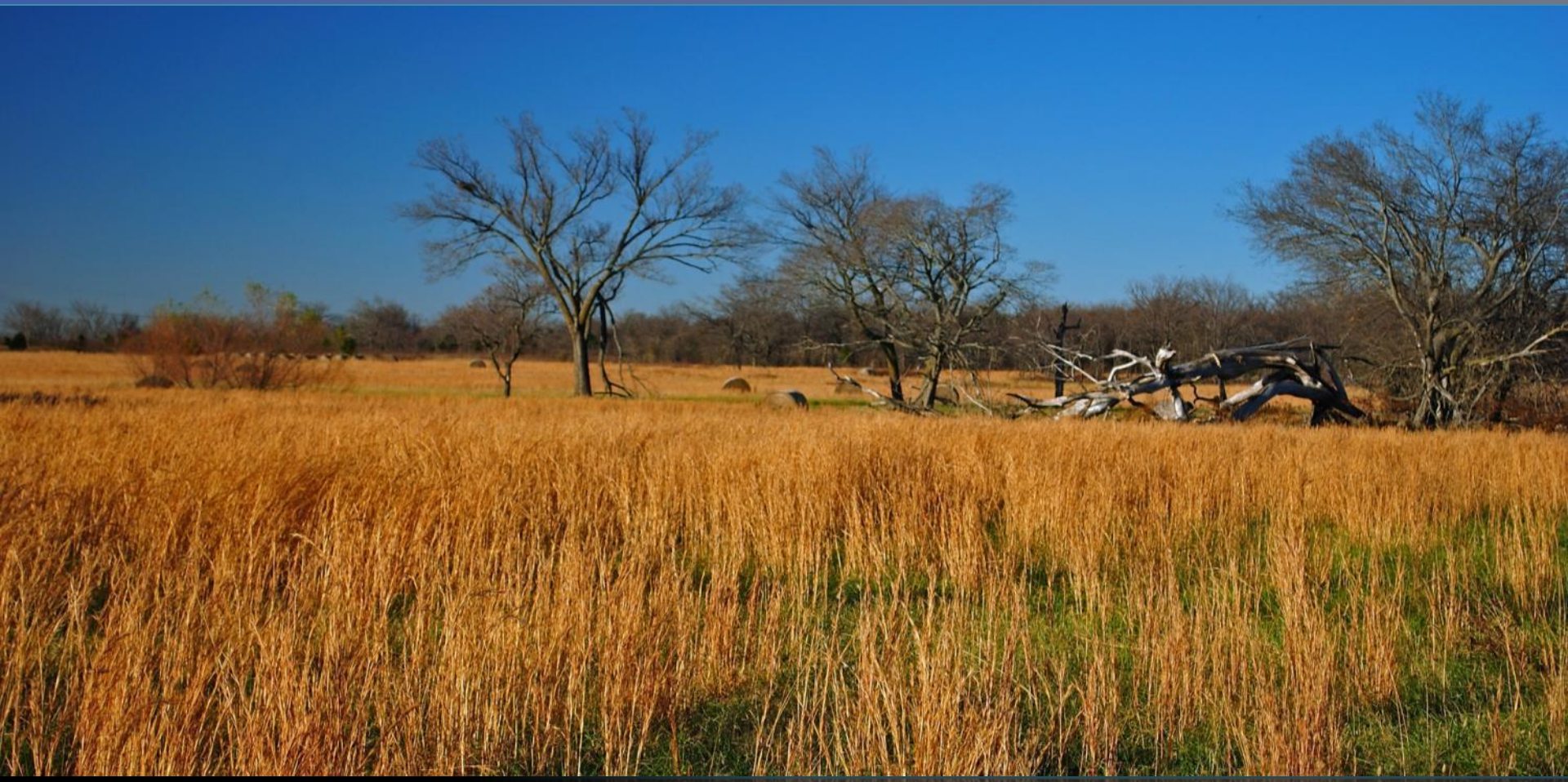
HYDROLOGIC INVESTIGATIONS



Oklahoma Governor's Water Conference

October 18, 2011

Norman, Oklahoma

Christopher R. Neel
Hydrologist
OWRB
the water agency

OUTLINE

I. WHY WE DO HYDROLOGIC INVESTIGATIONS?

II. BENEFITS

III. HYDROLOGIC INVESTIGATIONS STATUS

IV. 2012 COMPREHENSIVE WATER PLAN

V. FUTURE STUDIES

HYDROLOGIC INVESTIGATIONS

Why does the State conduct hydrologic investigations?

