

# Arkansas Irrigation

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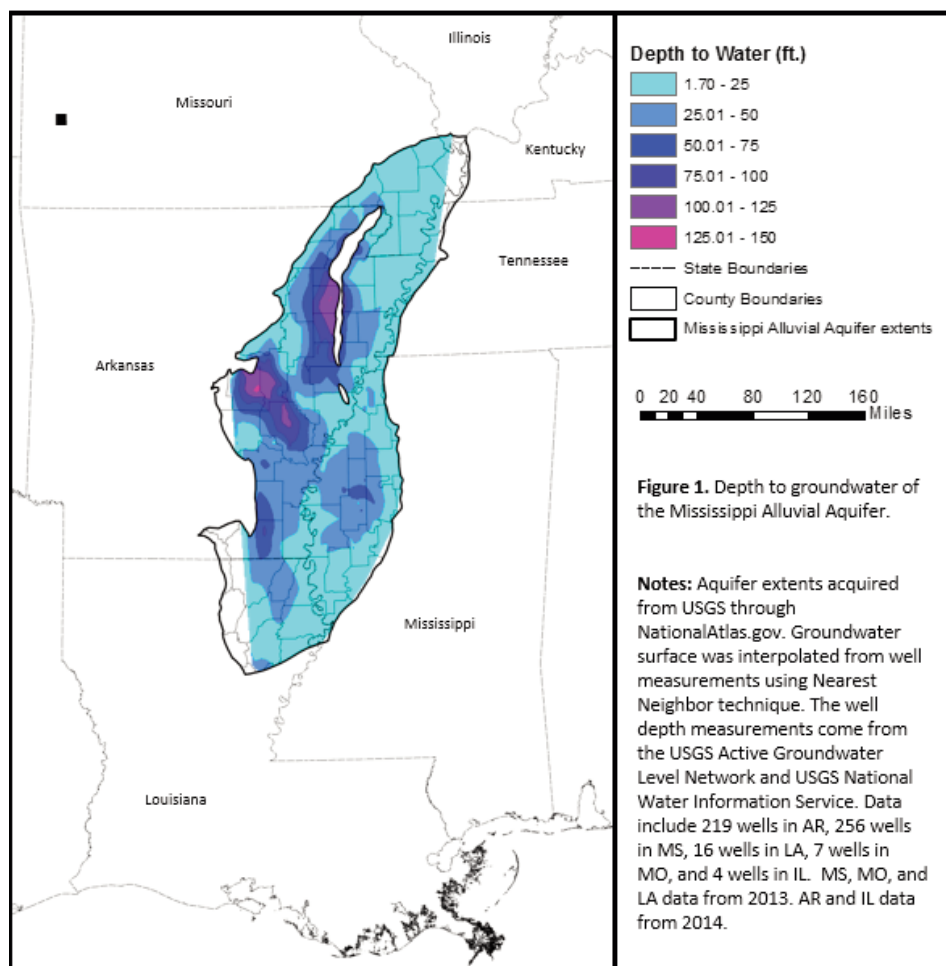
Irrigation is a critical component of the agricultural economy of Arkansas. Among the top five agricultural commodities by farm receipts in 2012 were soybean, rice and cotton. All of these crops depend on irrigation to increase yields. The information in the figures and tables below comes from the 2007 and 2012 Censuses of Agriculture and the USDA 2013 Farm and Ranch Irrigation Survey. The purpose of this

fact sheet is to indicate the trends and magnitude of irrigated agriculture in the state and to provide comparisons with other states that heavily depend on irrigation.

## Mississippi Alluvial Aquifer

The Mississippi Alluvial Aquifer (or “alluvial aquifer”) lies beneath the states of Arkansas, Louisiana,

**Figure 1. The Mississippi Alluvial Aquifer**



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Mississippi, Missouri, Illinois, Kentucky and Tennessee. The aquifer extends over roughly 19,000 square miles in Arkansas.

The depth to water in the aquifer varies from 1.7 to 150 feet at the deepest section. The shallowest depths run along the Mississippi River, while the aquifer surface gets deeper further away from the river. The deepest area is near the center of Arkansas.

## Arkansas Critical Groundwater Areas

Critical groundwater areas defined by the Arkansas Natural Resources Commission are areas determined to have “significant groundwater depletion or degradation.”

