

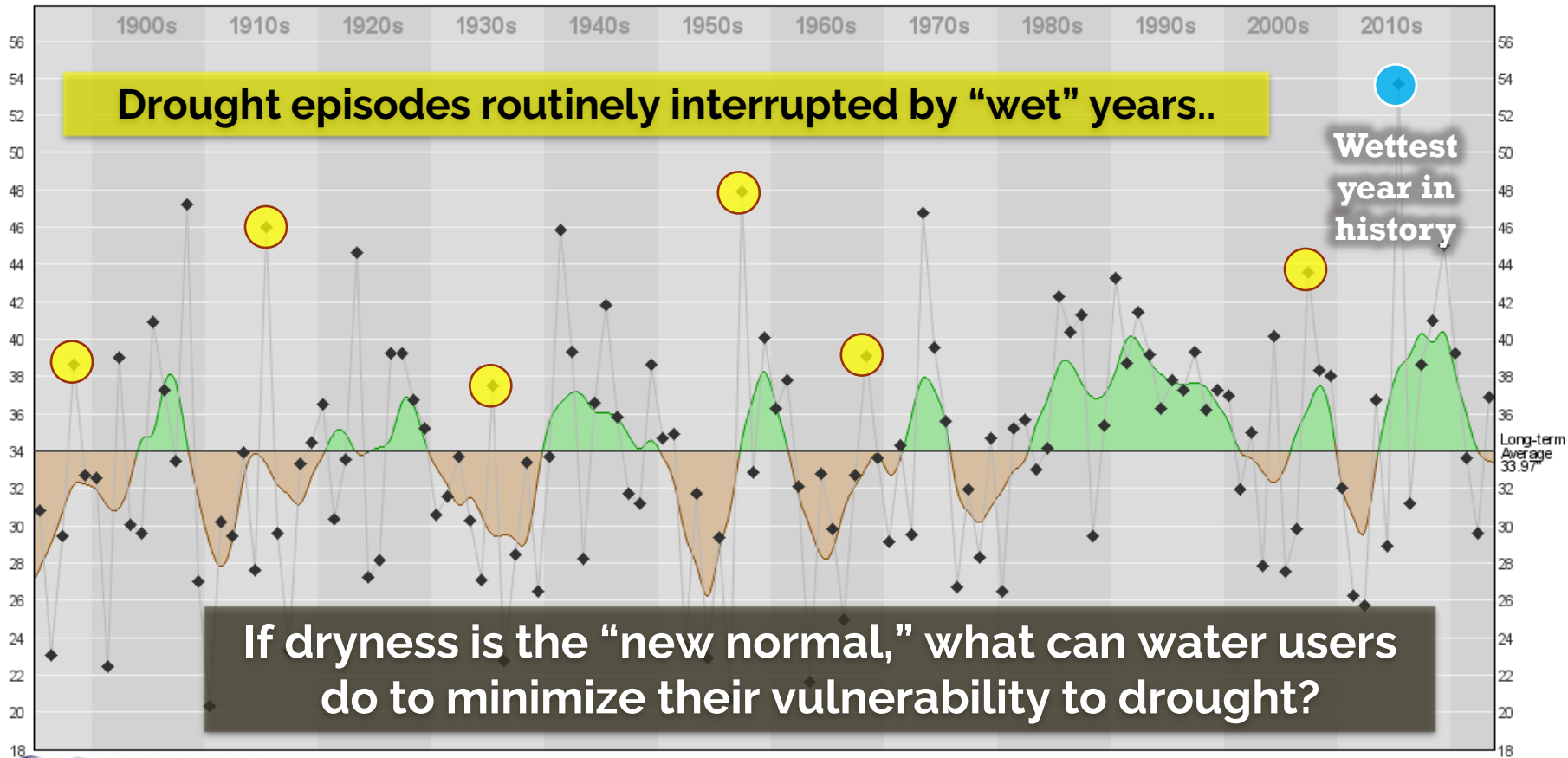
OKLAHOMA WATER LAW & SUSTAINABILITY: PLANNING FOR A NEW ERA

Duane Smith, Executive Director



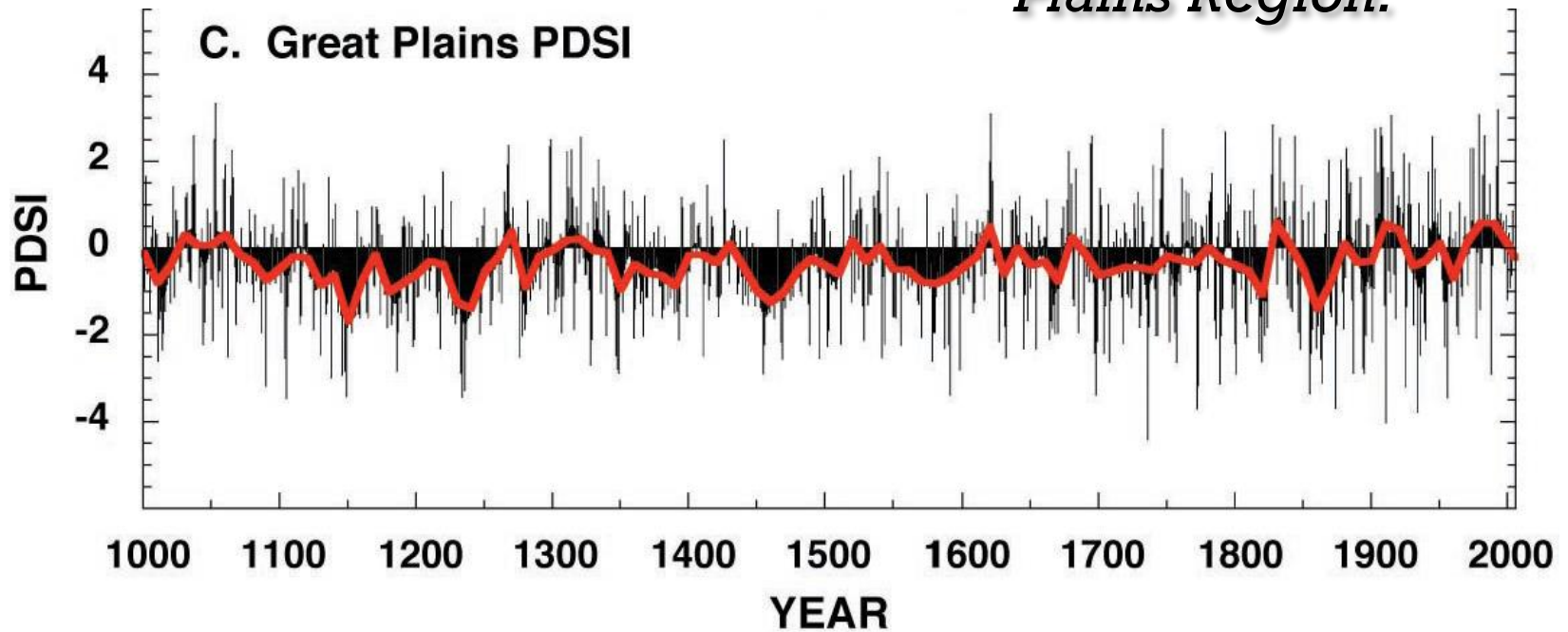


OKLAHOMA'S PRECIPITATION HISTORY (1895-2023)



MILLENNIAL DROUGHT IN THE GREAT PLAINS

*Data from tree-ring
PDSI analysis of Great
Plains Region.*



