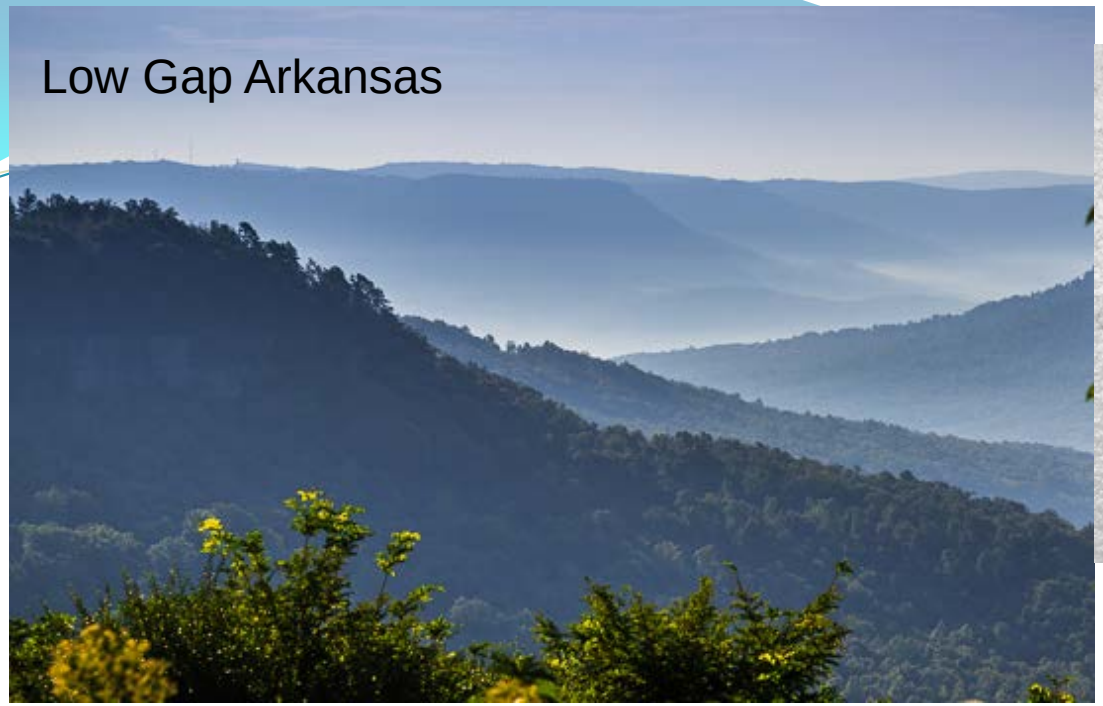
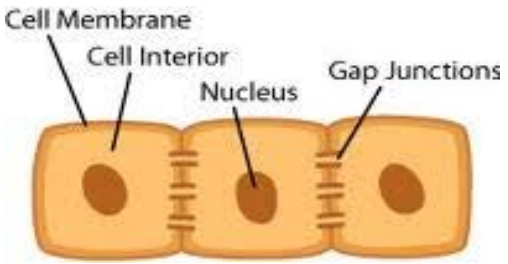
Arkansas Water Plan
Gap Analysis

February 19, 2014
Revised 2/20/2014



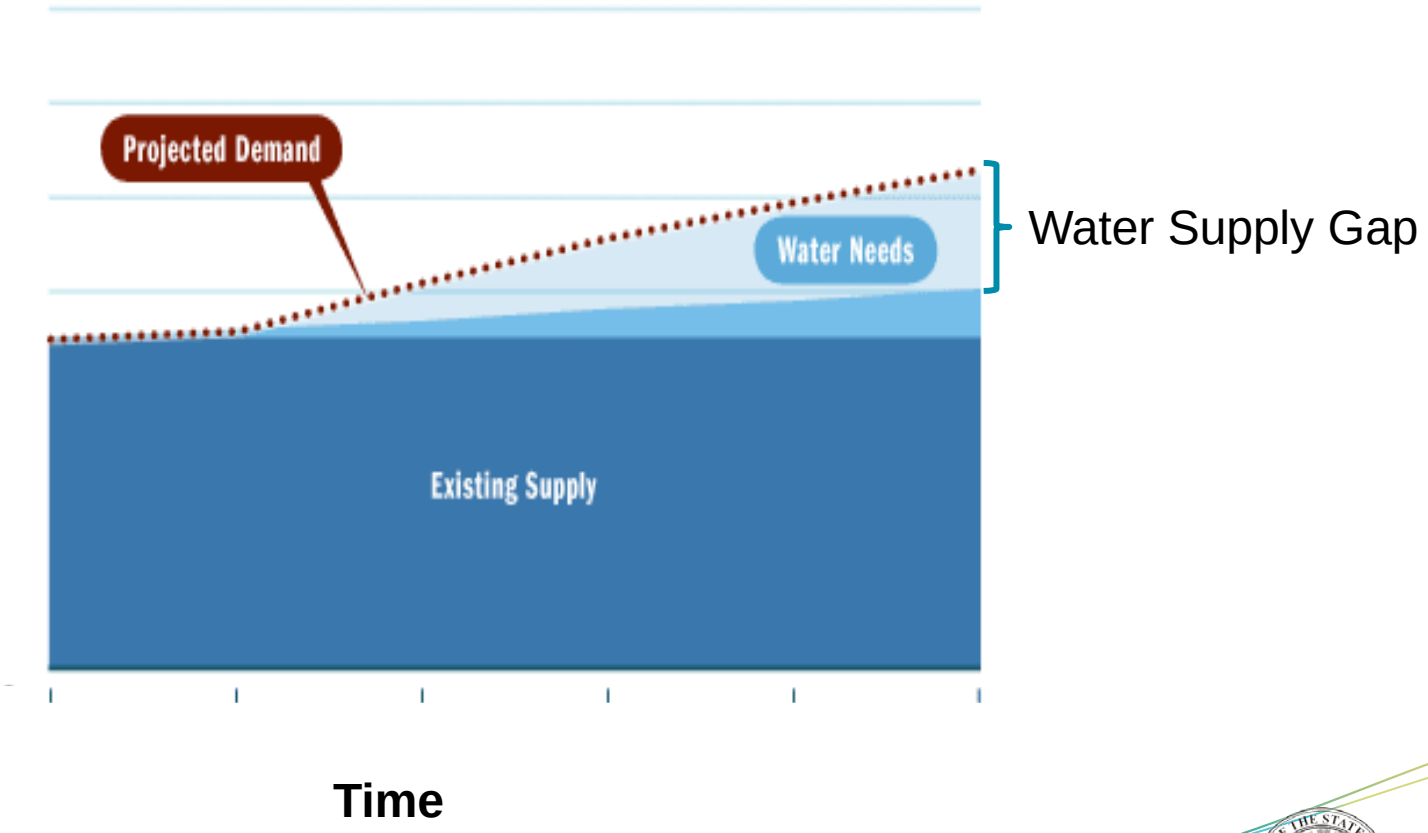


What is a Gap?

