

OKLAHOMA COMPREHENSIVE WATER PLAN TECHNICAL STUDIES OVERVIEW

29th Annual Oklahoma
Governor's Water Conference

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October 28, 2008





*OCWP Technical
Work Overview*

Looking Ahead to Meet our Future Needs

**How are
we using
our water
resources
today?**

2008

- **Infrastructure**
- **Efficiencies**
- **Funding &
Finance**

**How do we
want to use
our water
resources
in the
future?**

2060

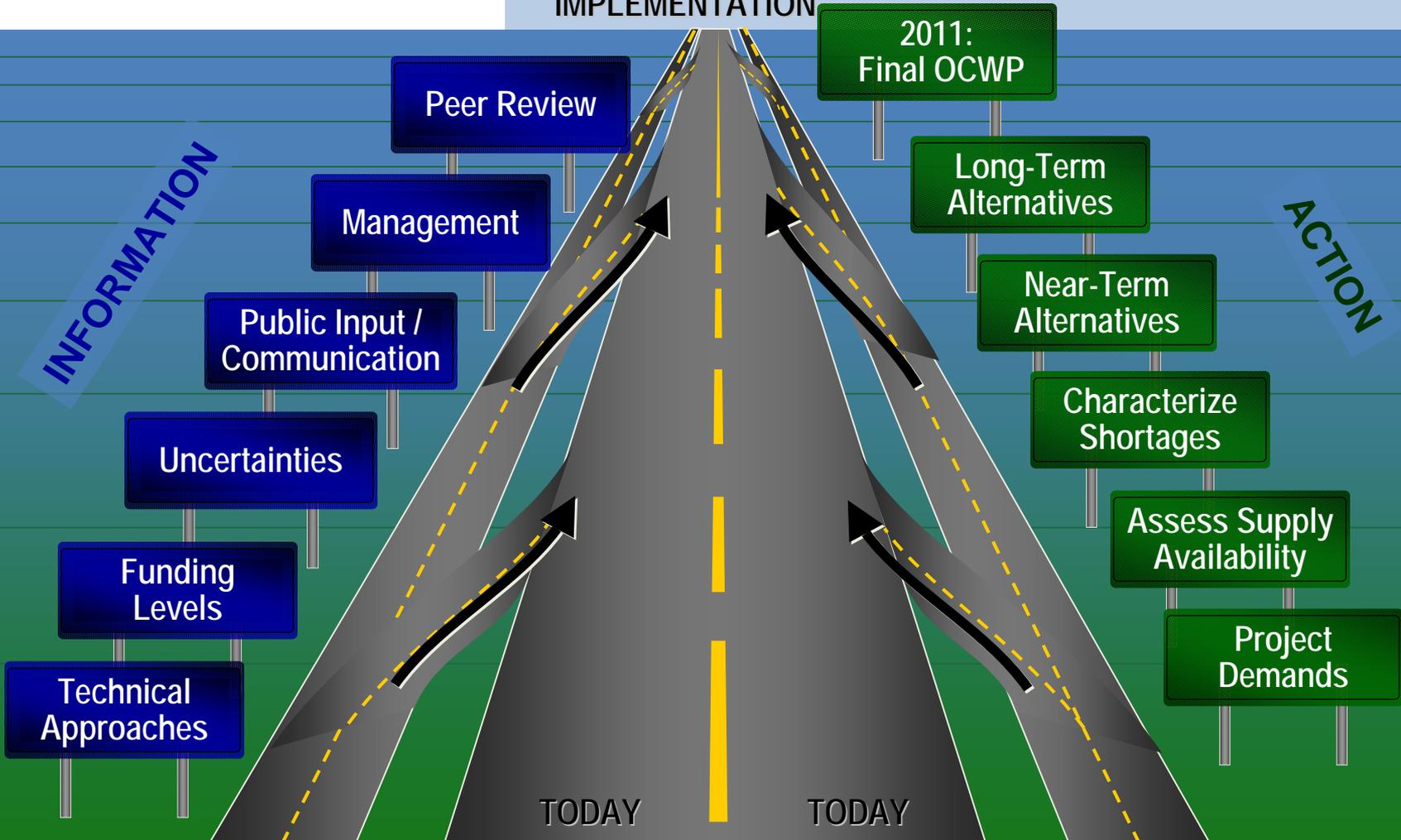


Partnerships for Successful Planning

- Oklahoma Water Resources Board
 -  US Army Corps of Engineers
Tulsa District
-
- Bureau of Reclamation
 - Other State and Federal Agencies
 - OWRRI – public/policy lead
 - CDM – lead technical consultant

The Programmatic Work Plan: A Roadmap for Developing the Water Plan

IMPLEMENTATION



Technical Work Plan

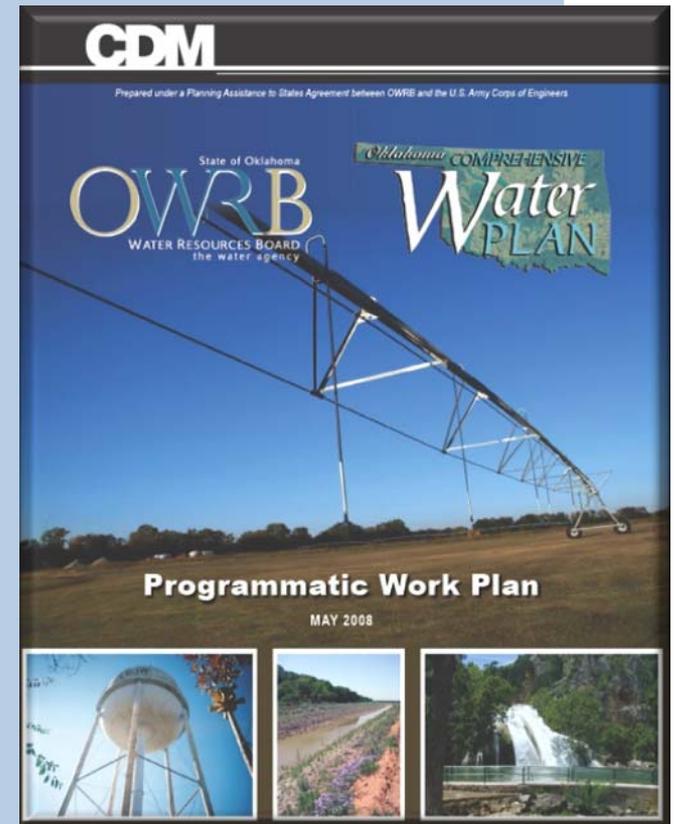
- Living document as a roadmap: Programmatic Work Plan

www.owrb.ok.gov

- 2008 technical work underway

- *Co-funded by OWRB and US Army Corps of Engineers*
- *Focus on defining demands and projecting supply shortfalls*

- Technical Work 2009-2011 to focus on identifying solutions



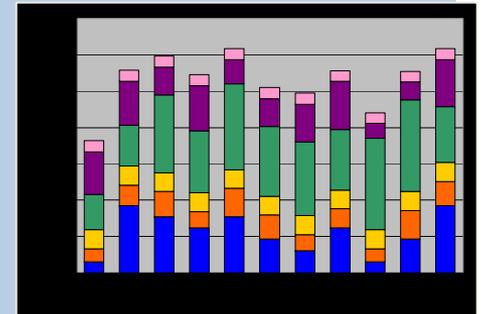
Public/Policy Interaction



**Policy
Development
(Public Input)**



Information & Analysis

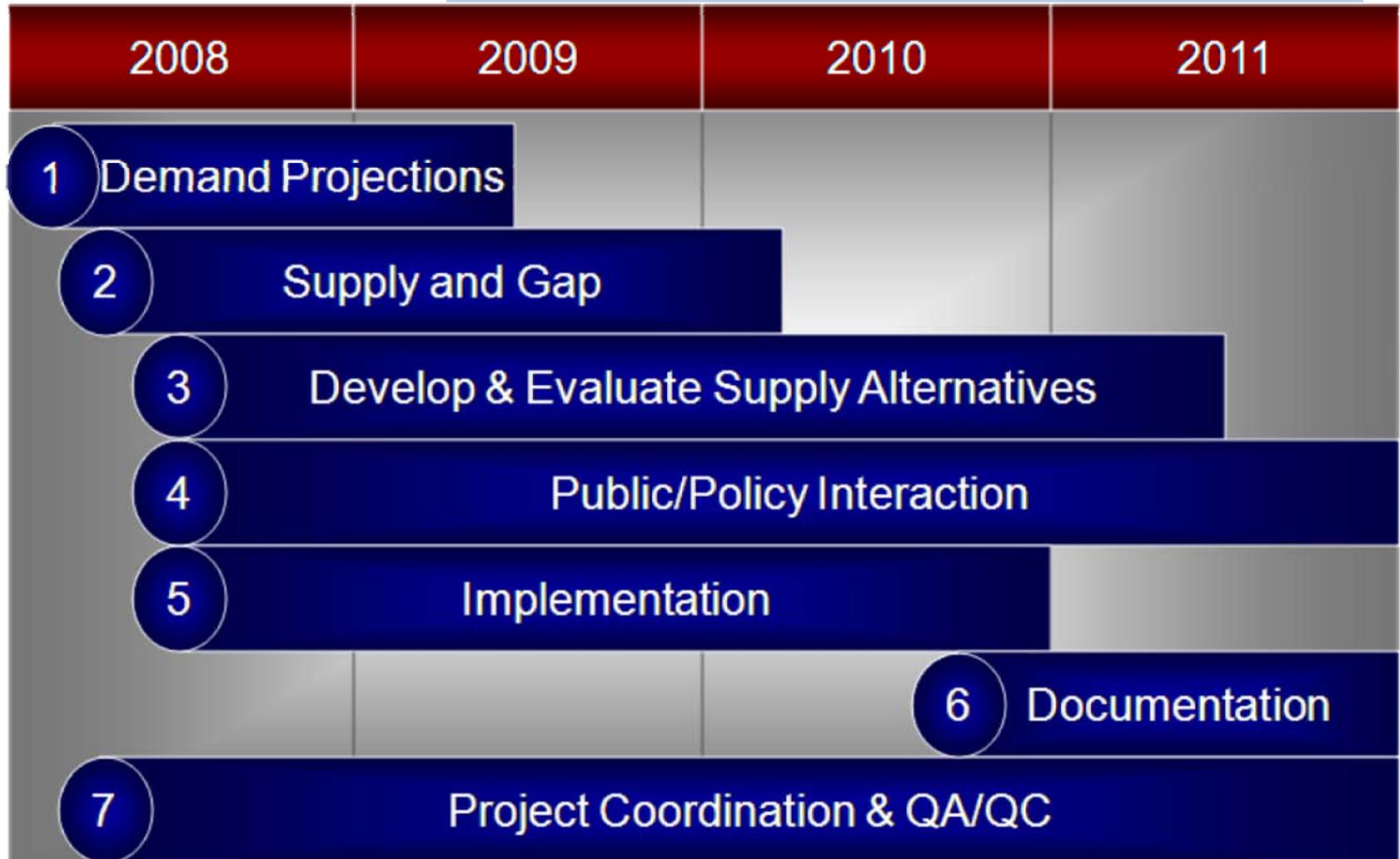


**Technical
Studies**

*Reliable Data for
Informed
Decisionmaking*

*Technical Analysis of
Public / Policy
Concepts*

Major Technical Work Elements

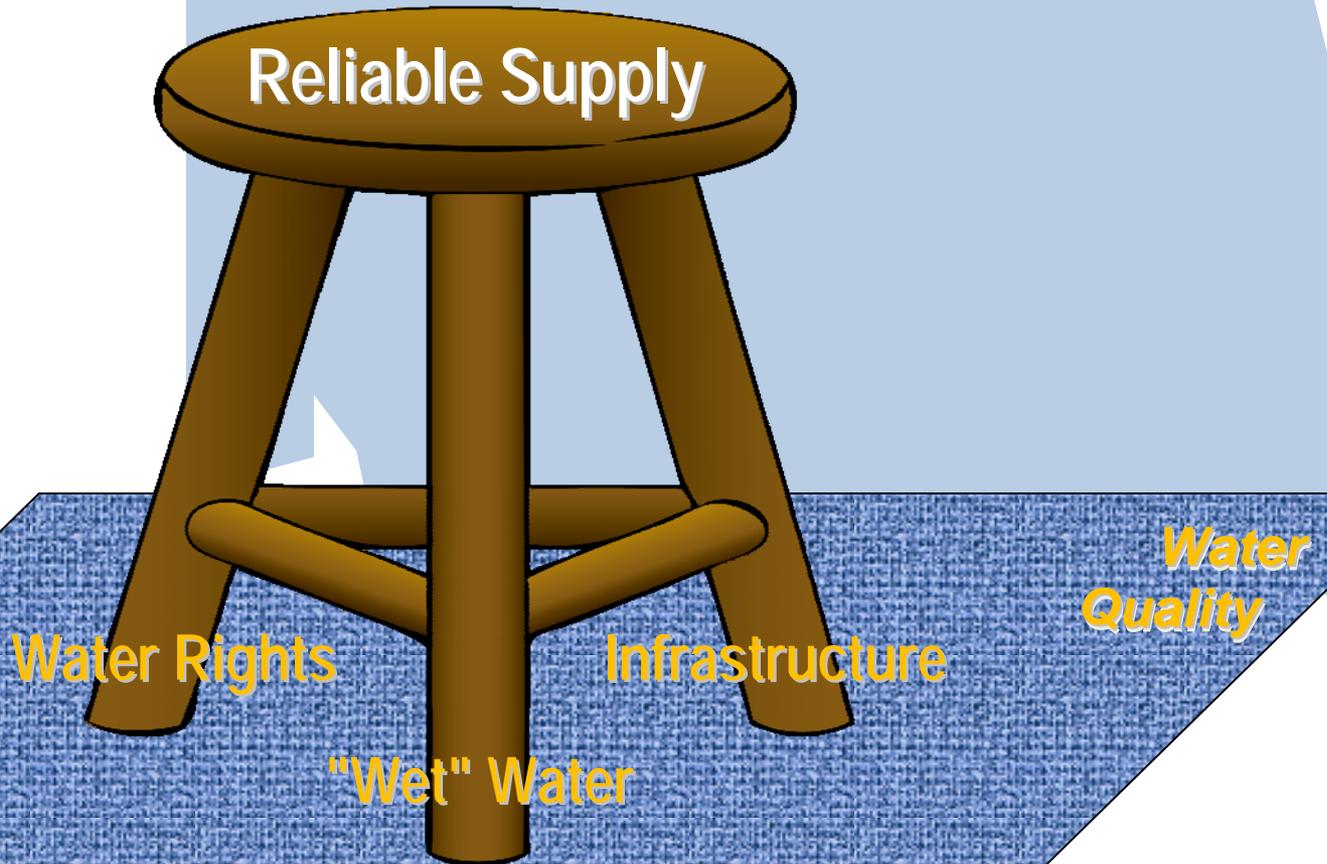


Attributes of the Water Plan



- **Reliable information**
- **Consistent methods, comparable results**
- **Practical, understandable, useable**
- **Consistent with existing policy**
- **Forward-looking**
- **Robust management of supplies**
- **The "go-to" source of water information for water users, planners, and media**

What Contributes to a Reliable Supply?



