Arkansas Water Plan Update

Arkansas WATERplan

Essential For Life

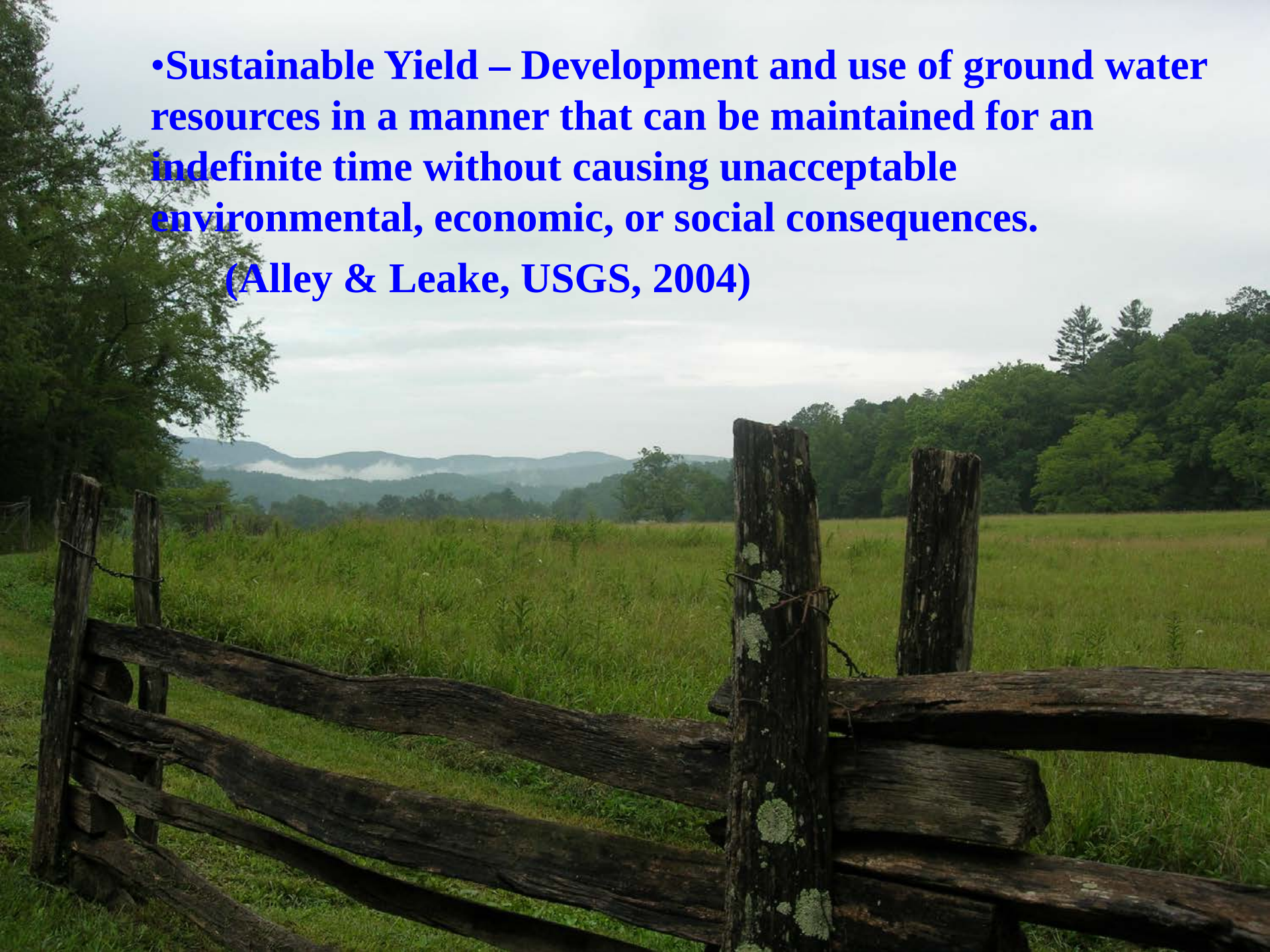
D. Todd Fugitt, RPG
Geology Supervisor, ANRC

Jim Battreal, RPG
Senior Geologist, ANRC

Aquifers of Arkansas

Protection, Management, and Hydrologic and Water-Quality Characteristics of Arkansas' Groundwater

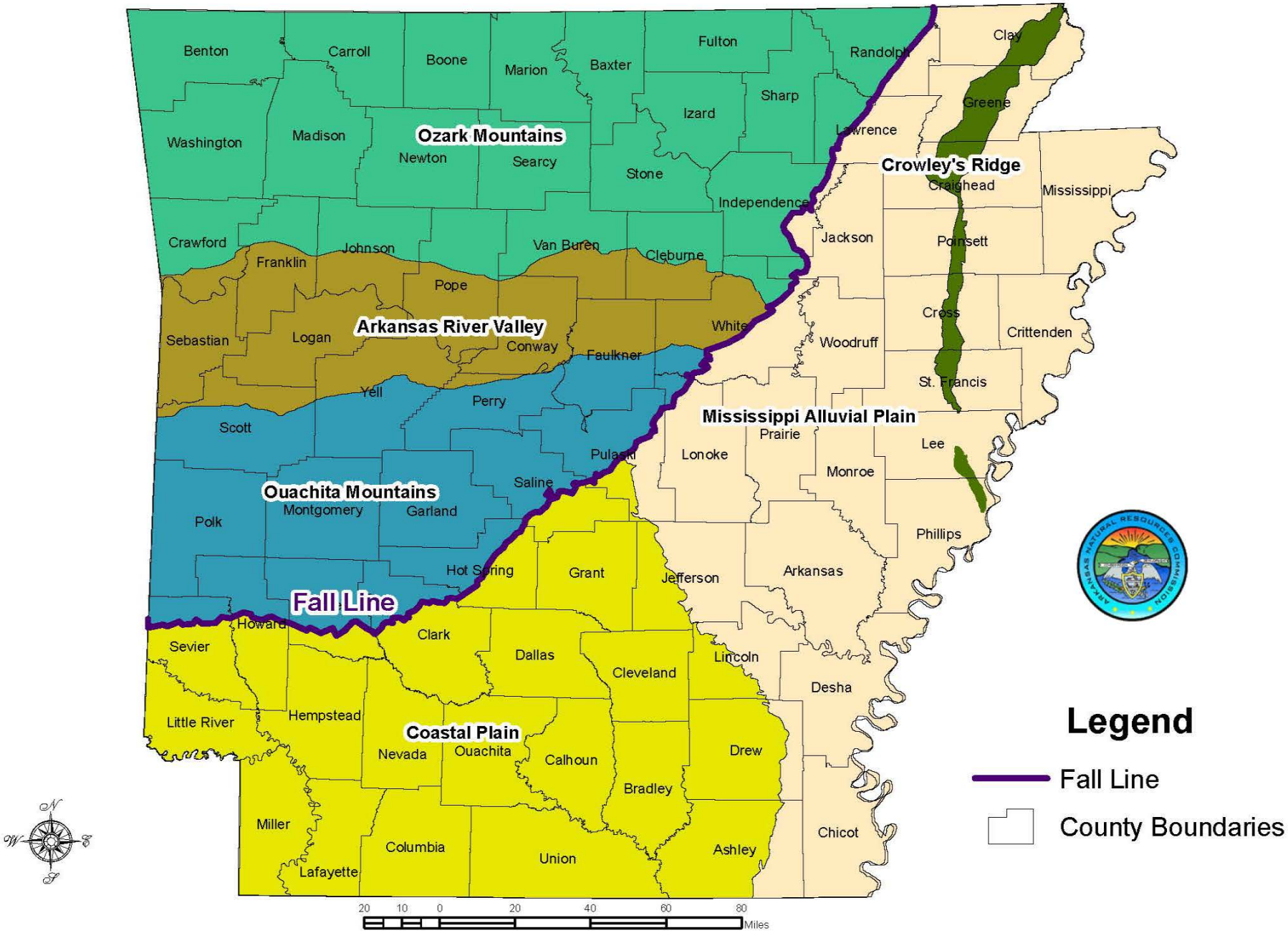
Timothy M. Kresse and Phil Hays USGS Arkansas Water Science Center
Todd Fugitt, Arkansas Natural Resources Commission