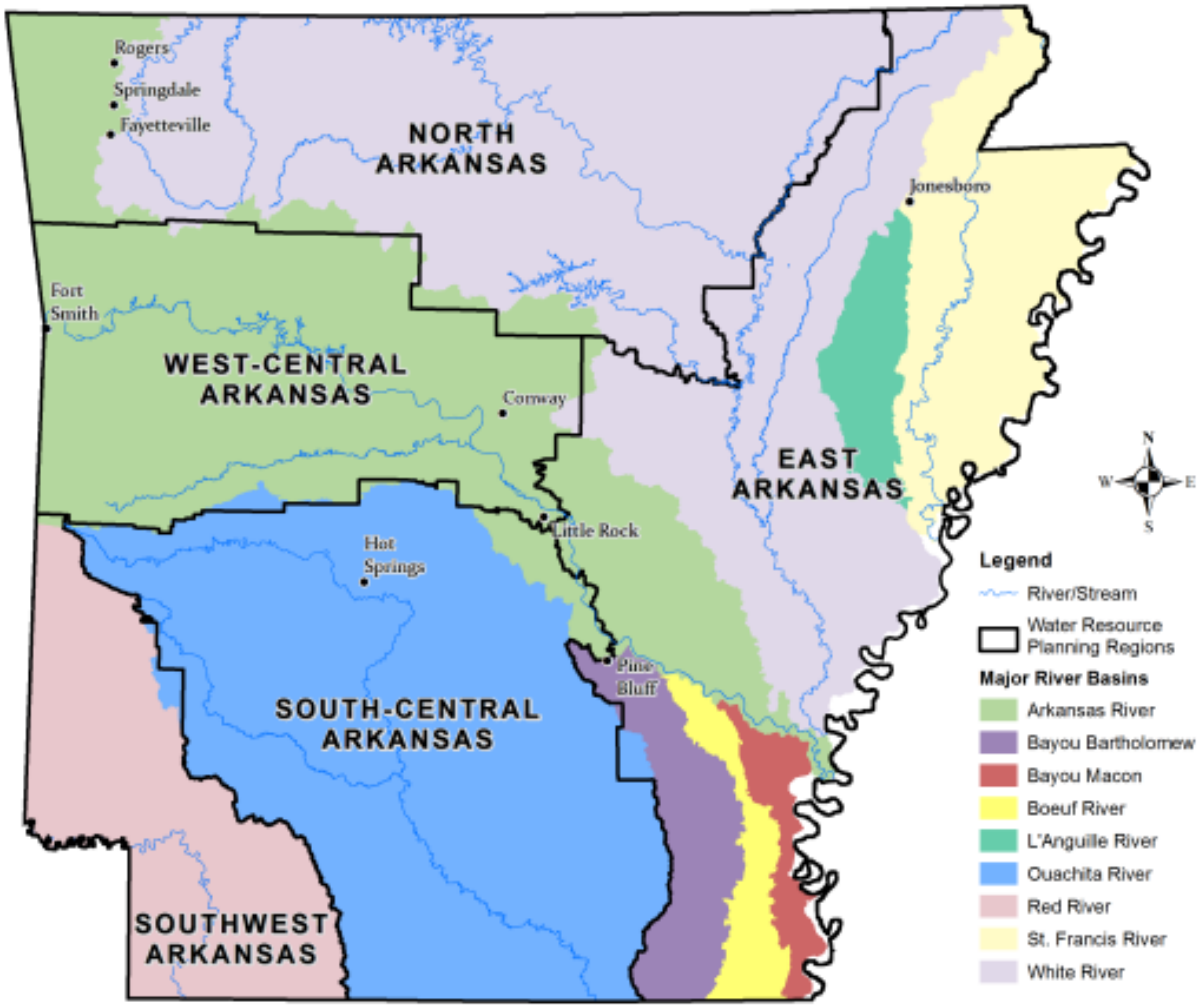
GAP

Arkansas WATERplan
Essential For Life

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

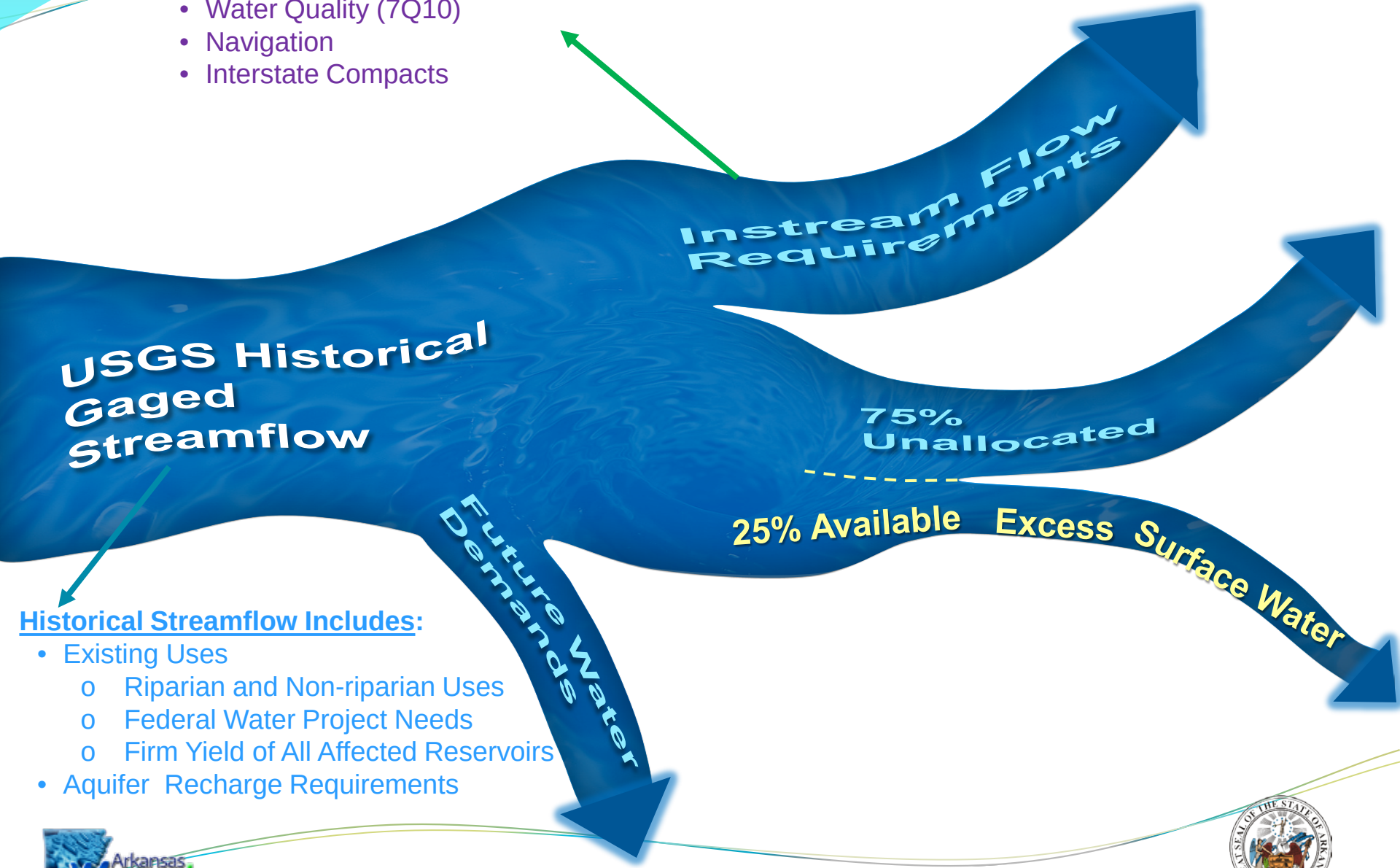
Surface Water Availability

- 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