Projected Demands

- Public Water Supply
- Agriculture
- Industrial & Power

Surface Water

Groundwater

- Physical Availability
(Wet Water)
- Legal Availability
(Permits & Water Rights)
- Infrastructure
(Storage, Conveyance,
Treatment)

Priority Sites and Areas

Detailed Analysis and Alternatives Assessment

Management

- Water Uses
- Efficiencies
- Policy &
Administration

Comprehensive Water Plan

- Coordinated Planning
- Funding & Financing
- Infrastructure
- Water Policy

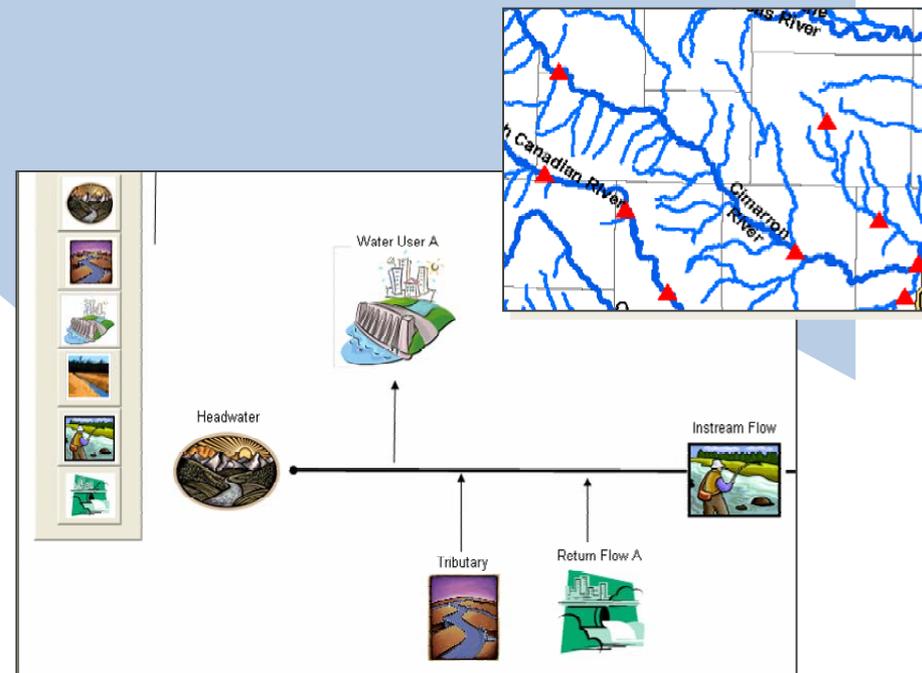
Task 1: Demand Projections

- All water use sectors
 - *Public water supply*
 - *Agriculture*
 - *Industry and power*
- Consumptive demands
 - *Updated model*
 - *County level*
 - *Disaggregation to provider level*
 - *Conservation status and potential*



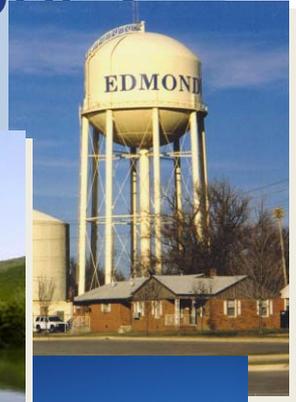
Task 2: Supply and Gap

- Physical availability screening
- Infrastructure / legal availability screening
 - *Public water supplier survey*
 - *Water quality*
- Statewide screening to identify projected "hot spots"
- Water allocation modeling



Near-term Goals and Schedule Milestones

- "Characterize the needs"
- Provide foundation for subsequent phases of OCWP development
- Preliminary assessment of supply gaps and "hot spots" by Spring 2009





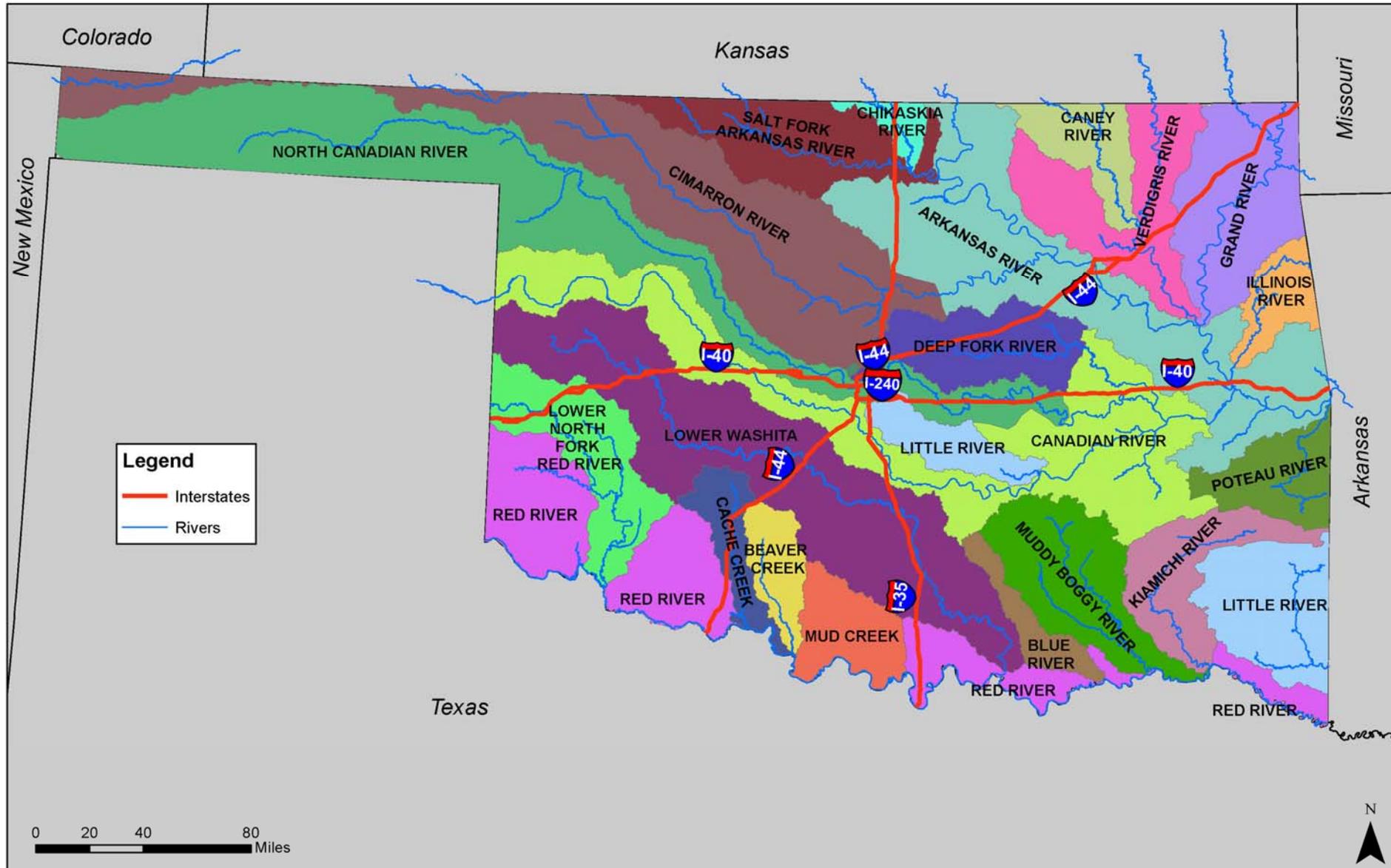
Demand and Supply Evaluations

- *Overview*
- *Demand Projections*
- *Groundwater Supply Availability*
- *Surface Water Supply Availability*
- *GIS Tool for Assessing Potential Shortages*

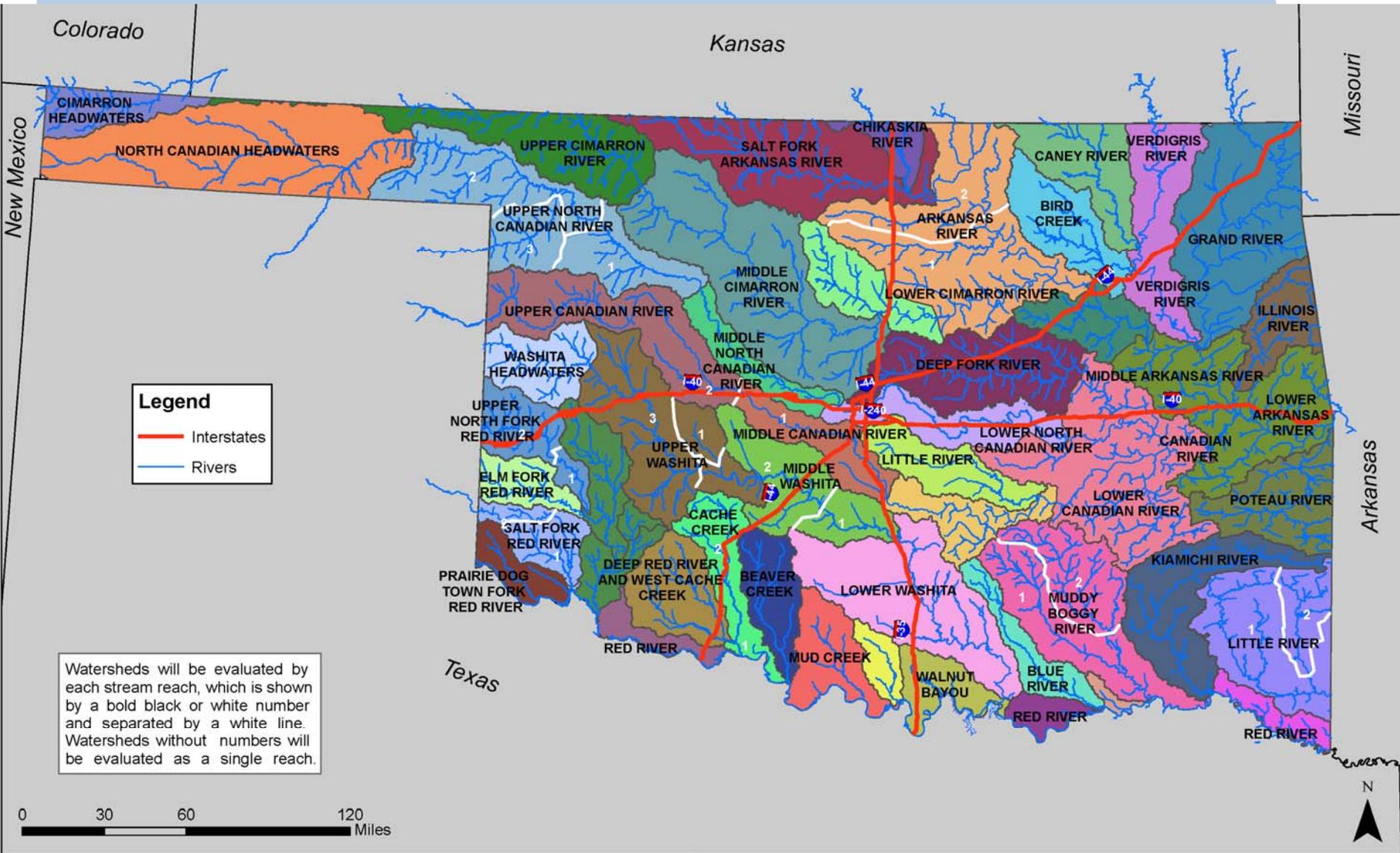
Overview of Supply and Demand

- Projection of demands through 2060
- Characterization of surface water and groundwater supplies
- Hydrologic variability
- Reliability of supplies
- Location, magnitude, and frequency of gaps between supply and demand

