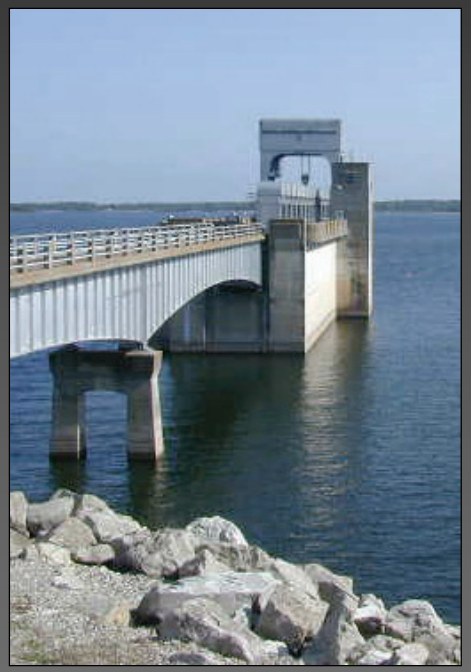
Water Use In Oklahoma
Past, Present & Future

Dave Dillon
Water Plan Coordinator
Oklahoma Water Resources Board

The Oklahoma Comprehensive Water Plan

Meeting Oklahoma's future water supply challenges…



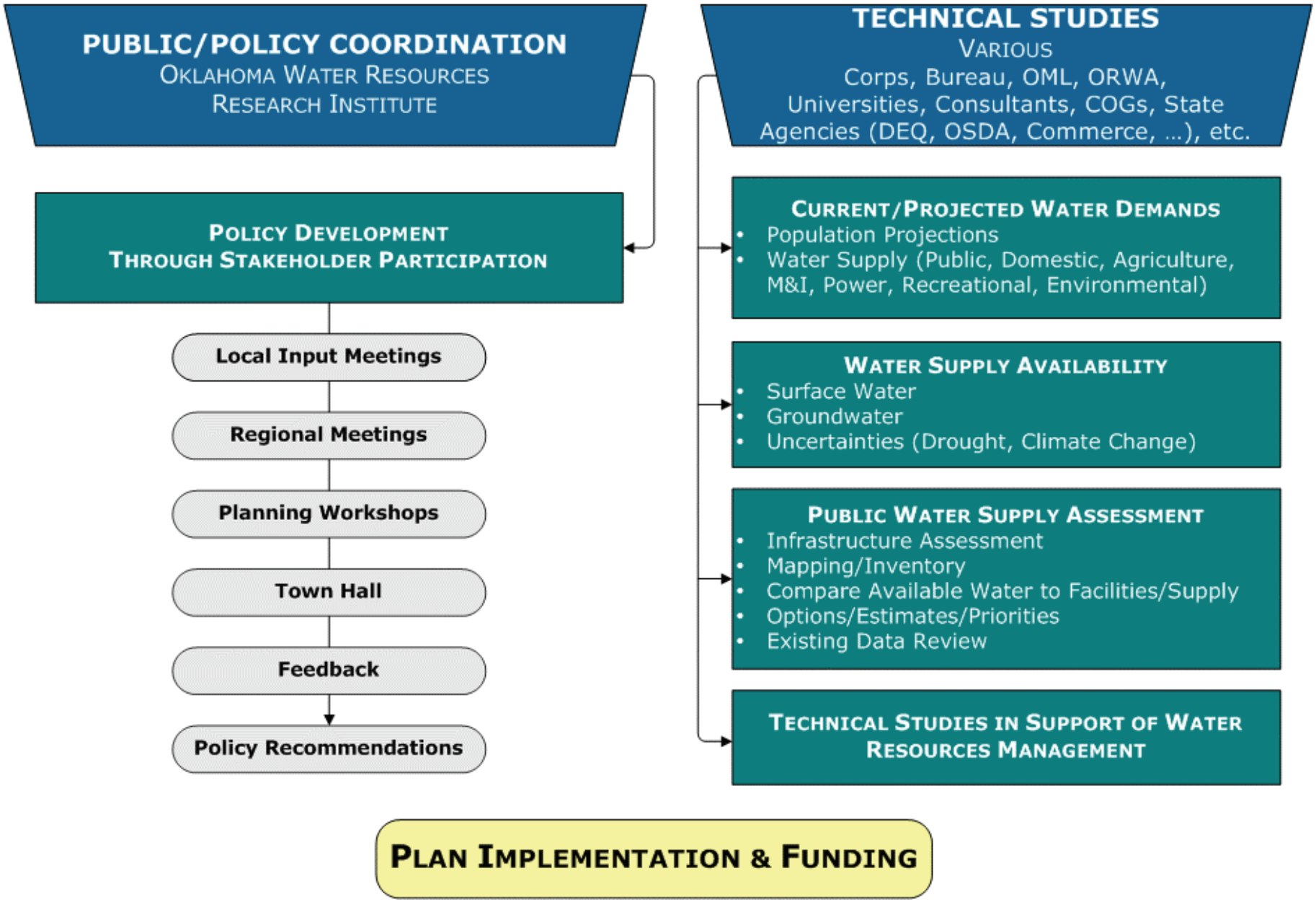
- Population growth
- Future water needs
- Competing water interests
- Vulnerability to drought/flooding
- Environmental protection
- Economic development

Water Plan Goals

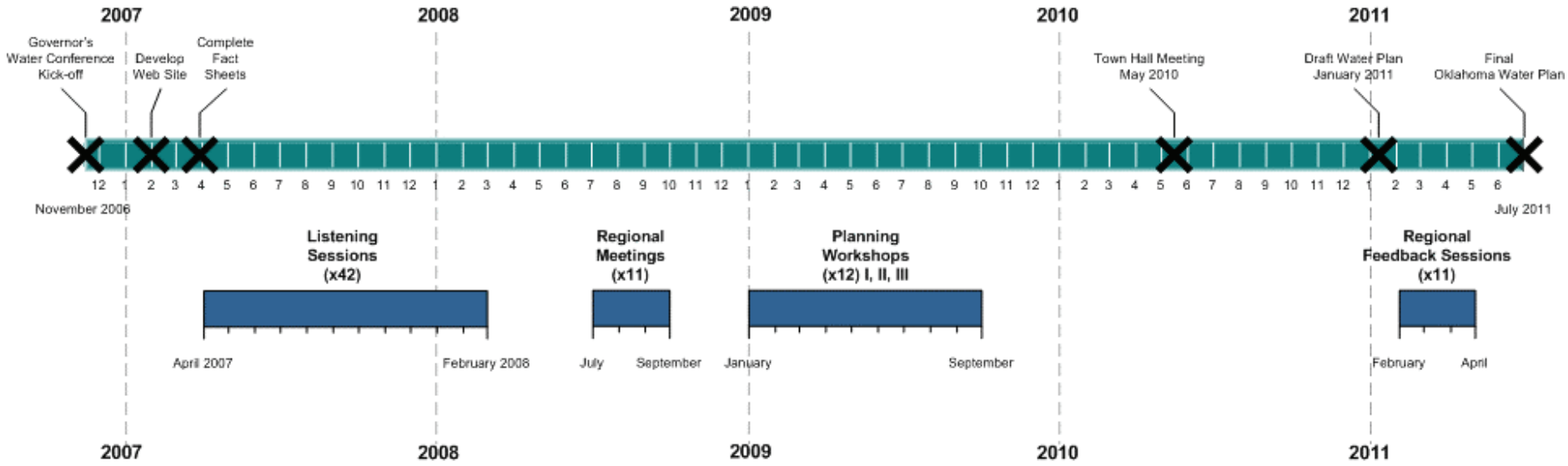
- *Provide safe and dependable water supply for all Oklahomans while improving the economy and protecting the environment.*

- *Provide information so that water providers, policy-makers, and water users can make informed decisions concerning the use and management of Oklahoma's water resources.*

Oklahoma Comprehensive Water Plan
Process



Oklahoma Comprehensive Water Plan
Policy Development



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OCWP Local Input Meetings

<u>OCWP Local Input Meeting</u>
<u>Dates & Locations (scheduled to date)</u>:

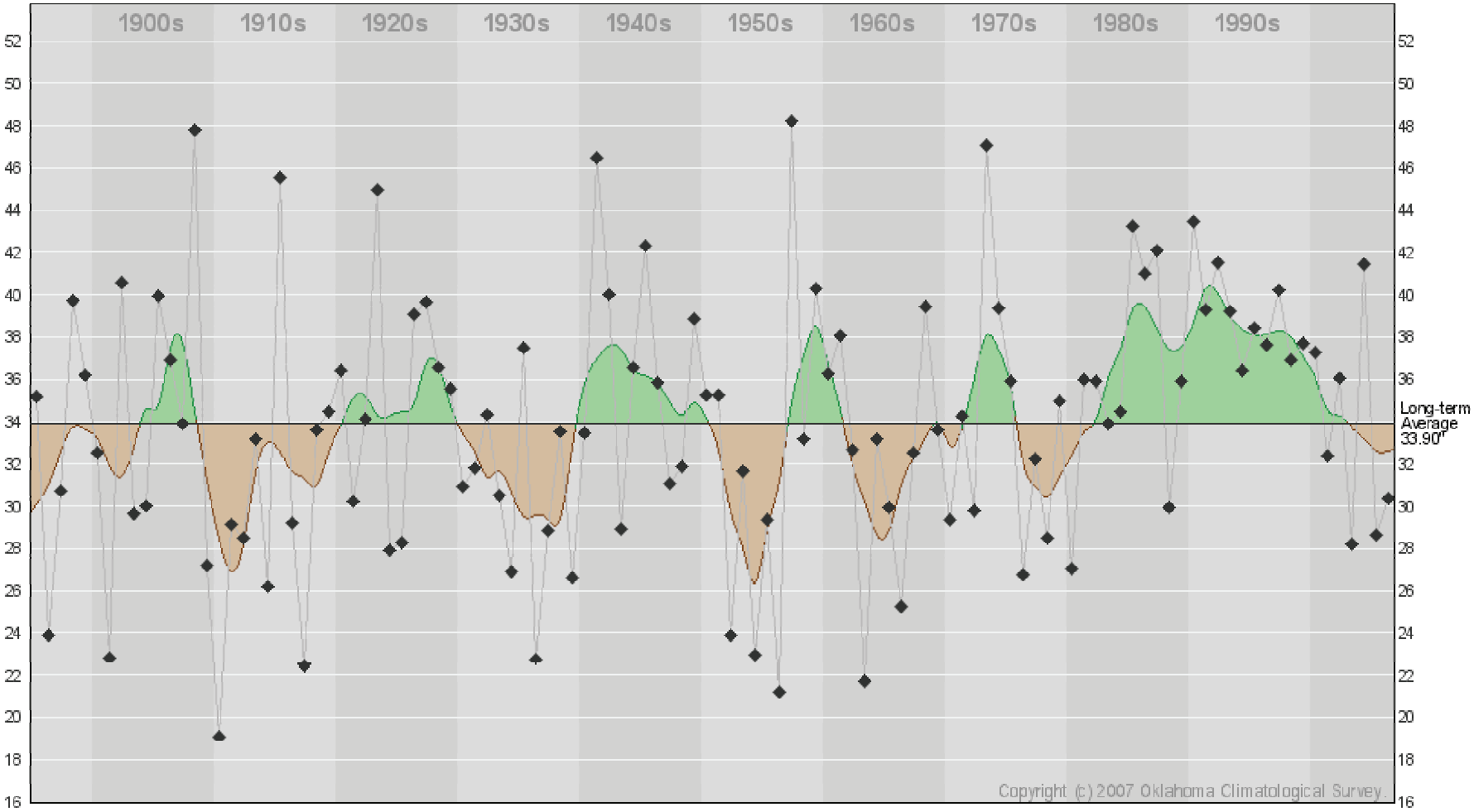
April 12—Beaver
April 19—Goodwell
April 26—Woodward
May 3—Alva
May 8—Sayre
May 15—Lawton
May 17—Weatherford
May 29—Hobart
May 31—Altus

June 5—Tonkawa
June 7—Chickasha
June 12—Duncan
June 19—Enid
June 21—El Reno
June 28—Kingfisher
July 12—Oklahoma City
July 17—Sulphur
July 19—Norman