OKLAHOMA'S STREAM WATER LAW

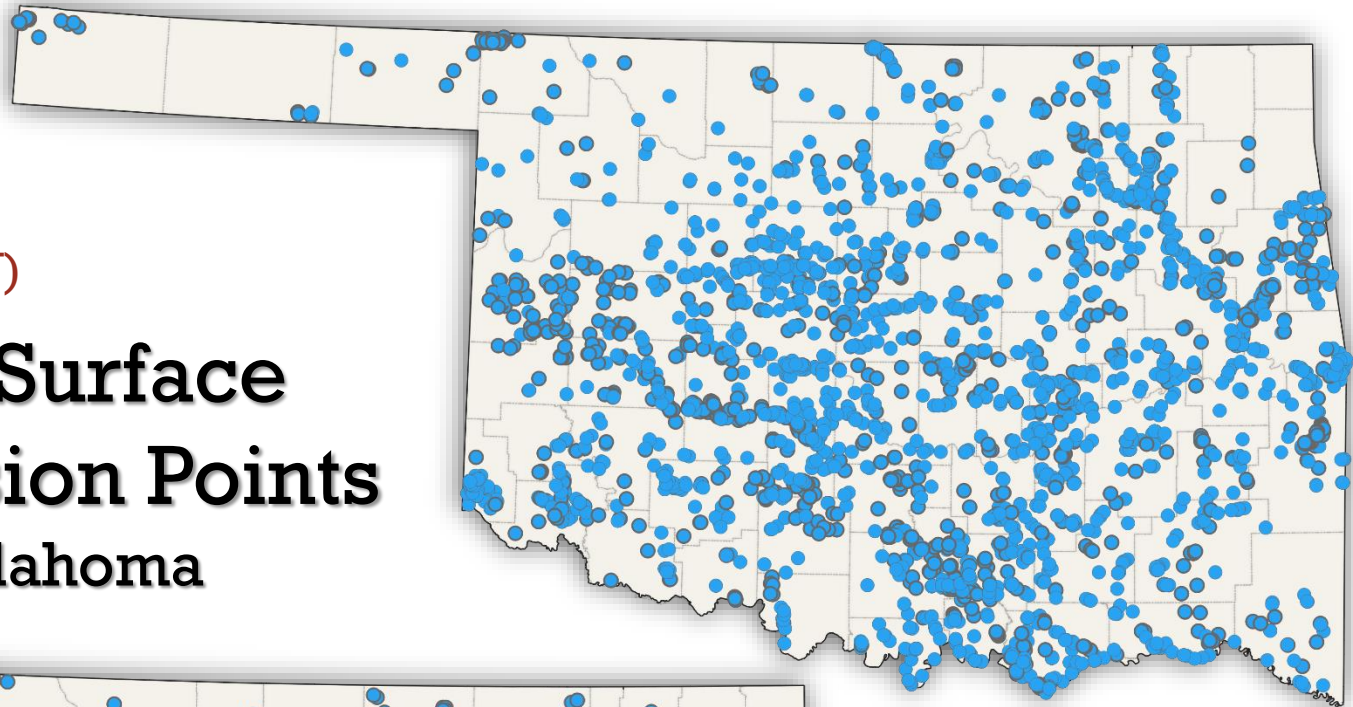
- Surface water is considered to be publicly owned and subject to appropriation by the OWRB:
 - “First in time, first in right”
 - “Beneficial use is the basis and limit of the appropriation right”
- Protection of domestic uses
- Prevent speculation