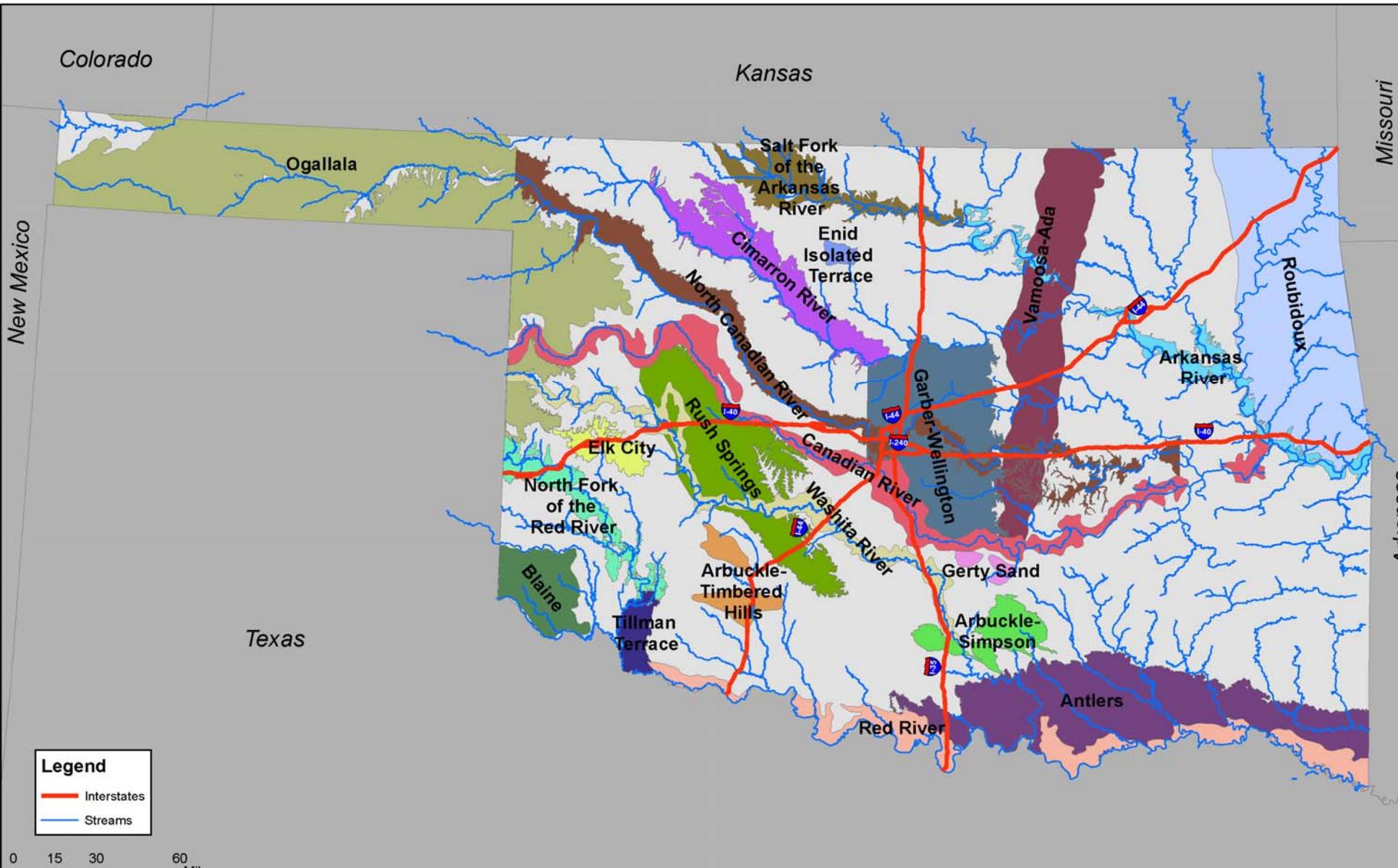
Major River Basins



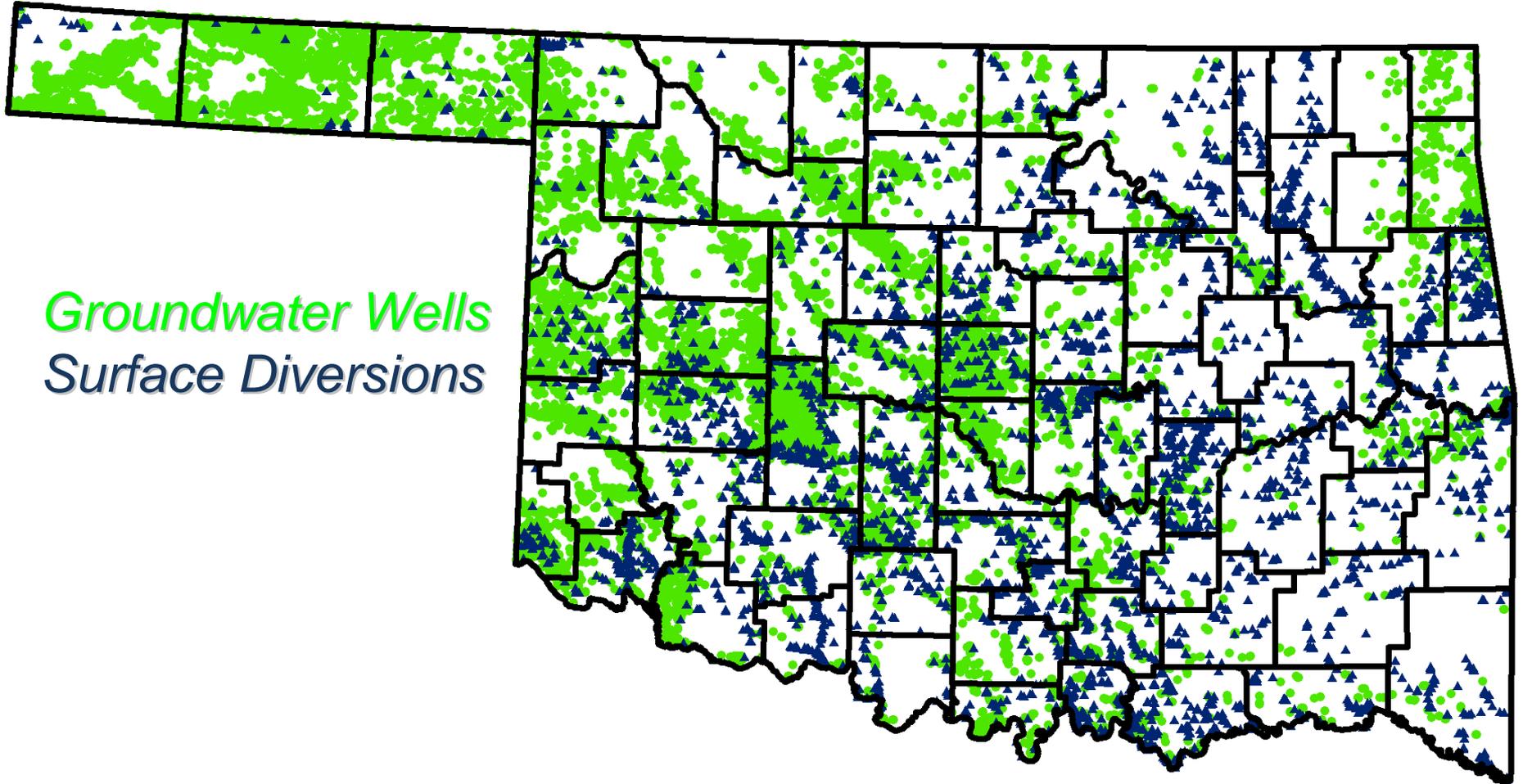
OCWP Supply Availability Sub-Basins



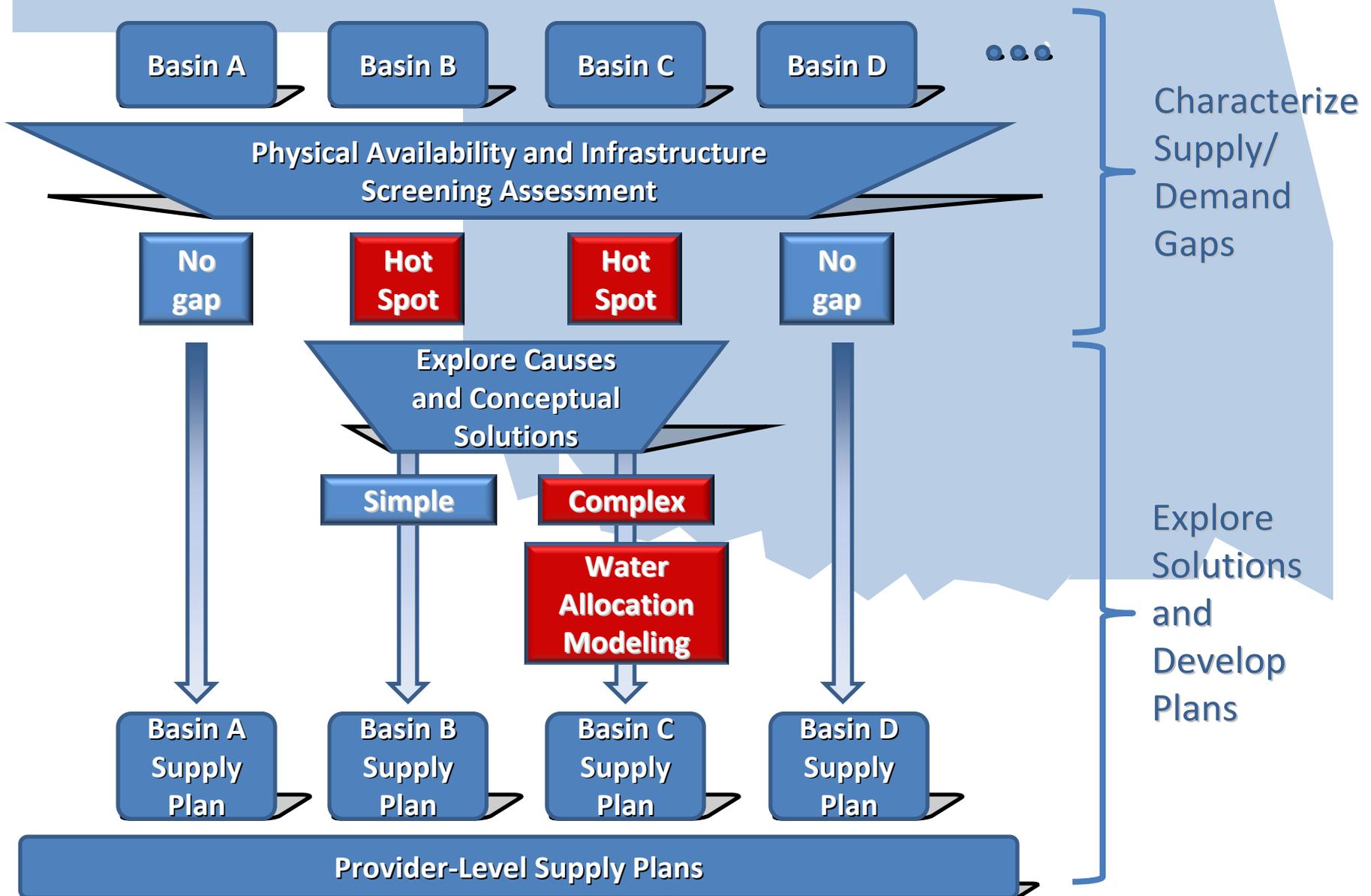
Major Groundwater Aquifers



OWRB Permitted Wells and Diversions



Focused Planning Process for OCWP





Demand and Supply Evaluations

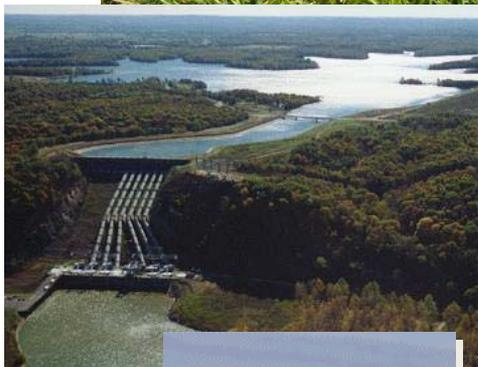
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Major Water Use Sectors



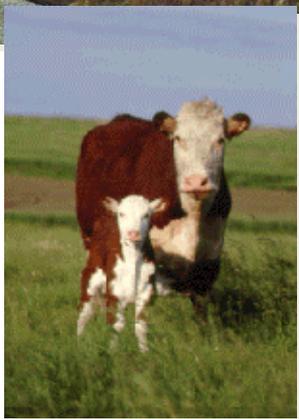
Public Supply (M&I)

- Residential
- Commercial
- Industrial
- Self-Supplied Domestic



Self Supplied Industrial

- Power Plants
- Oil and Gas
- Tribal Industries
- Other Large Industries



Agriculture

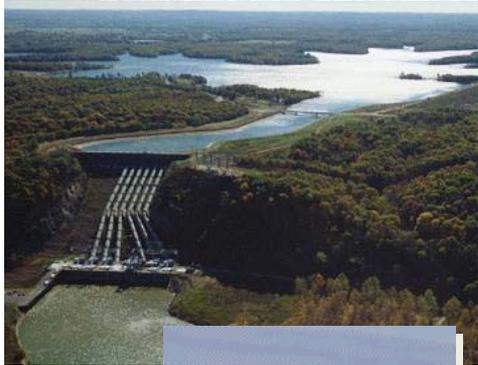
- Livestock
- Irrigated Crops

What Level of Geography?



Public Supply (M&I)

- Municipal Systems
- Tribal Water Systems
- Rural Water Systems
- Remainder of County