July 24—Chandler
July 31—Ardmore
August 7—Shawnee
August 23—Kellyville
September 13—Broken Arrow
September 18—Okmulgee

WELCOME
TO
BEAVER
NO MAN'S LAND - EVERYONE'S TOWN

Annual Trends in Statewide Averaged Rainfall (1895 Through 2006)



OKLAHOMA CLIMATOLOGICAL SURVEY

Annual Rainfall History with 5-yr Weighted Trends
Climate Division OK-ST (Oklahoma Statewide): 1895-2006

Wetter historical periods
Drier historical periods

Water Use Permitting in Oklahoma

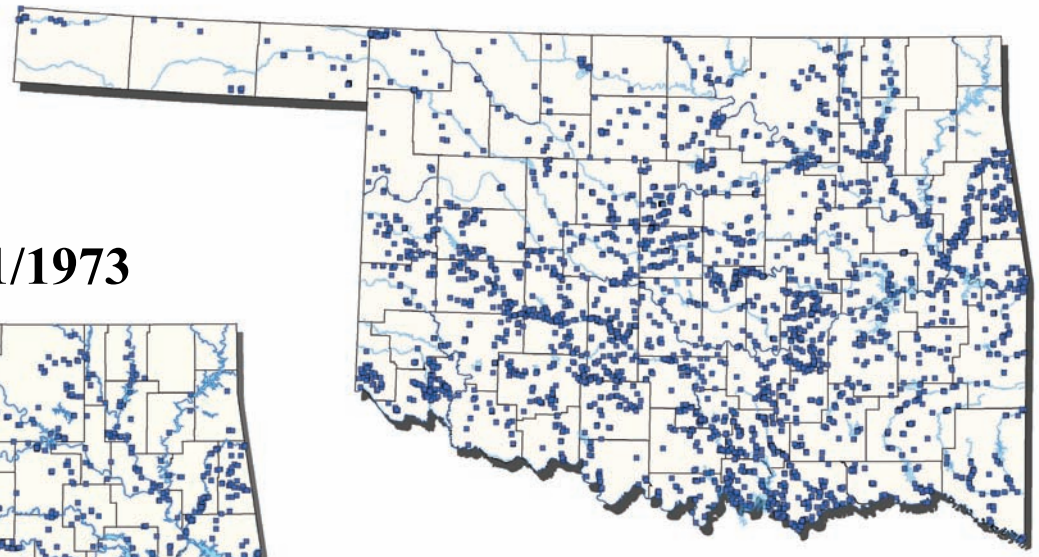
- Stream Water:
  - water in a "definite stream" (a watercourse in a definite, natural channel, with defined beds and banks, originating from a definite source or sources of supply);
  - may be intermittent or irregular flow
- Groundwater:
  - fresh water under the surface of the earth regardless of the geologic structure in which it is standing or moving outside the cut banks of any definite stream
- Domestic/household uses exempt
- <u>No priority of uses</u>.

Overview
Oklahoma Stream Water Law

- Stream water is considered to be publicly-owned and subject to appropriation by the OWRB:
  - water use permits approved by 9-member Water Board
- "First in time, first in right":
  - first person to apply for the water right establishes a right superior to later appropriators
- <u>"Beneficial use is basis and limit of the appropriation right"</u>

Permitted Surface Water Rights

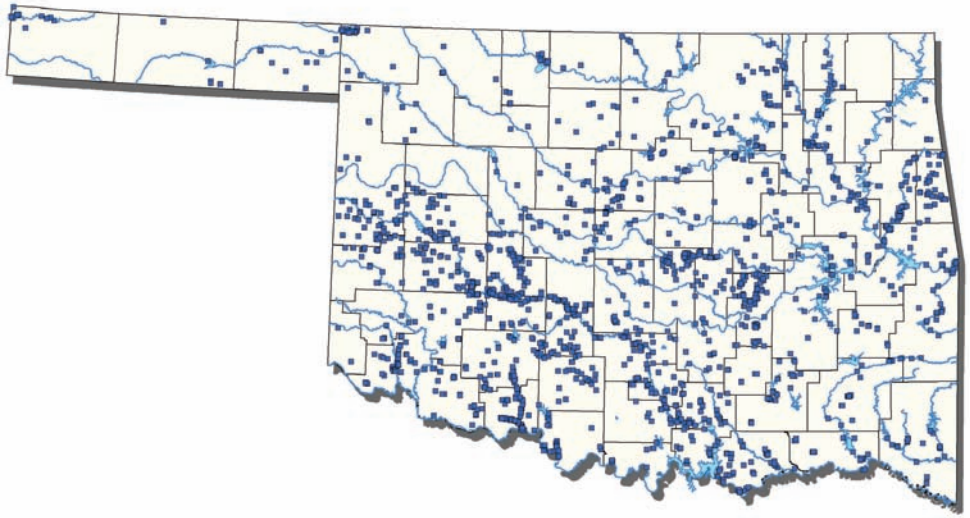
2007



2,680 - Active Surface Water Permits
2,748,342 - AF/Y Permitted Surface Water

Purpose	Total Amount (AF/YR)
Irrigation	424,020
Public Water	1,622,718
Other	701,604

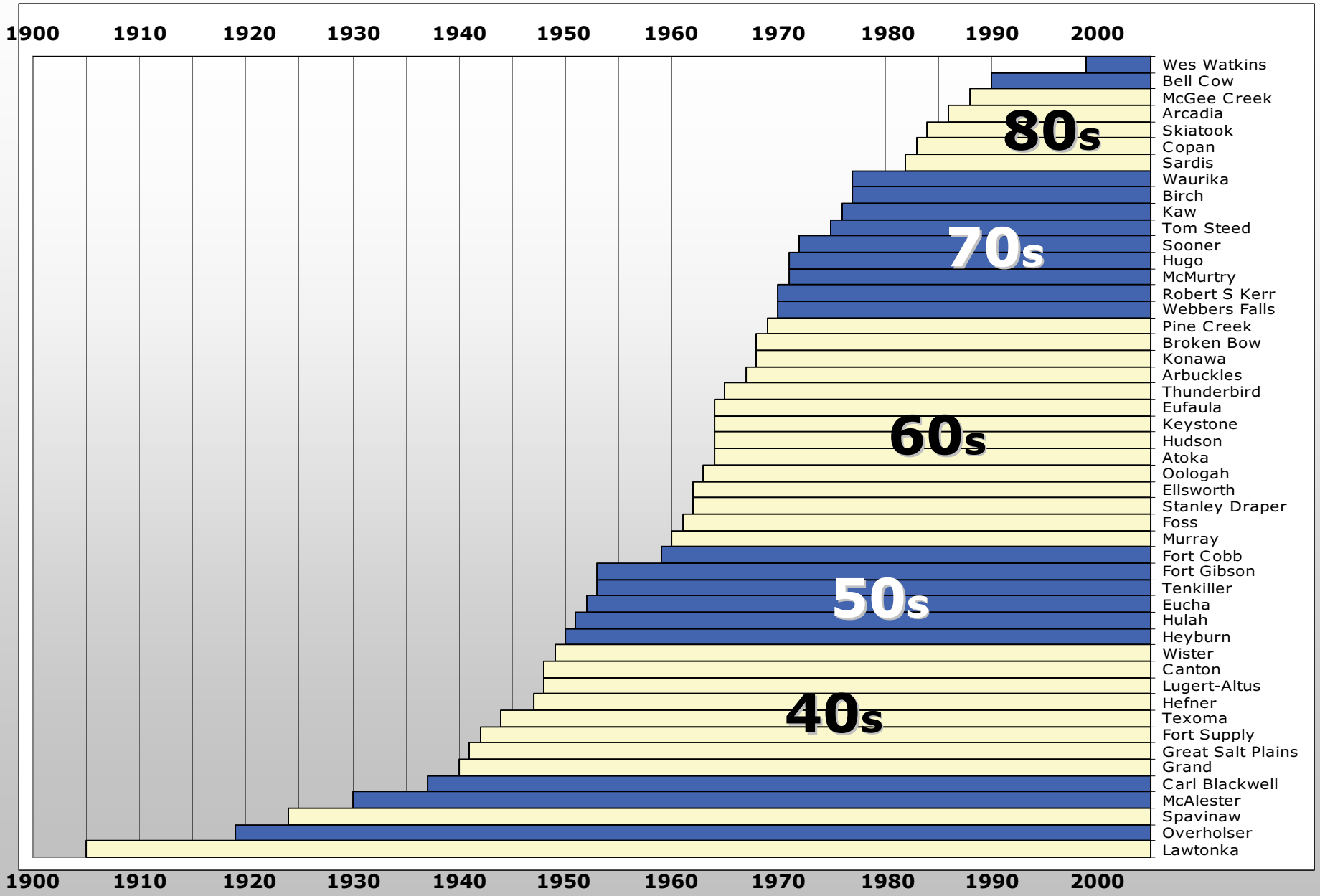
Prior to 07/01/1973



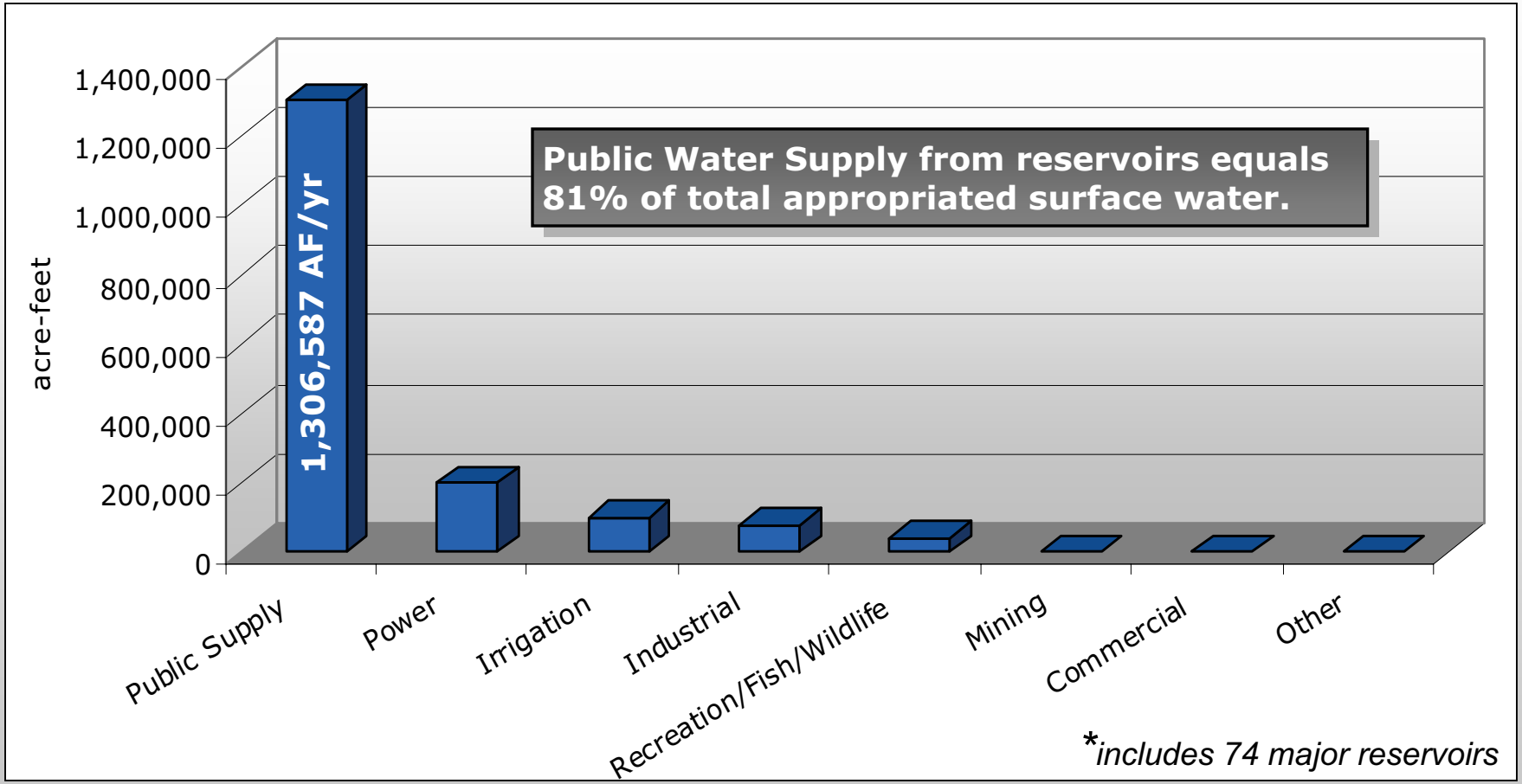
1,867 - Active Surface Water Permits
1,357,646 - AF/Y Permitted Surface Water