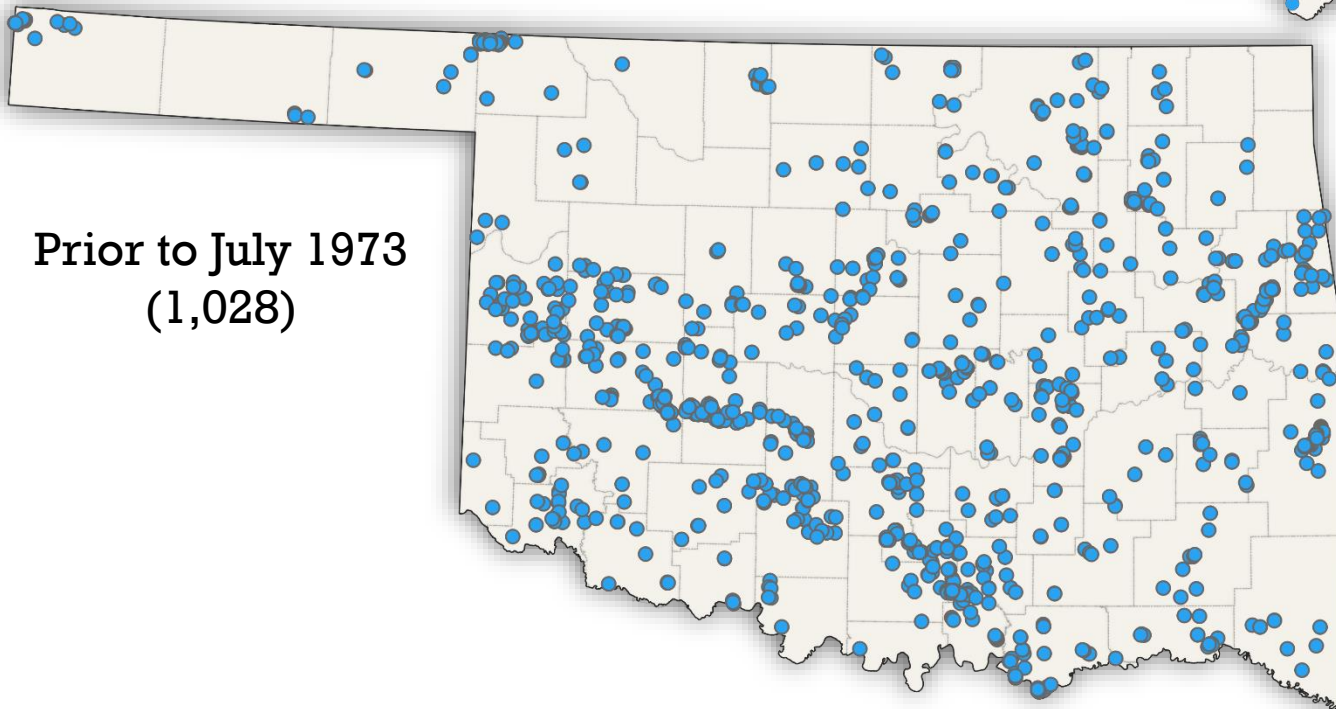
Current
(3,374)

(2,188 for
2,923,516 AFY)

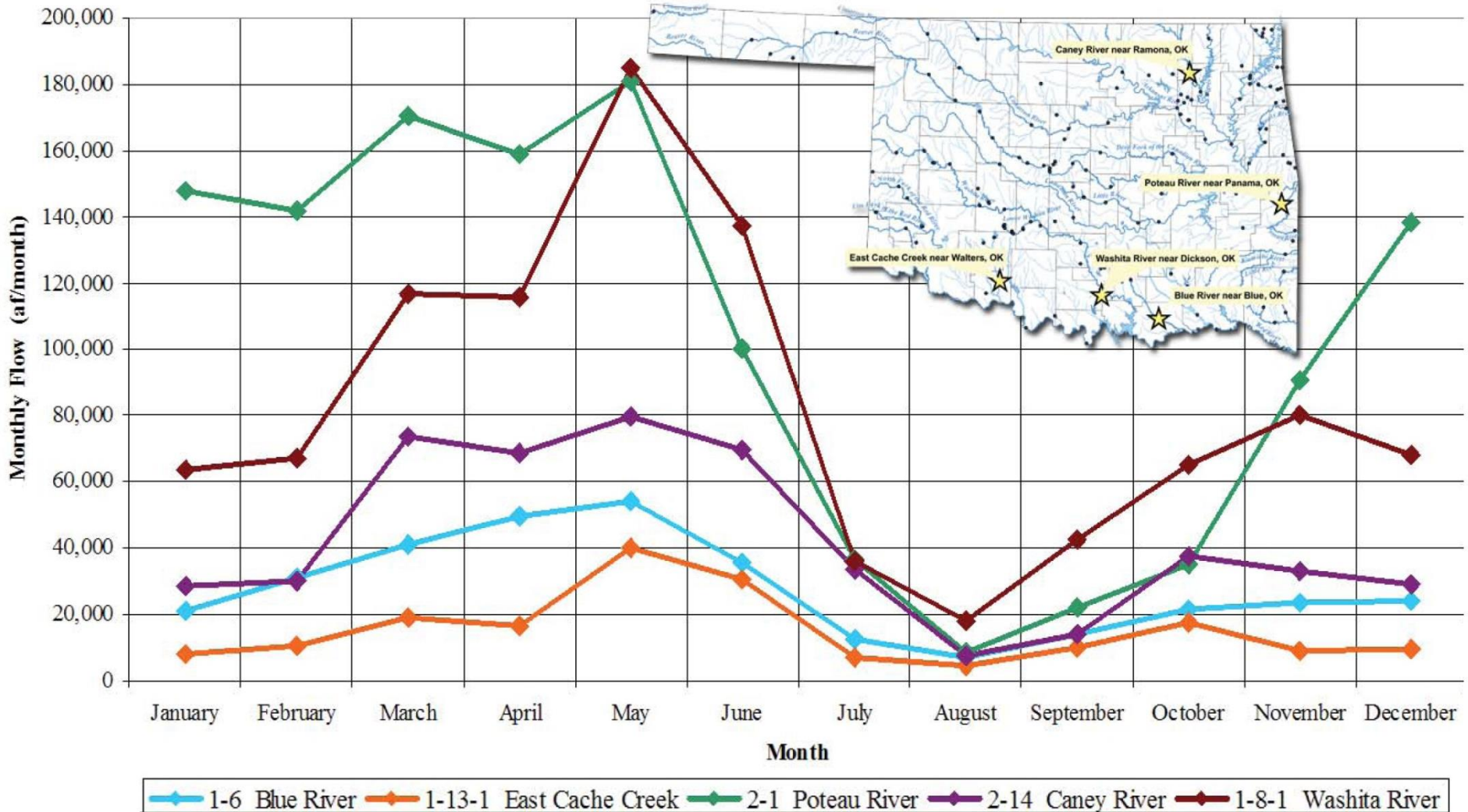
Permitted Surface Water Diversion Points State of Oklahoma



Prior to July 1973
(1,028)



Mean Monthly Streamflow (Period of Record) Selected Major River Basins in Oklahoma



OKLAHOMA'S GROUNDWATER LAW

- Ownership
- Overlie groundwater basin
- Beneficial Use
- Non-waste
 - Quantity
 - Quality