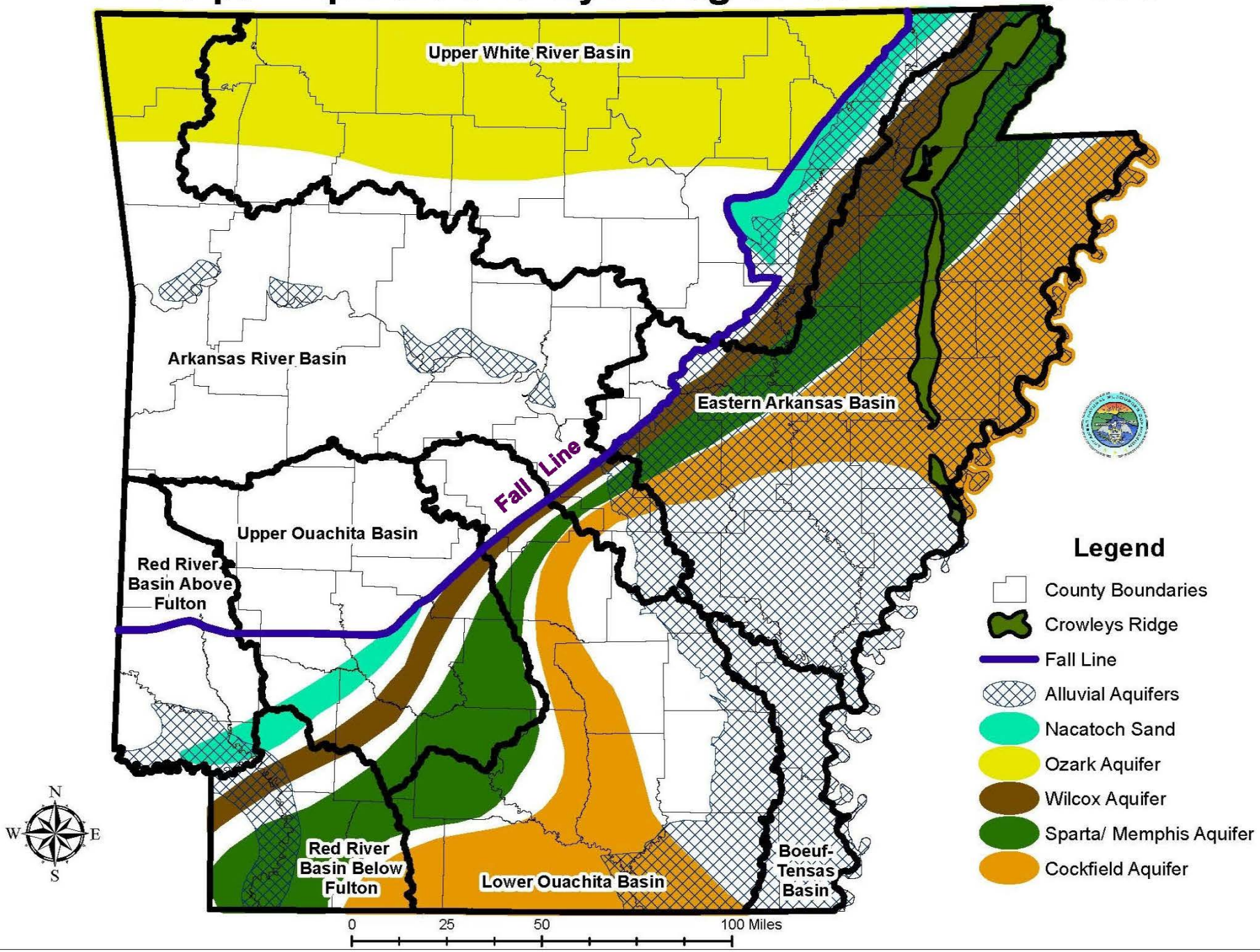
- **Sustainable Yield – Development and use of ground water resources in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences.**

  (Alley & Leake, USGS, 2004)

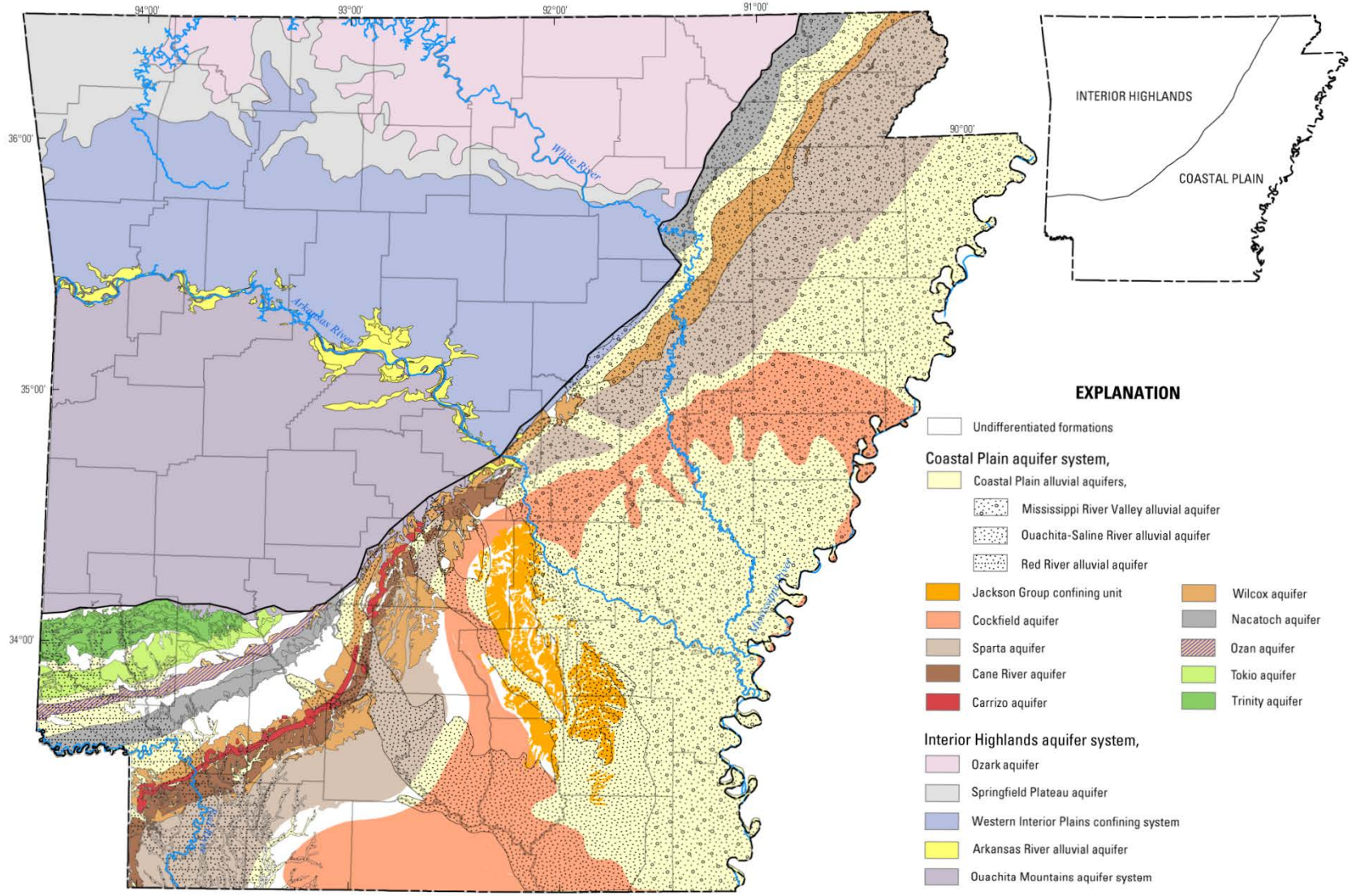
Physiographic Regions of Arkansas



Principal Aquifers and Hydrologic Basins in Arkansas



The Sixteen Aquifers of Arkansas



Base from U.S. Geological Survey digital data, Universal Transverse Mecator projection, 15 North North American Datum, 1983