Purpose	Total Amount (AF/YR)
Irrigation	218,950
Public Water	825,916
Other	312,780

Oklahoma Water Development—Major Reservoirs



Oklahoma Surface Water Permit Allocations With Major Reservoirs* as Source

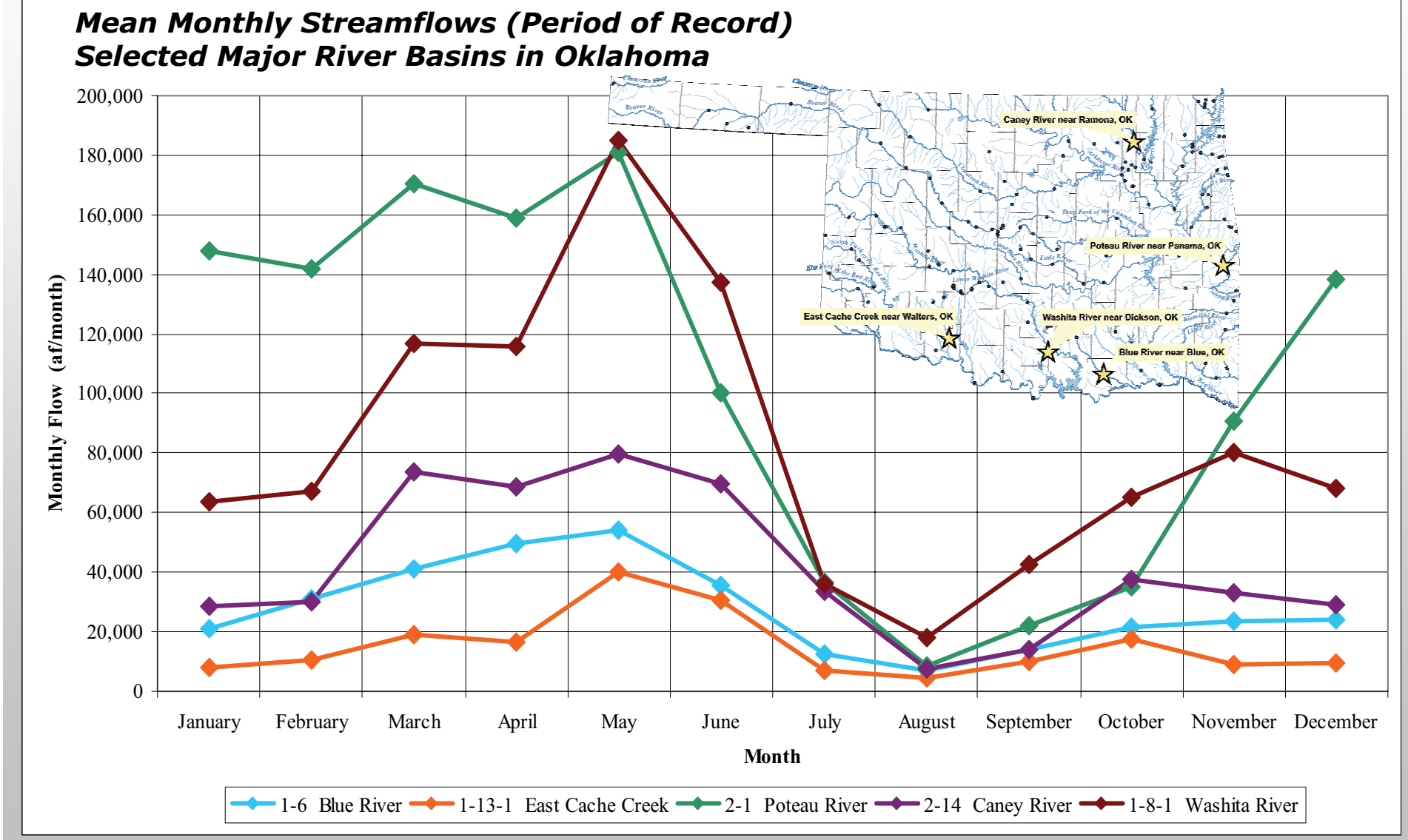


Surface Water Allocations in Oklahoma:

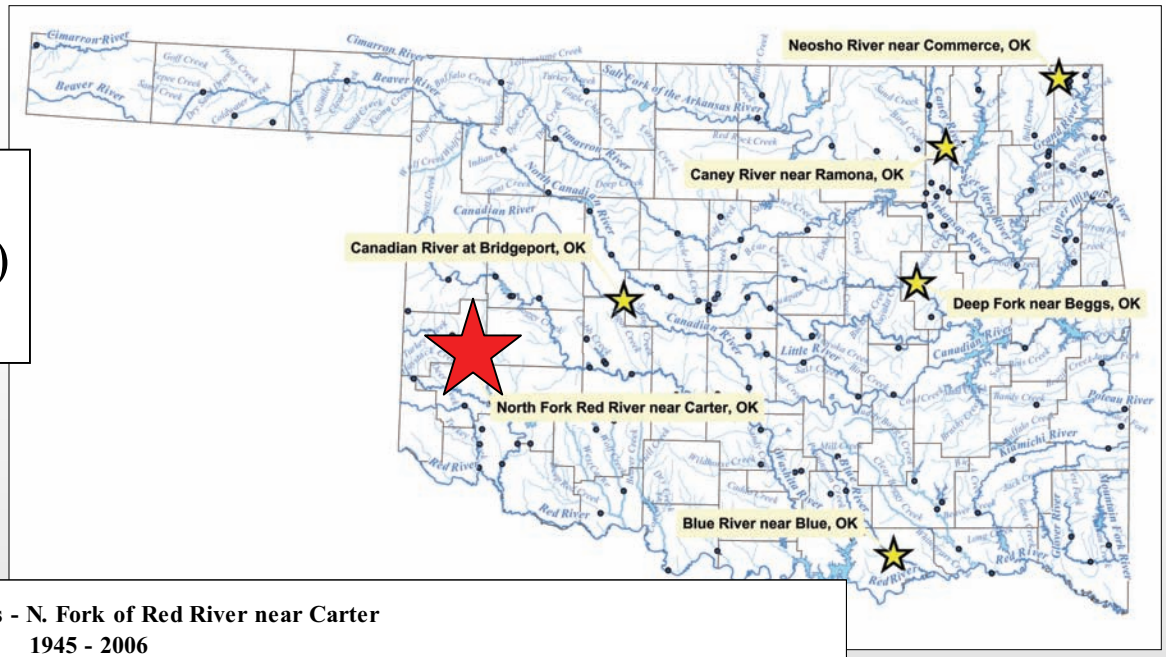
For Public Water Supply Use	=	1,622,718 AF/yr
Total For All Uses	=	2,748,342 AF/yr