Self Supplied Industrial

- By location



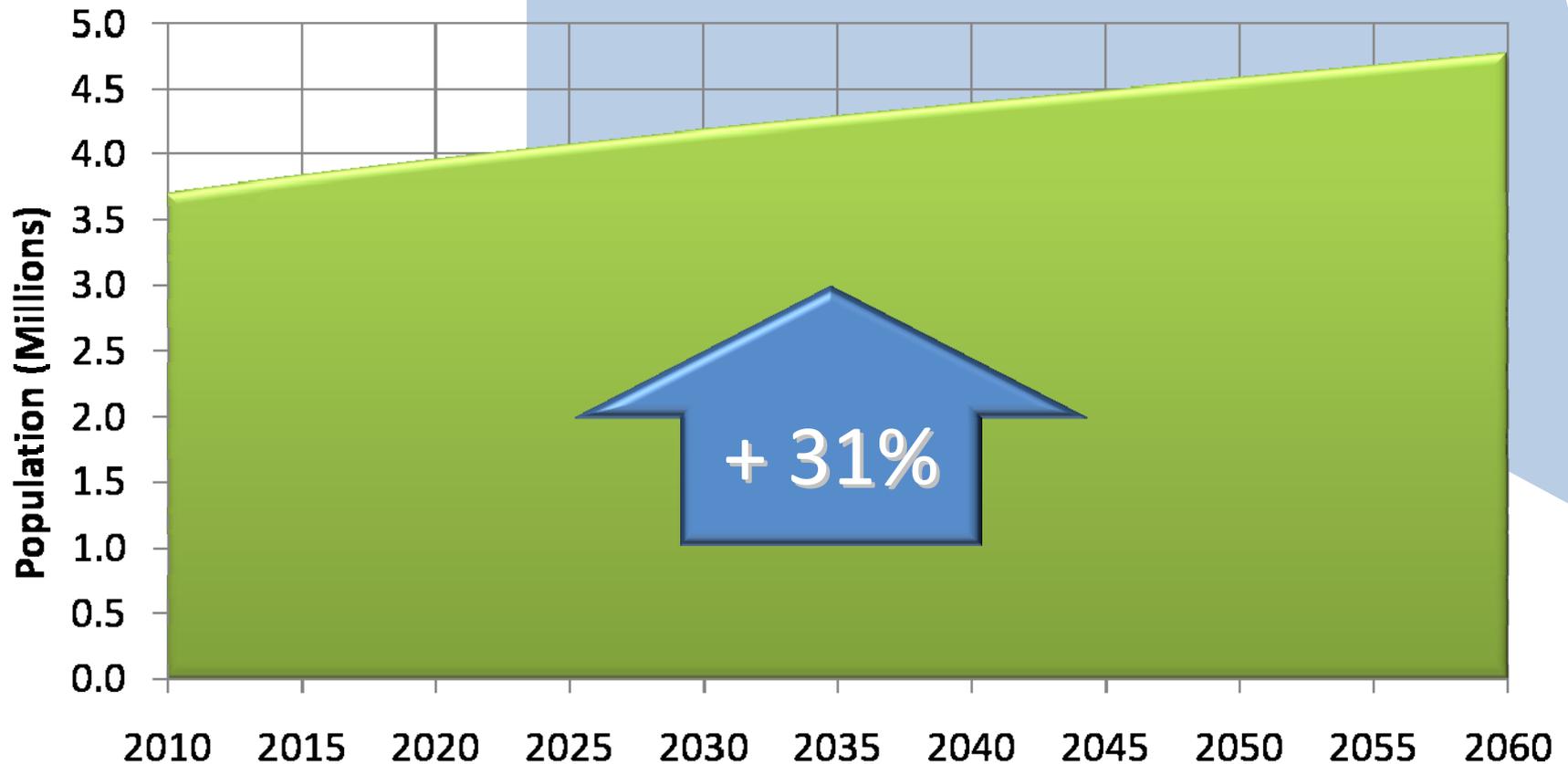
Agriculture

- By County

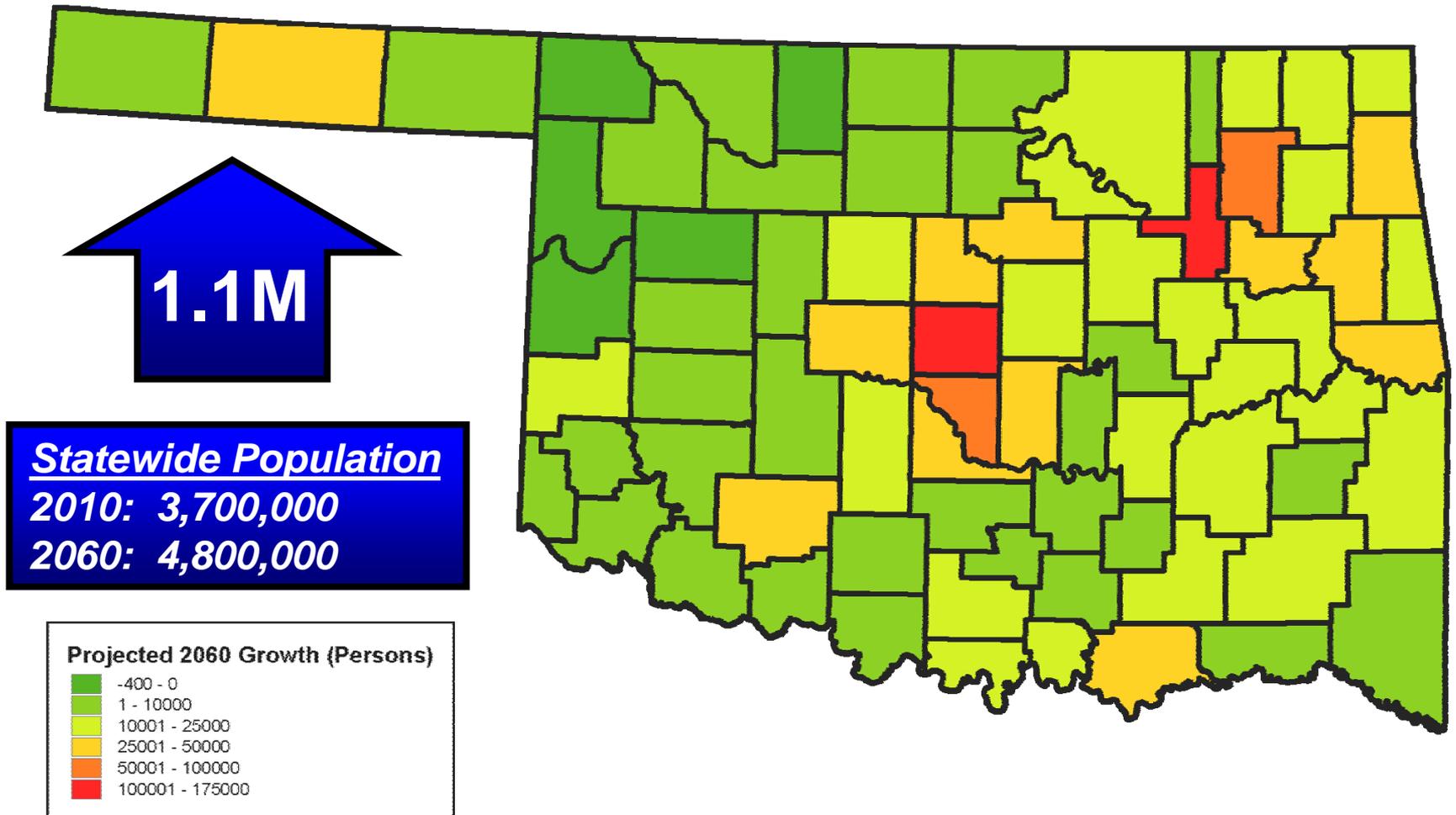
Public Supply Residential

Based on population projections and per person residential use

ODOC Statewide Population Estimates

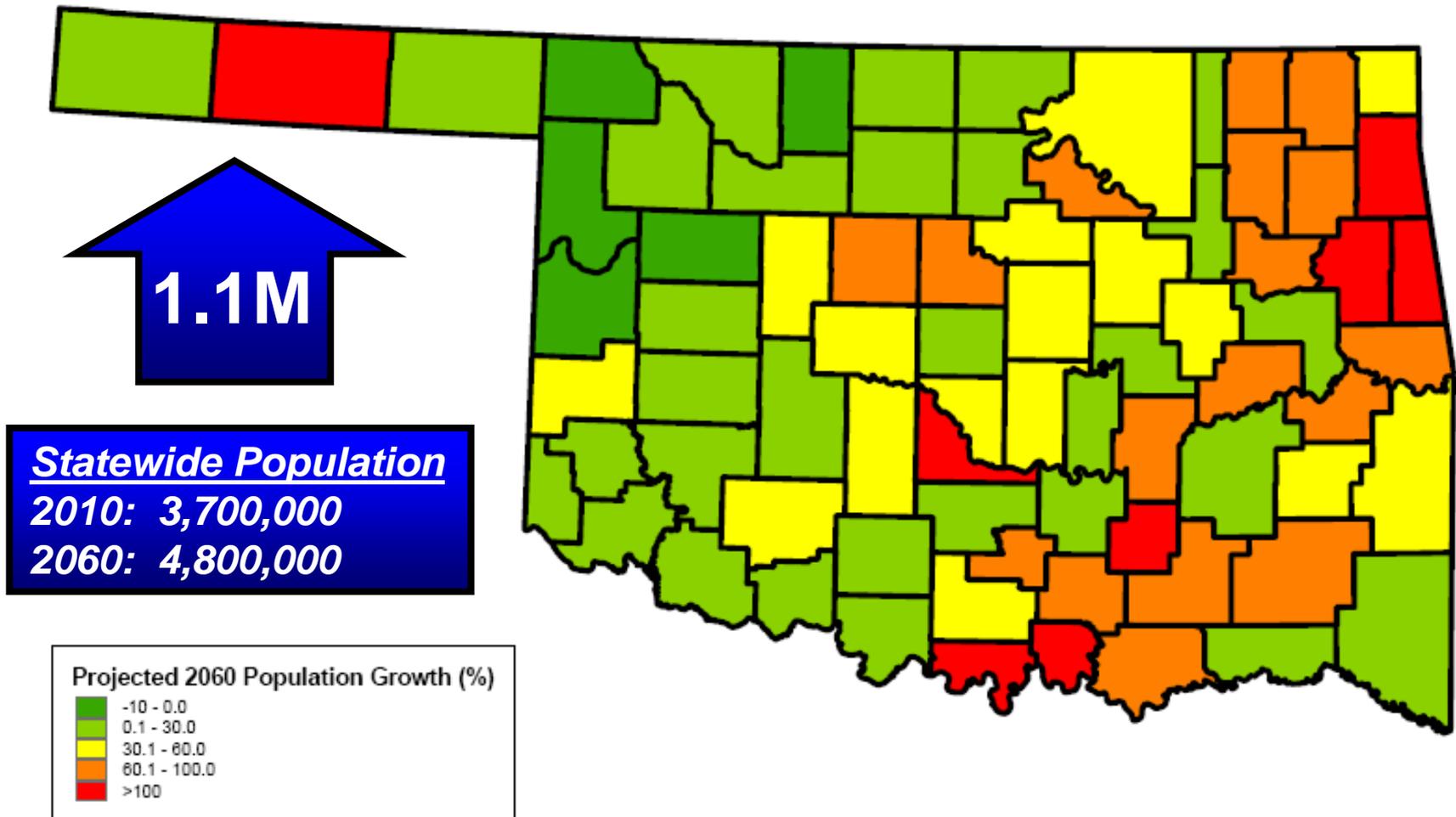


Where Will Population Growth Occur? (number of persons)



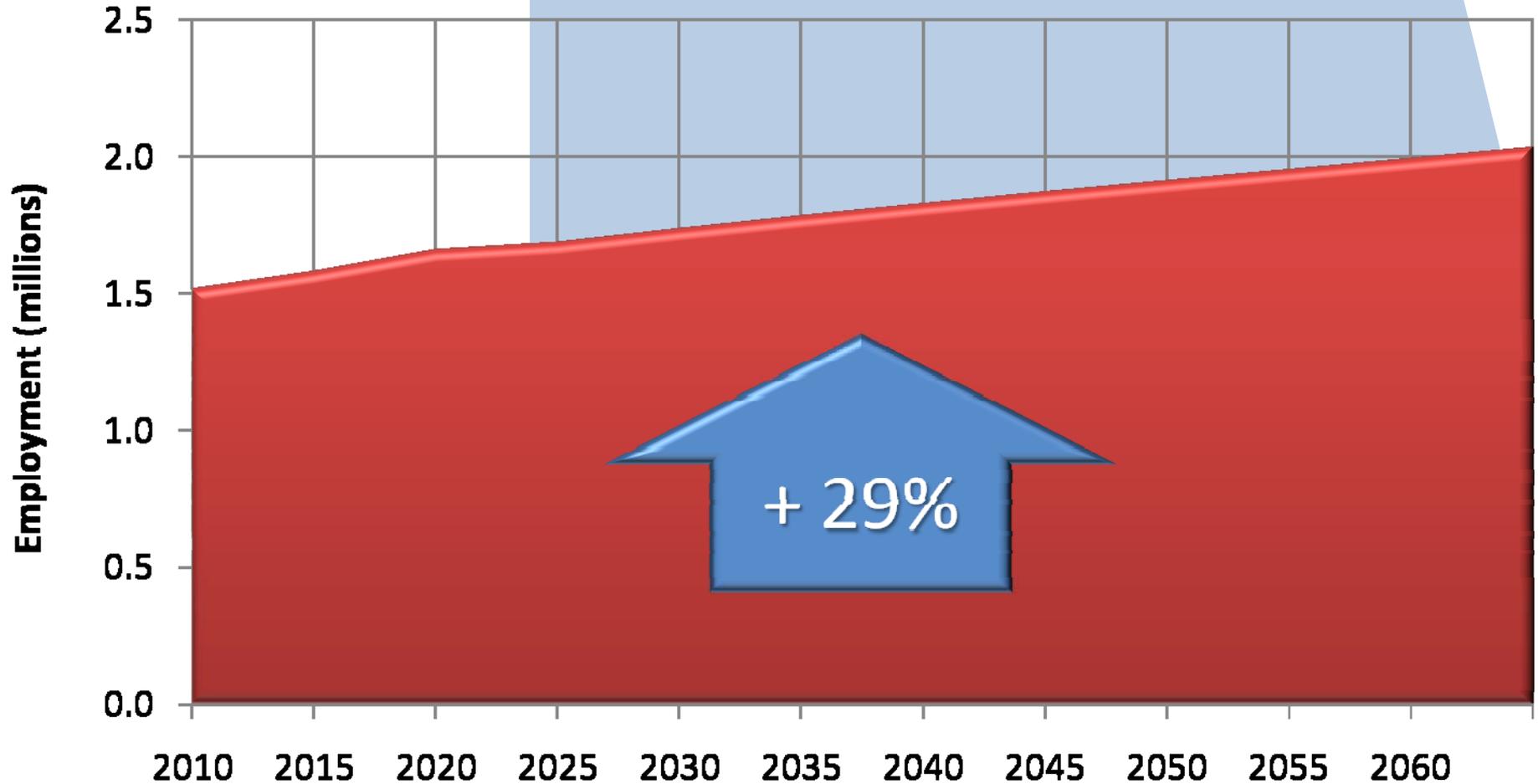
Where Will Population Growth Occur?

(percent growth 2010-2060)



Public Supply Nonresidential

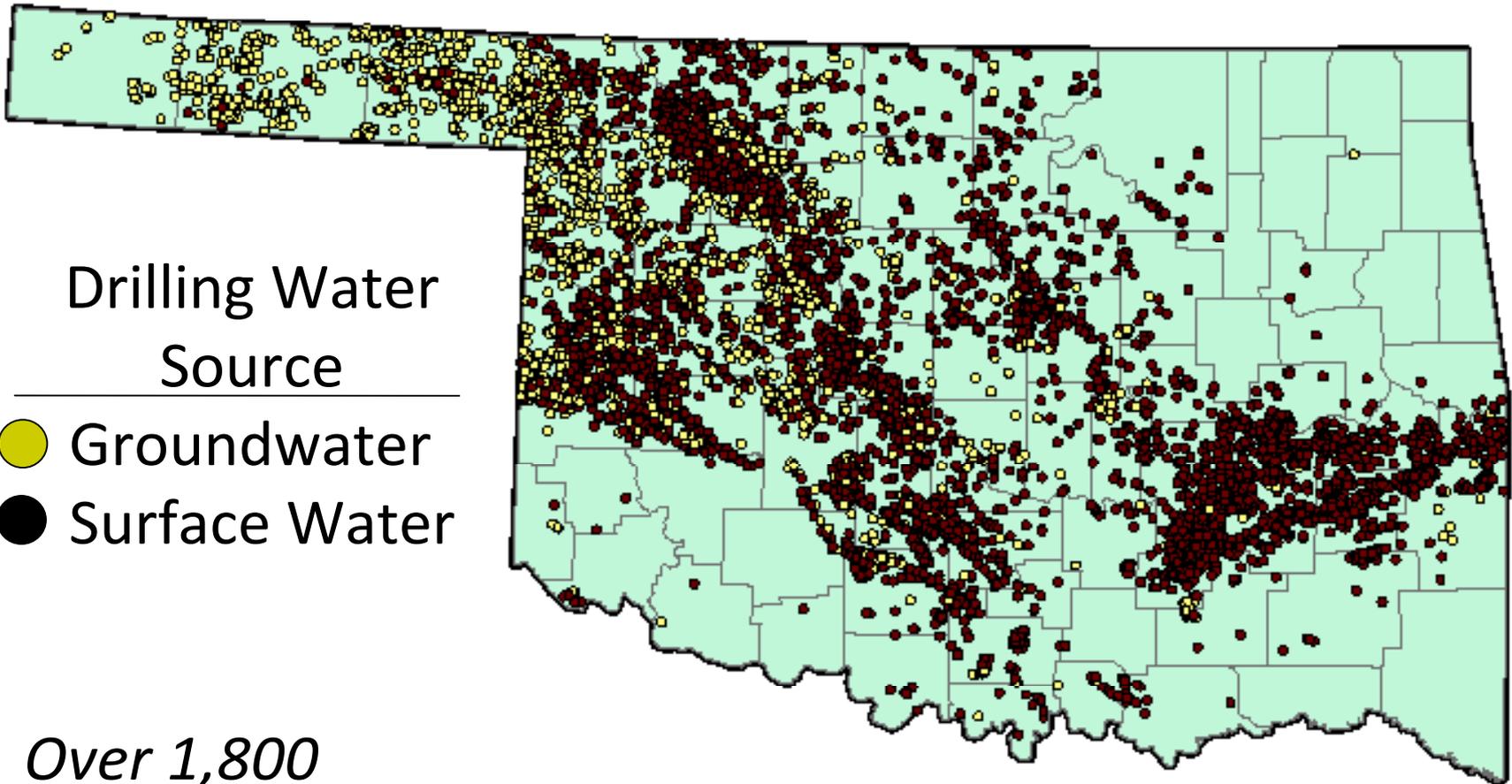
Statewide Employment Projections



Self-Supplied Residential and Nonresidential

- Approximately 115,000 households are self-supplied
- Self-supplied nonresidential include:
 - *Thermoelectric power plants*
 - *Oil and gas drilling operations*
 - *Bottling companies*
 - *Chemical plants*
 - *Meat packing plants*
 - *Pulp mills*
 - *Refineries*
 - *Other industrial*