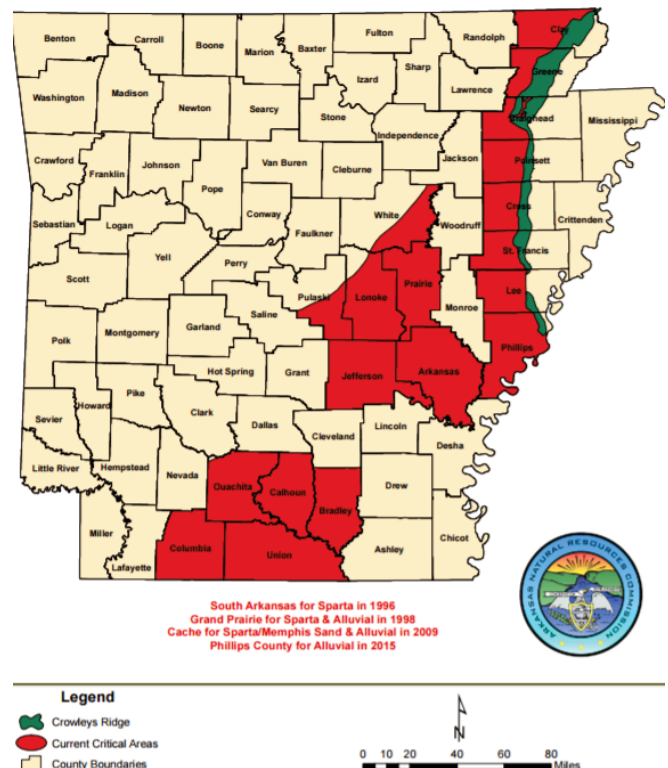
The critical groundwater areas are concentrated in the Delta and in South Central Arkansas. Groundwater depletion in the Delta is most significant in the Grand Prairie and at the western edge of Crowley’s Ridge. This is where water-intensive rice production is the most prominent (Figure 2).

Farmers in critical groundwater areas receive higher priority to qualify for state and federal cost-sharing programs and tax credits for conservation practices.

## Arkansas Is One of the Leading States in Irrigated Acres

As of 2012, Arkansas has the third largest irrigated acres, totaling 4.8 million acres (Figure 3).

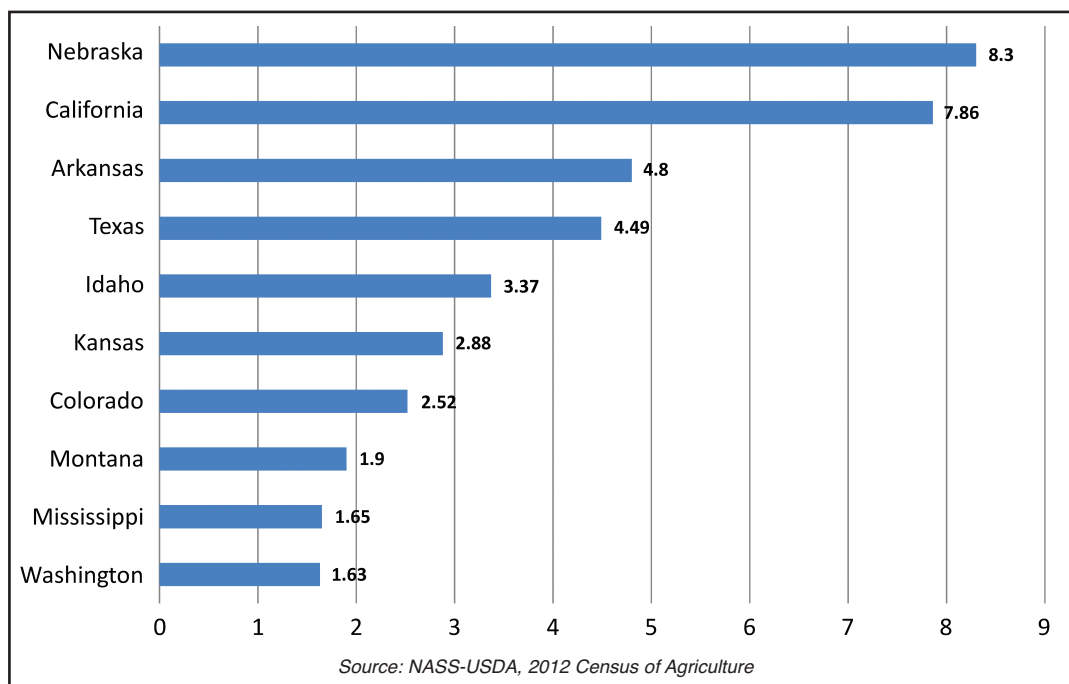
**Figure 2. Critical groundwater areas.**



Between 2007 and 2012 agricultural census years, Arkansas’ irrigated base expanded by 343,220 acres.