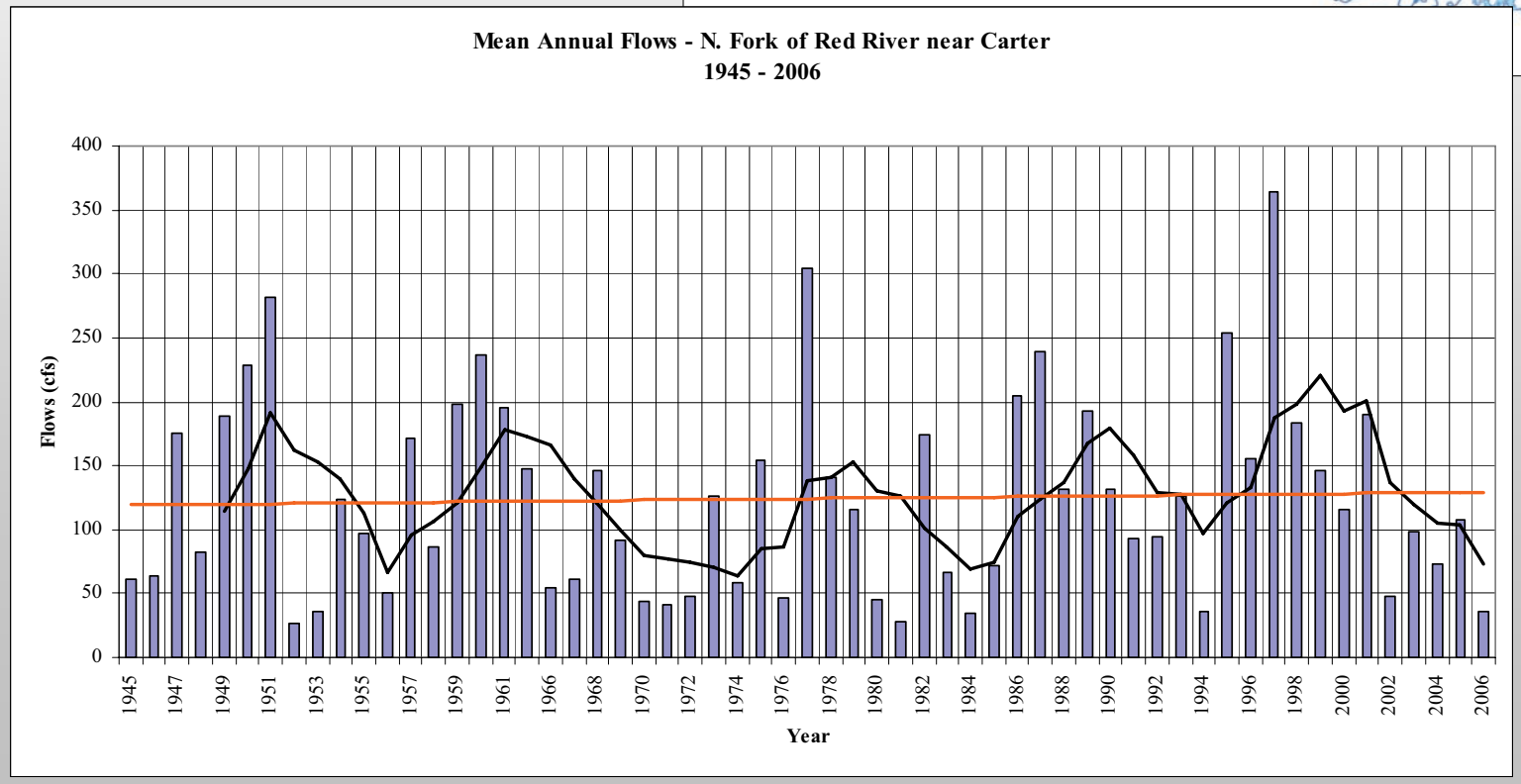
Water Use Management Issues

Seasonal Variations of Water Availability

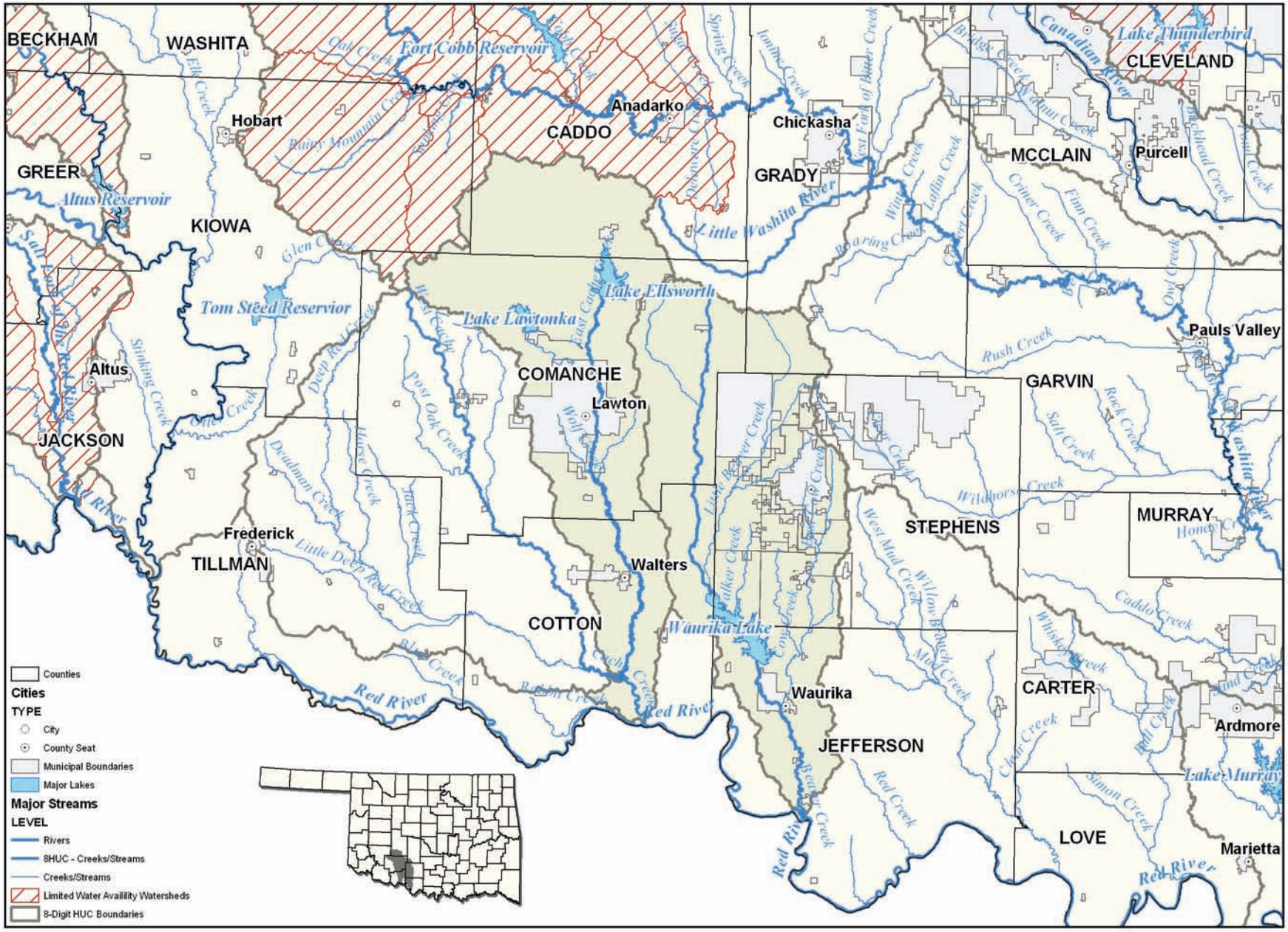


Mean Annual Flow
North Fork/Red River (Carter)
1945-2006





Surface Water Basins in the Lawton Area (SS 1-12, 1-13-1)

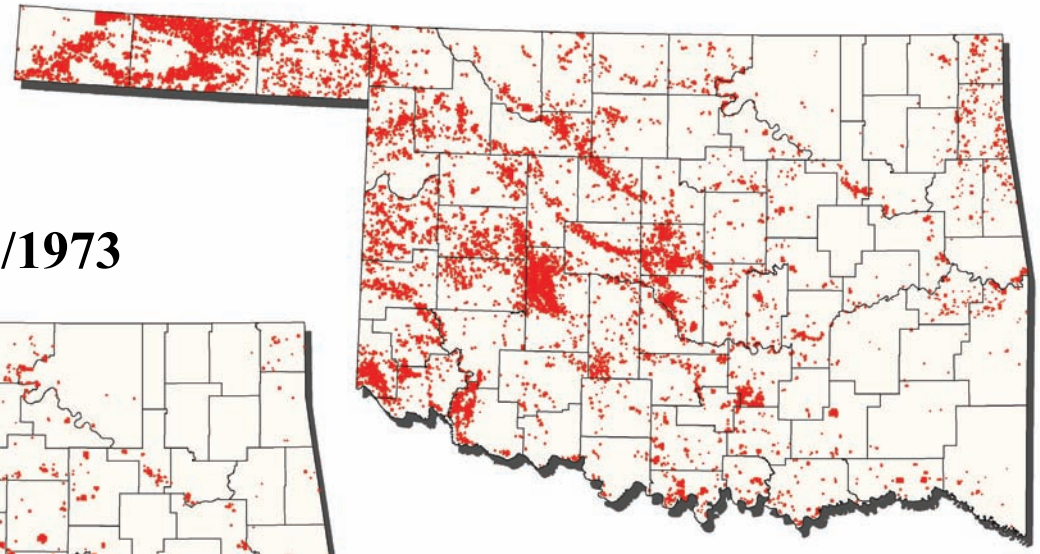


Overview
Oklahoma Groundwater Law (1972)

- Groundwater is considered private property that belongs to the overlying surface owner, although it is subject to reasonable regulation by the OWRB.
- The Oklahoma Groundwater Law is a utilization statute:
  - Promotes development and growth.

Permitted Groundwater Rights

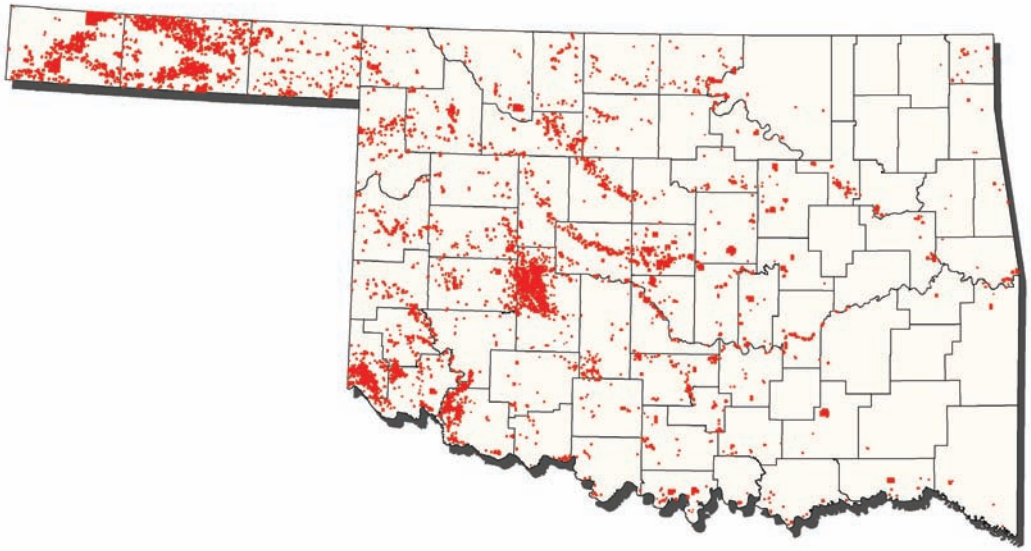
2007



10,462 - Active Groundwater Permits
3,428,115 - AF/Y Permitted Groundwater

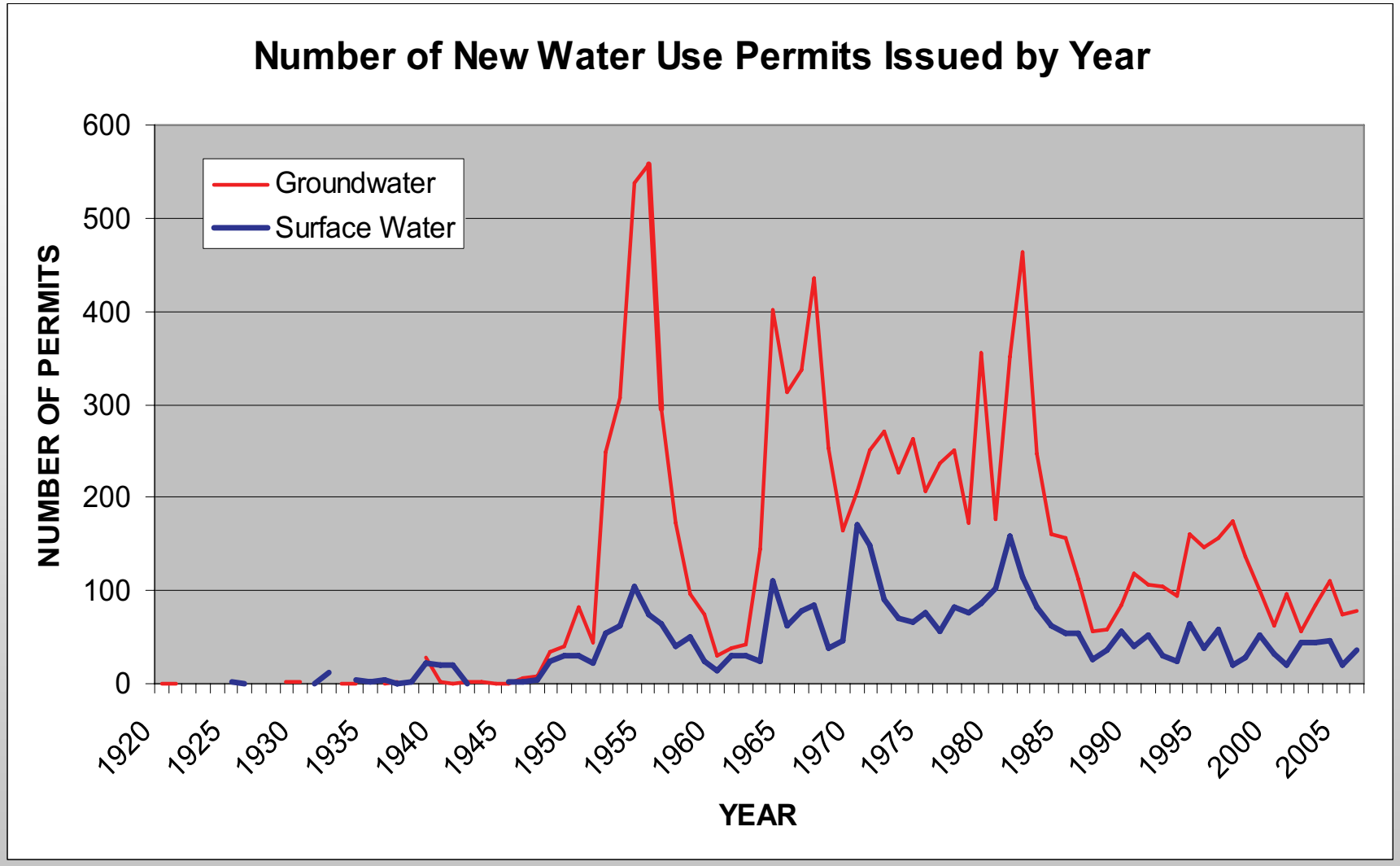
Purpose	Total Amount (AF/YR)
Irrigation	2,515,562
Public Water	652,028
Other	260,985