Oil and Gas Drilling Activity Since 2000



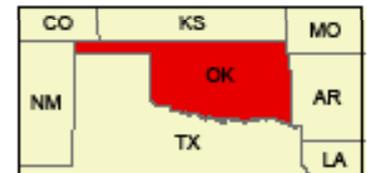
Drilling Water
Source

- Groundwater
- Surface Water

*Over 1,800
applications in
2008 alone*

CDM

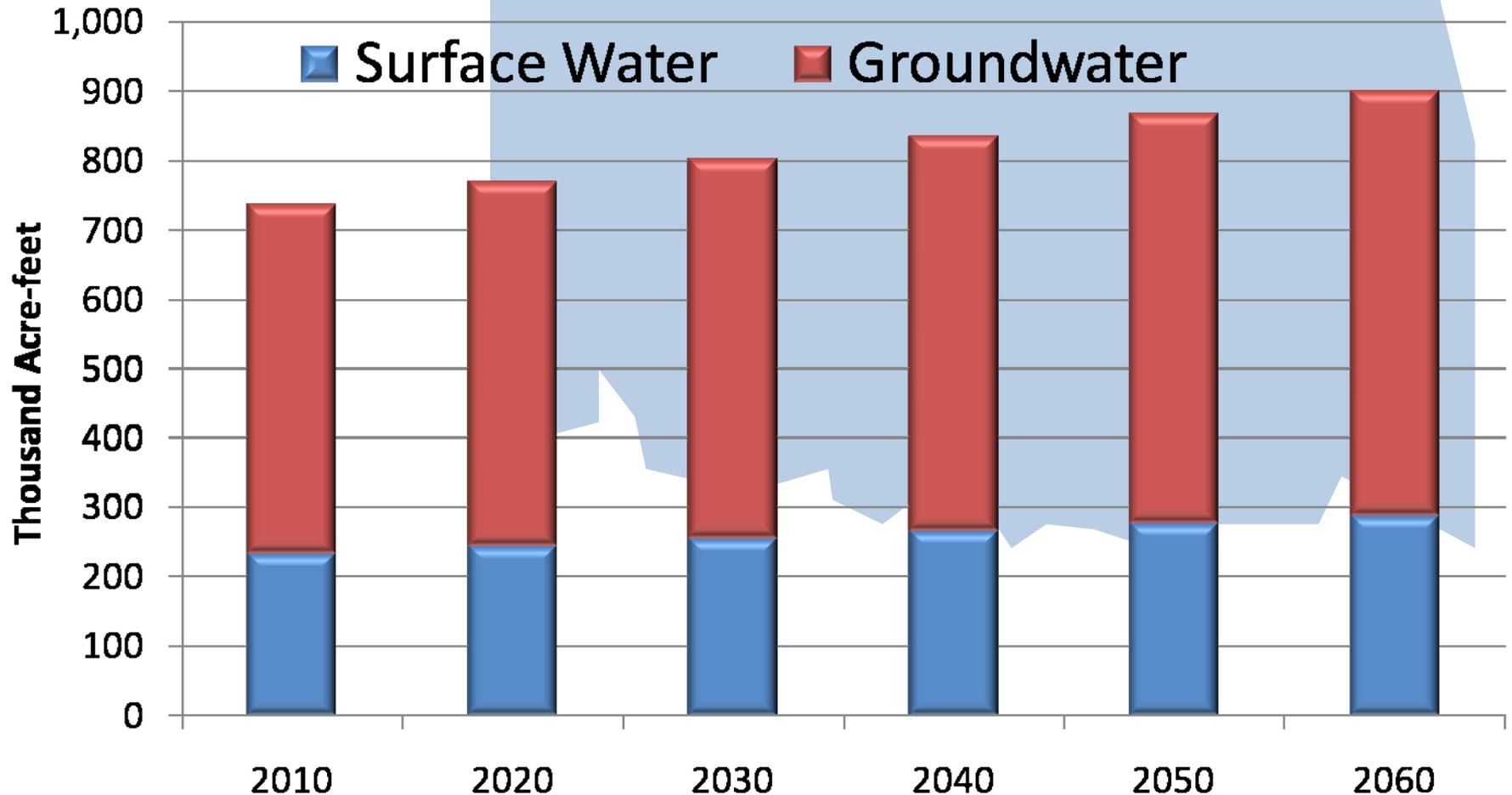
0 50 100
Miles



Data Source: OWRB Water Rights Database

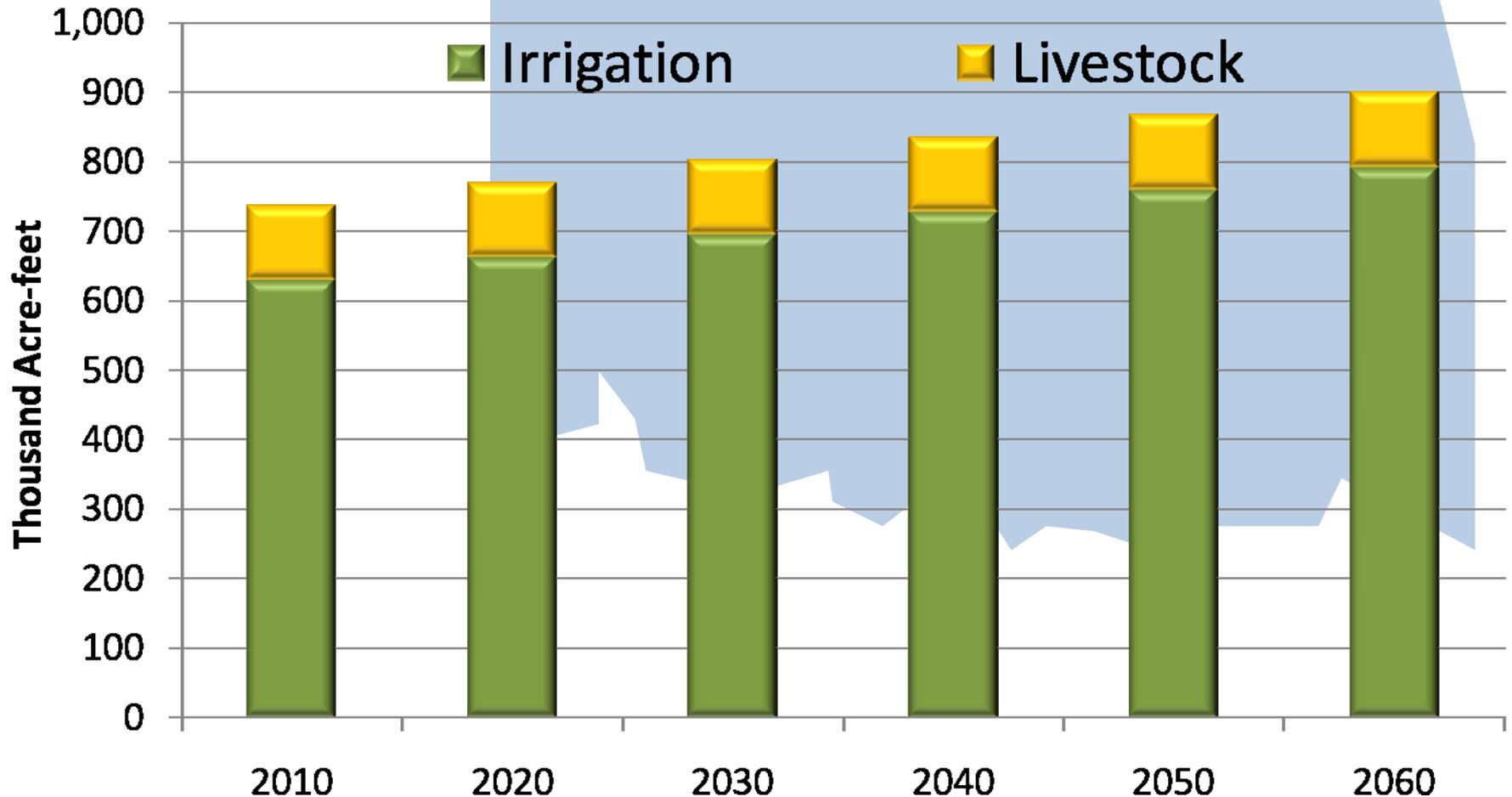
Preliminary Agriculture Water Demand Projections

Considers irrigation efficiency and daily livestock water needs

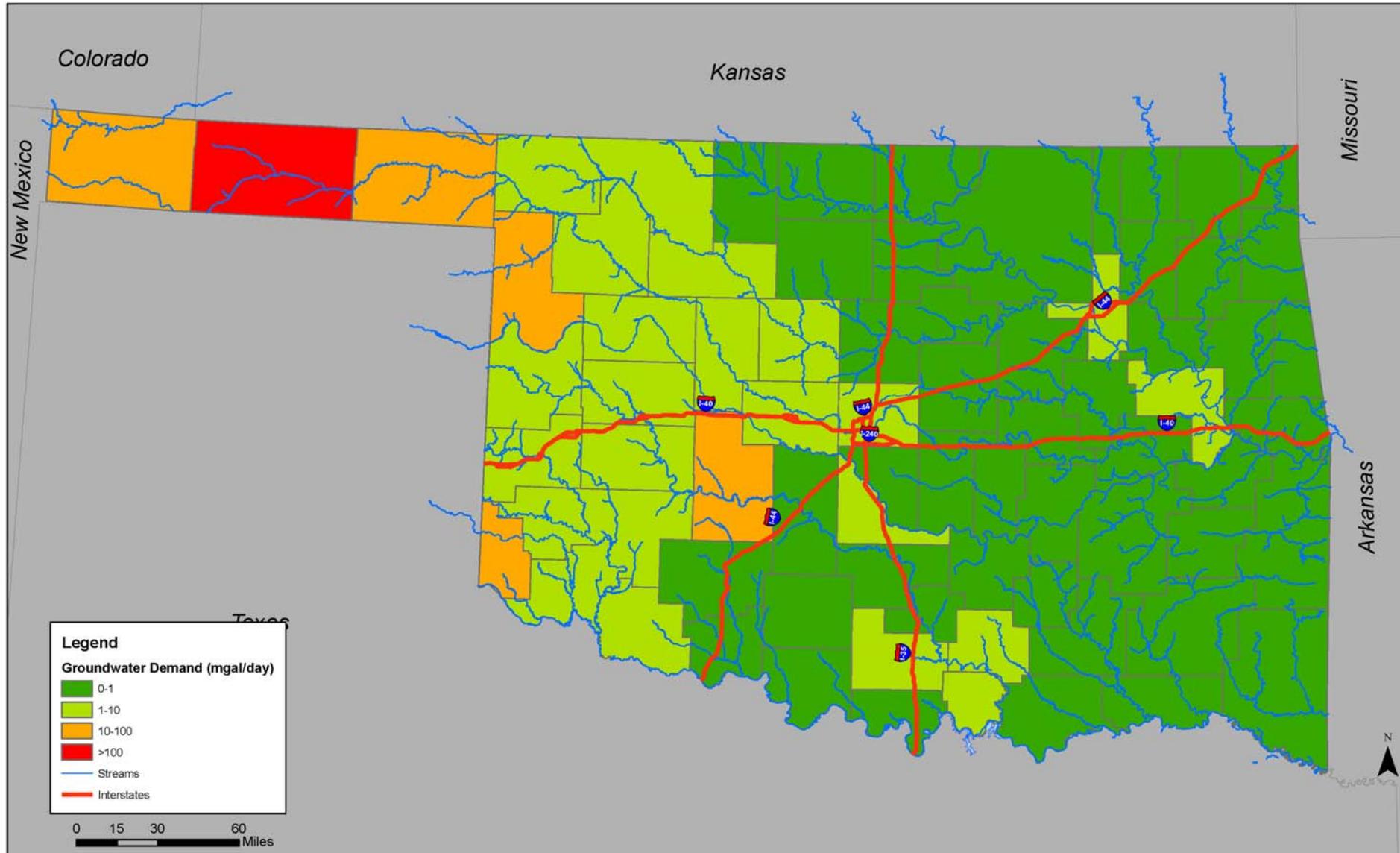


Preliminary Agriculture Water Demand Projections

Considers irrigation efficiency and daily livestock water needs



Preliminary Estimate of 2060 Agriculture Groundwater Use



Demand Work Groups

- Military Bases
- Oil & Gas Industry
- Tribal Nations
- Self-Supplied Industrial
- Agriculture
- Public water suppliers (via survey)



Demand and Supply Evaluations

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Groundwater Supply Availability