0 20 40 80 MILES

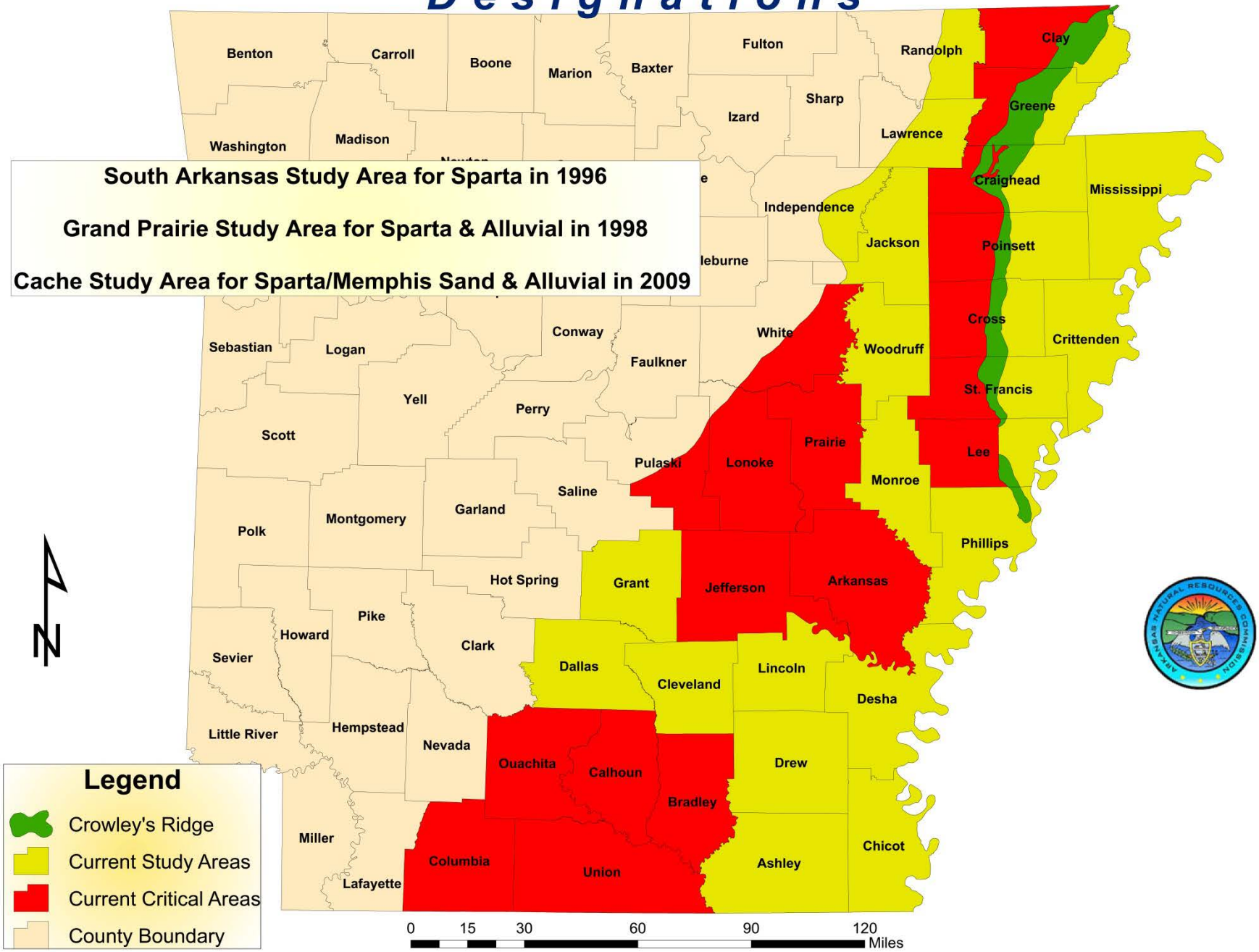
0 20 40 80 KILOMETERS

Hydrogeologic data modified from Boswell, 1965; Hosman and others, 1968; Hosman, 1982; Petersen and others, 1985; Payne, 1968; Hosman, 1986; Haley and others, 1993

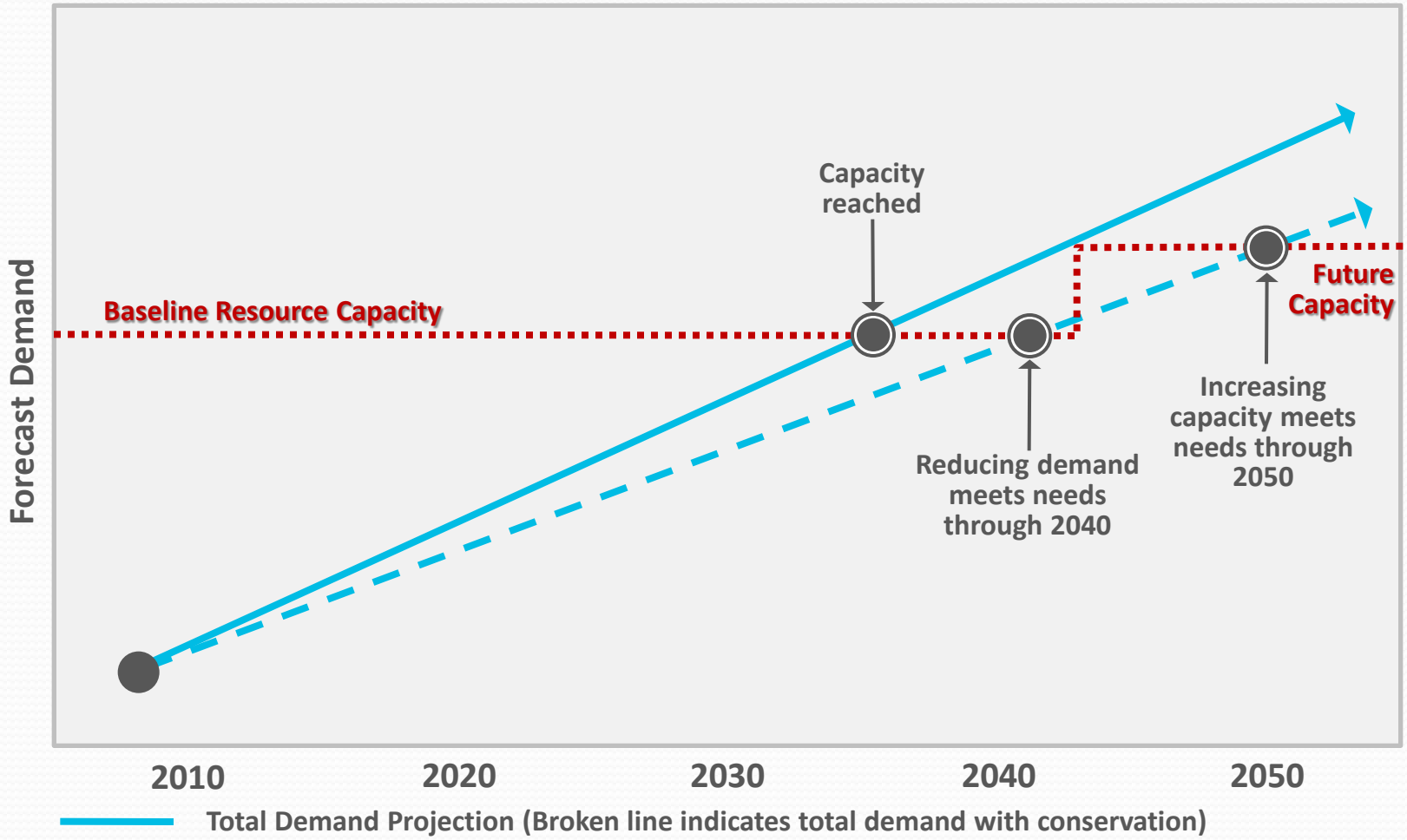
Location, Age, Use, Aquifer Codes, and Number of Water-Quality Sites