Prior to 07/01/1973



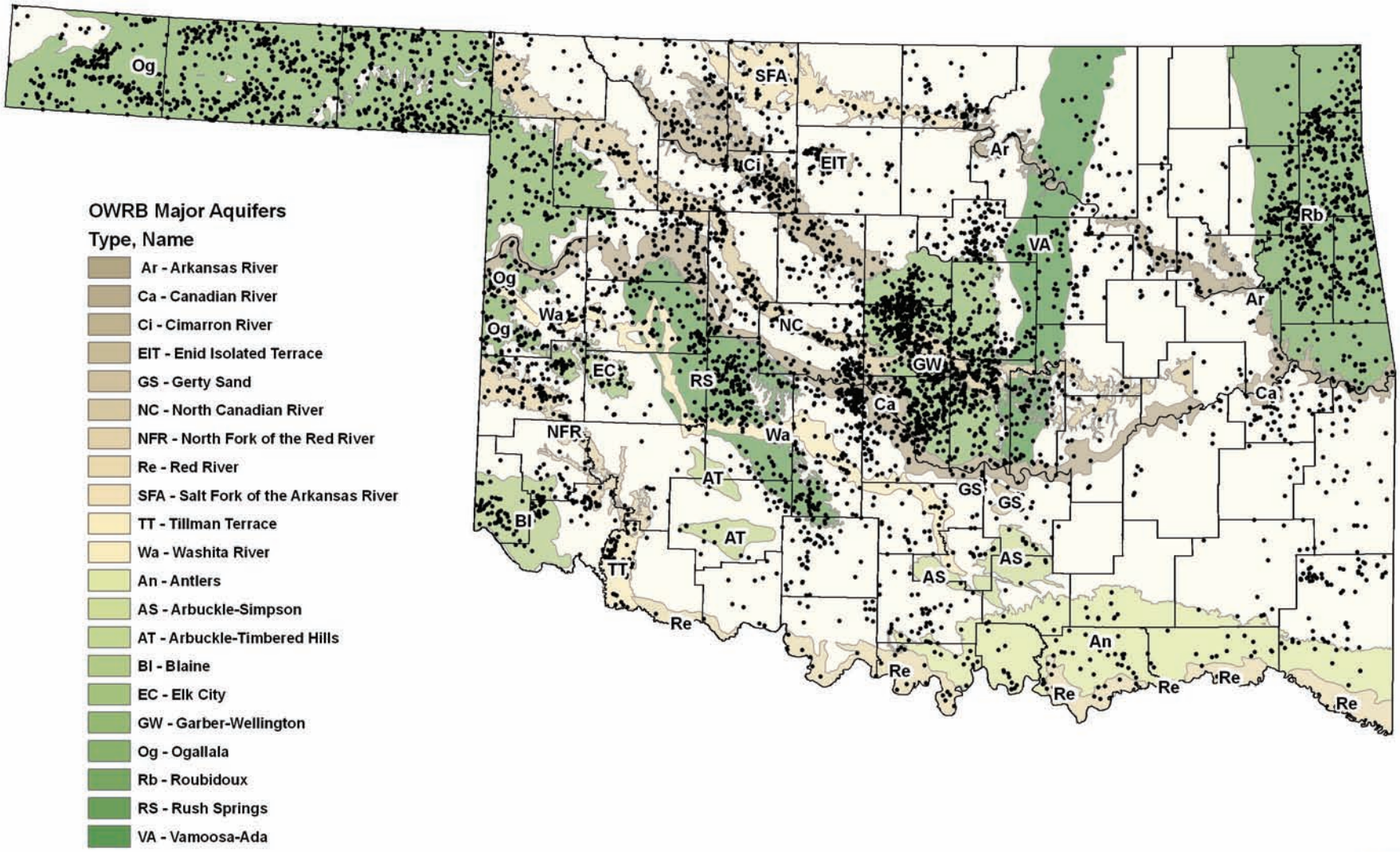
4,953 - Active Groundwater Permits
1,407,298 - AF/Y Permitted Groundwater

Purpose	Total Amount (AF/YR)
Irrigation	1,103,669
Public Water	204,371
Other	99,258


Number of New Water Use Permits Issued by Year
Groundwater
Surface Water
NUMBER OF PERMITS
600
500
400
300
200
100
0
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
YEAR

Locations of Reported Groundwater Wells

Prior to 1972 - (6,035 Wells)



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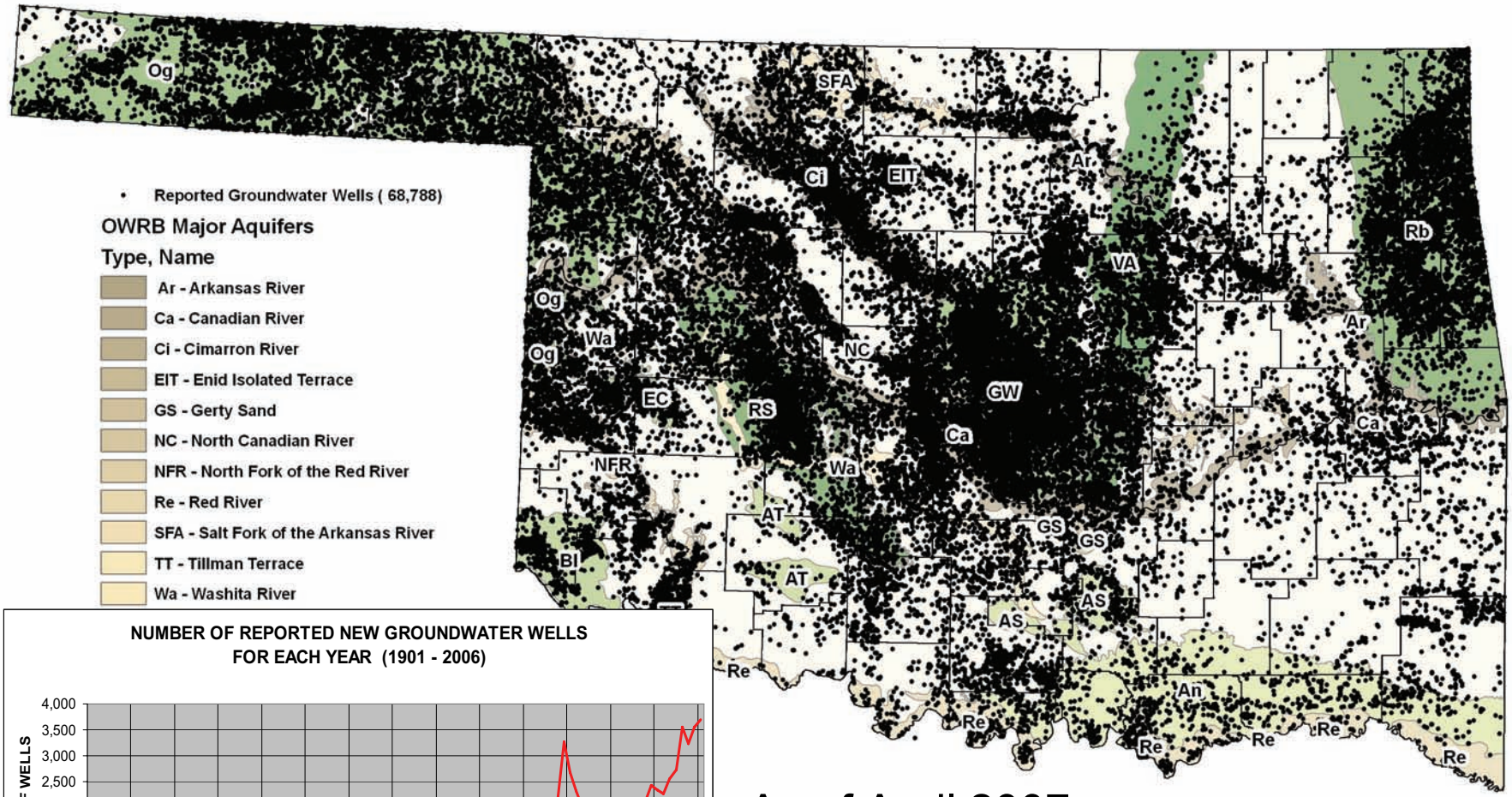
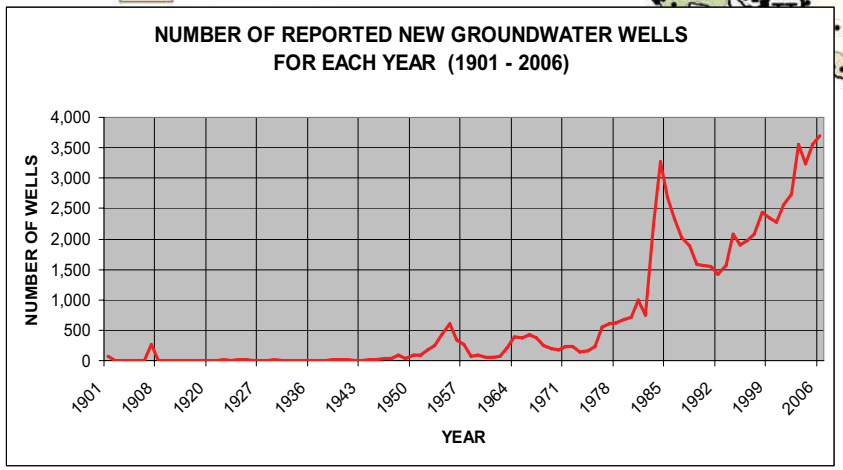
the water agency

Locations of Reported Groundwater Wells





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<u>As of April 2007</u>:

- 69,921 total wells (49,038 domestic)

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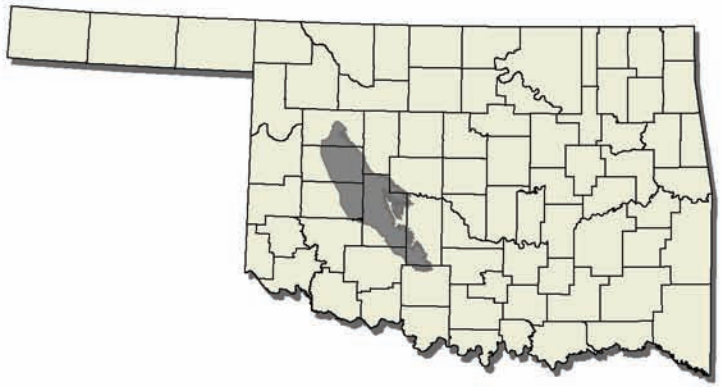
Dedicated Lands associated with Permitted Groundwater Rights overlaying the Rush Springs Bedrock Aquifer

Rush Springs Aquifer = 2,430 Square Miles



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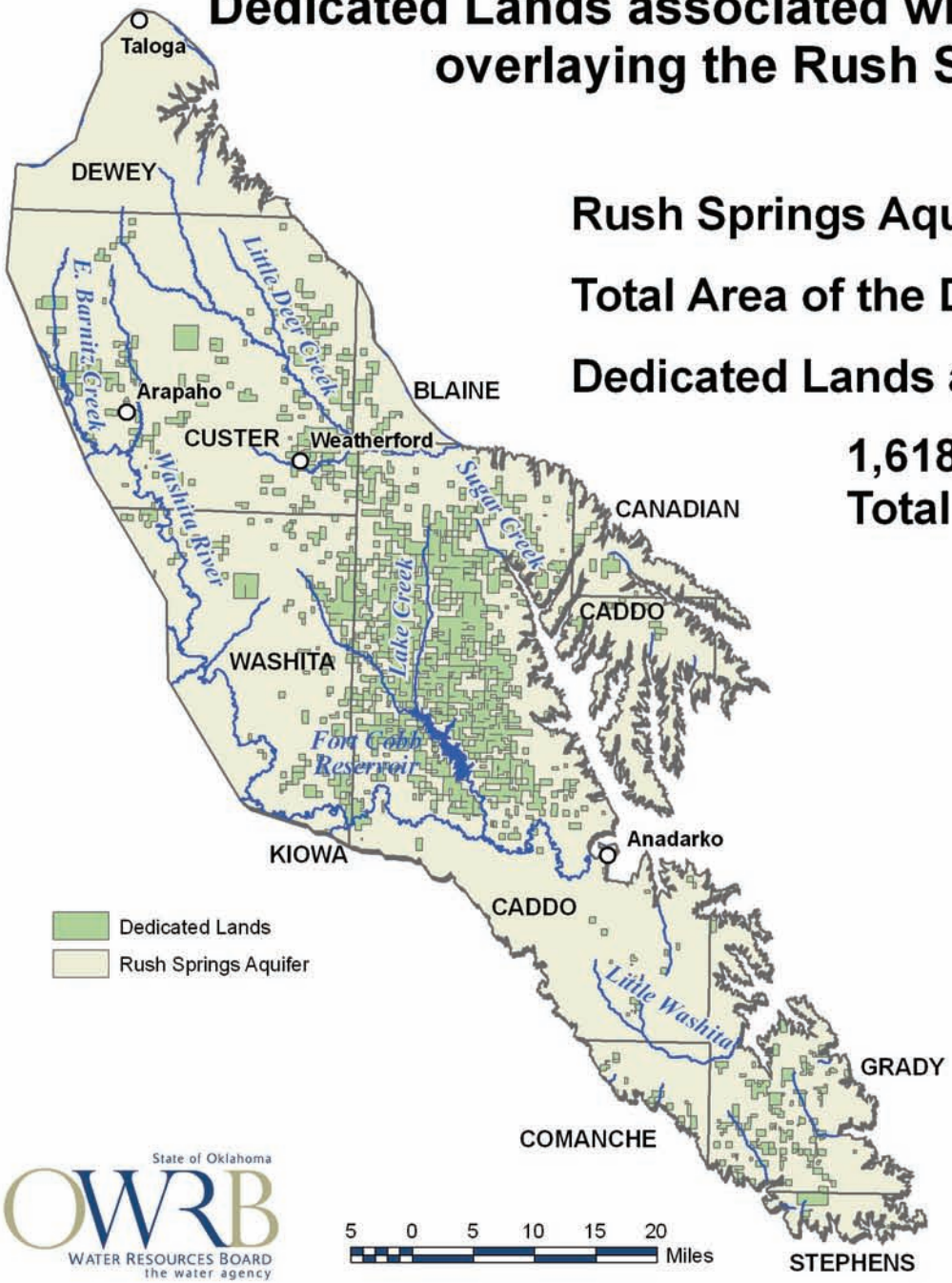
the water agency

