

# Groundwater Use in the Arbuckle-Simpson Aquifer

The Arbuckle-Simpson aquifer is located in south-central Oklahoma and underlies more than 500 square miles near the towns of Ada and Sulphur. Water from the aquifer is withdrawn for public water supply, domestic, irrigation, mining, and other uses. This fact sheet describes historical (1964-2008) and recent (2004-2008) groundwater use from the aquifer. The focus of the Arbuckle-Simpson Hydrology Study was the eastern Arbuckle-Simpson aquifer, where most permitted groundwater withdrawals occur.

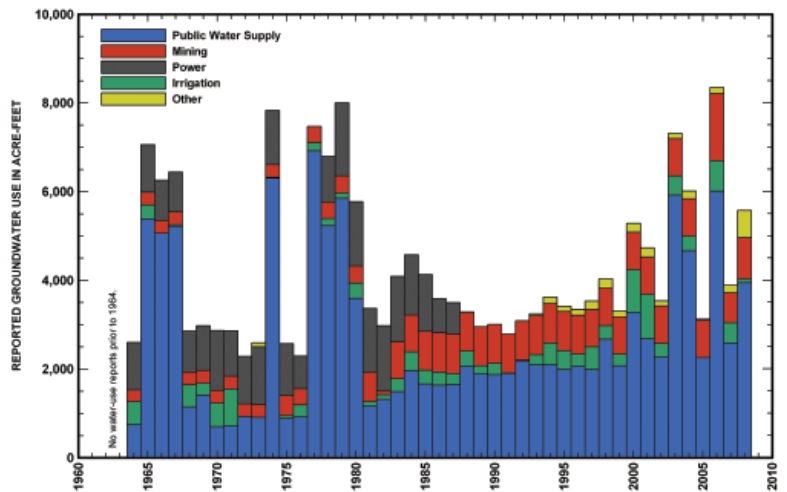
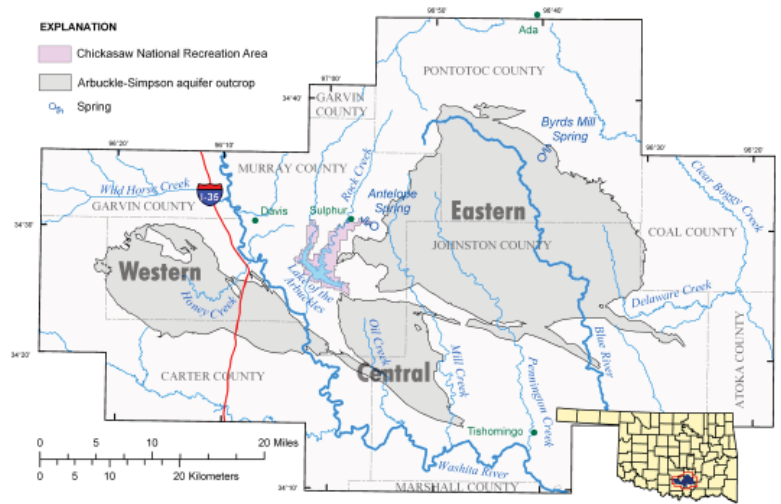
## Reported Water Use

Permitted users of groundwater in Oklahoma are required by statute to report annual water use to the Oklahoma Water Resources Board (OWRB). From 1964 through 2008, average annual reported groundwater use from the eastern Arbuckle-Simpson aquifer was 4,299 acre-feet with a median annual use of 3,532 acre-feet.