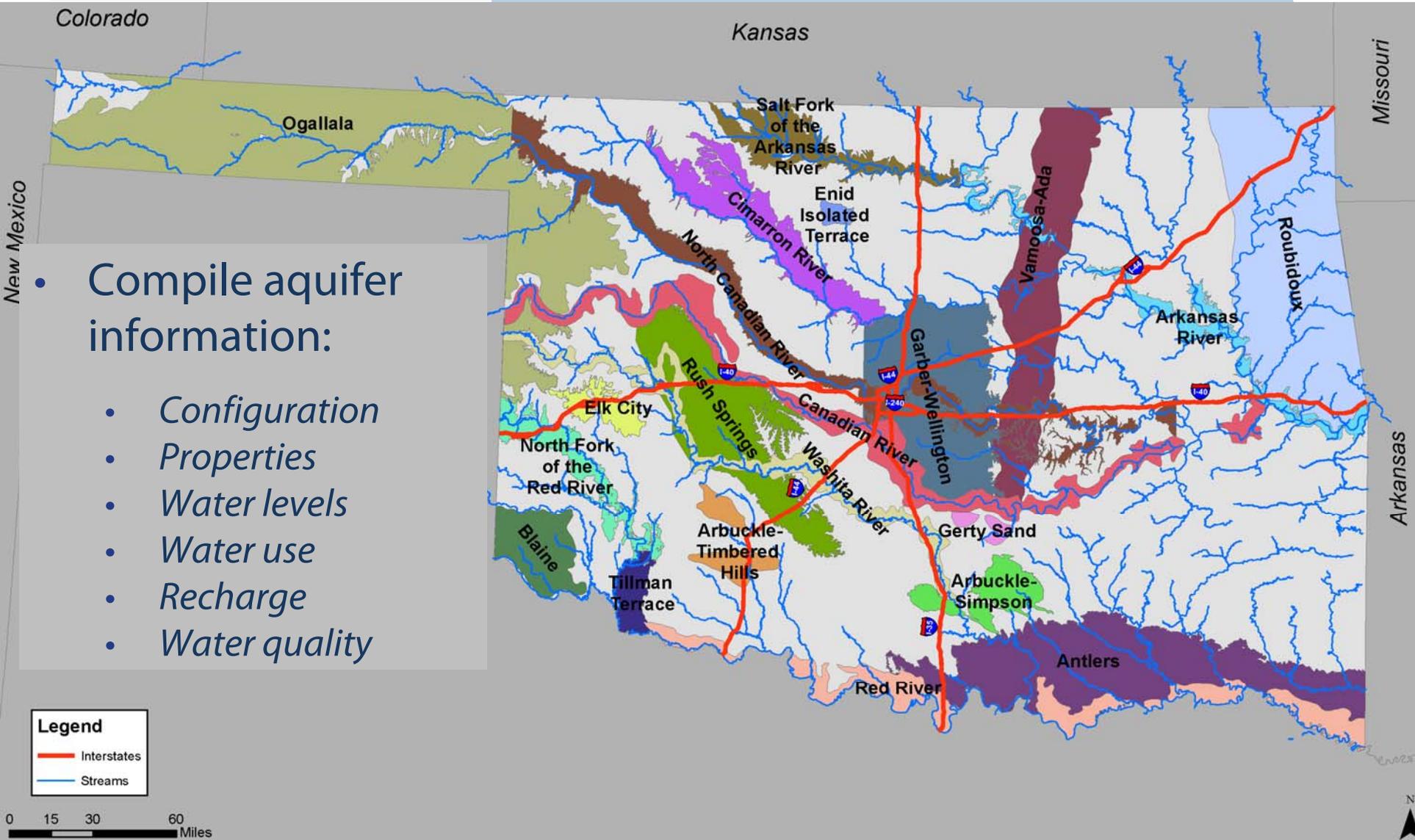
- Bedrock aquifers and alluvial and terrace aquifers
- Quantity in storage
- Current and projected rates of usage
- Estimated rates of recharge
- Enhancing the level of confidence in key aquifer parameters



Groundwater Evaluation Approach

- Compile aquifer information:

- Configuration
- Properties
- Water levels
- Water use
- Recharge
- Water quality





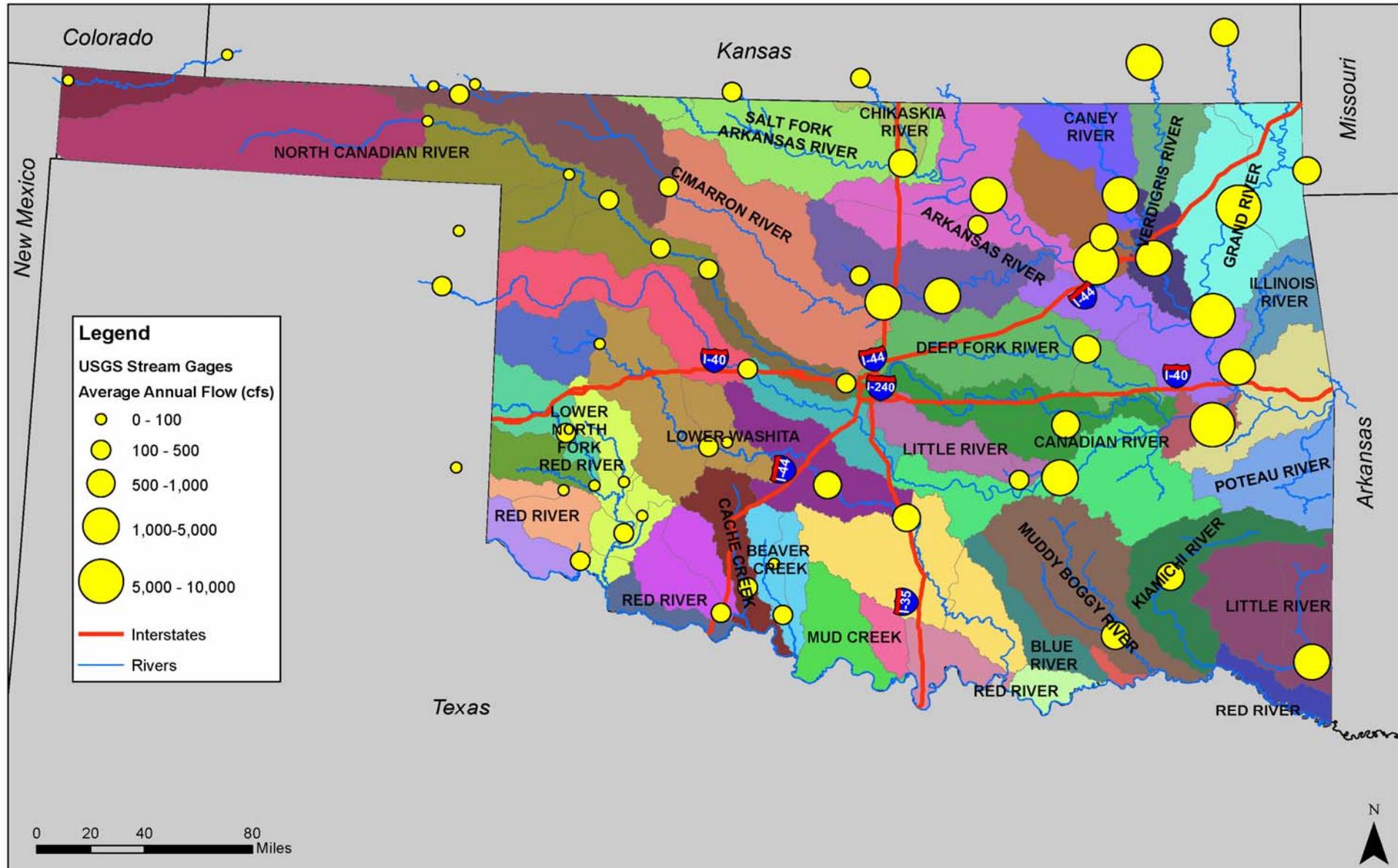
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Components of Supply Availability Analysis: Surface Water

- Streamflows
- Reservoir storage and yield
- Hydrologic variability
 - *Average, wet, and dry conditions*
 - *Historical droughts*
 - *Climate change*

Average Annual Flow at Selected Gages

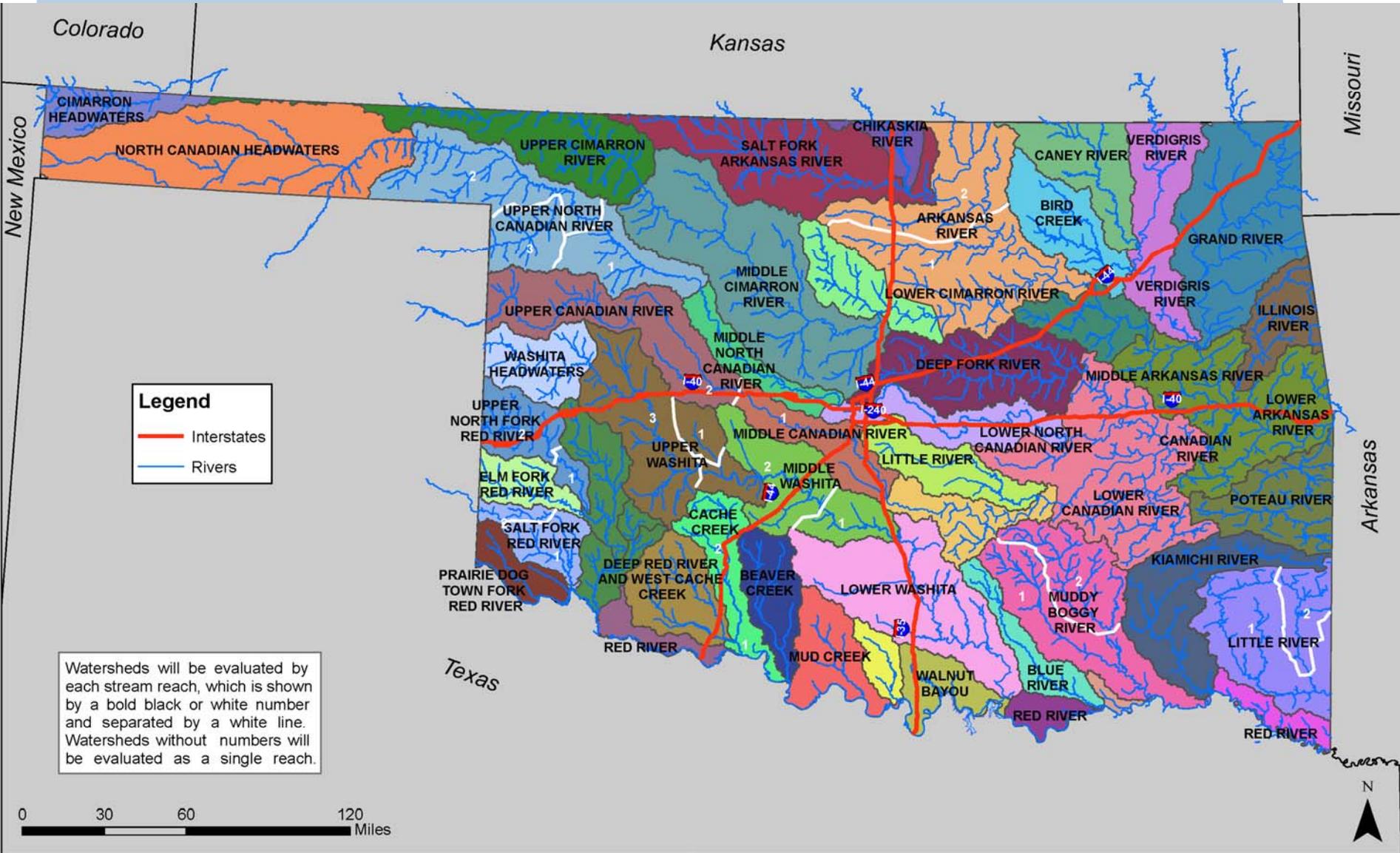




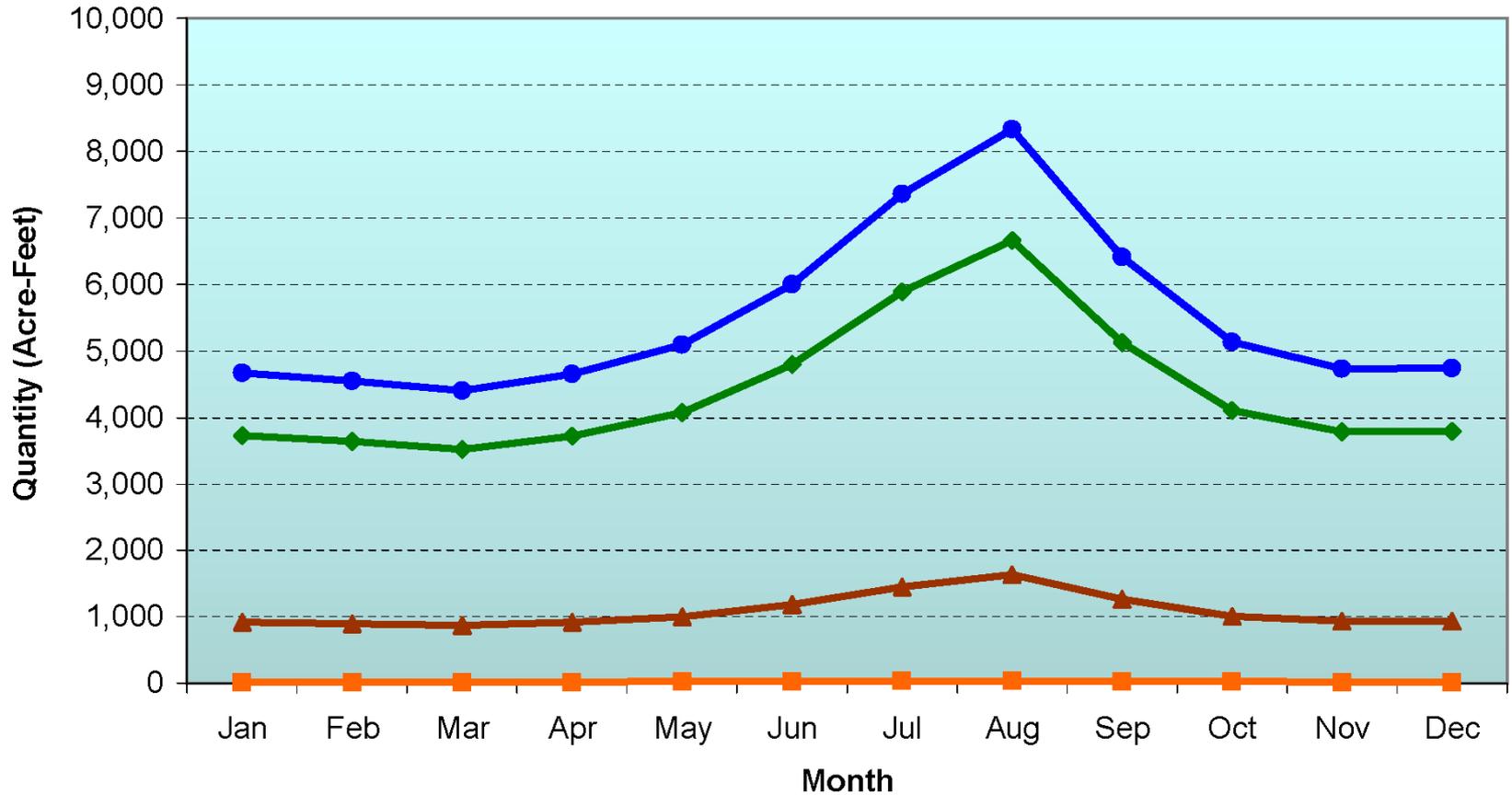
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OCWP Supply Availability Sub-Basins