Dedicated Lands associated with Permitted Groundwater Rights overlaying the Rush Springs Bedrock Aquifer

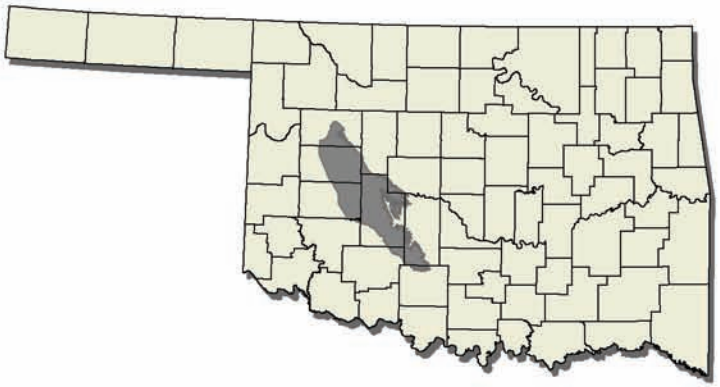


Rush Springs Aquifer = 2,430 Square Miles

Total Area of the Dedicated Lands = 376 Square Miles

Dedicated Lands account for 15.5% of the Total Area

1,618 Permits Utilizing Groundwater
Total Amount Allocated = 323,508 AF/YR



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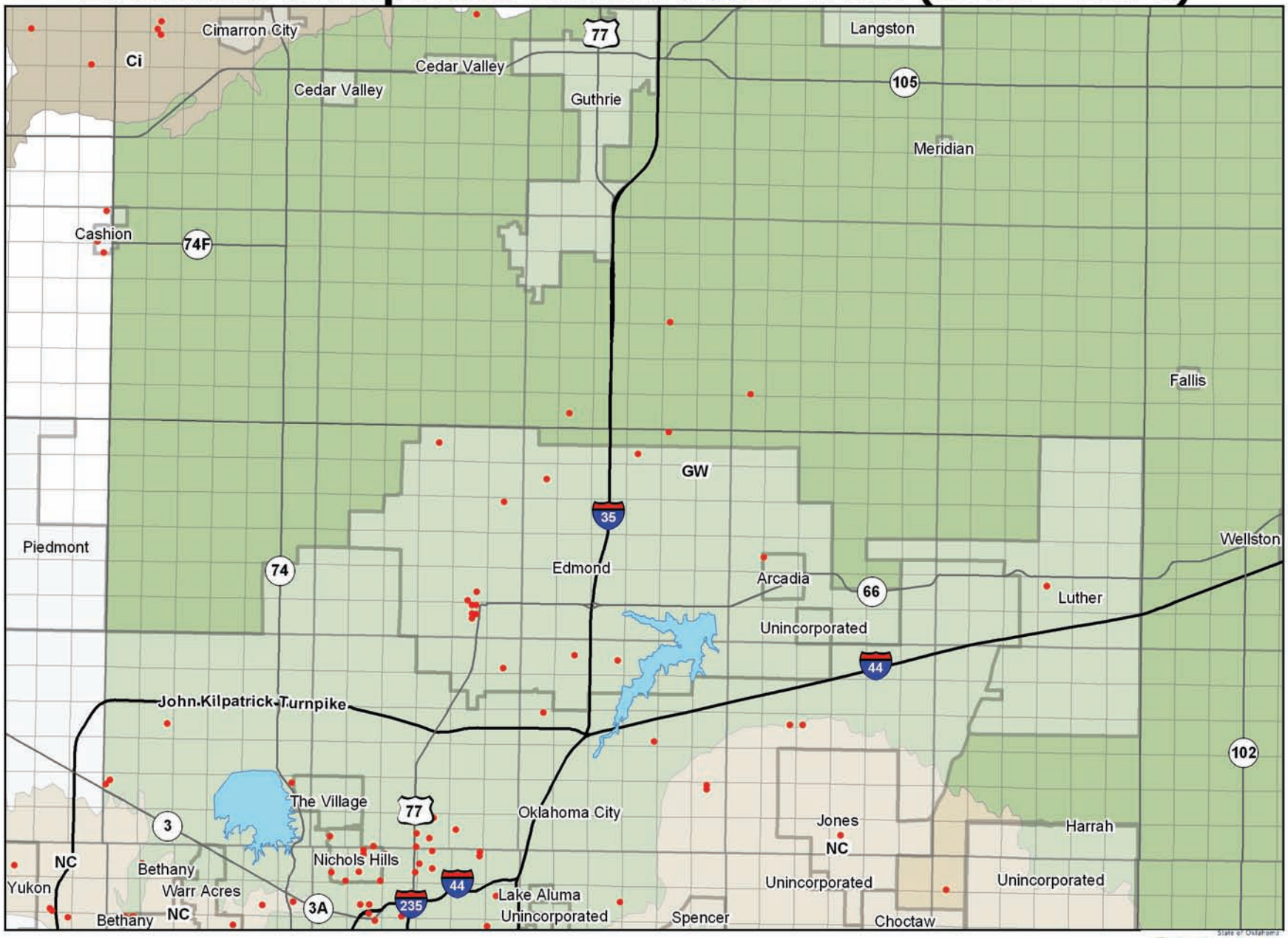
Locations of Reported Groundwater Wells (1900 - 1971)



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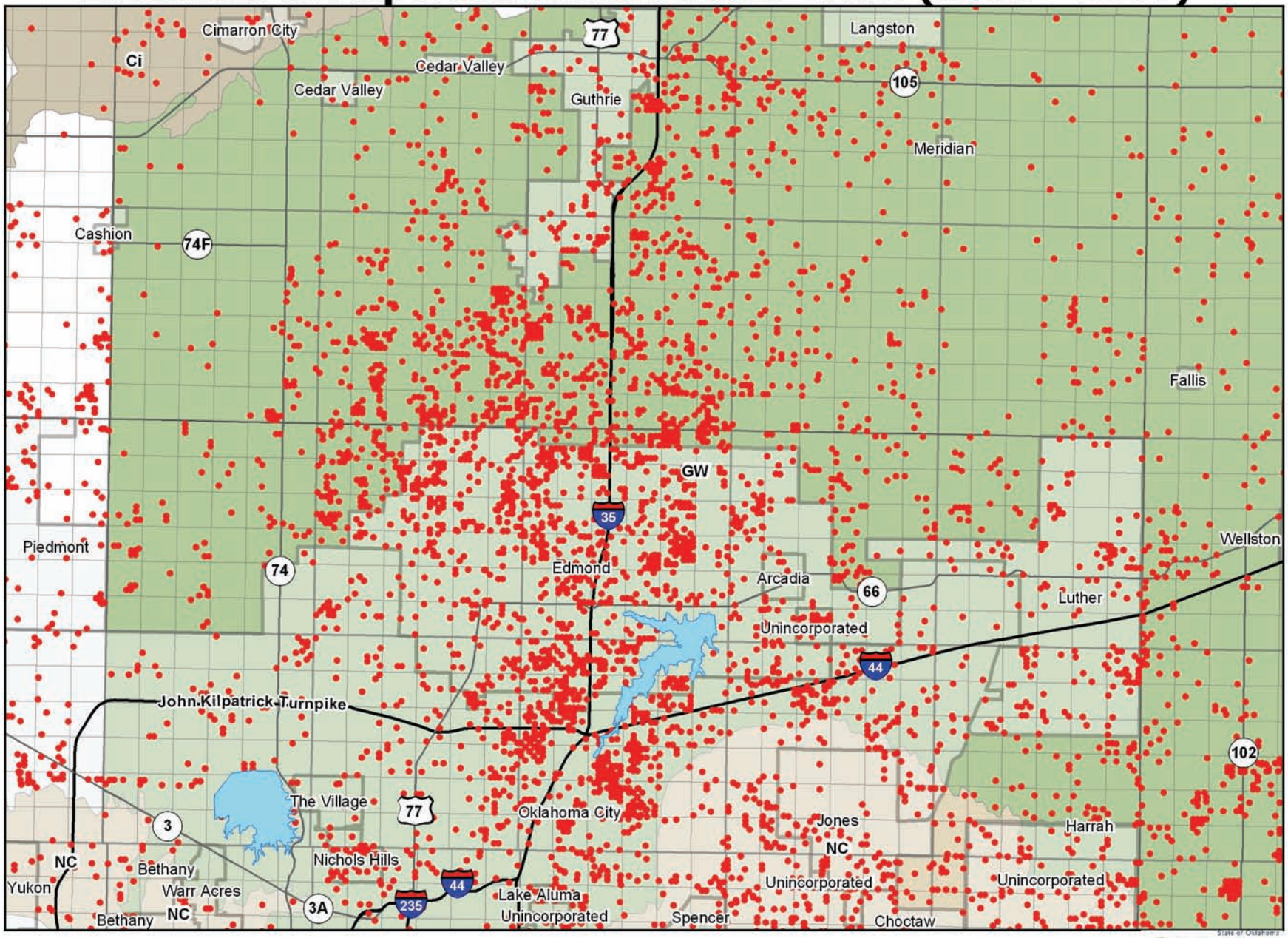
Locations of Reported Groundwater Wells (1900 - 2007)