Historical Streamflow Includes:

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

Arkansas WATERplan
Essential For Life

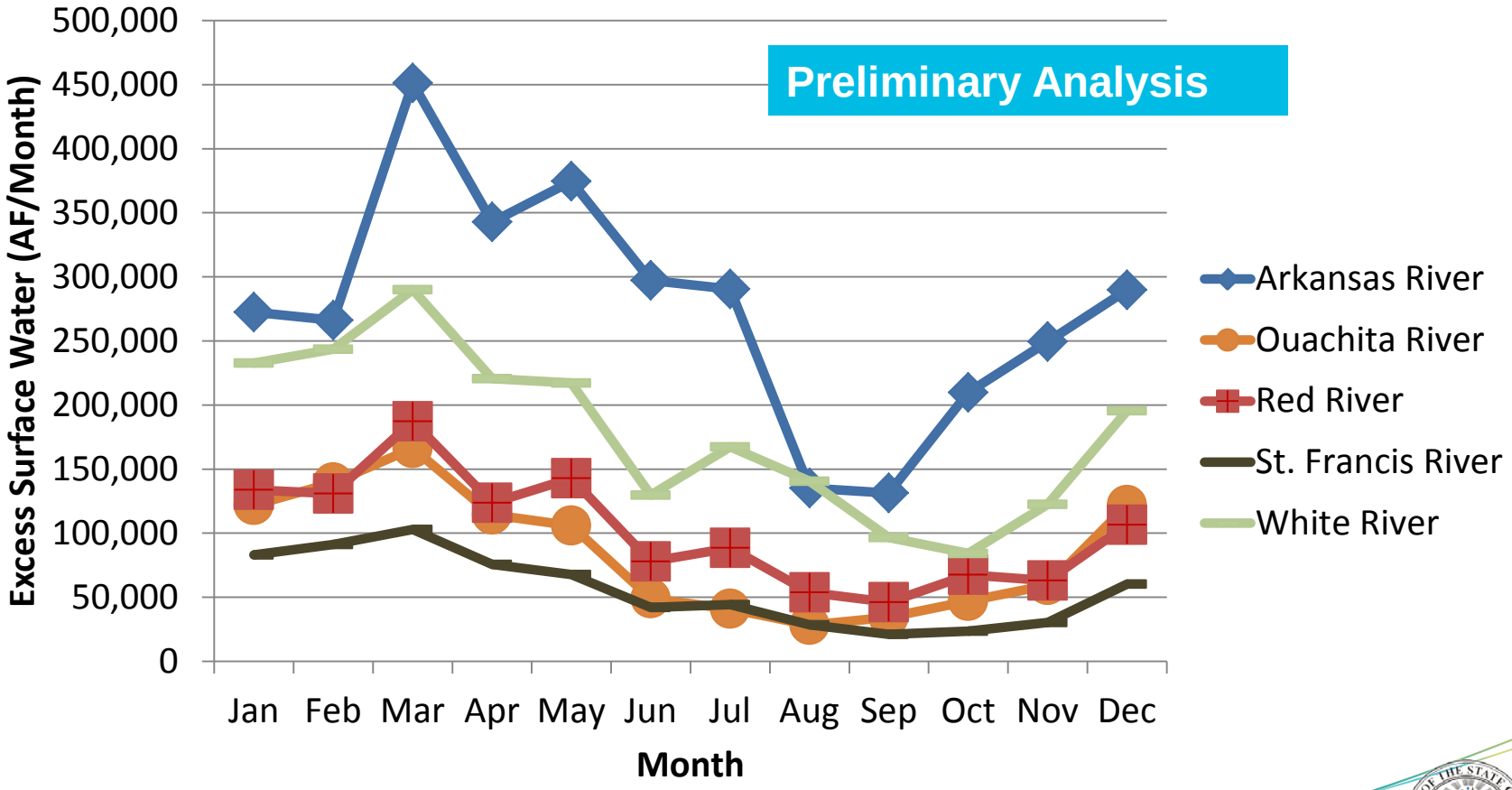
Surface Water Gap

- 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”