1973 Oklahoma Groundwater Law

It is declared to be the public policy of the State of Oklahoma, in the interest of the agricultural stability, domestic, municipal, industrial and other beneficial uses, general economy, and health and welfare of the State and its citizens, to utilize the ***groundwater resources*** *of the State, and for that purpose to provide* ***reasonable regulations*** *for the allocation for reasonable use based on* ***hydrologic surveys*** *of fresh groundwater basins or subbasins to* ***determine a restriction on the production*** *based upon the acres overlying the groundwater basin or subbasin.*

HYDROLOGIC INVESTIGATIONS

Why does the State conduct hydrologic investigations?

1963 Oklahoma Stream Water Law

1) *There is **unappropriated water** available in the amount applied for;* and
2) *"…the Board shall consider the **availability of all stream water** sources…."*

HYDROLOGIC INVESTIGATIONS

Fairness:

- To ensure everyone has enough water
- To protect current and future groundwater rights

HYDROLOGIC INVESTIGATIONS

Benefits

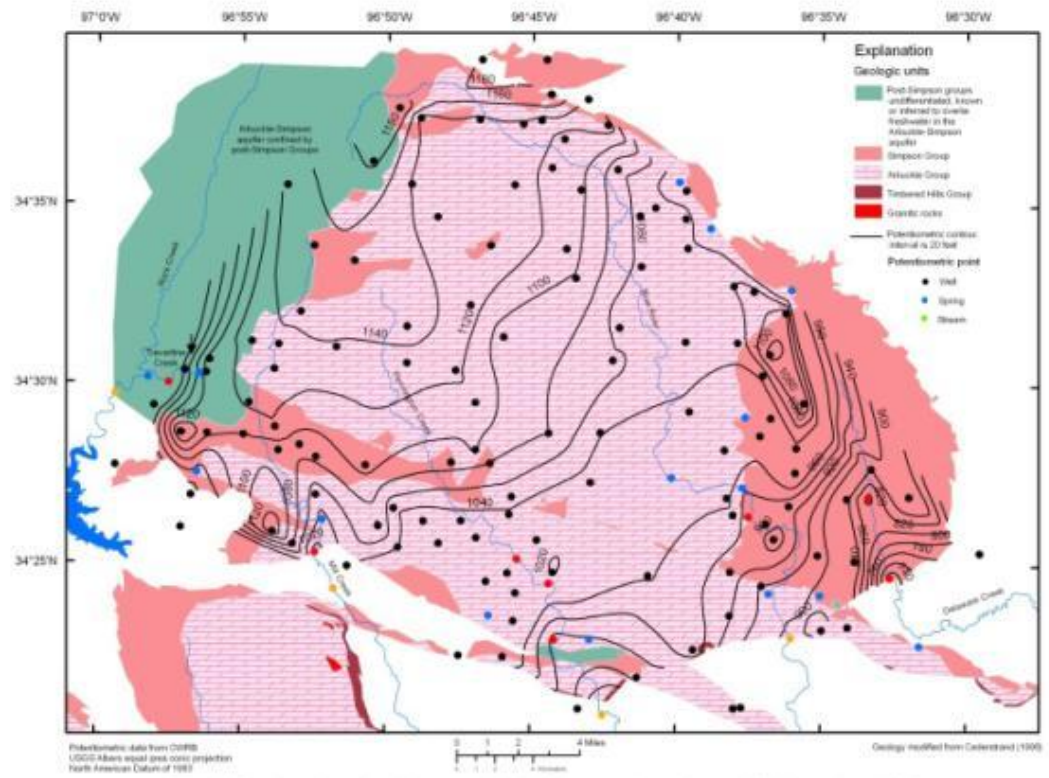


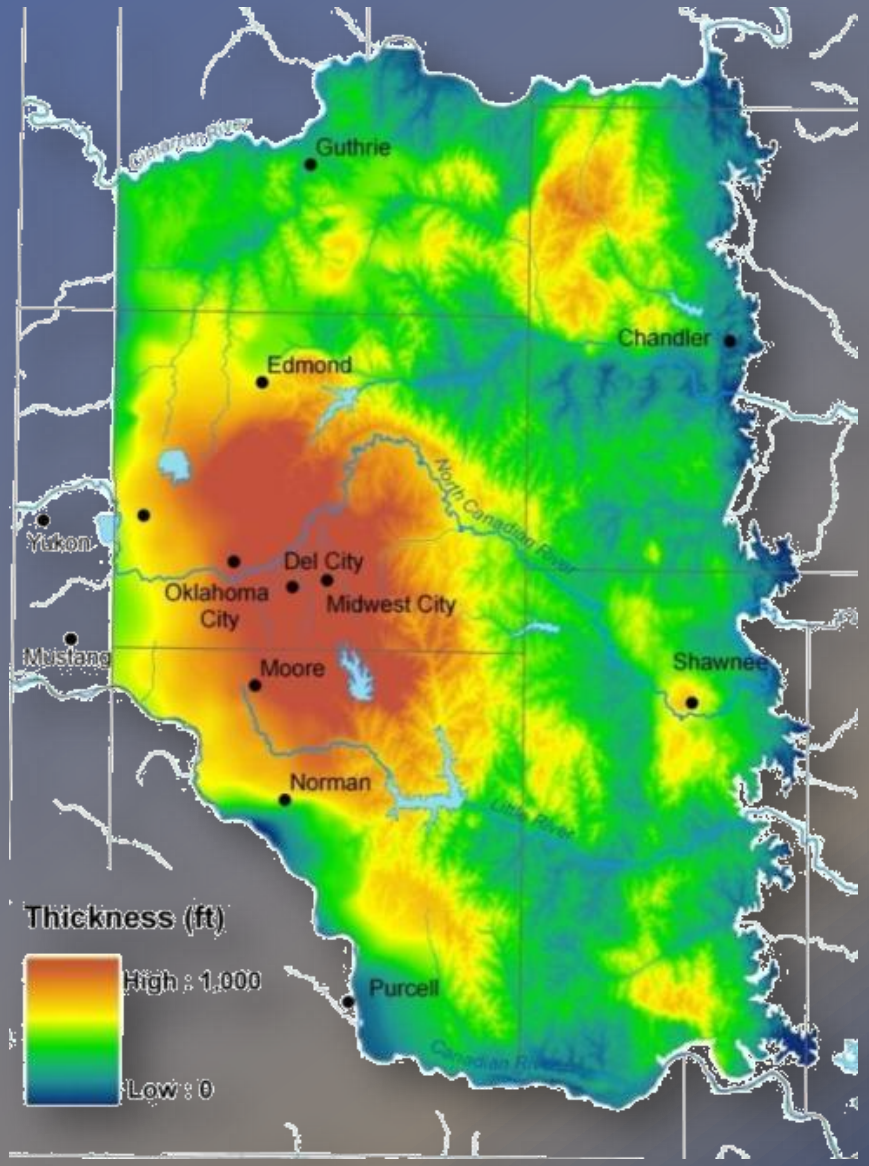
Figure X. Potentiometric surface in the eastern Arbuckle-Simpson aquifer, south-central Oklahoma, August 1995