Out of the 55.8 million acres nationally under irrigation in 2012, about 8.6 percent are located in Arkansas.

**Figure 3. Top ten states in total irrigated acres (million acres).**



- About three out of five cropland acres in Arkansas are under irrigation.

## Irrigation Expansion

Arkansas' irrigated acres expanded more than all other states, with the exception of Mississippi (Table 1).

In general, the Western states saw a decline in irrigated acres over the five-year period due to water supply scarcity caused by drought.

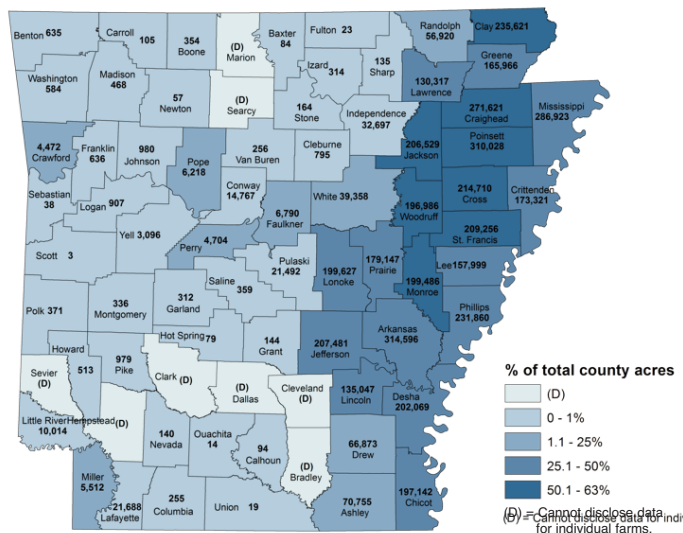
Irrigation expanded in the Southern states where water is more readily available and prolonged drought conditions are less frequent.

## State's Irrigation Concentration

The percentage of irrigated acres in Arkansas counties roughly corresponds to each county's proximity to the Mississippi Alluvial Aquifer (Figure 4).

Arkansas' irrigated acres lie mostly in the Delta region and along the Mississippi and Arkansas rivers. This is because those farms typically have more productive soils and water availability.

**Figure 4. Total irrigated acres by county for 2012.**



Source: NASS-USDA, 2012 Census of Agriculture

There is also a substantial number of irrigated acres in the River Valley and along the Red River.

## County Irrigation Changes, 2007-2012

Between 2007 and 2012, 17 of the top 25 counties in Arkansas experienced an expansion of irrigated acreage (Table 2).

While the overall net change in irrigated acres was positive, there was much variation in growth rate between different counties.

**Table 1. Irrigation Expansion, 2007-2012.**

National Ranking	State	Change in Irrigated Acres 2007-2012	
		Acreage	Percentage
1	Nebraska	-261,986	-3.1%
2	California	-154,495	-1.9%
3	Arkansas	343,220	7.7%
4	Texas	-521,253	-10.4%
5	Idaho	65,403	2.0%
6	Kansas	118,544	4.3%
7	Colorado	-351,172	-12.2%
8	Montana	-110,148	-5.5%
9	Mississippi	283,317	20.7%
10	Washington	-102,346	-5.7%

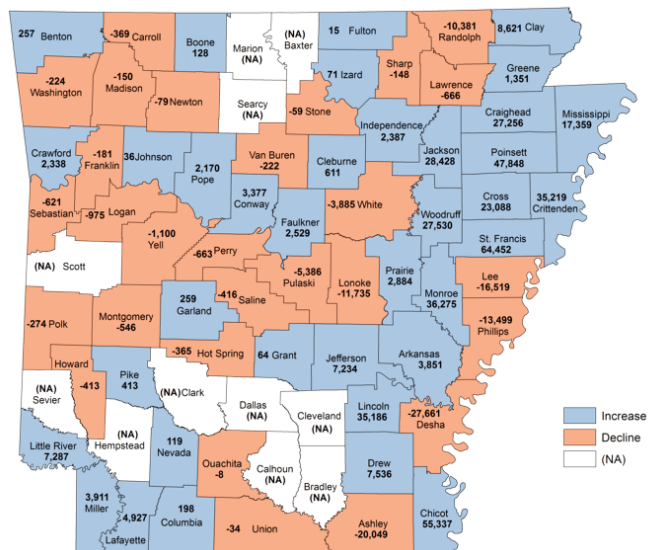
Source: NASS-USDA, 2012 Census of Agriculture