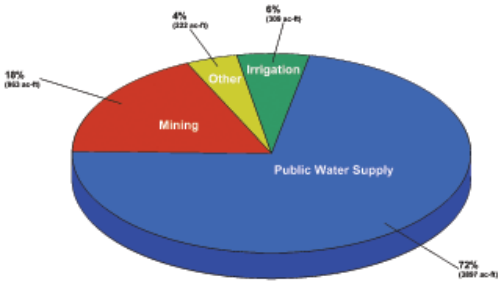
Historically, most of the water withdrawn from the aquifer serves public water supply systems, including the towns of Ada, Mill Creek, Roff, and Sulphur; Murray Co. RWD #1; and Johnston Co. RWD #3. On average, from 1964-2008, 63% of the total annual use of groundwater was for public water supply. The two largest consumers during this period were the cities of Ada (annual average 1,140 acre-feet) and Sulphur (annual average 939 acre-feet). Combined, Sulphur and Ada accounted for 77% of the average annual public water supply use and 48% of the total use.

Ada's minimum and maximum annual use ranged from 0 acre-feet (in 1964, 1970, 1975, and 1976) to 5,889 acre-feet (in 2003) with a median of 78 acre-feet (in 1989). The large range in Ada's groundwater use is directly related to discharge from Ada's primary water source, Byrds Mill Spring. When discharge from the spring falls below a certain threshold, Ada withdraws groundwater from wells to preserve streamflow for downstream landowners. (Water withdrawals from springs are reported as surface water use).

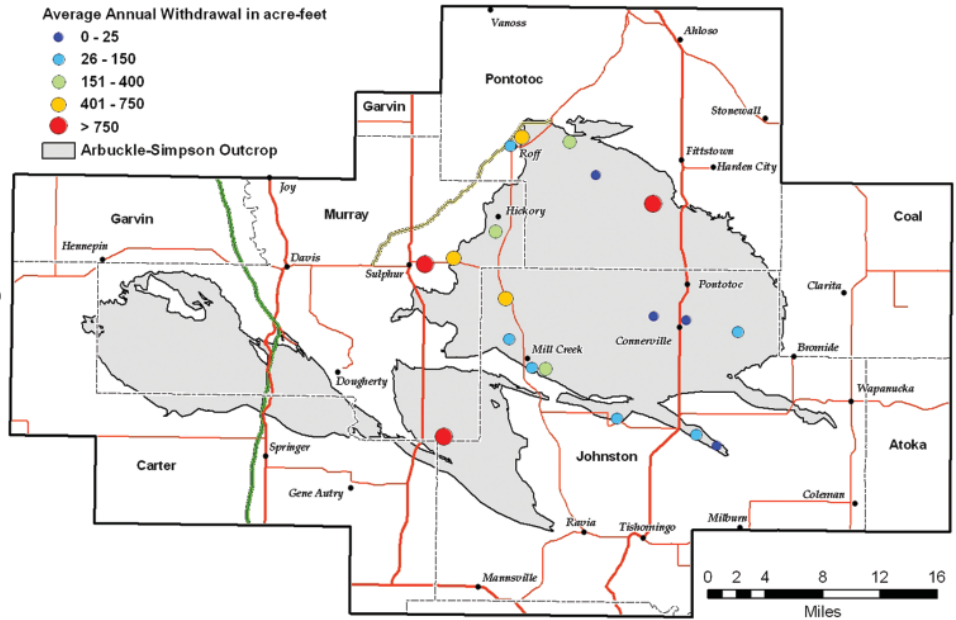
During this same period, mining accounted for 15% of groundwater use (averaging 648 acre-feet annually) and irrigation for 7% (averaging 301 acre-feet annually). Power accounted for 14% (averaging 586 acre-feet annually), but power use from the aquifer discontinued in 1988 when the Oklahoma Gas and Electric (OG&E) power plant north of Sulphur ceased operation. Other uses accounted for approximately 1%.



Reported annual groundwater use from 1964-2008 of the eastern Arbuckle-Simpson aquifer.