Arbuckle-Simpson Potentiometric Surface Map

HYDROLOGIC INVESTIGATIONS

Benefits

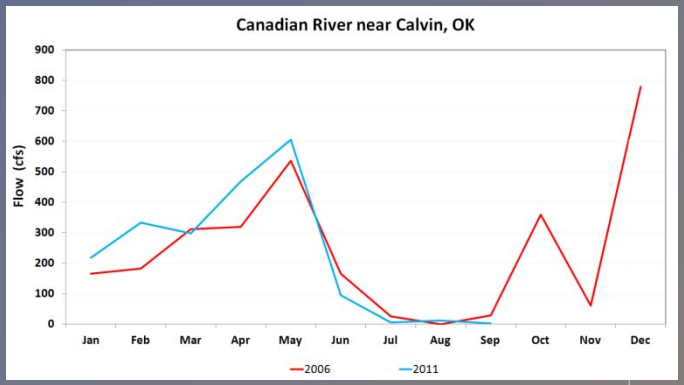
Garber-Wellington
Aquifer Thickness

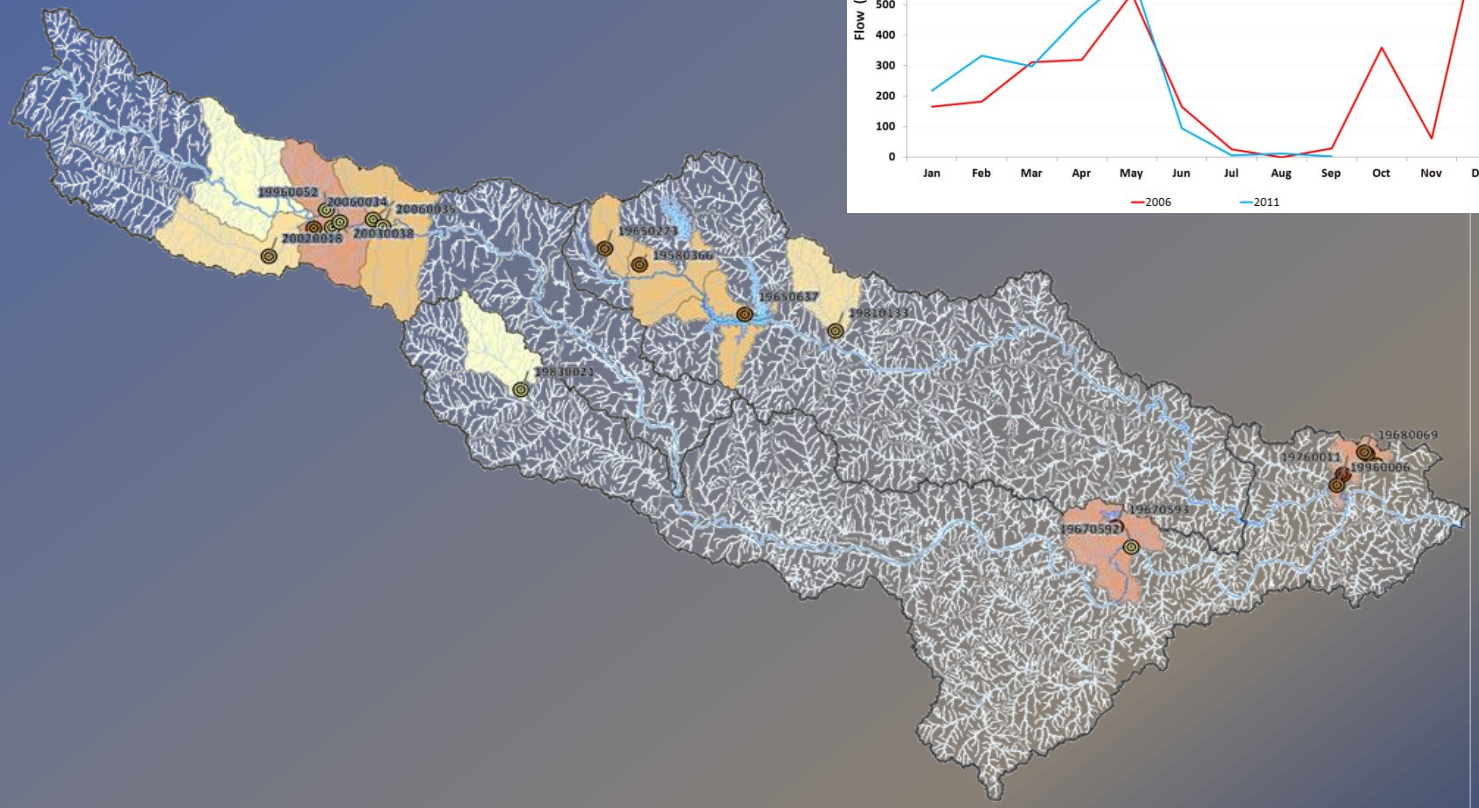


Hydrologic Investigations

Benefits

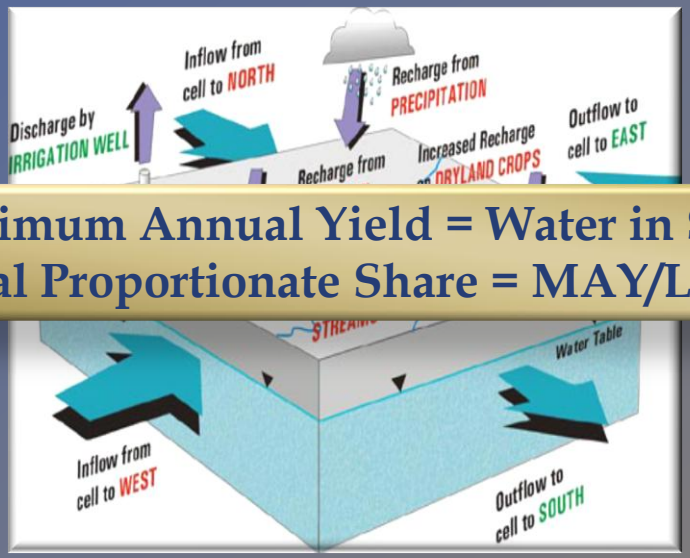
Identify potential shortages during low-flow conditions