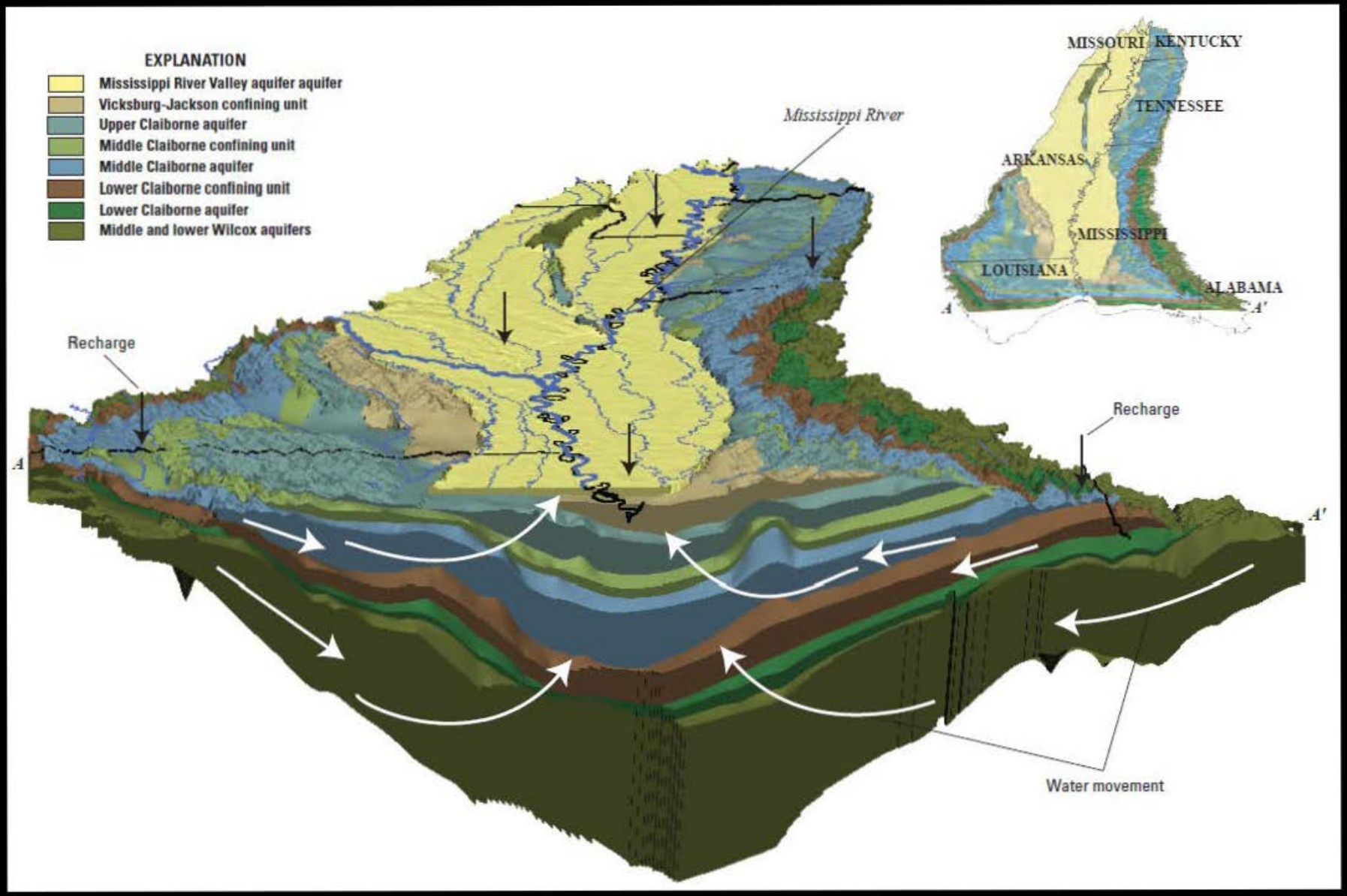
Major Division	Province	Section	Formation or Group of Formations	Geologic Age	Hydrogeologic Unit Name	Aquifer Code	Aquifer Use[1]	Water-Quality Sites
Atlantic Plain	Coastal Plain	Mississippi Alluvial Plain and West Gulf Coastal Plain	Coastal Plain Alluvium	Quaternary	Mississippi River Valley, Ouachita-Saline, and Red River alluvial aquifers	110ALVM, 112ALVM 112VLTR, 112TRRC	IR, ps, in	4,061
			Jackson Group	Tertiary	Vicksburg-Jackson confining unit	124JCKS	D	68
			Cockfield Formation	Tertiary	Cockfield aquifer	124CCKF	IN, IR, ps	257
			Sparta Sand	Tertiary	Sparta aquifer	12405MP, 124SPRT, 124MMPS	IR, PS, IN	1,626
			Cane River Formation	Tertiary	Cane River aquifer	124CRVR, 124CANR	PS, d	45
			Carrizo Sand	Tertiary	Carrizo aquifer	124CRRZ	D	12
			Wilcox Group	Tertiary	Wilcox aquifer	124WLCX, 124WLCXG	PS, ir, in	170
			Nacatoch Sand	Cretaceous	Nacatoch aquifer	211NCTC	PS	143
		West Gulf Coastal Plain	Ozan Formation	Cretaceous	Ozan aquifer	212OZAN	D	14
			Tokio Formation	Cretaceous	Tokio aquifer	212TOKO	PS, in	165
			Trinity Group	Cretaceous	Trinity aquifer	218TRNT	PS, in	38
Interior Highlands	Ouachita Province	Arkansas Valley	Arkansas River Valley Alluvium	Quaternary	Arkansas River Valley alluvial aquifer	110ALVM, 110TRRC 112TRRC	PS, IR, d	680
		Ouachita Mountains	Collier Shale through Boggy Formation[4]	Cambrian through Pennsylvanian	Ouachita Mountains aquifer	325HRSR, 325MCAL 326ATOK, 328JKFK 330ARKS, 330HSPG 330STNL, 350MSRM 361PKCK, 364BGFK	D	162
	Ozark Plateaus	Boston Mountains	Moorefield Formation through McAlester Formation[2]	Mississippian and Pennsylvanian	Western Interior Plains Confining System	325HRSR, 325MCAL 326ATKN, 326ATOK 328BLYD, 328CNHL 328JKFK, 3331BSVL 331MFLD, 331PTKN	D	287
		Springfield-Salem Plateaus	Boone Formation	Mississippian	Springfield Plateau aquifer	330BOON	D, ps	95
			Van Buren Formation through Clifty Limestone[3]	Ordovician through Devonian	Ozark aquifer	361FRVL, 364EVRN 364JCHM, 364STPR 367CTJF, 367CTTR 368PWLL, 371POTS 367RBDX, 367GNTR	PS, d	131