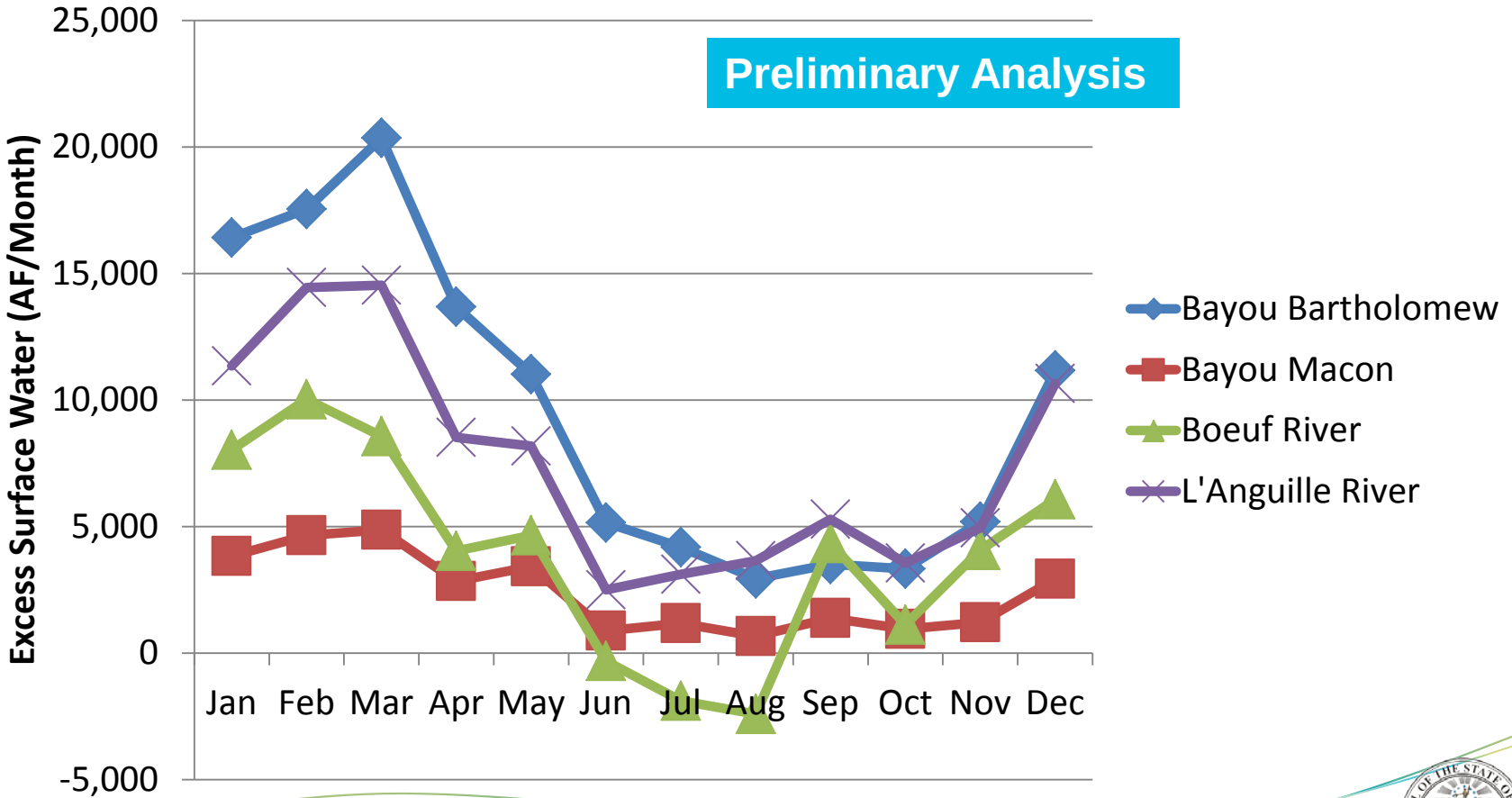
Excess Water, by River Basin

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

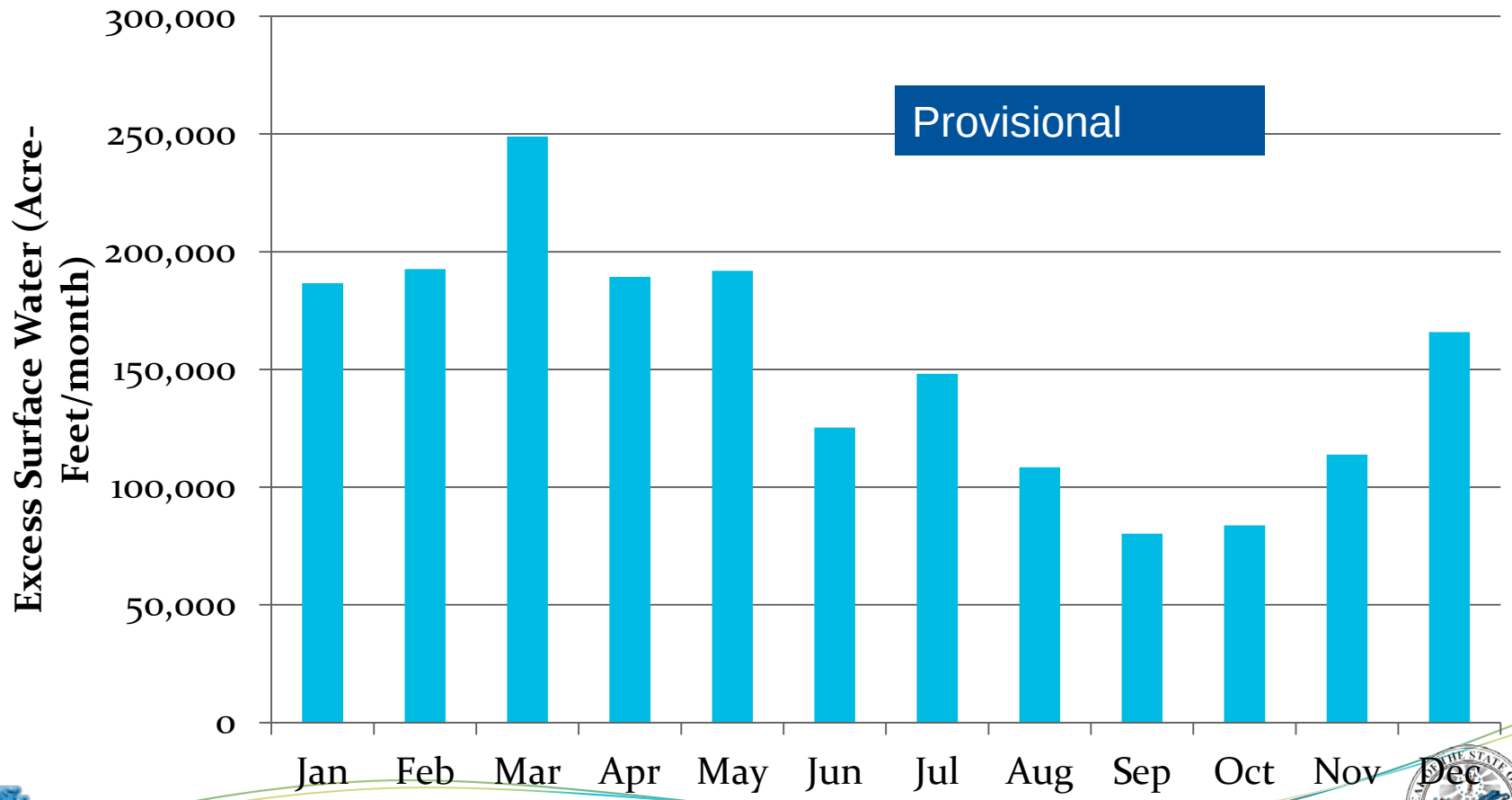
Monthly Excess Surface Water – Large Rivers



Monthly Excess Surface Water – Small Rivers



North Planning Region Excess Surface Water – Monthly



North Region Planning Area Surface Water Gap

- On an average annual basis, there is excess surface water available in all basins
- Provisionally, there is excess water on a monthly basis
- Separating the flows in the Upper and Lower White River Basin is ongoing