**Table 2. Top 25 Arkansas counties in 2012 total irrigated acres.**

County	Irrigated Acres		2007-2012 Change in Irrigated Acres	
	2012	2007	Acres	%
Arkansas	314,596	310,745	3,851	1%
Poinsett	310,028	262,180	47,848	18%
Mississippi	286,923	269,564	17,359	6%
Craighead	271,621	244,365	27,256	11%
Clay	235,621	227,000	8,621	4%
Phillips	231,860	245,359	-13,499	-6%
Cross	214,710	191,622	23,088	12%
St. Francis	209,256	144,804	64,452	45%
Jefferson	207,481	200,247	7,234	4%
Jackson	206,529	178,101	28,428	16%
Desha	202,069	229,730	-27,661	-12%
Lonoke	199,627	211,362	-11,735	-6%
Monroe	199,486	163,211	36,275	22%
Chicot	197,142	141,805	55,337	39%
Woodruff	196,986	169,456	27,530	16%
Prairie	179,147	176,263	2,884	2%
Crittenden	173,321	138,102	35,219	26%
Greene	165,966	164,615	1,351	1%
Lee	157,999	174,518	-16,519	-9%
Lincoln	135,047	99,861	35,186	35%
Lawrence	130,317	130,983	-666	-1%
Ashley	70,755	90,804	-20,049	-22%
Drew	66,873	59,337	7,536	13%
Randolph	56,920	67,301	-10,381	-15%
White	39,358	43,243	-3,885	-9%

Source: NASS-USDA, 2012 Census of Agriculture

**Figure 5. Change in irrigated acres by county, 2007-2012.**



Source: NASS-USDA, 2012 Census of Agriculture

St. Francis, Chicot and Poinsett counties were the leading contributors to the increase in irrigated acres. Collectively these three counties account for 167,637 acres of increased irrigation acreage, a 34 percent increase over the five-year period. Six counties, all in the Delta, had decreases of over 10,000 acres.

## Water Application Rates by State

Arkansas ranks third among states in total volume of water applied for irrigation (Figure 6).

The total water applied in 2013 to Arkansas irrigated acres was 6.45 million acre-feet.

The average irrigation water applied per acre in Arkansas in 2013 was 16 inches.

This is the same rate of application as Texas but less than the 37 inches in California and more than the 12 inches in Nebraska.

## Percentage of Irrigation Water by Source Type

Nebraska, Arkansas and Texas obtain over 80 percent of their irrigation water from groundwater sources. At 13.9 percent, Arkansas has the highest percentage of on-farm surface water used for irrigation of the five states that irrigate most (Figure 7).

California and Idaho use off-farm water for over 45 percent of their irrigation needs, while Nebraska, Arkansas and Texas use less than 10 percent from off-farm sources.