Critical Groundwater Designations

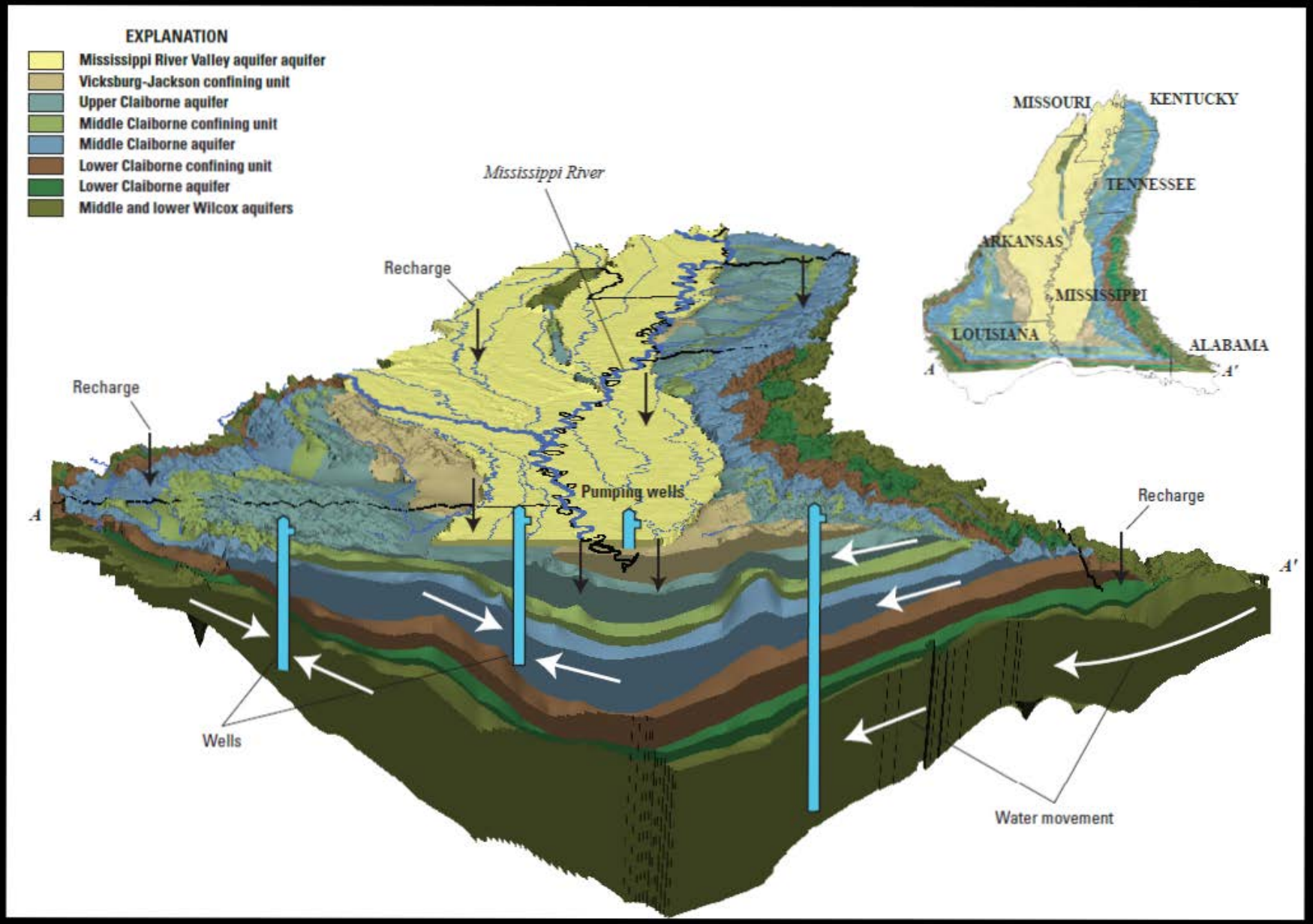


Water Supply Planning – Demand and Supply





Predevelopment



Postdevelopment

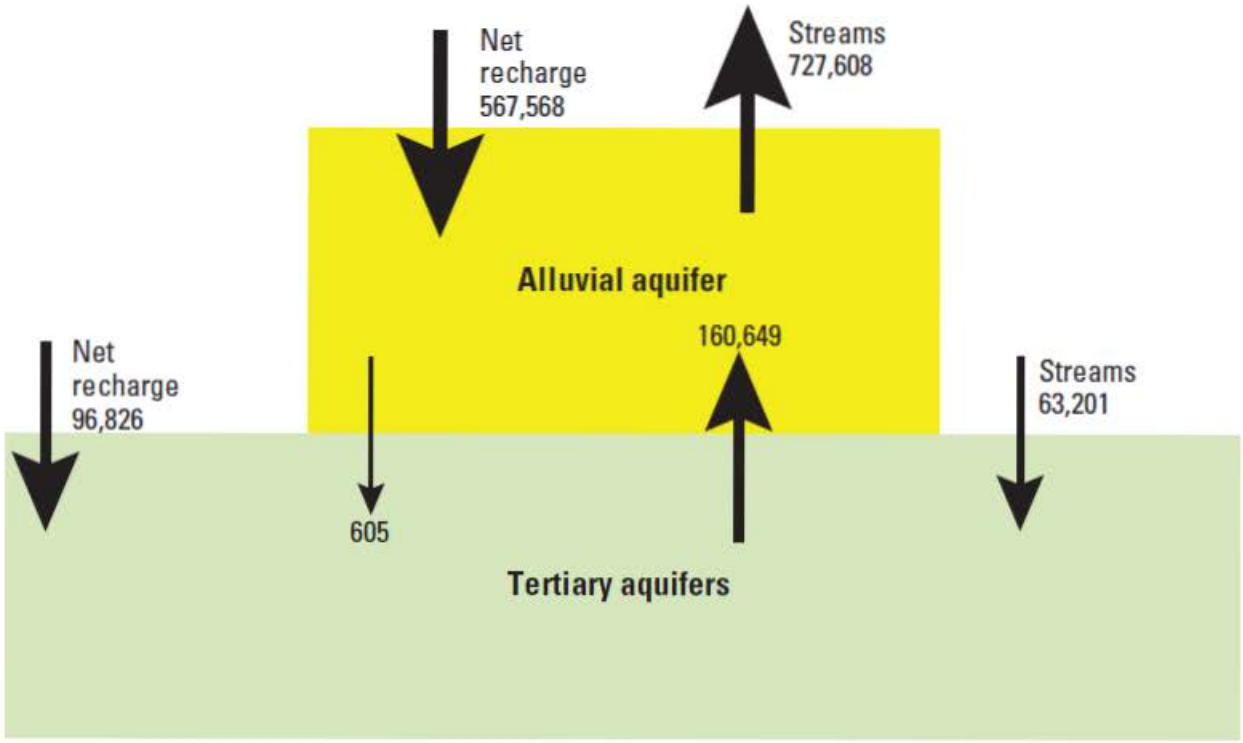


Figure 8. Predevelopment groundwater-flow budget of the alluvial and Tertiary systems, in acre-feet per year.