Groundwater Gap Analysis

Groundwater Gap =

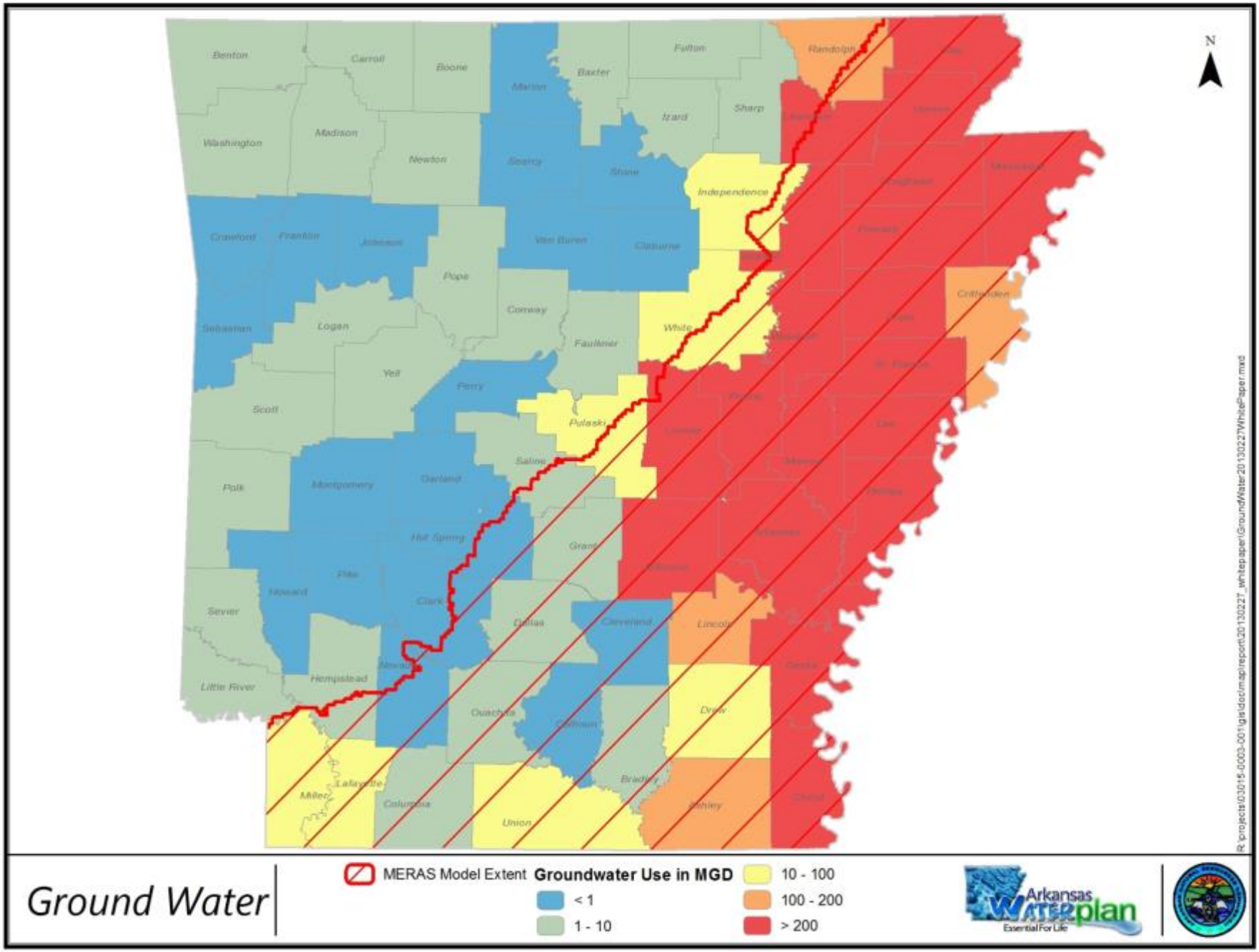
Groundwater Demand – Groundwater Yield

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

Groundwater Yield is assumed to be equal to 2010 groundwater demands for other planning regions