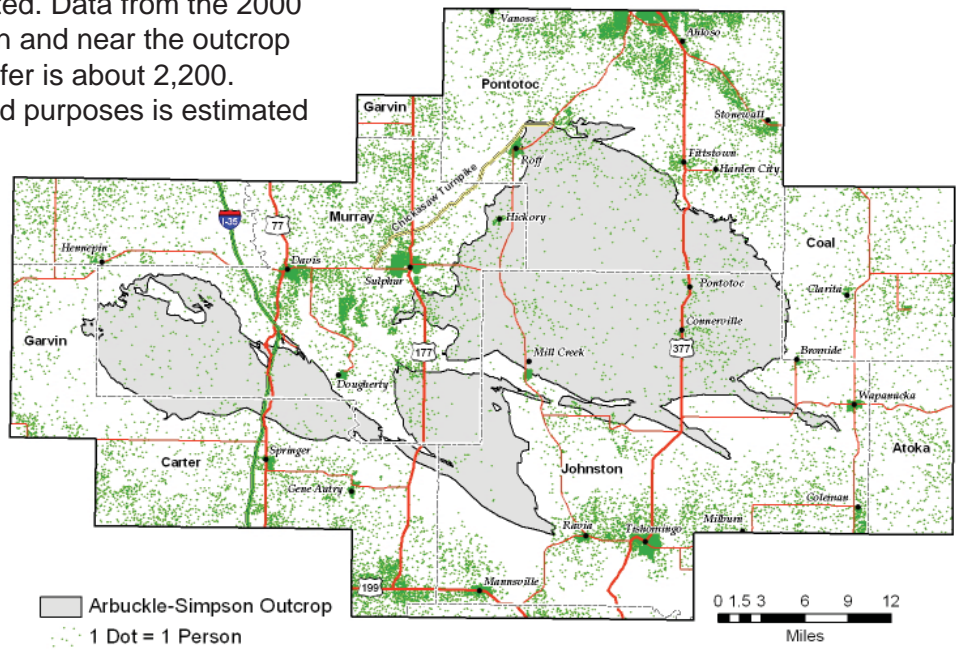


Above: average annual groundwater withdrawal by use from the eastern Arbuckle-Simpson aquifer from 2004-2008. At right: average annual withdrawal from the Arbuckle-Simpson aquifer from 2004-2008.



### Estimated Non-permitted Use

Annual groundwater use for non-permitted livestock and household purposes was also estimated. Data from the 2000 Census indicate that the population on and near the outcrop of the eastern Arbuckle-Simpson aquifer is about 2,200. Annual groundwater use for household purposes is estimated at about 209 acre-feet per year. (This estimate assumes an average use of 85 gallons per day per person and that each person uses private well water; however, many are on public water supply systems.) Groundwater use for livestock in the eastern Arbuckle-Simpson aquifer is estimated at about 25 acre-feet per year, assuming 22,300 head of cattle.



Arbuckle-Simpson aquifer population density.

### Prior Rights

Prior rights were granted to landowners who established beneficial use of groundwater prior to the Groundwater Act (July 1, 1973). Prior rights have been established for 10 prior right holders aquifer-wide for a total allocation of 5,432 acre-feet. In some cases, prior right holders, such as the City of Ada and the City of Sulphur, have obtained temporary permits for additional allocations. In other cases, such as OG&E, prior rights have not been utilized in a number of years.

Prior rights of groundwater from the Arbuckle-Simpson aquifer

Allocation in acre-feet				
Permit #	Permit Holder	Allocation	County	Aquifer
19510039	OG&E Company	2,214	Murray	Eastern
19560906	City of Sulphur	1,120	Murray	Eastern
19640120	Unimin Corporation	764	Pontotoc	Eastern
19570279	B&R Farms	693	Murray	Eastern
19590158	City of Ada	349	Pontotoc	Eastern
19551306	Pruitt, Gene	100	Murray	Eastern
19710165	Chaffin, Paul	67	Murray	Eastern
19580303	Chapman, Jr, Fred A.	50	Murray	Central
19640025	Mill Creek Public Works Authority	45	Johnston	Eastern
19720326	Little, Ronald E.	30	Murray	Eastern

For more information on the Arbuckle-Simpson Hydrology Study, go to [www.owrb.ok.gov](http://www.owrb.ok.gov).