MAXIMUM ANNUAL YIELD

- Oklahoma water law states that certain factors be considered in the determination of the maximum annual yield of a major water basin:
 - Total land area overlying the basin
 - Amount of water in storage in the basin
 - Total discharge from the basin
 - Transmissivity of the basin
 - Possibility of pollution from natural sources
- Additional requirements for sensitive sole-source groundwater basins
 - Maximum annual yield ensures the natural flow of water from springs or streams will not be reduced

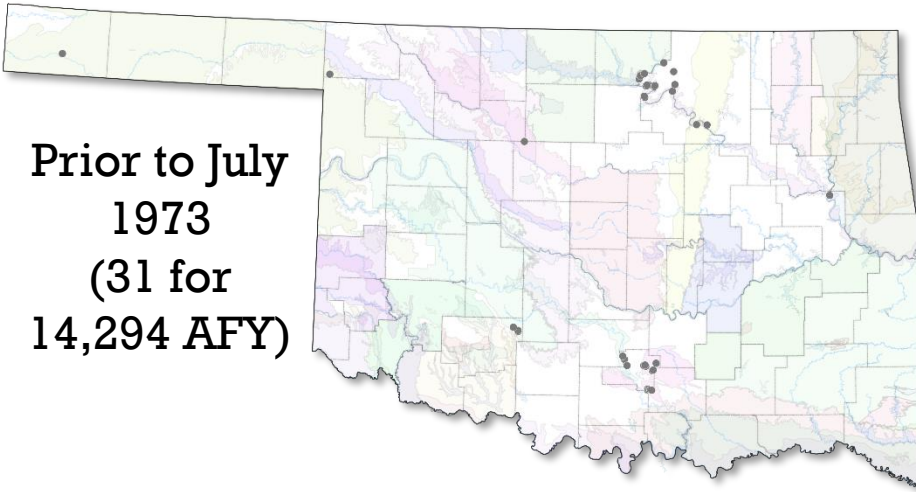


HYDROLOGIC STUDIES

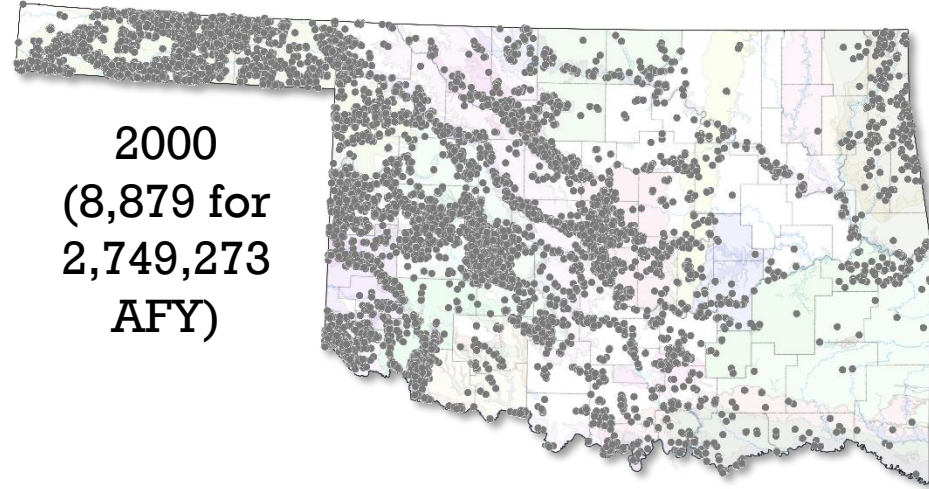
- Geologic Boundaries
- Find and Measure Wells
- Saturated Thickness
- Water-Level Fluctuations
- Recharge
- Water Use
- Streamflow/ Springs
- Estimate Aquifer Properties



Prior to July
1973
(31 for
14,294 AFY)