= 2050 Demand – 2010 Demand

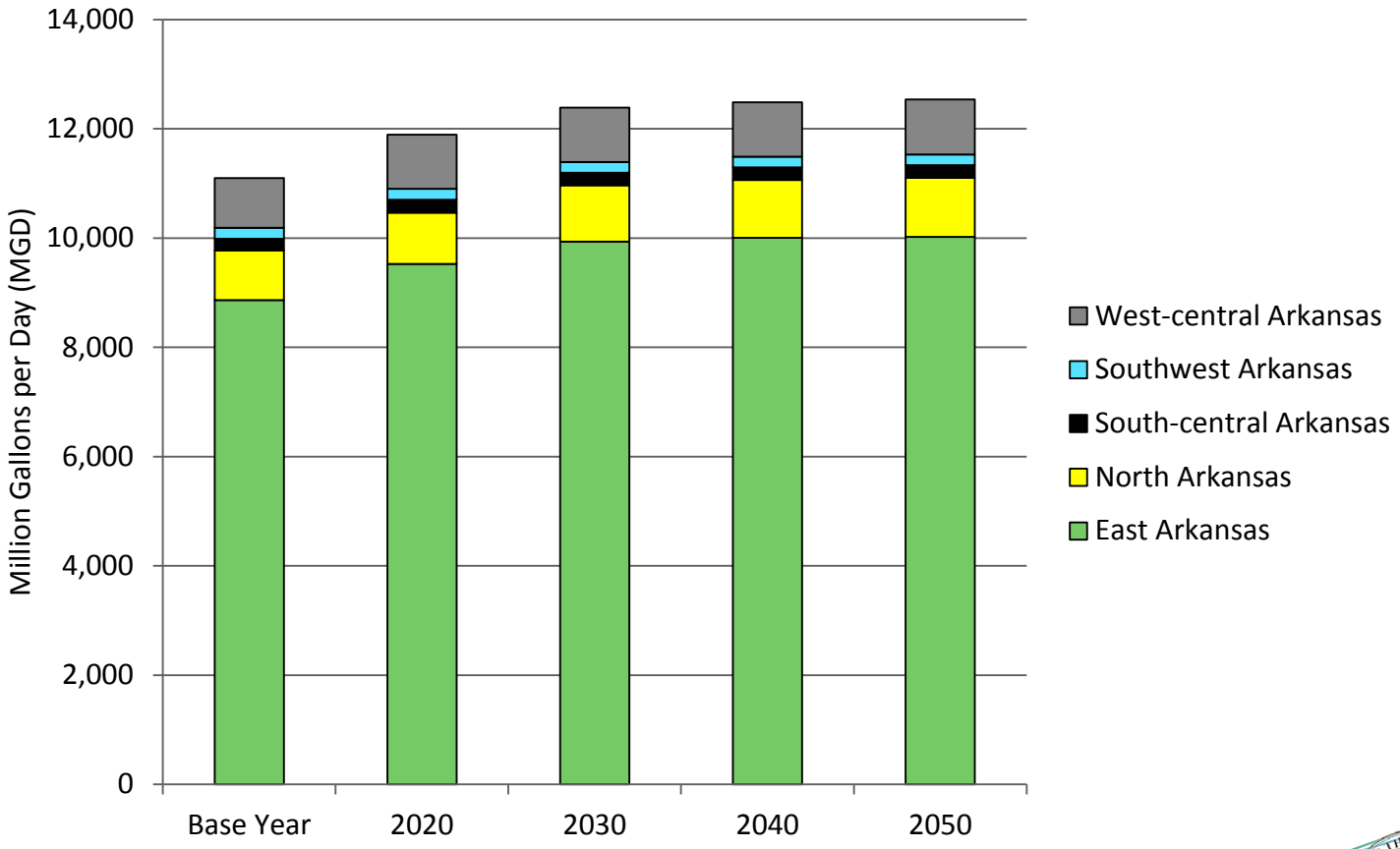

Benton
Carroll
Boone
Marion
Baxter
Fulton
Randolph
Izard
Sharp
Washington
Madison
Newton
Searcy
Stone
Independence
Crawford
Franklin
Johnson
Van Buren
Cleburne
Pope
Conway
Sebastian
Logan
Faulkner
White
Yell
Perry
Scott
Pulaski
Saline
Polk
Montgomery
Garland
Hot Spring
Grant
Pike
Howard
Clark
Sevier
Dallas
Cleveland
Lincoln
Little River
Hempstead
Nevada
Ouachita
Calhoun
Drew
Lafayette
Miller
Columbia
Bradley
Ashley
Union
N
MERAS Model Extent
Groundwater Use in MGD
< 1
1 - 10
10 - 100
100 - 200
> 200
Ground Water
Arkansas Waterplan
Essential For Life
R:\projects\03015-0003-001\gis\doc\mapreport\20130227_whitepaper\GroundWater20130227WhitePaper.mxd

North Water Resource Planning Region - Counties

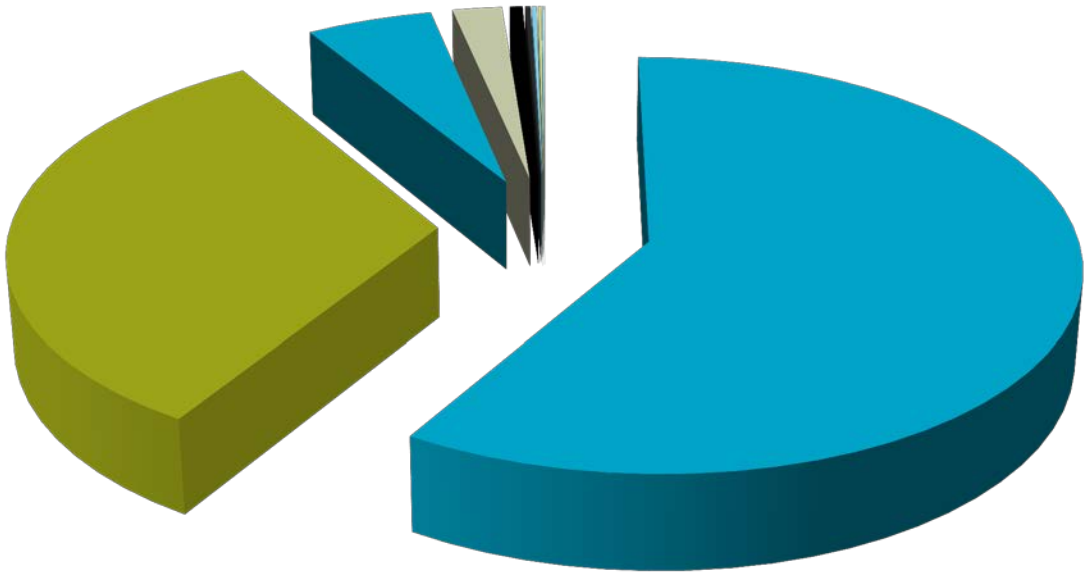
- Baxter
- Benton
- Boone
- Carroll
- Cleburne
- Fulton
- Independence*
- Izard
- Lawrence*
- Madison
- Marion
- Newton
- Randolph*
- Scott
- Sevier
- Stone
- Van Buren
- Washington
- White*