## Prominence of Gravity Application

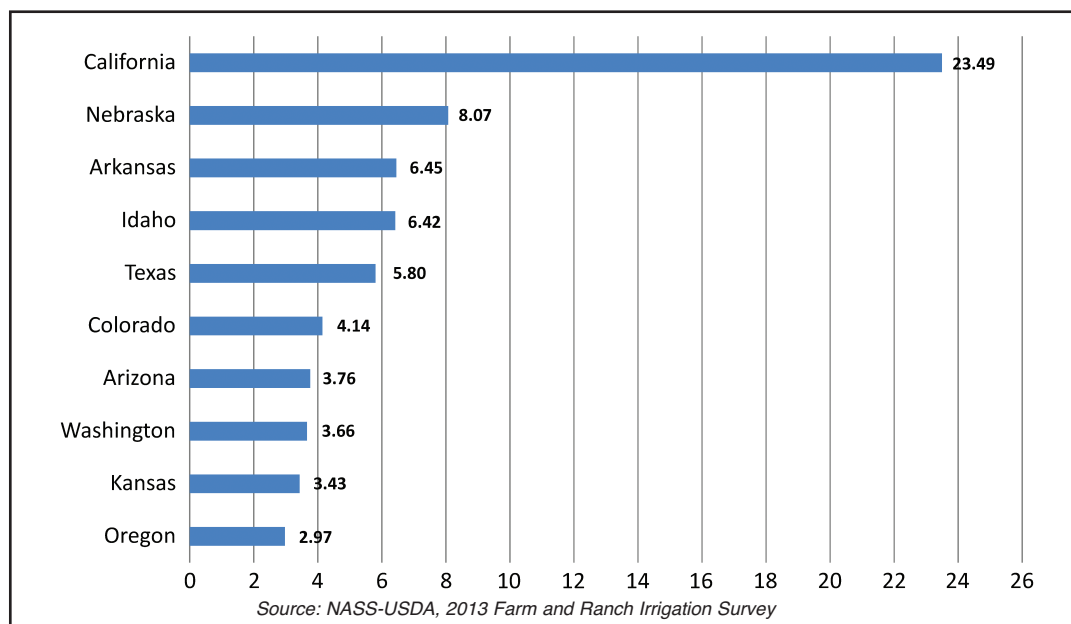
Gravity application systems make up 86 percent of the irrigated systems used in Arkansas (Figure 8).

This is due to the large number of rice acres in Arkansas under flood irrigation and the fact that furrow irrigation is typically less expensive than sprinkler irrigation.

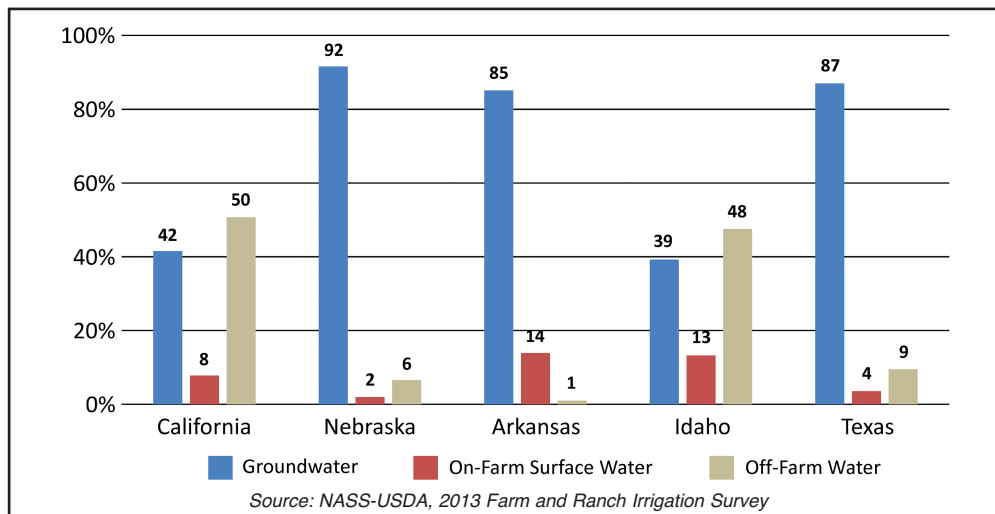
## Flow Meter Use by State

States that use the alluvial aquifer have 6 percent or less of irrigated acres that use flow meters (Figure 9). The percentage is likely higher in Mississippi now since their 2011 metering program.