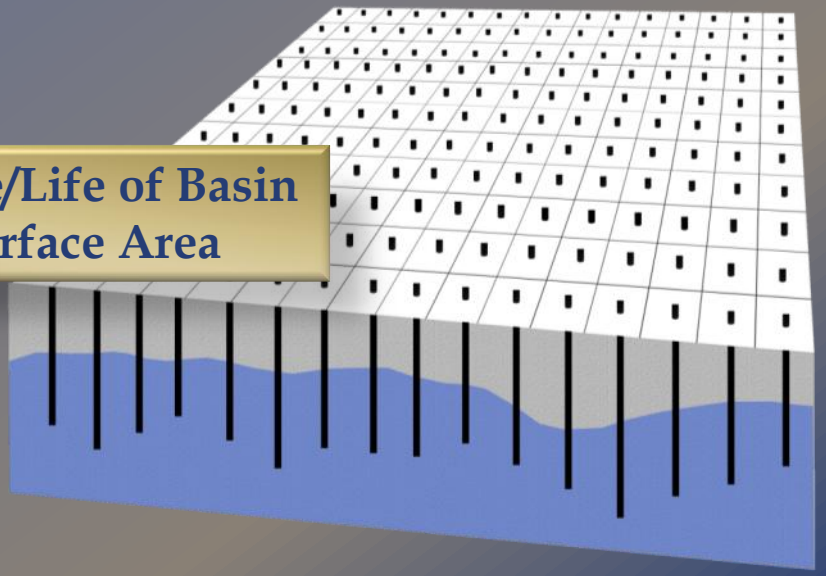


TYPICAL ELEMENTS
MAXIMUM ANNUAL YIELD & EQUAL PROPORTIONATE SHARE

- Total land area overlying basin (acres)
- Amount of water in storage (acre-feet)
- Rate of recharge *to* basin and total discharge *from* basin
- Transmissivity and Hydraulic Conductivity
- *Minimum* basin life of 20 years

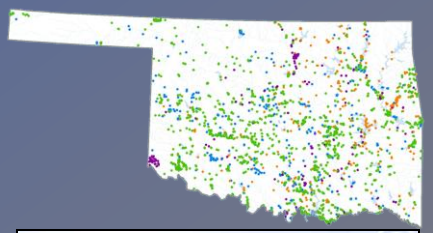


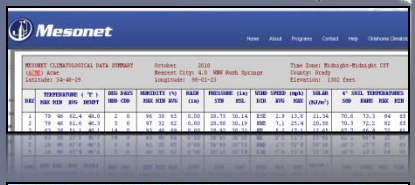
Maximum Annual Yield = Water in Storage/Life of Basin
Equal Proportionate Share = MAY/Land Surface Area

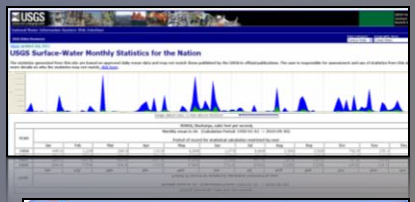


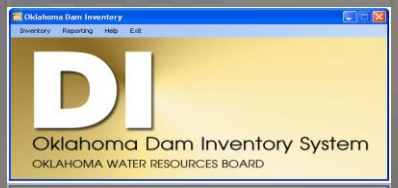
Typical Elements
Surface Water Modeling

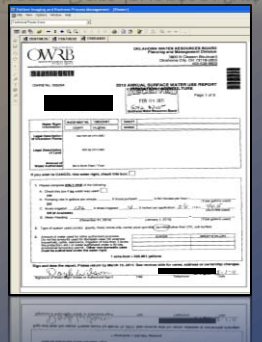
- NHD, land cover/use, other datasets
- Precipitation and Evaporation Data from the Mesonet
- USGS Streamflow Gauge Data
- Reservoir Data (OWRB Dam Safety Database)
- Water Use Reports (OWRB Water Rights Database)











GROUNDWATER INVESTIGATIONS

- 36 unstudied groundwater basins
- Completed Hydrologic Investigations 10 out of 23 major Aquifers
- Arbuckle-Simpson
  Garber-Wellington
  MAY By 2013
- Many minor aquifers need to be completed

