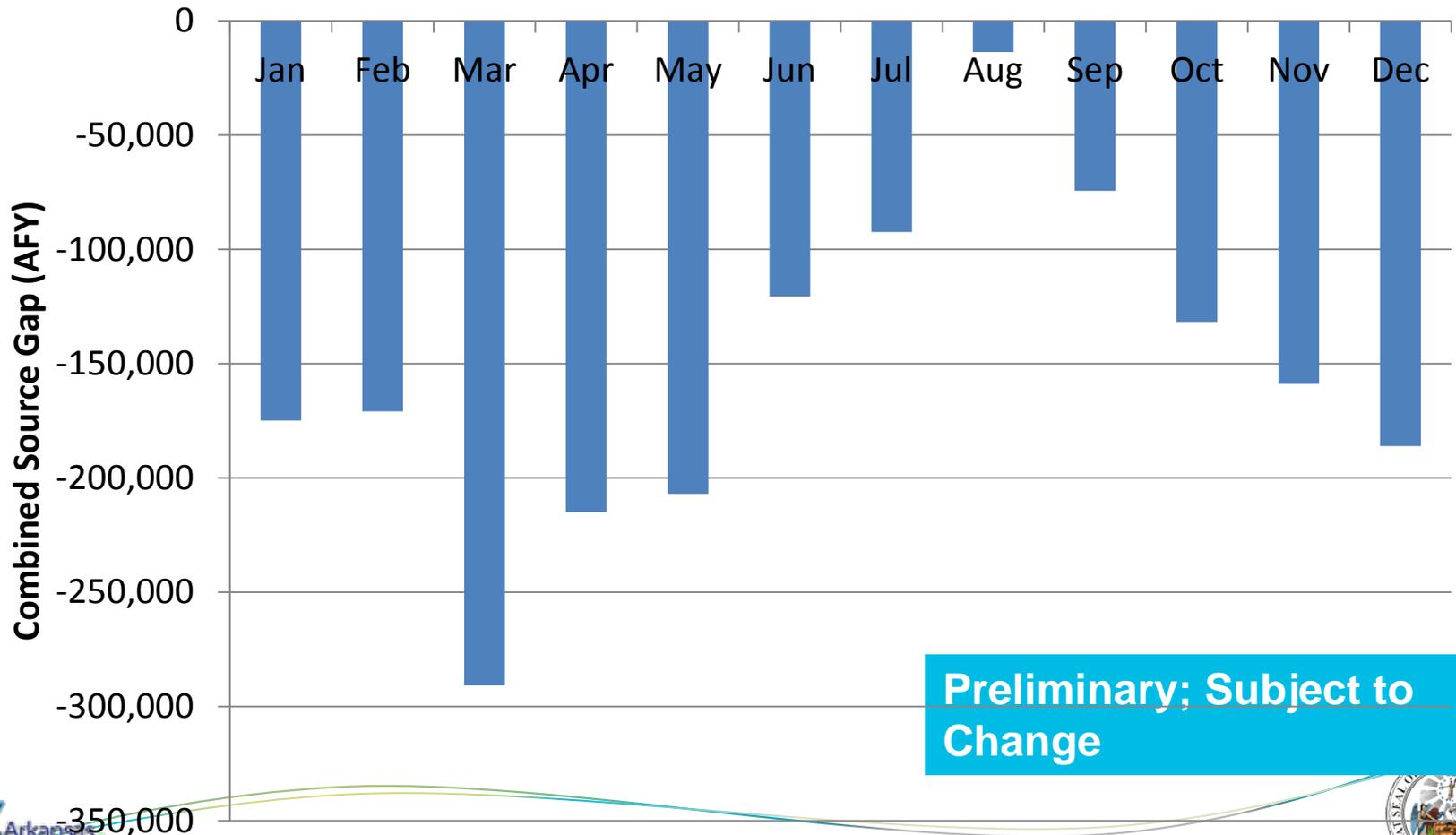
# Combined Source Gap

- Combines all available supply sources to meet all identified demand
- Combined Source Gap assumes that excess surface water will be put to use to meet groundwater demand within the same basin
- **Combined Source Gap =**  
**Total Groundwater Gap - Excess Supply Available**

# Planning with the Combined Source Gap

- In Regional Planning Areas where the Combined Source Gap is  $<0$  (no gap)
  - There is sufficient combined water resources to meet demands
  - The infrastructure necessary to use surface water to meet demands may not be in place
- In Regional Planning Areas where the Combined Source Gap is  $> 0$  (gap)
  - The water resources are not sufficient to meet demands
  - Additional water management recommendations should be considered (e.g., storage, reuse, conservation, etc.)

# West-central Regional Planning Area Combined Source Gap



# Combined Source Gap Summary – West-central Regional Planning Area

- There is no projected Combined Source Gap projected for the West-central Regional Planning Area
- There is projected to be about 1.8M AFY of excess surface water available to meet water demands
- The infrastructure necessary to use the excess surface water is not in place

# Comments

# Questions