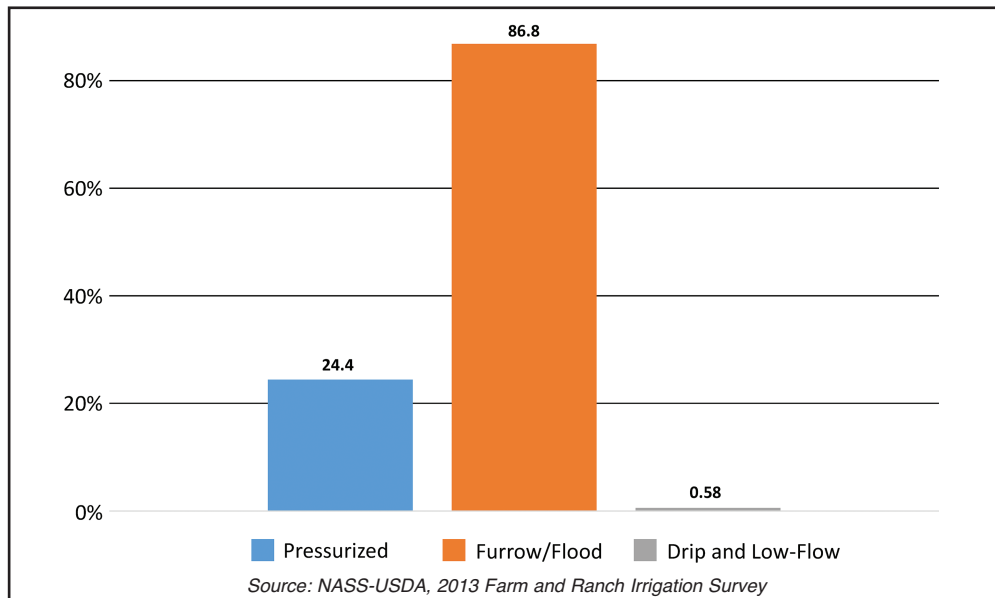
**Figure 6. Top ten states in quantity of water applied.**  
Total Acre-Feet of Water Applied (million acre-feet)



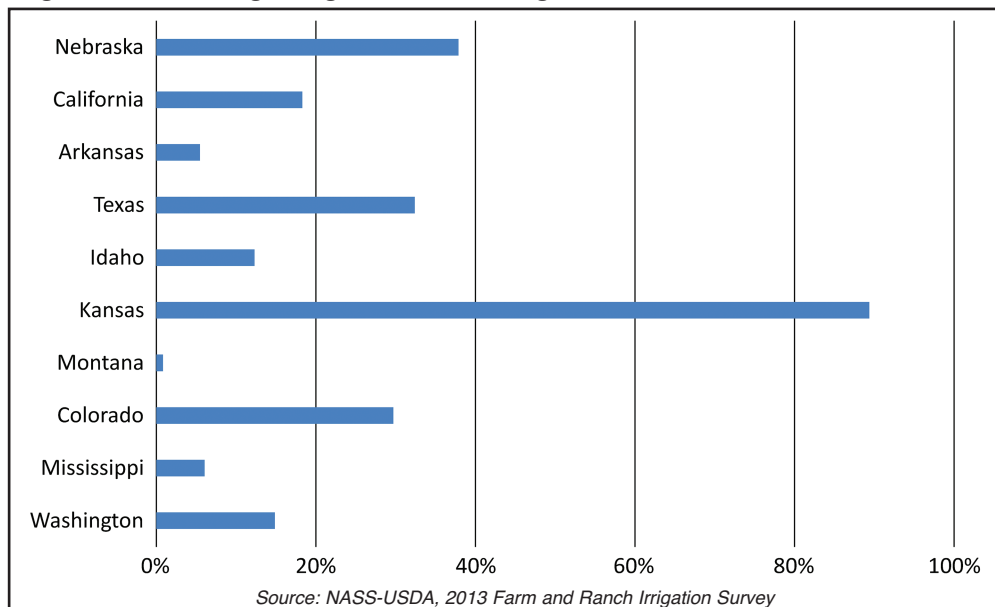
**Figure 7. Percentage quantity of water applied by source: 2013.**



**Figure 8. Arkansas irrigated acreage by type of system: 2013.**



**Figure 9. Percentage irrigated acres using flow meters: 2013.**



The four states that rank highest in the use of flow meters draw water primarily from the High Plains Aquifer.

## Summary

- Irrigation in Arkansas is expanding, especially in the northeastern part of the state and along the Mississippi River.
- The vast majority of Arkansas irrigation is gravity flow sourced from the Mississippi Alluvial Aquifer.
- Arkansas producers have more irrigated acres and apply more irrigation water than 47 other states.

## References

For additional information see:

- Arkansas Natural Resources Commission at [https://static.ark.org/eeuploads/anrc/Critical\\_area\\_Fact\\_Sheet\\_2015.pdf](https://static.ark.org/eeuploads/anrc/Critical_area_Fact_Sheet_2015.pdf)
- Lower Mississippi Gulf Water Science Center, USGS at <https://www.usgs.gov/centers/lmg-water/>
- U.S. Census of Agriculture at <https://www.agcensus.usda.gov/Publications/2012/> and [https://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Farm\\_and\\_Ranch\\_Irrigation\\_Survey/](https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Farm_and_Ranch_Irrigation_Survey/)

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