* = part of the county in the MERAS model

Total Water Demands by Water Planning Region

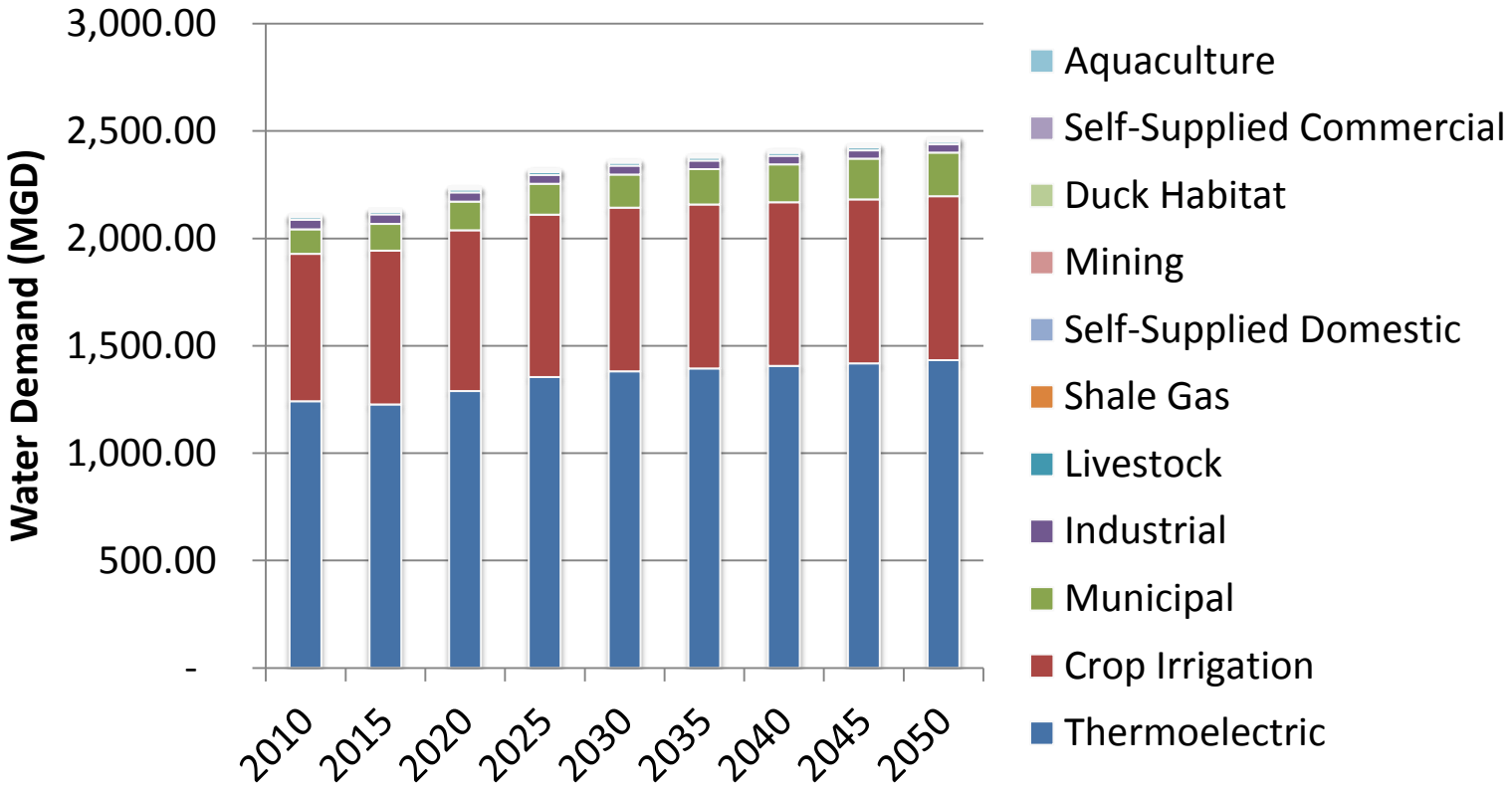


North Region Distribution of Demands in 2010

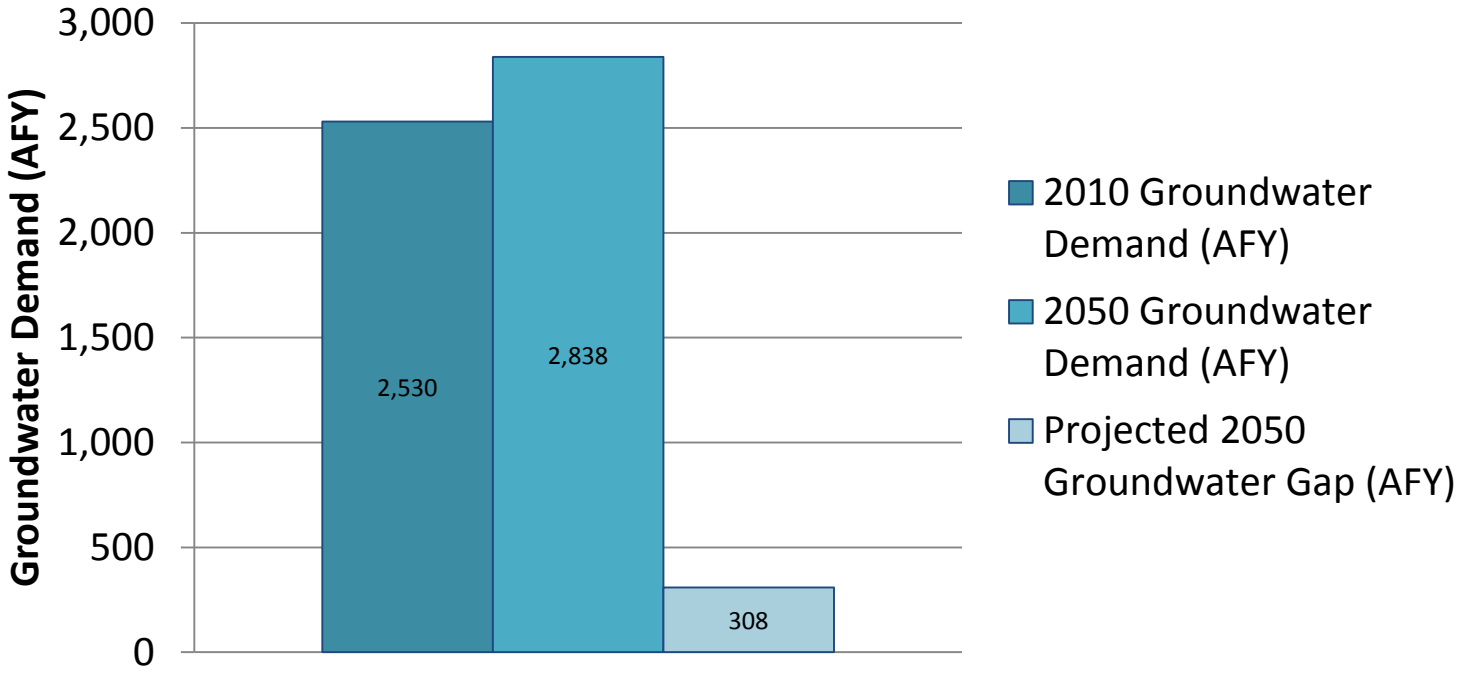


- Thermoelectric
- Crop Irrigation
- Municipal
- Industrial
- Livestock
- Shale Gas
- Self-Supplied Domestic
- Mining
- Duck Habitat
- Self-Supplied Commercial
- Aquaculture