Predevelopment

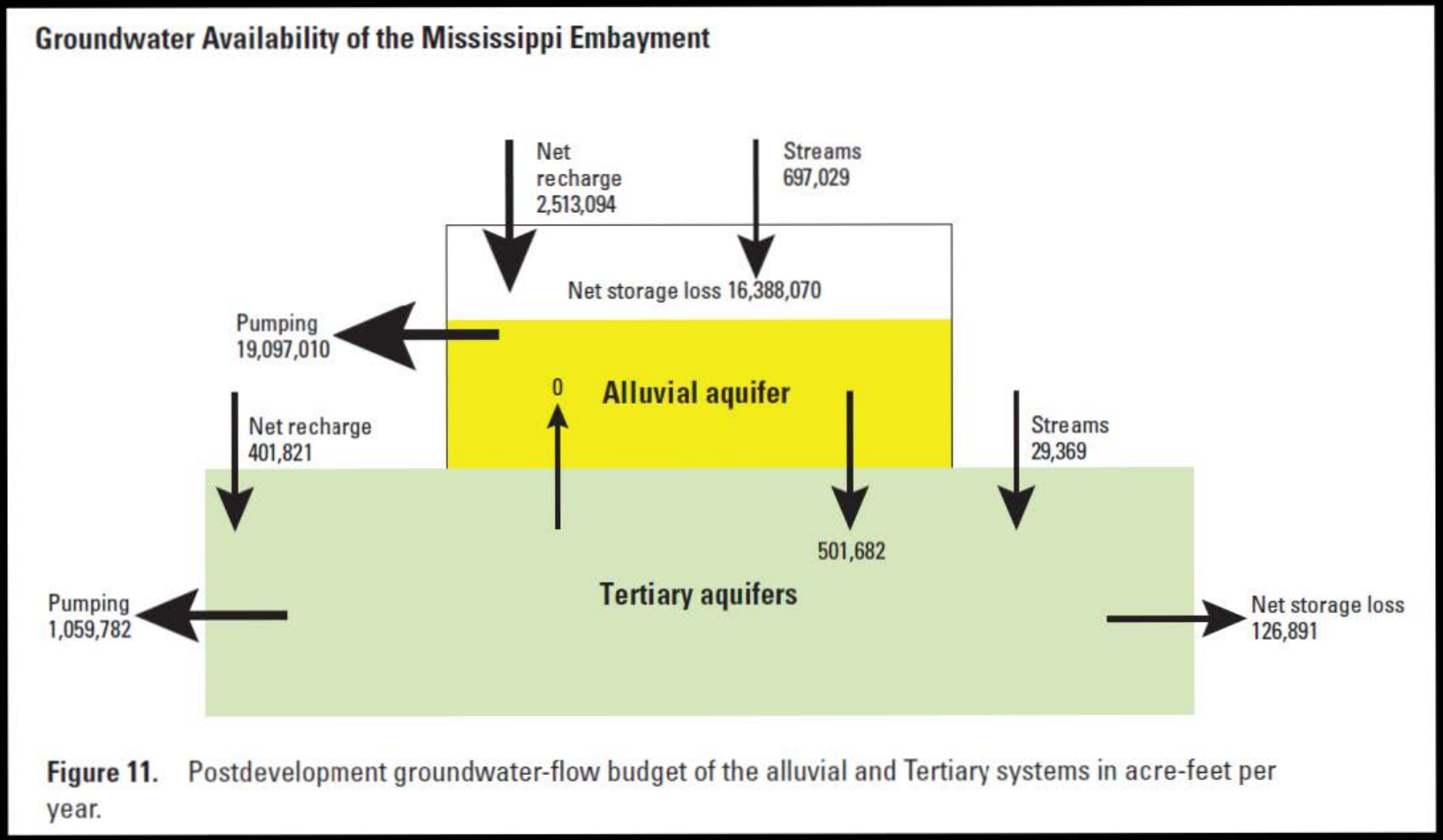
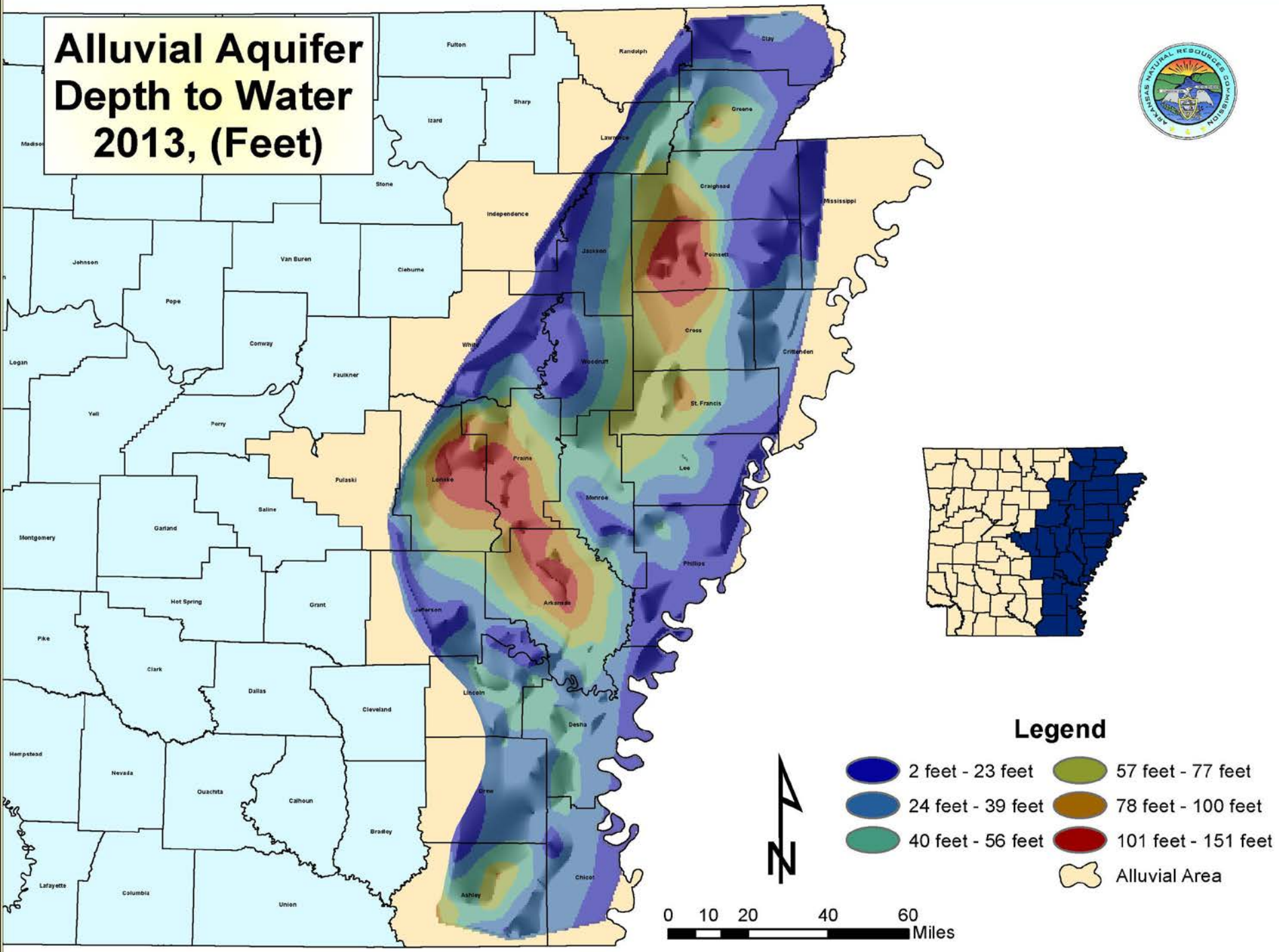