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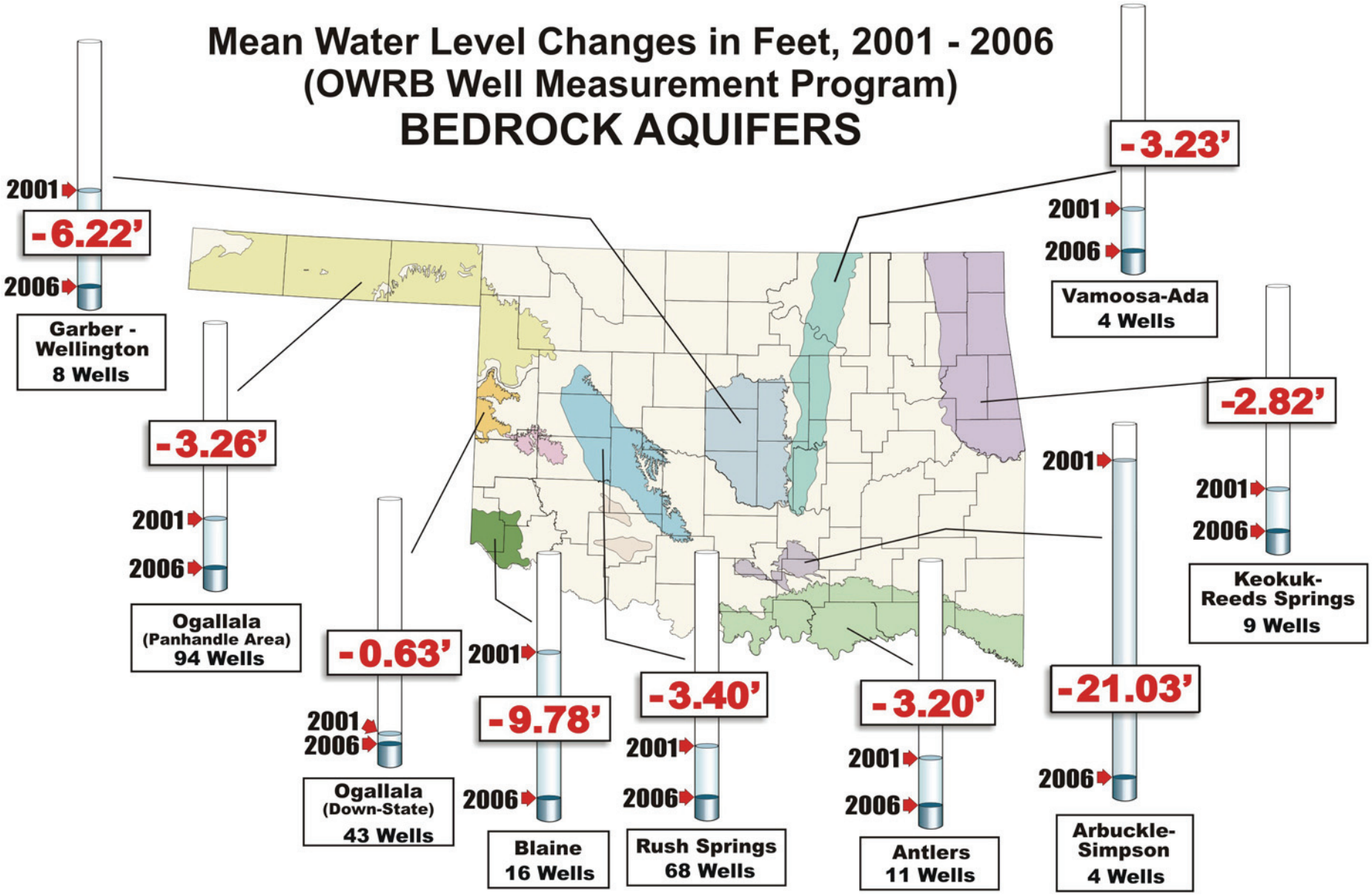
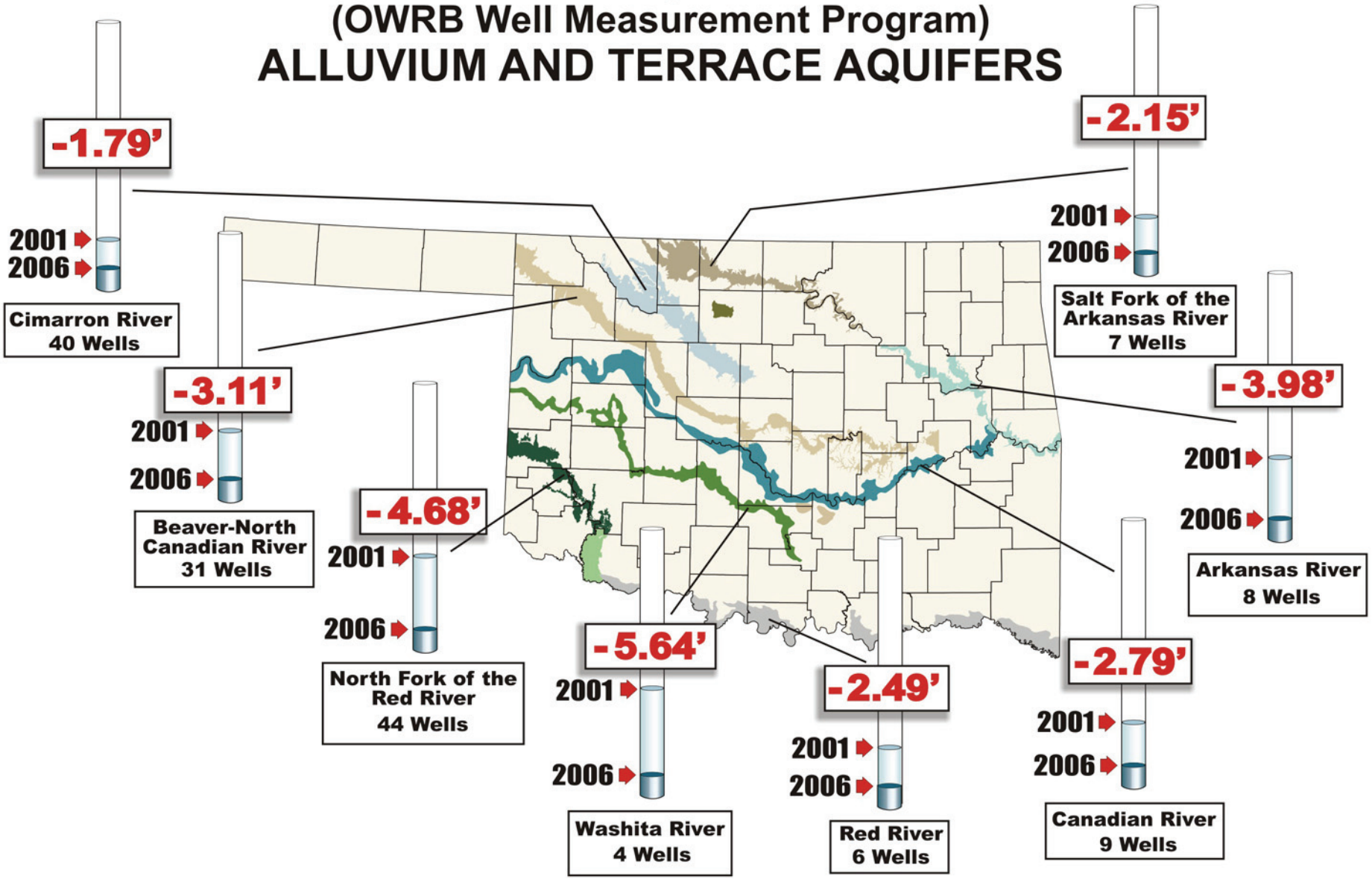
Mean Water Level Changes in Feet, 2001 - 2006
(OWRB Well Measurement Program)
BEDROCK AQUIFERS



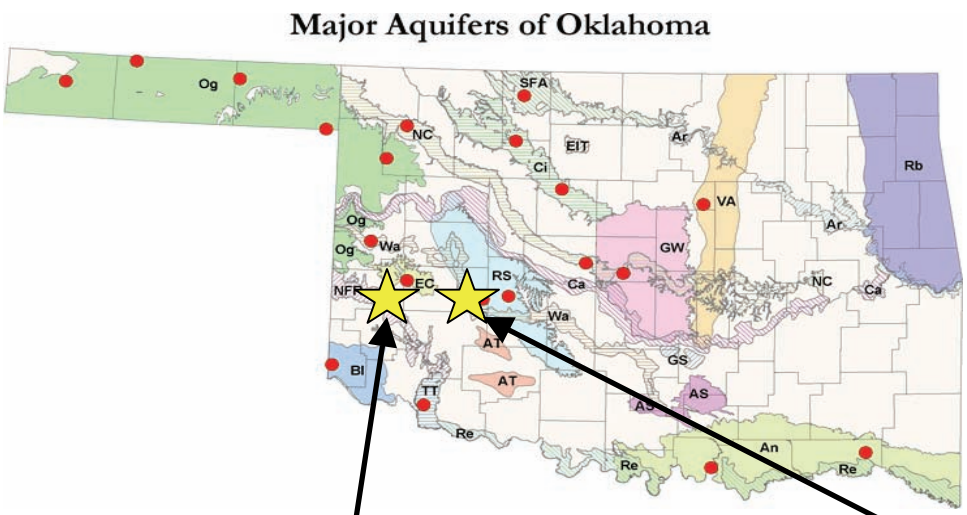
Mean Water Level Changes in Feet, 2001 - 2006
(OWRB Well Measurement Program)
ALLUVIUM AND TERRACE AQUIFERS