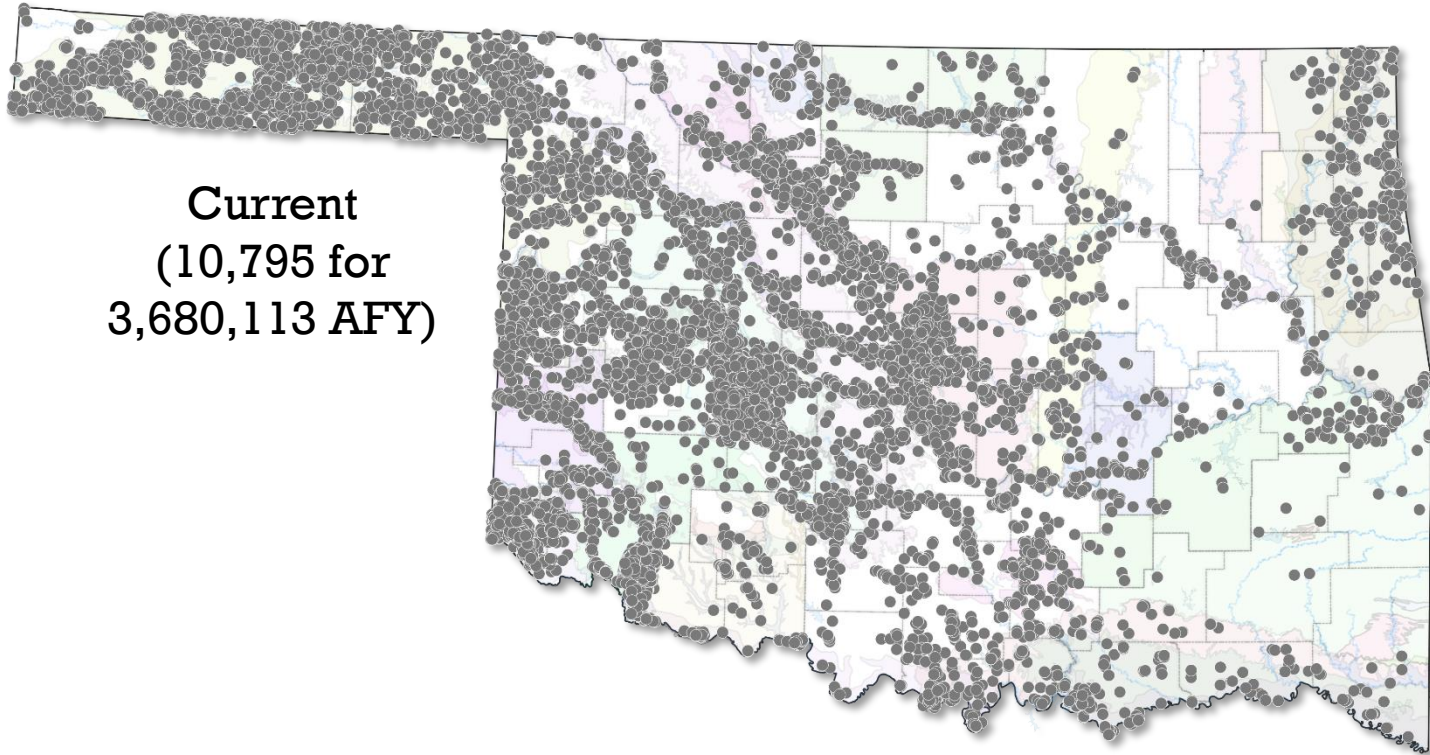


2000
(8,879 for
2,749,273
AFY)

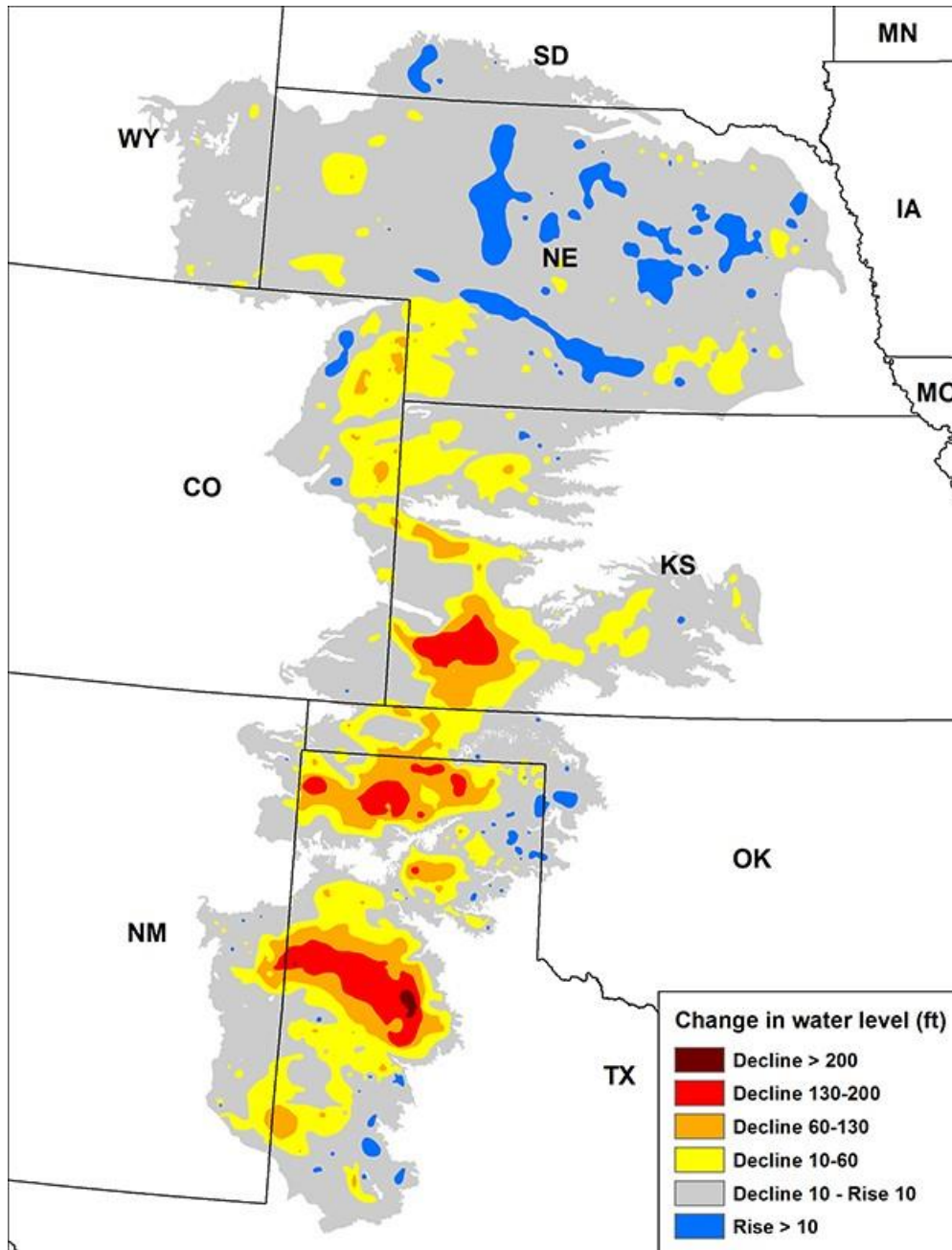


Permitted Groundwater Wells

Current
(10,795 for
3,680,113 AFY)



OGALLALA AQUIFER CHANGE IN WATER LEVELS



- Levels from predevelopment (1950s) to 2013.



OKLAHOMA WATER LAW...

...is a utilization (“mining”) law that allows depletion of the groundwater resource (20-year basin life)

...does not recognize the hydrologic connection between surface and groundwater

Are we planning for future needs and vulnerabilities and a drier climate?