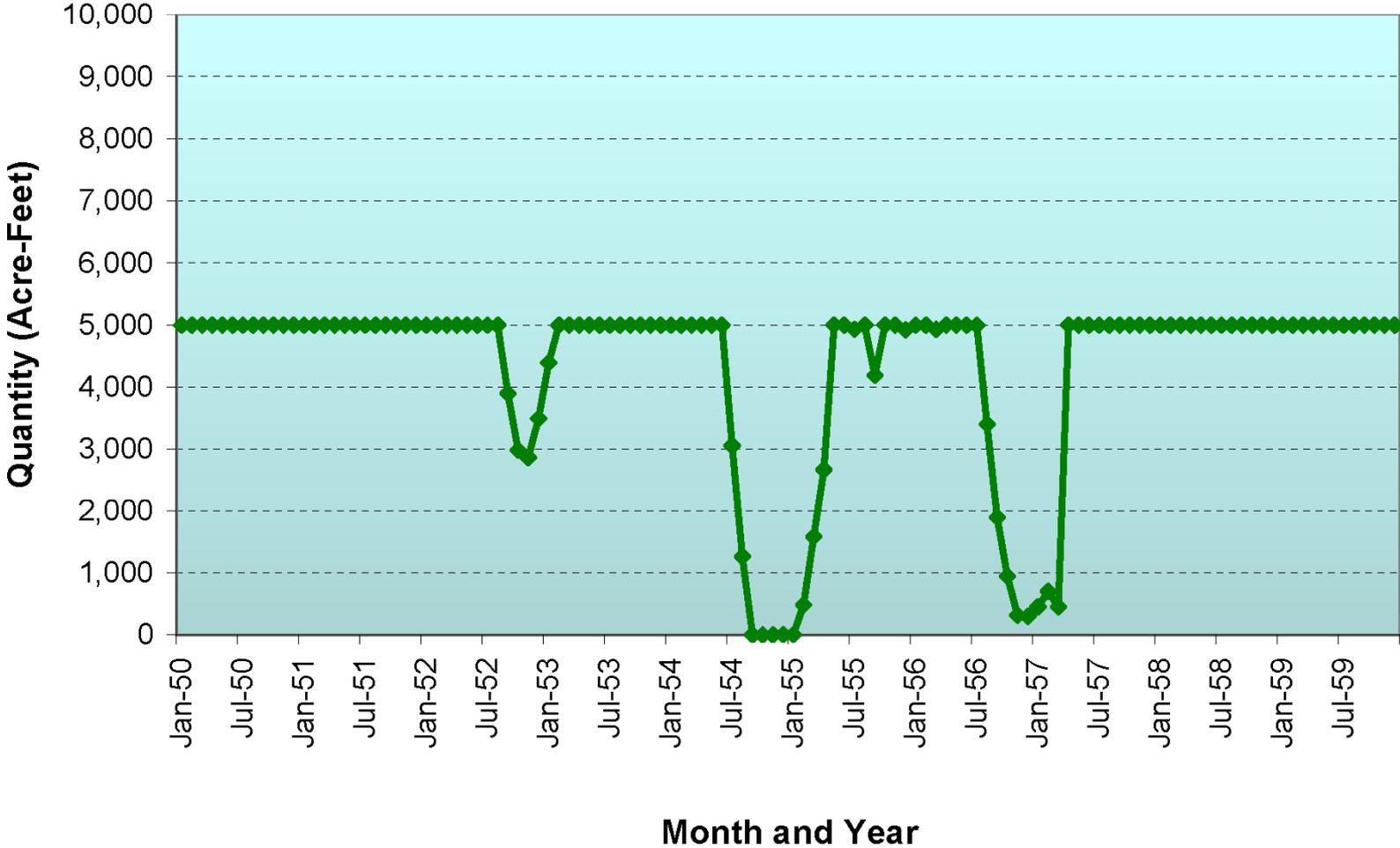
Projected Demand for Municipal & Industrial for Year 2060



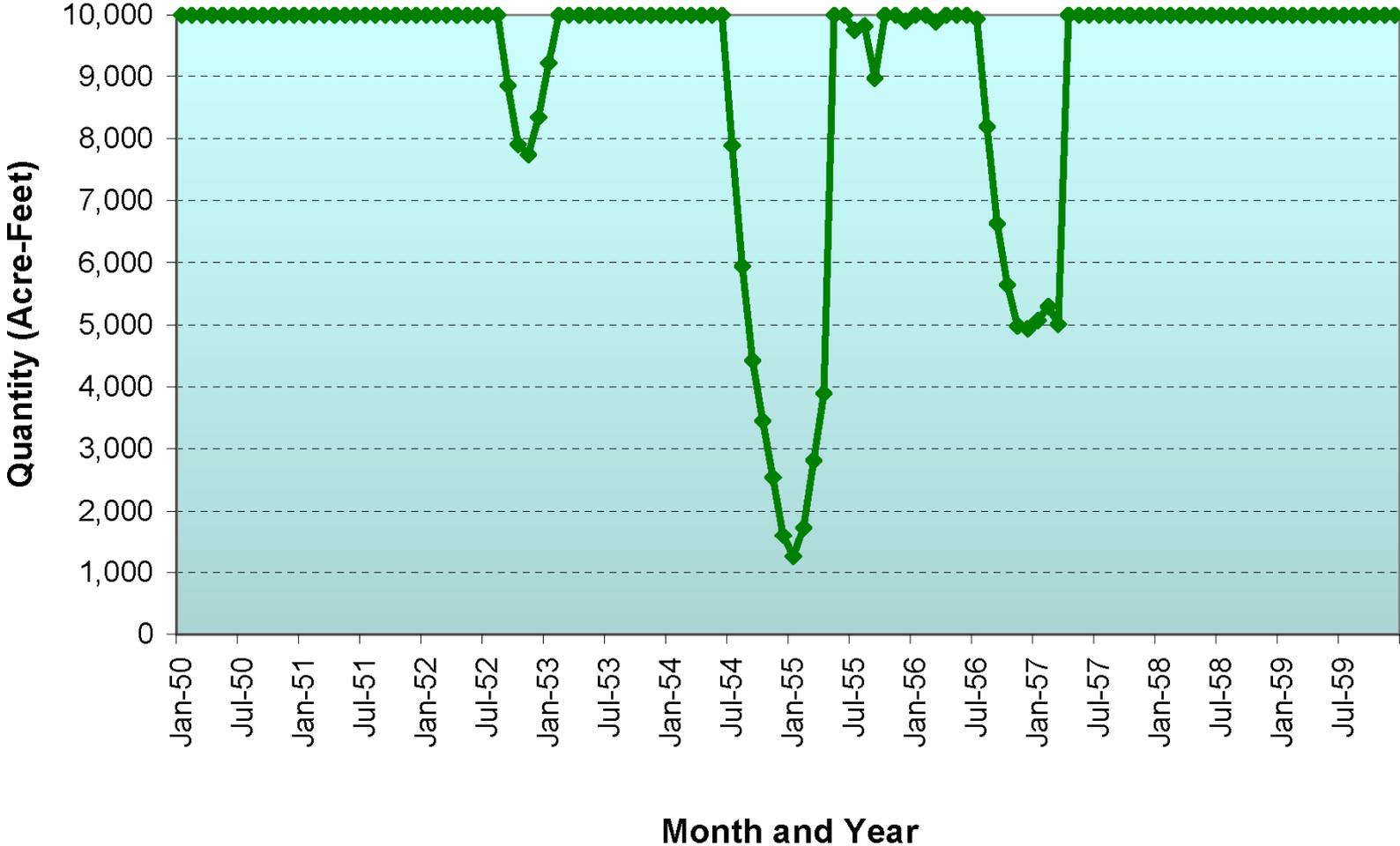
◆ Surface Water Demand
▲ Bedrock Groundwater Demand

■ Alluvial Groundwater Demand
● Total Demand

Reservoir End-of-Month Storage in 10-Year Periods



Reservoir End-of-Month Storage in 10-Year Periods





*Public Water
Supplier Survey*

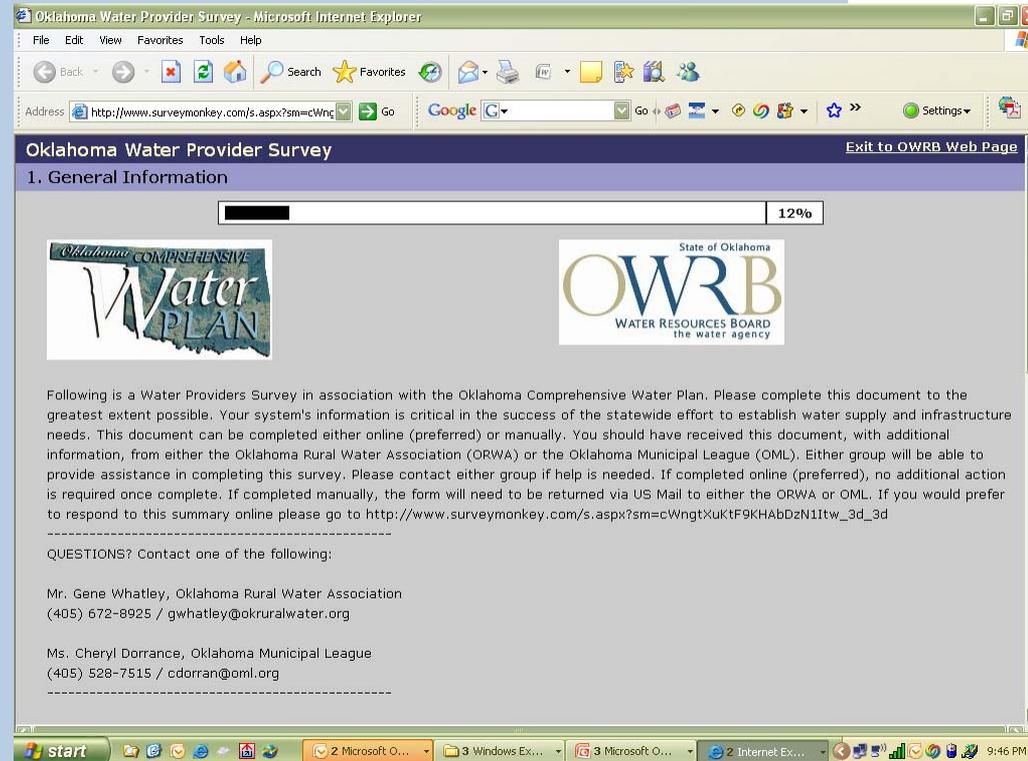
Goals of Survey

- Identify provider-specific constraints in meeting future water needs
- Enhanced understanding of infrastructure and permitting needs
- Determine county-level water use factors
- Validate OCWP projections of demands and limiting factors in meeting demands
 - *Rural Water Districts*
 - *Municipal Water Providers*

**– Seeking 100% Participation –
Help define our water future!**

Survey Background

- The provider-level survey was developed to directly identify the needs of water systems throughout Oklahoma
- Questions are directed to gain general and specific information to be incorporated into the OCWP



Areas Covered by Water Provider Survey

- Over 100 questions
- Areas covered
 - *General information*
 - *Conservation*
 - *Water demand*
 - *Purchased water supply information*
 - *Supply*
 - *Existing infrastructure*
 - *Reuse*
 - *Additional information and input*

Survey Background

- To truly be a state plan, the voice of providers have to be included into the big picture view of Oklahoma's future water needs
- We cannot go deeper into local needs without asking local providers to help with this data

Survey Distribution and Collection

- Realizing modern times require modern approaches, the questionnaires were to be completed online or by hand
- The OWRB contracted with both the Oklahoma Municipal League and Oklahoma Rural Water Association for assistance
 - *Reaching out statewide*
 - *Distribution and collection of surveys*
 - *Point of contact for providers*

Widespread Distribution

- The forms were distributed to a total of **761** water providers throughout Oklahoma



Champions For Effective Local Government

*was assigned **390** surveys*



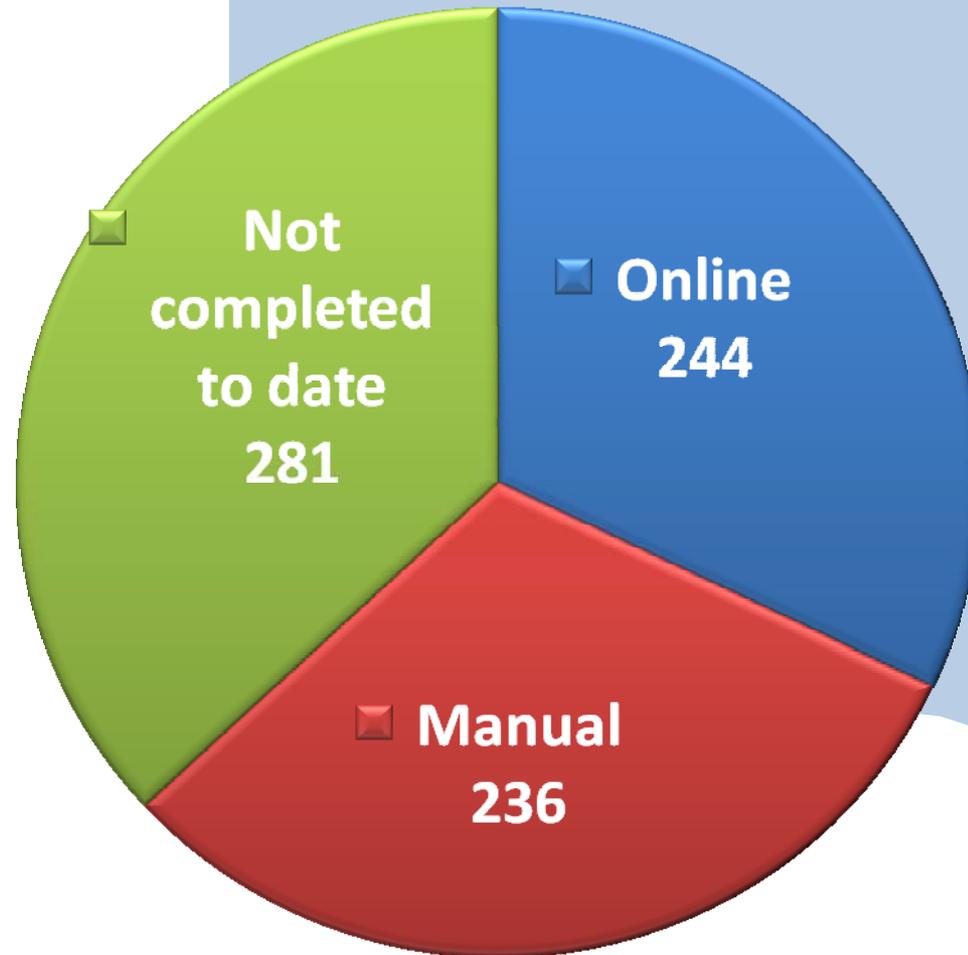
*was assigned **371** surveys*

- Survey distribution covers over 95% of Oklahoma's population

Responses to Date

- The deadline for the completion of questionnaires is the end of October 2008 (this Friday!)
- All of the following general statistics are preliminary based on online responses received through mid-October 2008
- Initial results bring light upon the level of information available across Oklahoma