2012 OKLAHOMA COMPREHENSIVE WATER PLAN

Recommendations

- Increased funding to complete backlogged studies

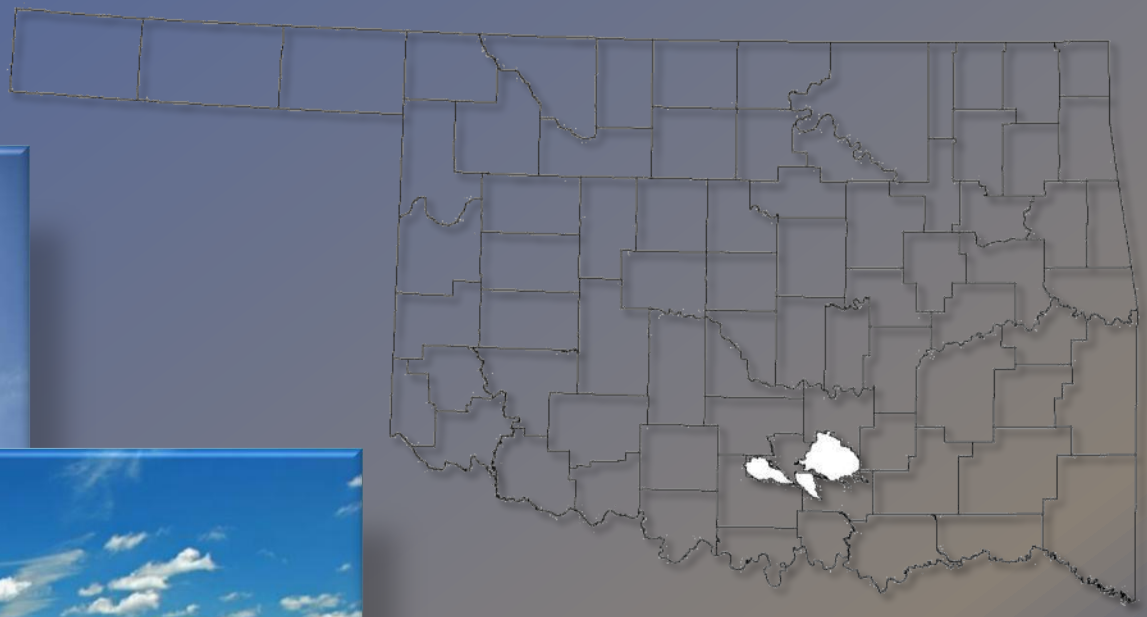
- Dedicated appropriations for critical state-wide monitoring programs

Goals

- Work with stakeholders – "How do you want to manage the aquifer?"