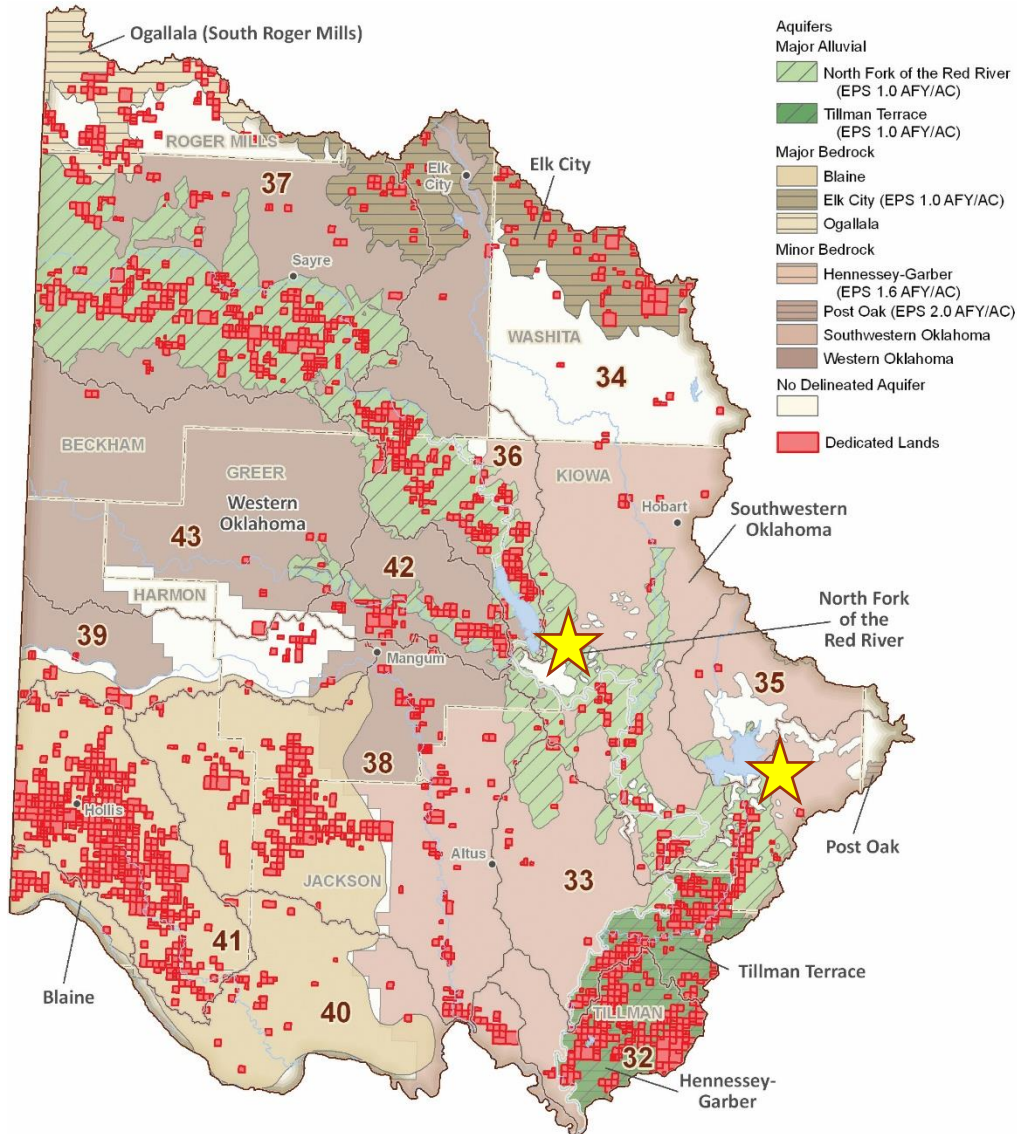
Do we need to incorporate better science?

Can we have both economic development and water sustainability?



WATER LAW-RELATED VULNERABILITIES...

TOM STEED & LUGERT-ALTUS RESERVOIRS

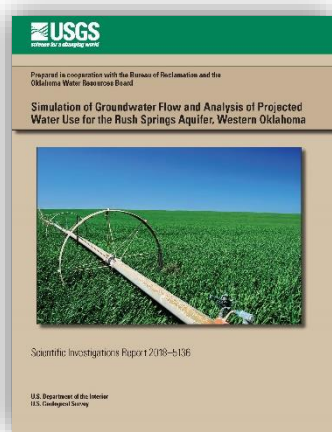
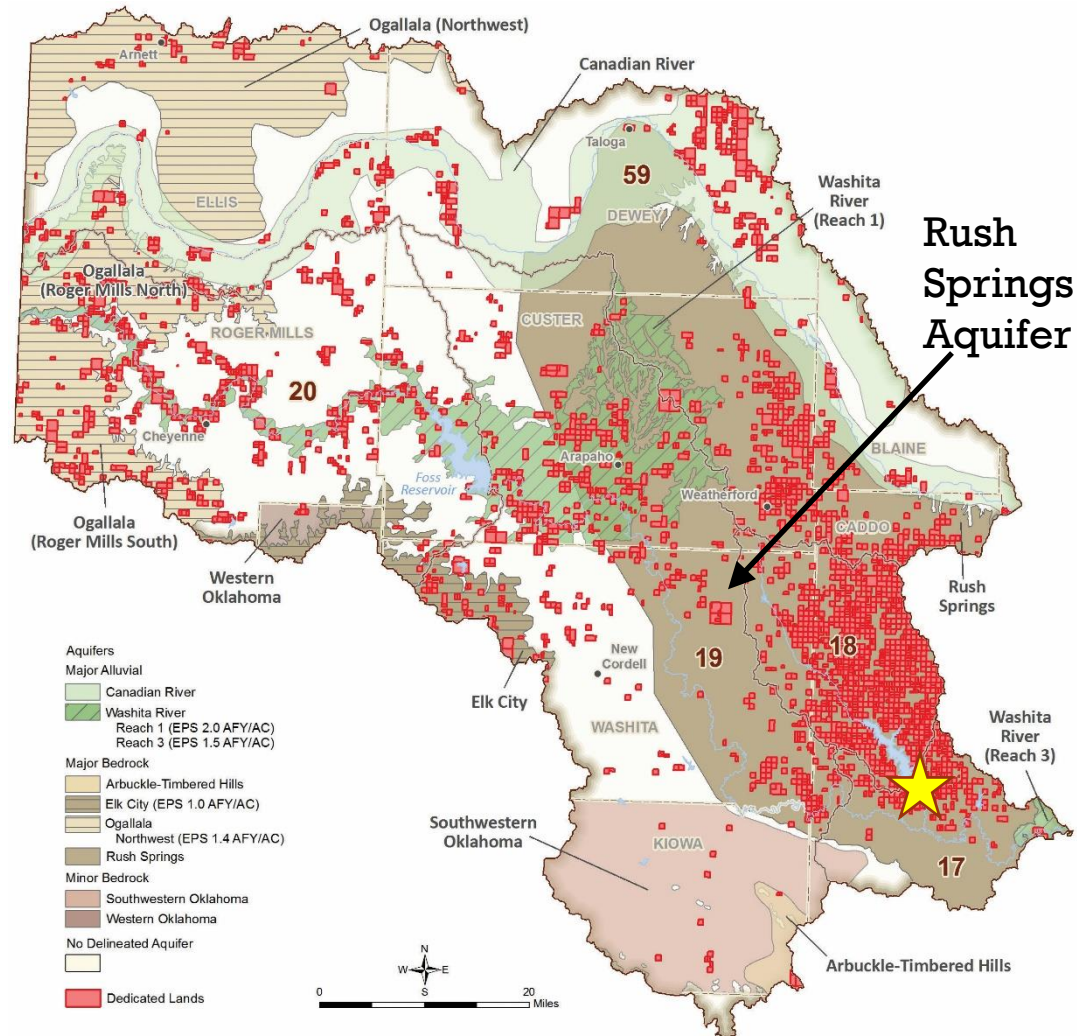