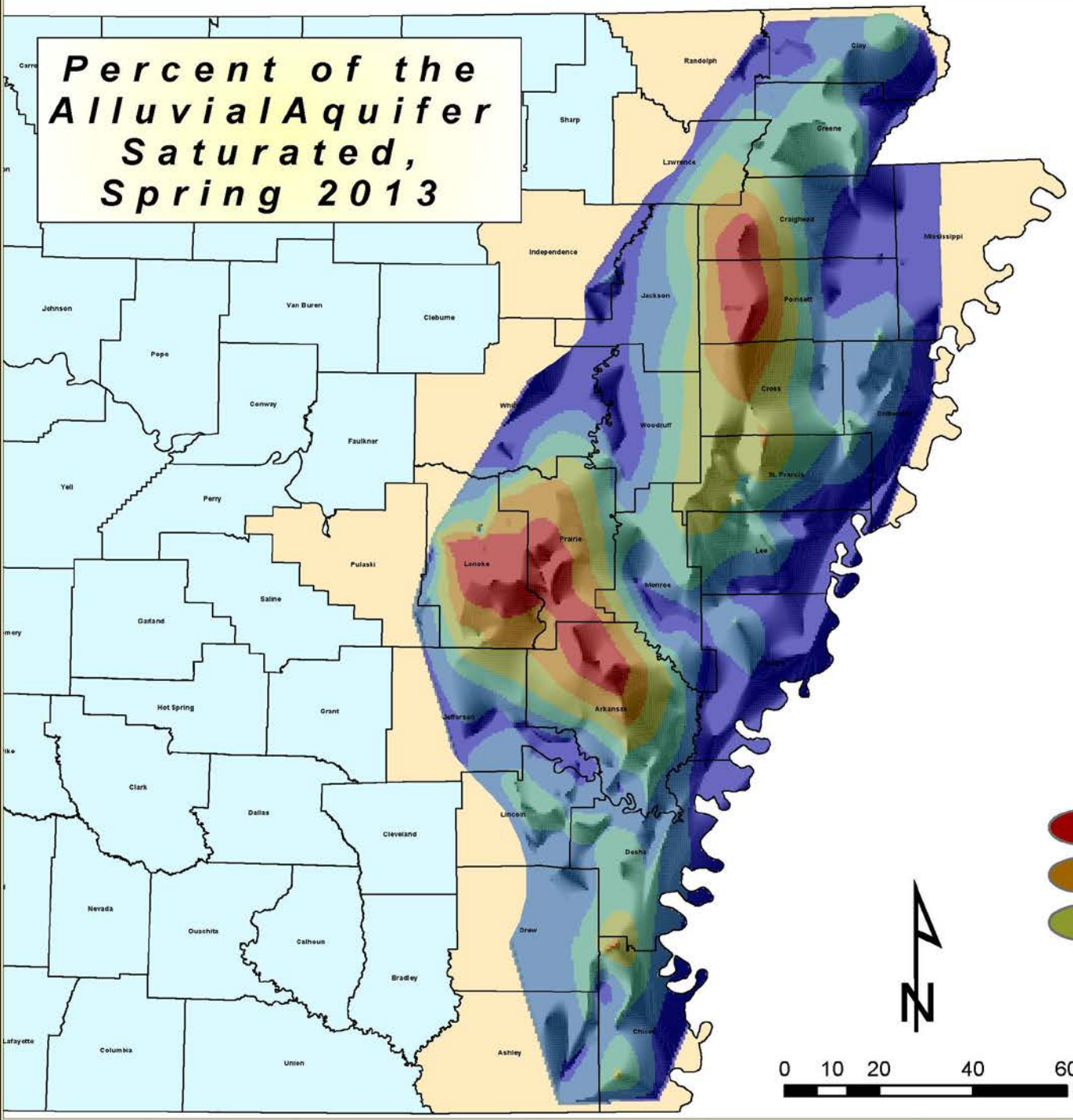
Figure 11. Postdevelopment groundwater-flow budget of the alluvial and Tertiary systems in acre-feet per year.

Postdevelopment

Alluvial Aquifer Depth to Water 2013, (Feet)