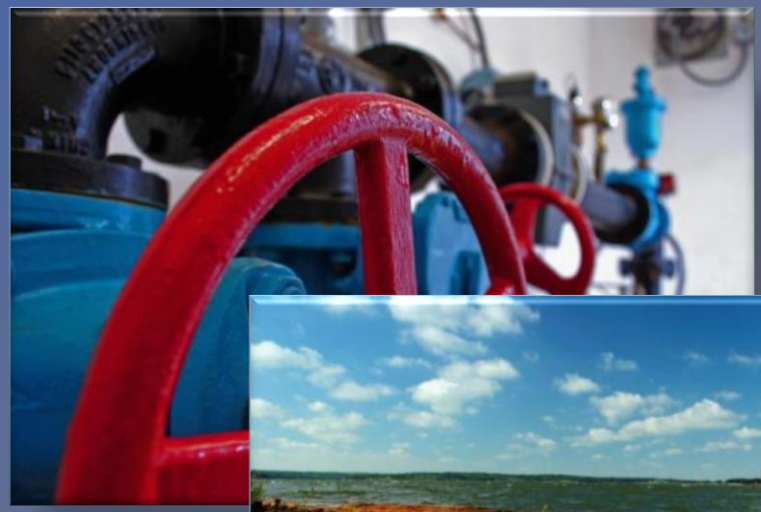
HYDROLOGIC STUDIES PAST AND FUTURE

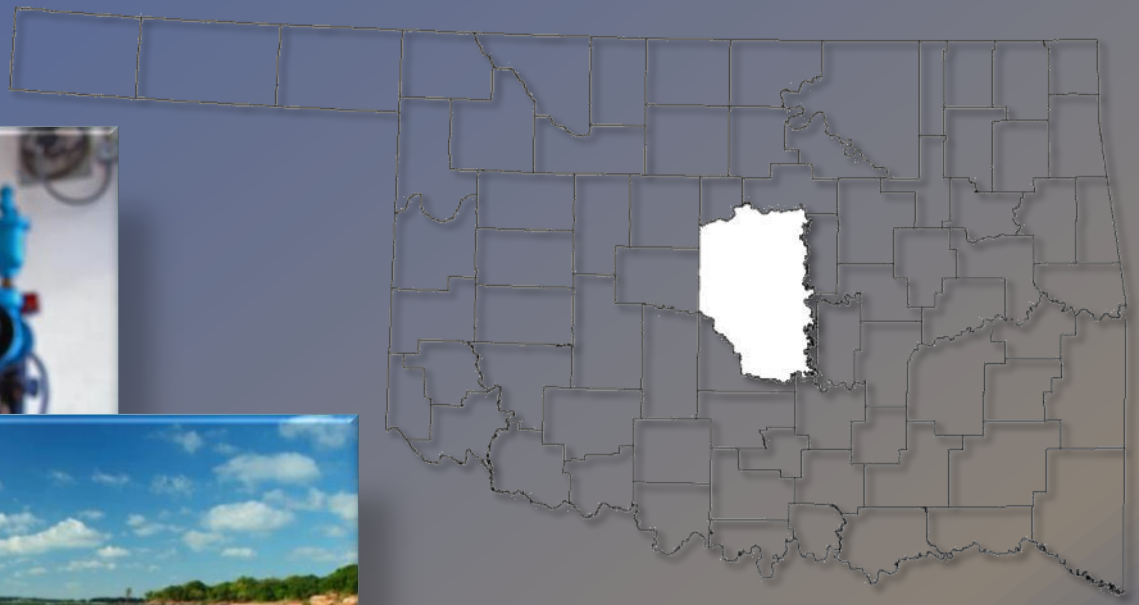
ARBUCKLE-SIMPSON AQUIFER STUDY



2004-2008

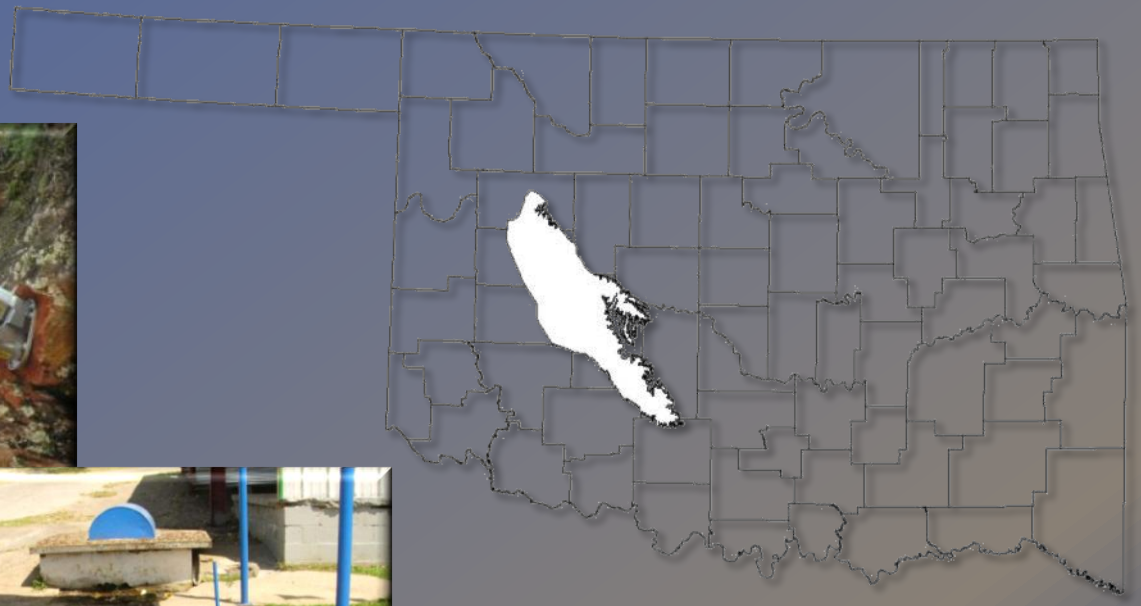
GARBER-WELLINGTON AQUIFER STUDY