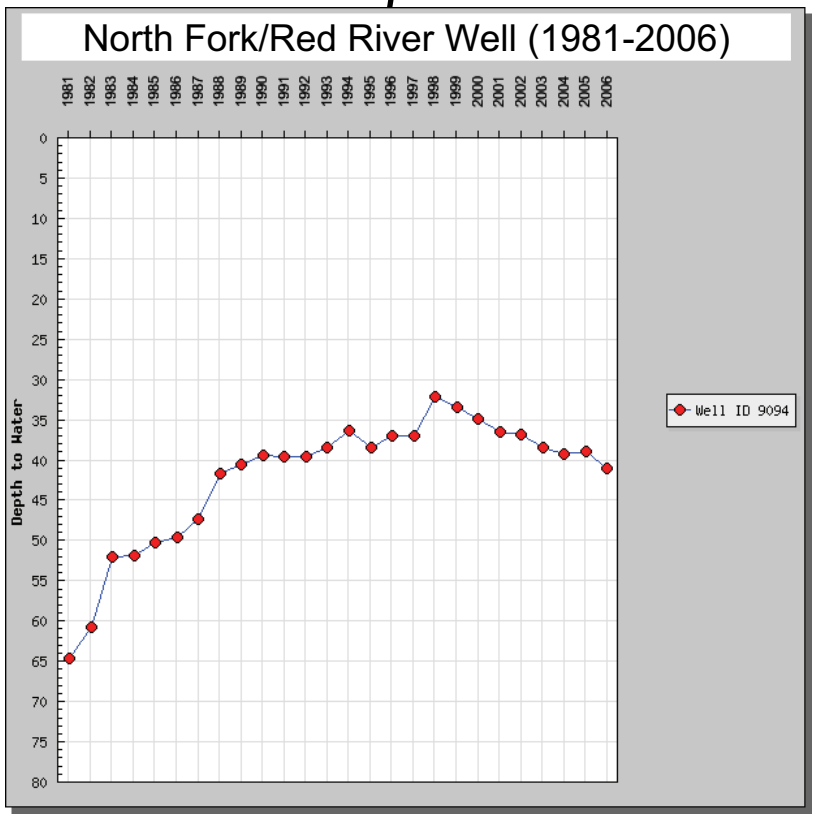


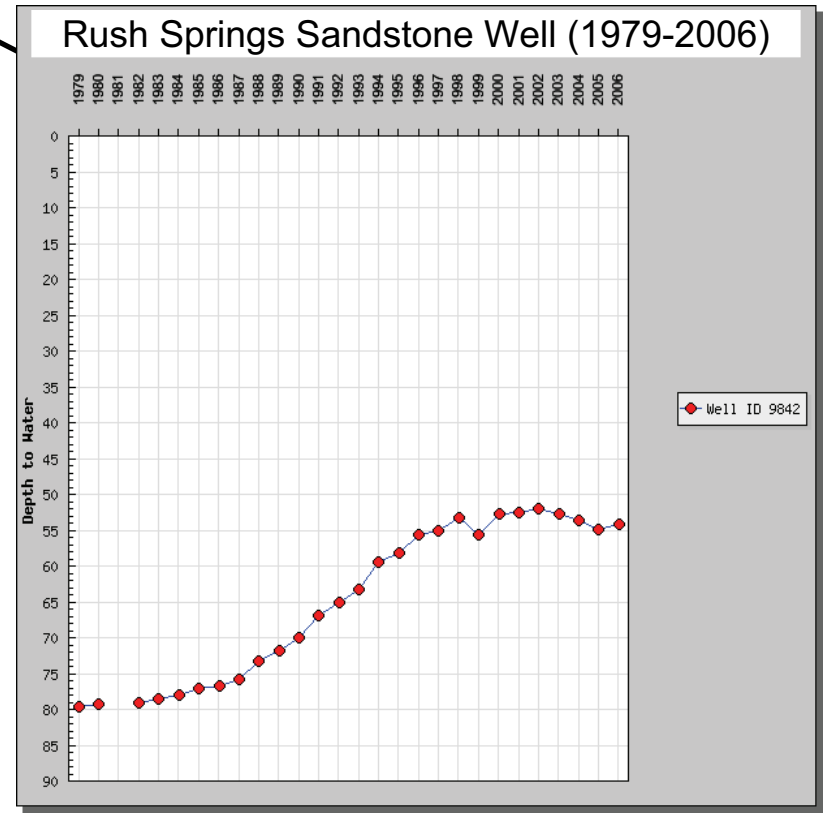
Selected Well Hydrographs

OWRB Well Measurement Program

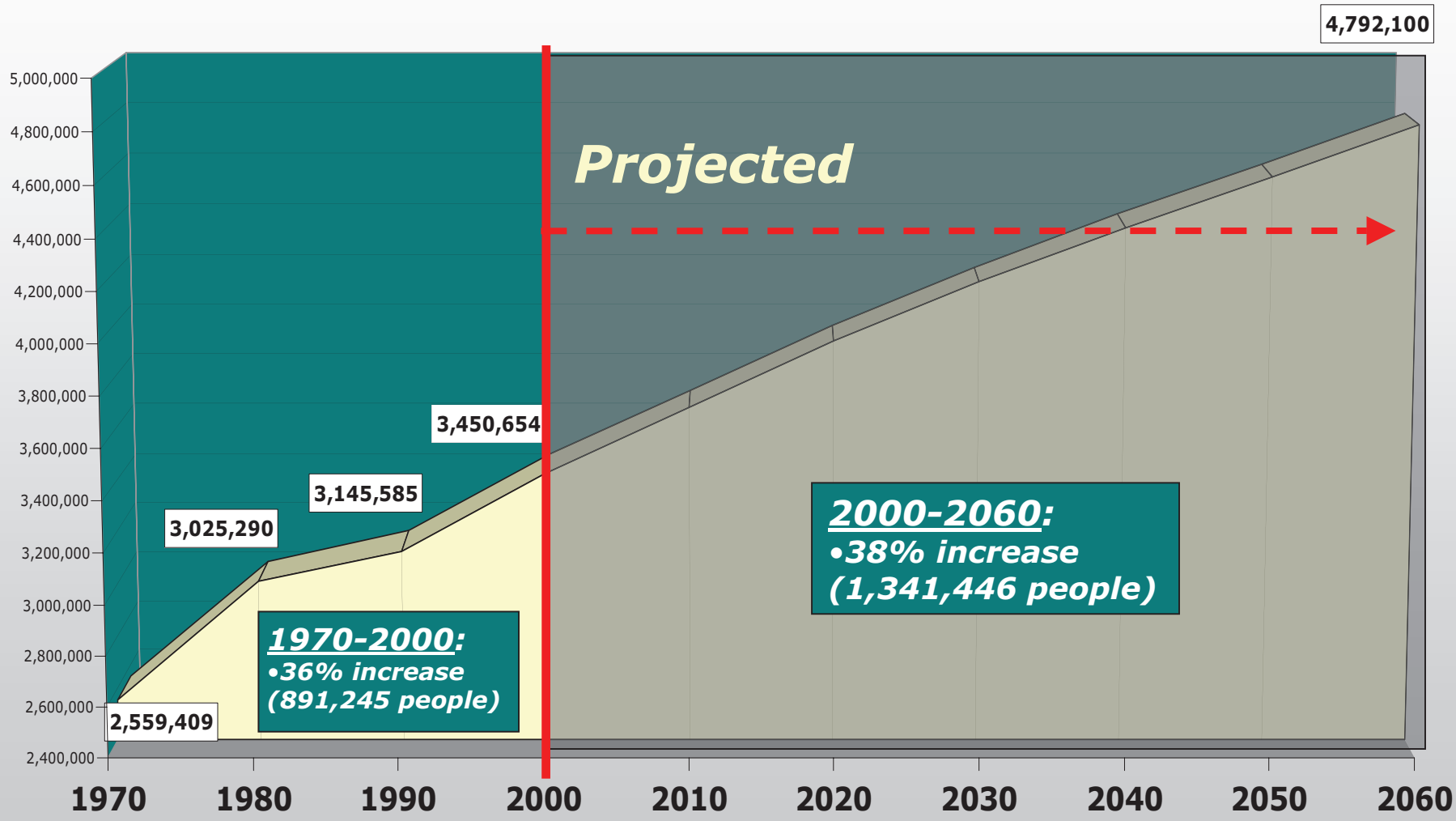
- >600 wells in network
- Data available at www.owrb.ok.gov





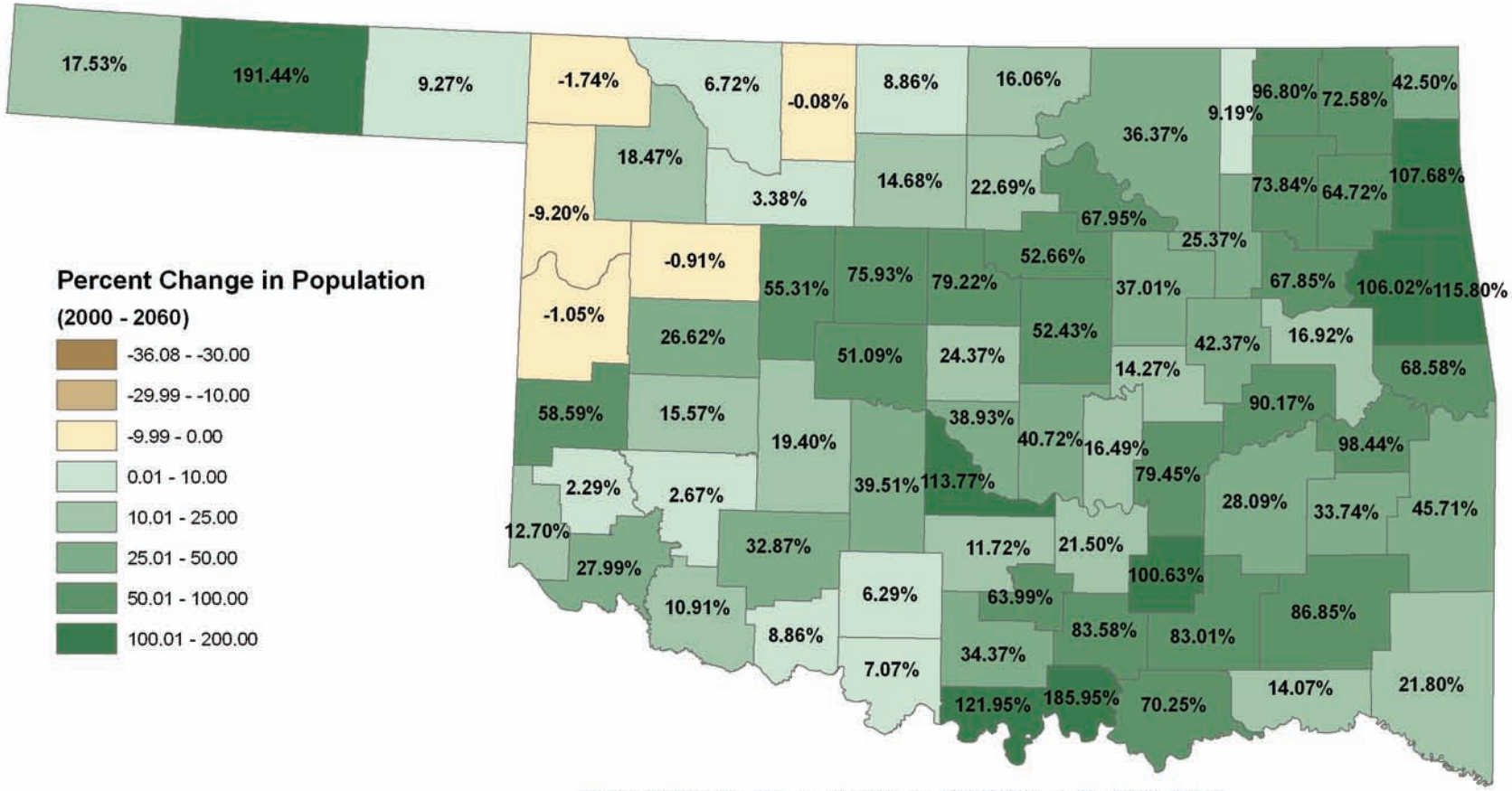


Oklahoma Population
1970-2060



Source: Oklahoma Department of Commerce

Percent Change in County Population (2000 - 2060)



Total State Population (2000) = 3,450,654

Total State Population (2060) = 4,792,000

Percent Change in State Population (2000 - 2060) = 38.9%

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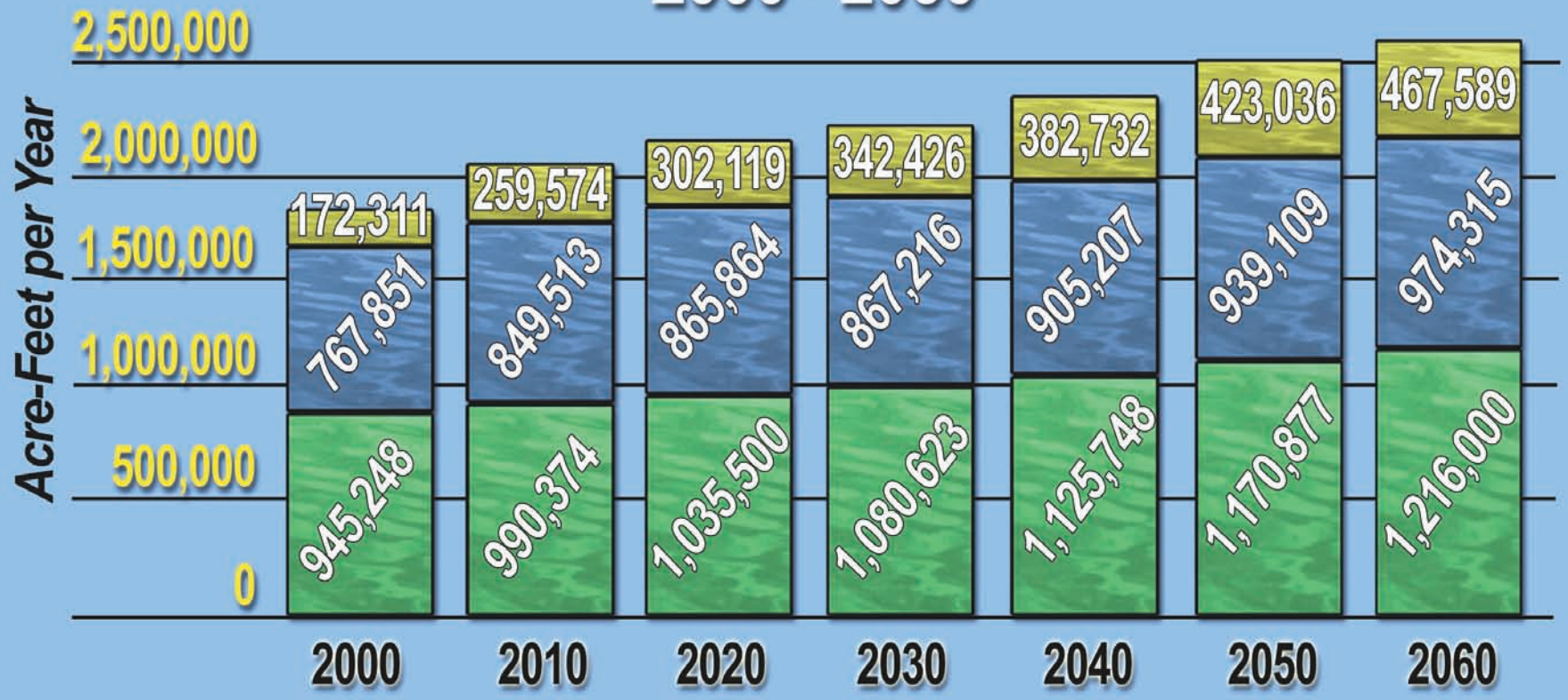
Oklahoma Water Use Projections
2000 - 2060



Thermoelectric Power

Municipal and Industrial

Agriculture

Projected Water Sector Growth (2000-2060):

Thermoelectric Power	=	63 percent
Municipal/Industrial	=	21 percent
Agriculture	=	22 percent

Source: U.S. Army Corps of Engineers (Tulsa District)

Evaluation of Water Supply Alternatives & Solutions

-785 Public Community Water Systems that Supply 94% of the State's Population

Public Community Systems				
Population Served	3,357,057			
Population Ranges	# Systems	Population	% of Total	
0 - 99	29	1,507	0.04	
100 - 199	63	9,128	0.27	**412 Systems = 5%**
200 - 499	169	57,215	1.70	
500 - 999	151	105,819	3.15	
1,000 - 9,999	327	900,483	26.82	**327 Systems = 27%**
10,000 - 49,999	37	739,238	22.02	**46 Systems = 68%**
>= 50,000	9	1,543,667	45.98	
Totals	785	3,357,057	100	

Some Issues for Consideration
Oklahoma Comprehensive Water Plan

- Water Supply & Infrastructure Needs
- Groundwater/Stream Water Interaction
- Environmental Flows
- Balancing Uses with Reservoir Operations
- Data Collection/Management Needs

- Other Issues:

_____?
_____?
_____?

Water Research Institute

Communication Portal for the Oklahoma Comprehensive Water Plan

OCWP

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State of Oklahoma

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