- State-issued permits upstream reduce water supply reliability for 40,000 users as well as a profitable cotton industry
- A particular issue during drought episodes



WATER LAW-RELATED VULNERABILITIES... FORT COBB RESERVOIR

- An essential water source for Anadarko and Chickasha
- USGS study of Rush Springs aquifer and pumping rates indicates a distinct GW/SW connection.



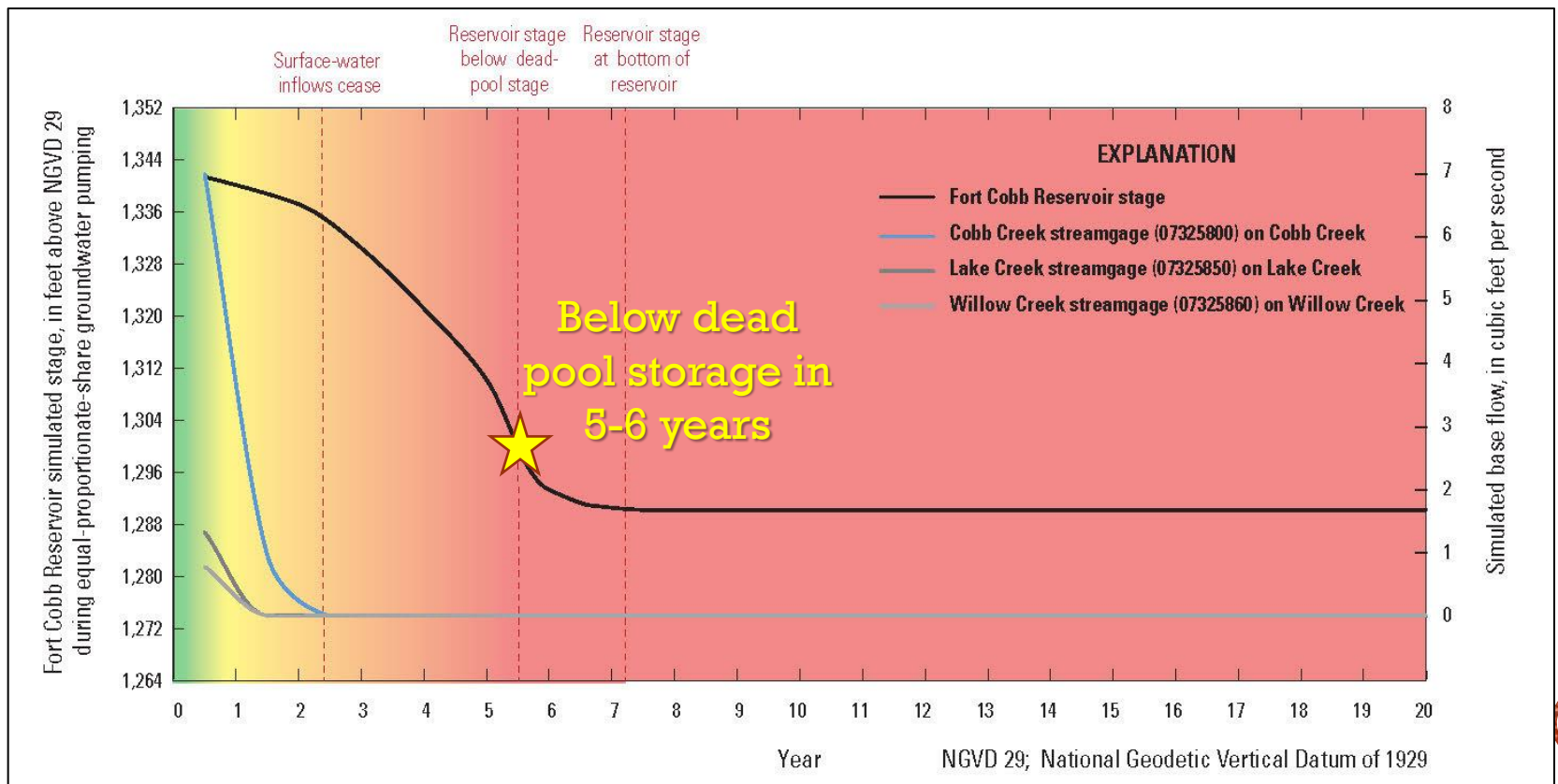
“Simulation of Groundwater Flow and Analysis of Projected Water Use for the Rush Springs Aquifer” (USGS, 2018)

WATER LAW-RELATED VULNERABILITIES...