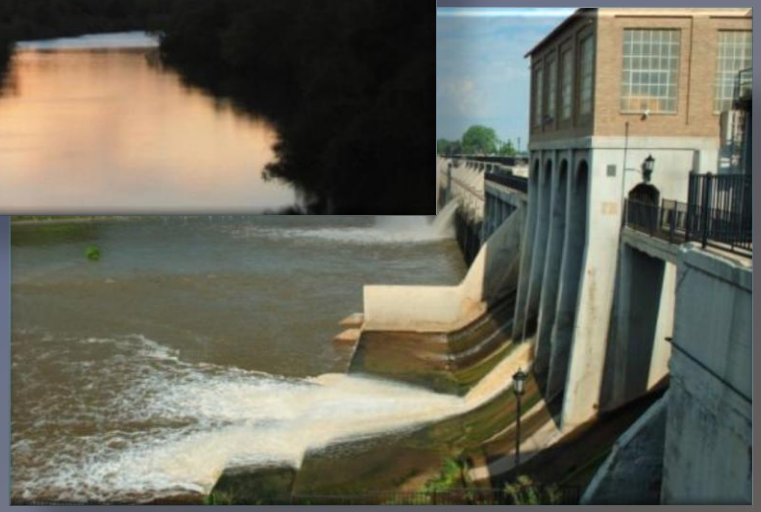
2008-2011

RUSH SPRINGS AQUIFER STUDY



2011-2013

NORTH CANADIAN RIVER ALLUVIUM & TERRACE 20-YEAR UPDATE

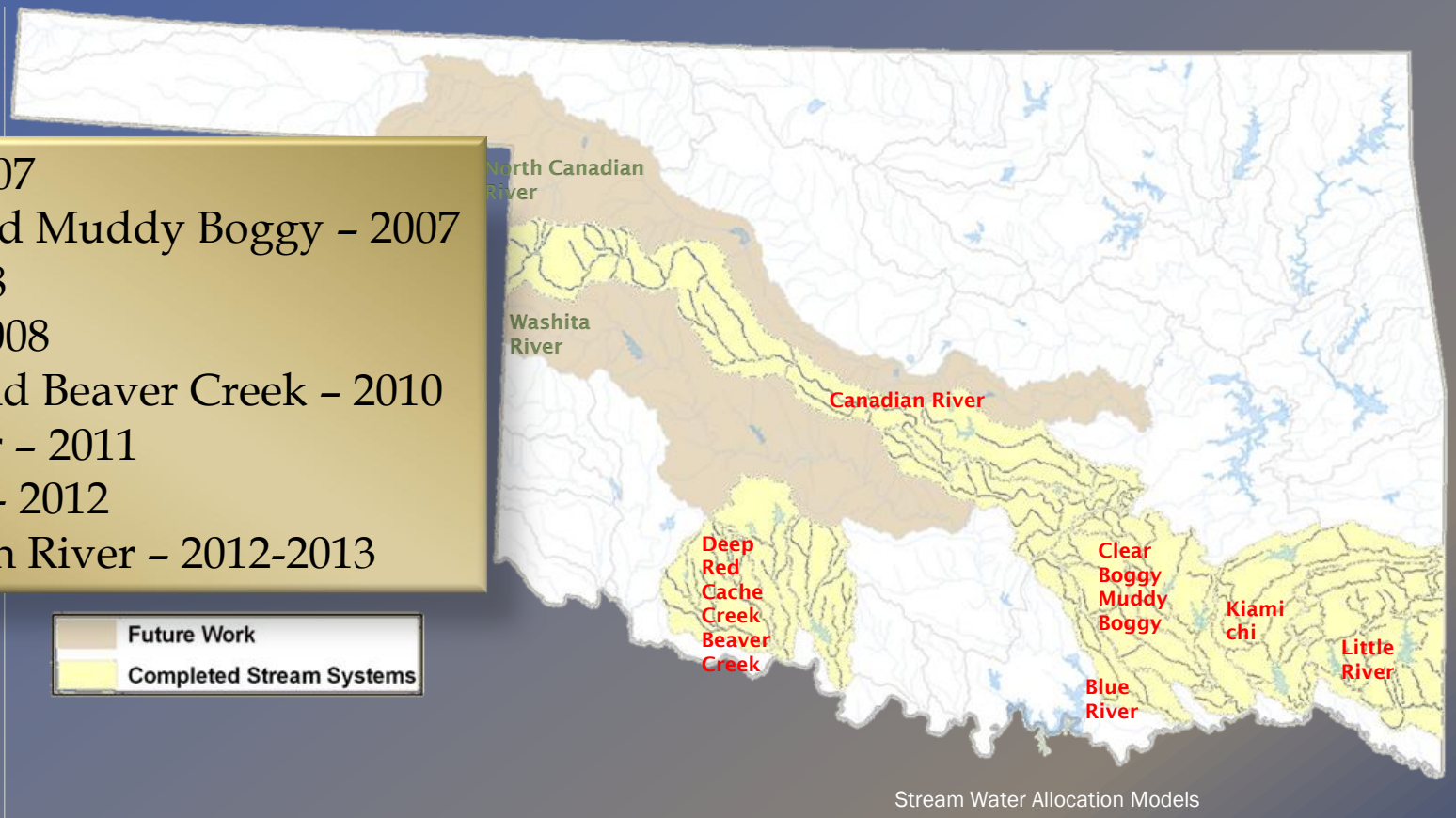


2011-2013

SURFACE WATER INVESTIGATIONS

Future Work

Blue River – 2007
Clear Boggy and Muddy Boggy – 2007
Kiamichi – 2008
Little River – 2008
Cache Creek and Beaver Creek – 2010
Canadian River – 2011
Washita River – 2012
North Canadian River – 2012-2013



Stream Water Allocation Models