Percent of the Alluvial Aquifer Saturated, Spring 2013

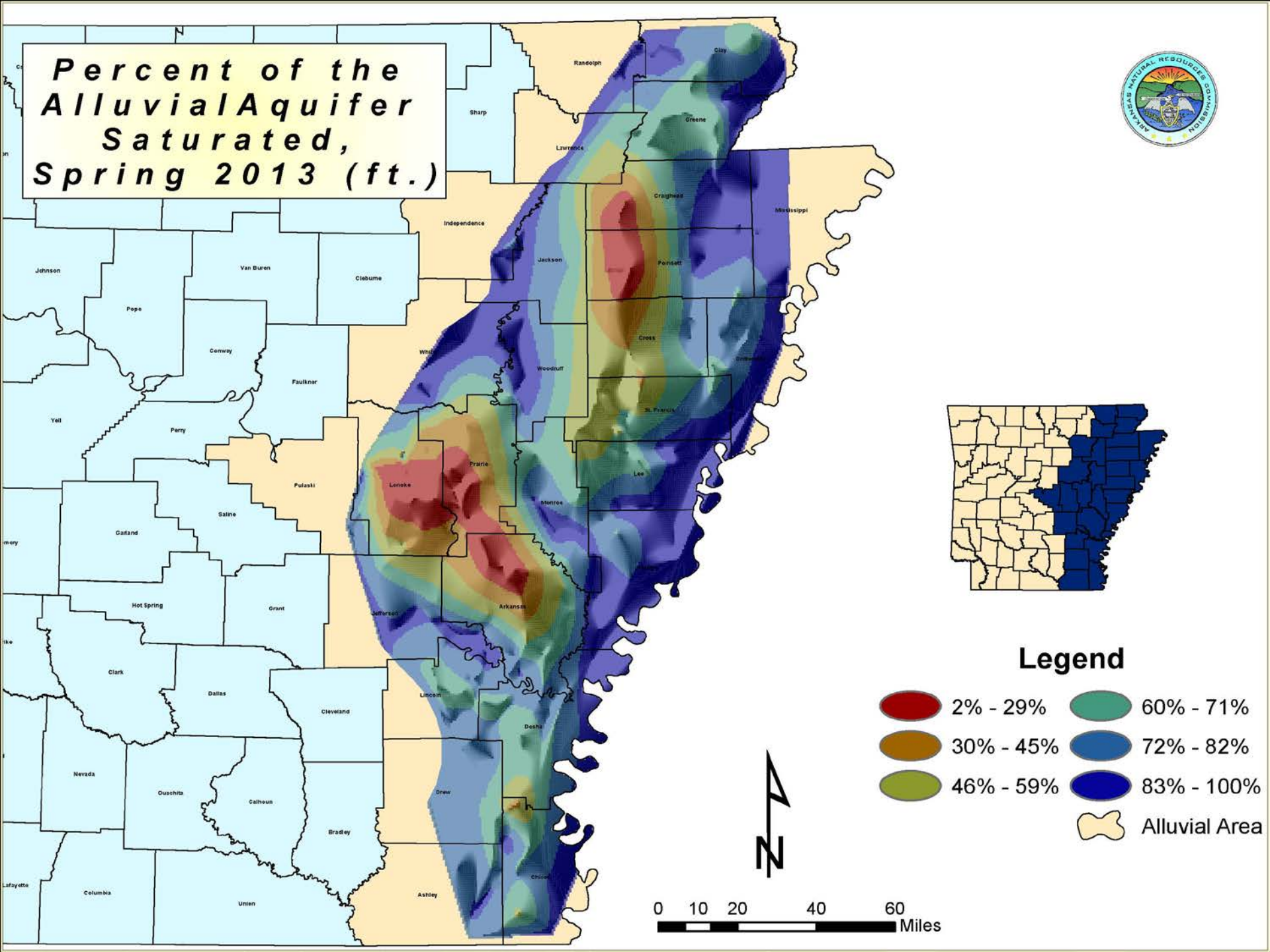


Legend

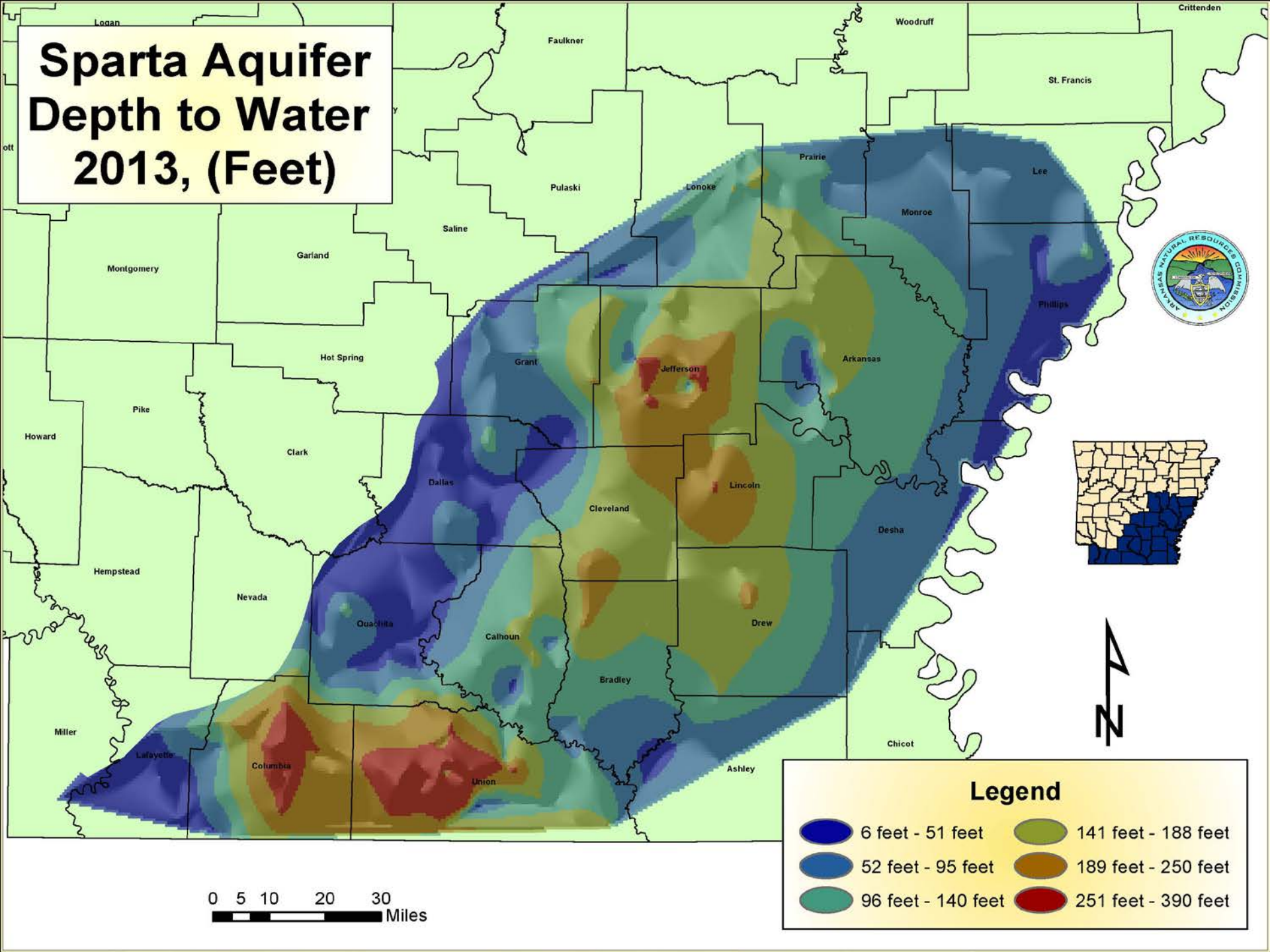
- 2% - 29%
- 30% - 45%
- 46% - 59%
- 60% - 71%
- 72% - 82%
- 83% - 100%
- Alluvial Area

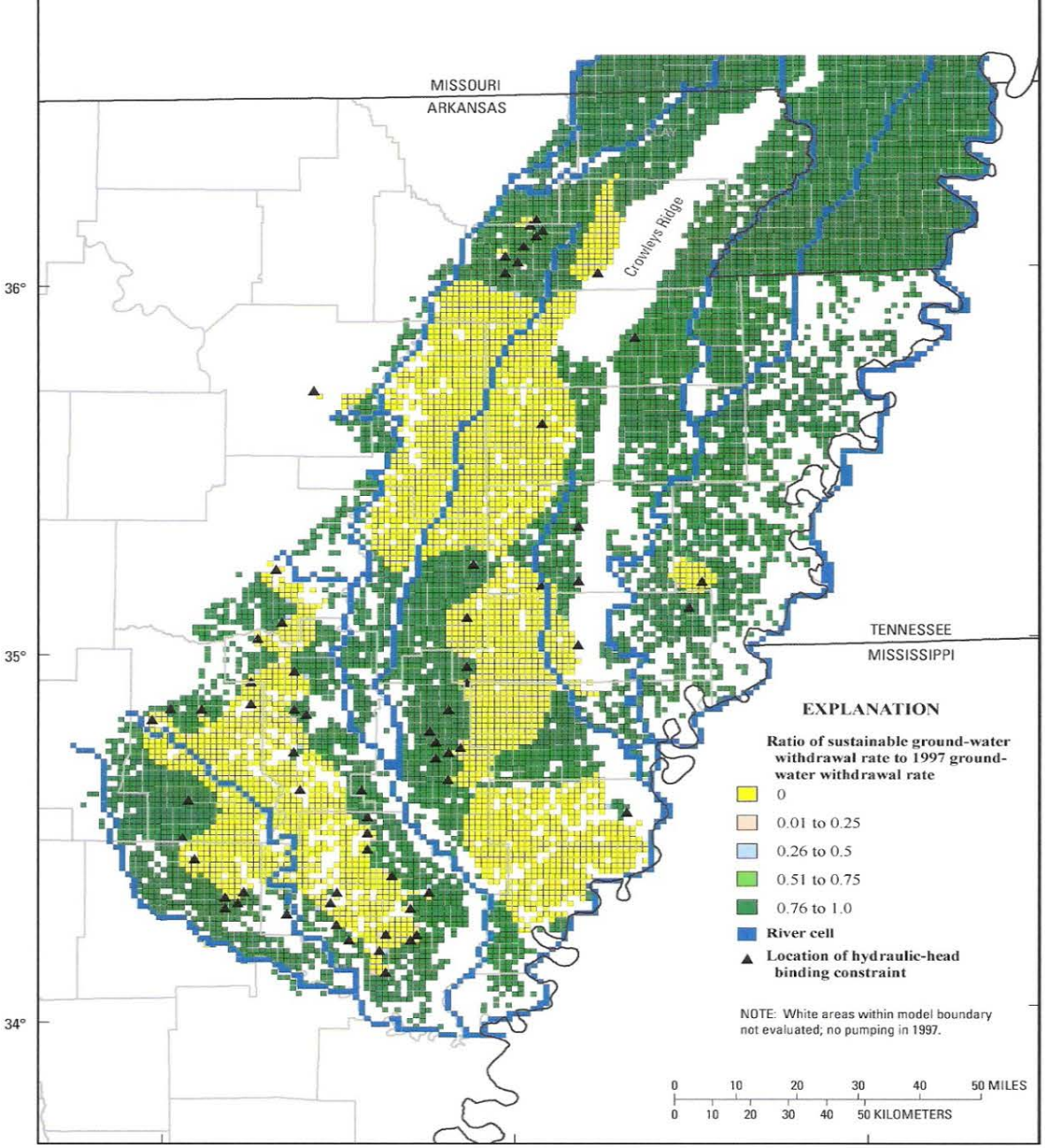
N

0 10 20 40 60 Miles


Percent of the AlluvialAquifer Saturated, Spring 2013 (ft.)
Randolph
Clay
Sharp
Greene
Lawrence
Craighead
Mississippi
Independence
Jackson
Poinsett
Johnson
Van Buren
Cleburne
Pope
Conway
Cross
Faulkner
Woodruff
Yell
Perry
St. Francis
Prairie
Pulaski
Lonoke
Lee
Monroe
Saline
Garland
Hot Spring
Grant
Arkansas
Jefferson
Clark
Dallas
Lincoln
Cleveland
Desha
Nevada
Ouachita
Calhoun
Drew
Bradley
Columbia
Union
Ashley
Legend
2% - 29%
30% - 45%
46% - 59%
60% - 71%
72% - 82%
83% - 100%
Alluvial Area
N
0 10 20 40 60
Miles

Sparta Aquifer Depth to Water 2013, (Feet)





Base from U.S. Census Tiger/line files, 2003

Figure 2. Optimized ground-water withdrawal rates and binding-constraint locations for scenario 1 (baseline), maximum withdrawal ratio of 1.0.

QUESTIONS?
www.anrc.arkansas.gov
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