FORT COBB RESERVOIR

USGS Study Groundwater Availability Scenarios:

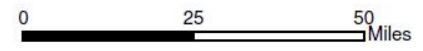
- Simulated base flow in tributaries and in Fort Cobb Reservoir stage during 20 years of continuous EPS groundwater pumping in the Rush Springs aquifer



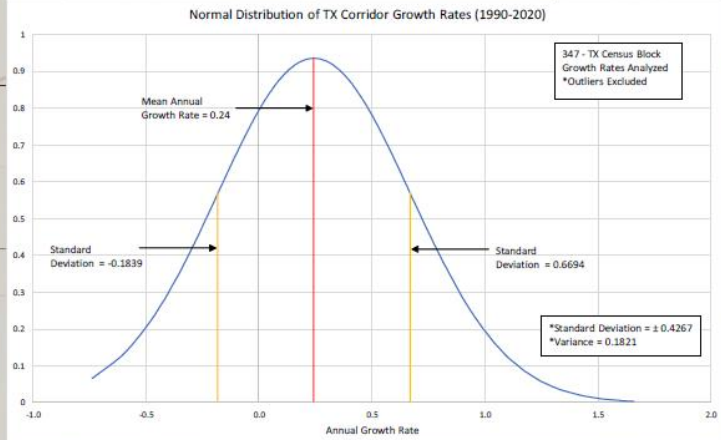


US Army Corps of Engineers

Oklahoma Water Planning Figure 16: Corridor Growth Rate Process

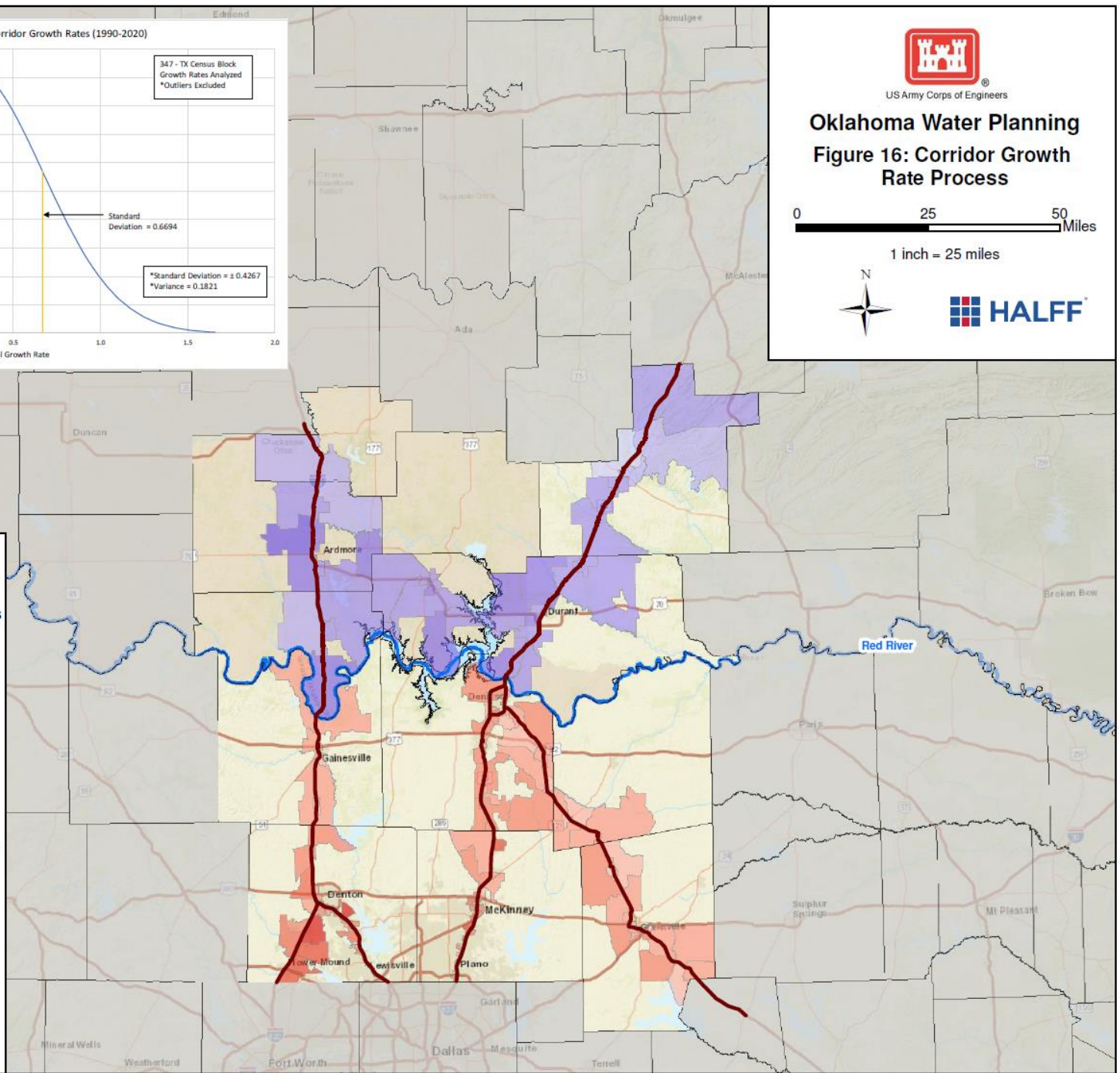


1 inch = 25 miles



Legend

- Major Highways
- 2020 OK Block Population Ranges**
- 0 - 500
- 500 - 1,000
- 1,000 - 2,000
- 2,000 - 4,000
- 4,000 - 6,000
- 6,000 - 8,000
- 8,000 - 10,000
- 2020 TX Block Population Ranges**
- 0 - 500
- 500 - 1,000
- 1,000 - 2,000
- 2,000 - 4,000
- 4,000 - 6,000
- 6,000 - 8,000
- 8,000 - 10,000



DEPLETION VS. RELIABILITY

- The current model of permitting all of the average annual flow, not recognizing groundwater and surface water interaction, and depleting the groundwater resources does not give reliability to any user and does not support economic development.



RECOMMENDATIONS TO CONSIDER TO MAKE WATER MORE RELIABLE

- 1) Make all Temporary permits equal to the recharge rate. Use Hydrologic Studies to justify raising or lowering the EPS. Adjust the EPS based upon the results of an updated Hydrologic Study.
- 2) Protect senior permits that utilize the yield of reservoirs by conditioning junior permits, both groundwater and surface water, accordingly.
- 3) Use average seasonal or average monthly flows instead of average annual flows when determining water available for appropriation.
- 4) Require "water use audits" every five years for all permits that use over 160 acre-feet/year.
- 5) Protect perineal streams by setting instream flows to protect reliability and the economy.



QUESTIONS?