North Planning Region Projected Water Demands

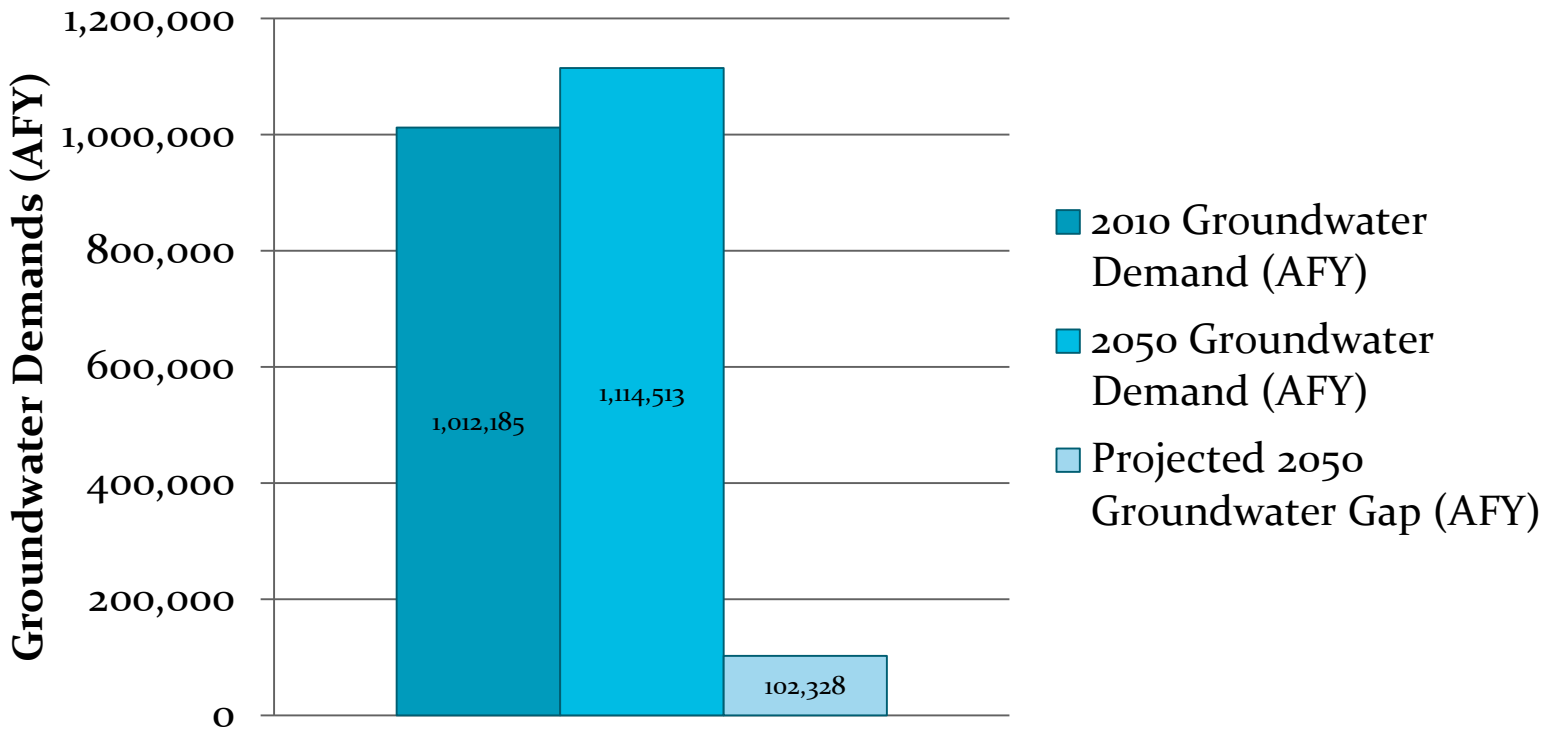


North Planning Area Projected Groundwater Gap (AFY) - Without Crop Irrigation



Excluding areas within the Mississippi Embayment Regional Aquifer Study (MERAS) Model

North Planning Area Projected Groundwater Gap (AFY) - With Crop Irrigation



Including areas within the Mississippi Embayment Regional Aquifer Study Model

North Planning Region Groundwater Gap Summary

- There is no quantitative groundwater model for most of the North Water Resource Planning Area; portions of 4 counties (Independence, Lawrence, Randolph and White) are in the MERAS Model
- Available groundwater is conservatively assumed to be the amount of groundwater used in 2010
- The projected 2050 groundwater gap is about 300 AFY (9% of total 2050 demand) excluding areas in the MERAS Model Boundary
- The projected 2050 groundwater gap is about 100,000 AFY (11% of total 2050 demand) including areas in the MERAS Model Boundary
- The gap occurs in the summer months

Combined Source Gap

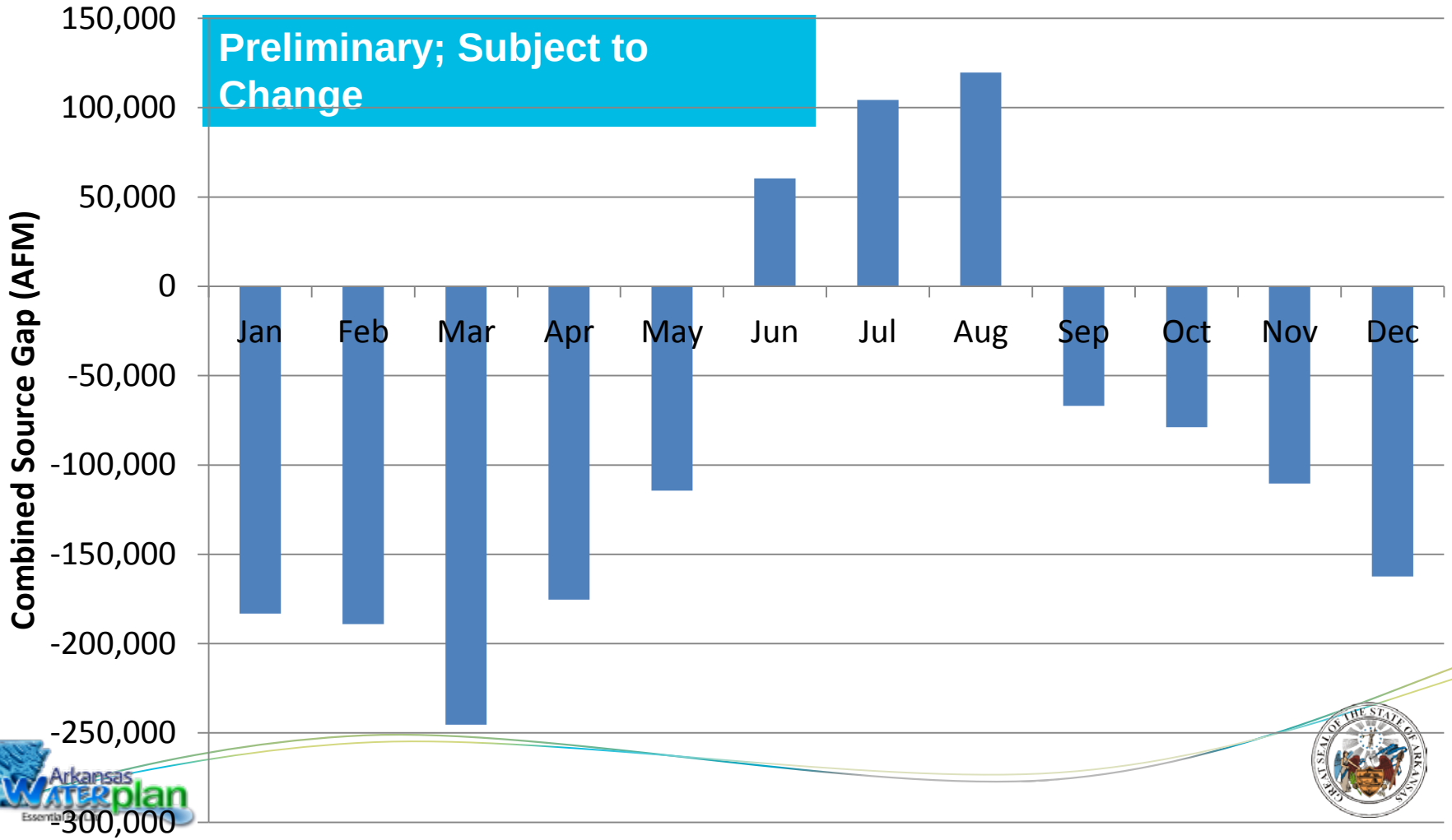
- Combines all available supply sources to meet all identified demand
- Combined Source Gap assumes that excess surface water will be put to use to meet groundwater demand within the same basin
- **Combined Source Gap =**

  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.)

North Regional Planning Area Combined Source Gap



Combined Source Gap Summary – North Regional Planning Area

- There is no apparent surface water gap on an annual or monthly basis (provisional)
- There is an apparent groundwater gap in the summer months (provisional)
- The groundwater gap is uncertain because it is not based on a quantitative assessment of groundwater
- There is no projected Combined Source Gap projected for 2050 in the North Water Resource Planning Area (provisional)
- There is projected to be sufficient excess surface water (approximately 1 million AFY) to close the groundwater gap (provisional)
- The infrastrucuture necessary to use the excess surface water may not be in place

Comments

Questions