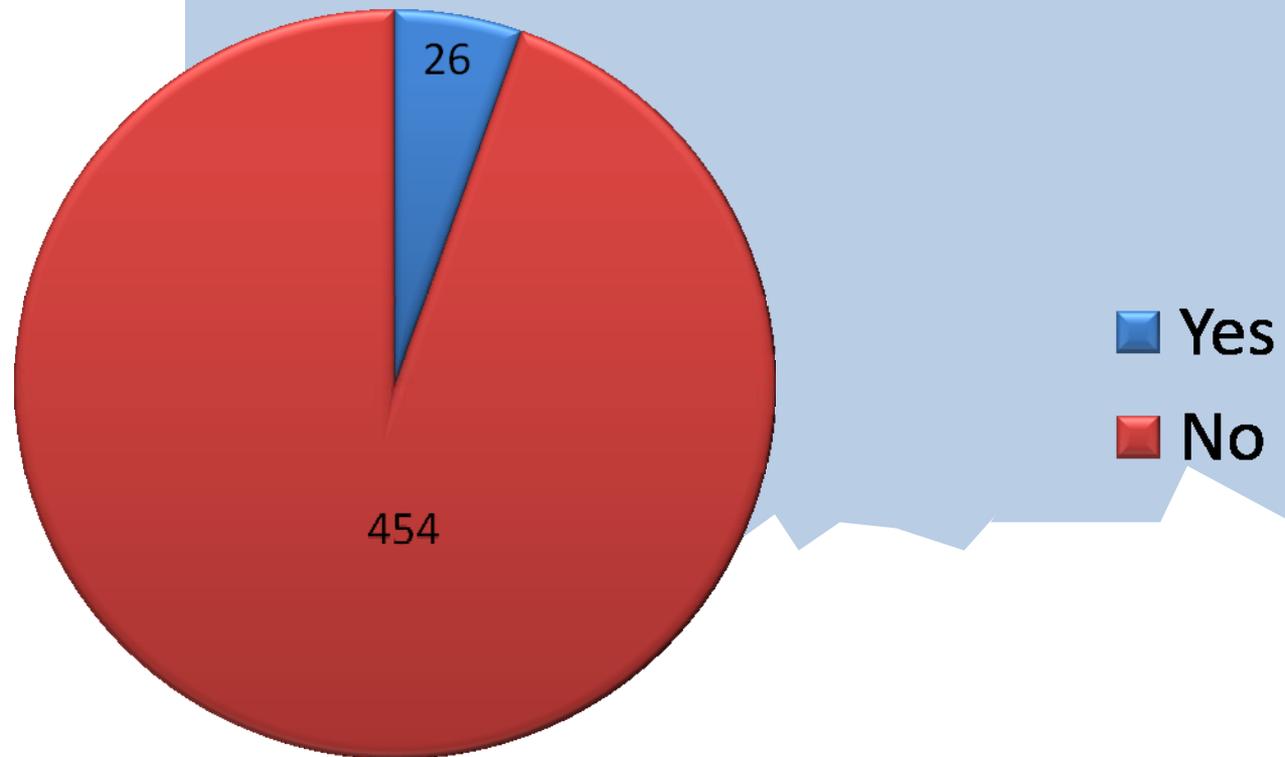
Provider Survey Responses



For survey responses collected through mid-October 2008

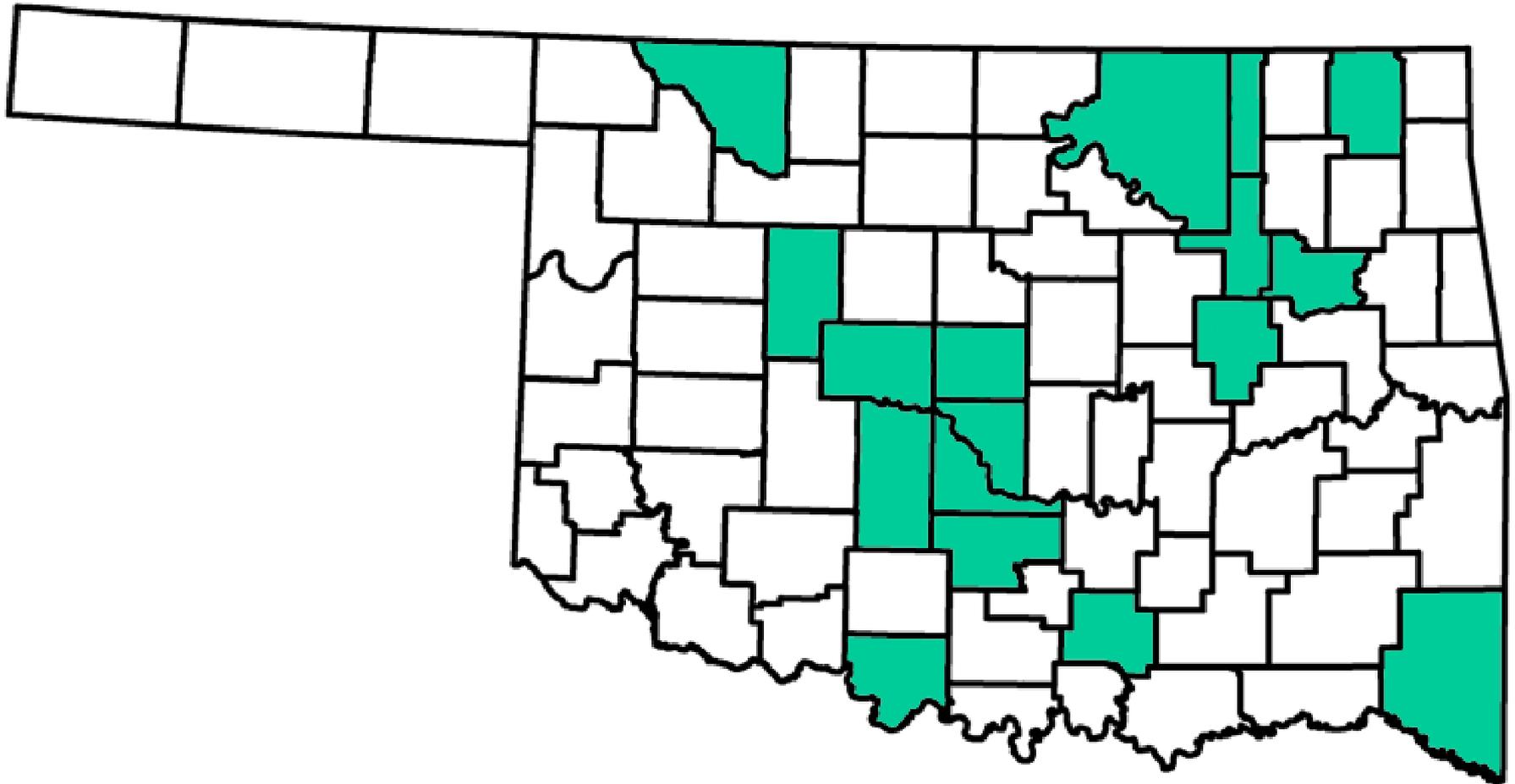
Provider Survey Response: Have an Existing Water Supply Plan?

Existing Water Plan



PRELIMINARY: Online survey responses collected through mid-October 2008

Existing Water Supply Plans



Counties

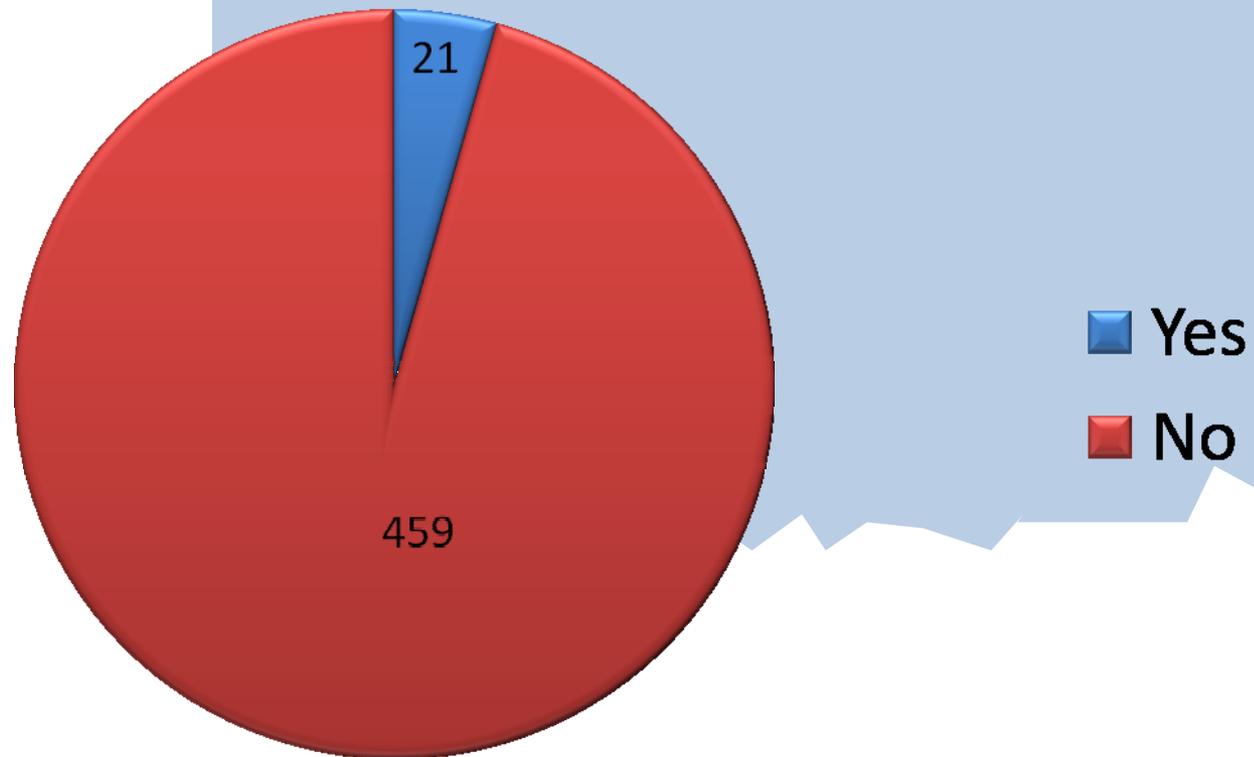
Shaded counties: One or more providers with plan

PRELIMINARY: Online survey responses collected through mid-October 2008

Provider Survey

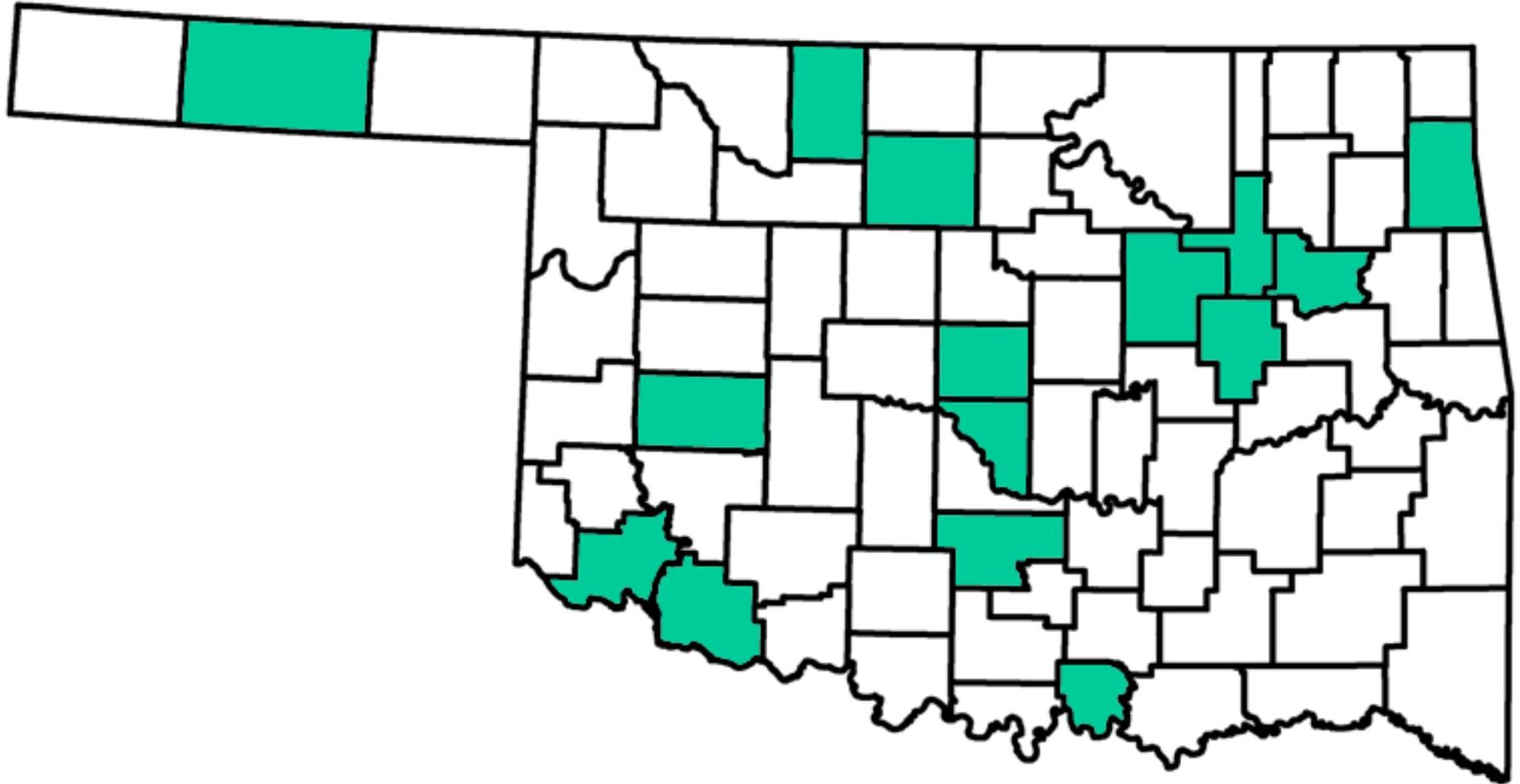
Have an Existing Water Conservation Plan?

Existing Water Conservation Plan



PRELIMINARY: Online survey responses collected through mid-October 2008

Existing Conservation Plans



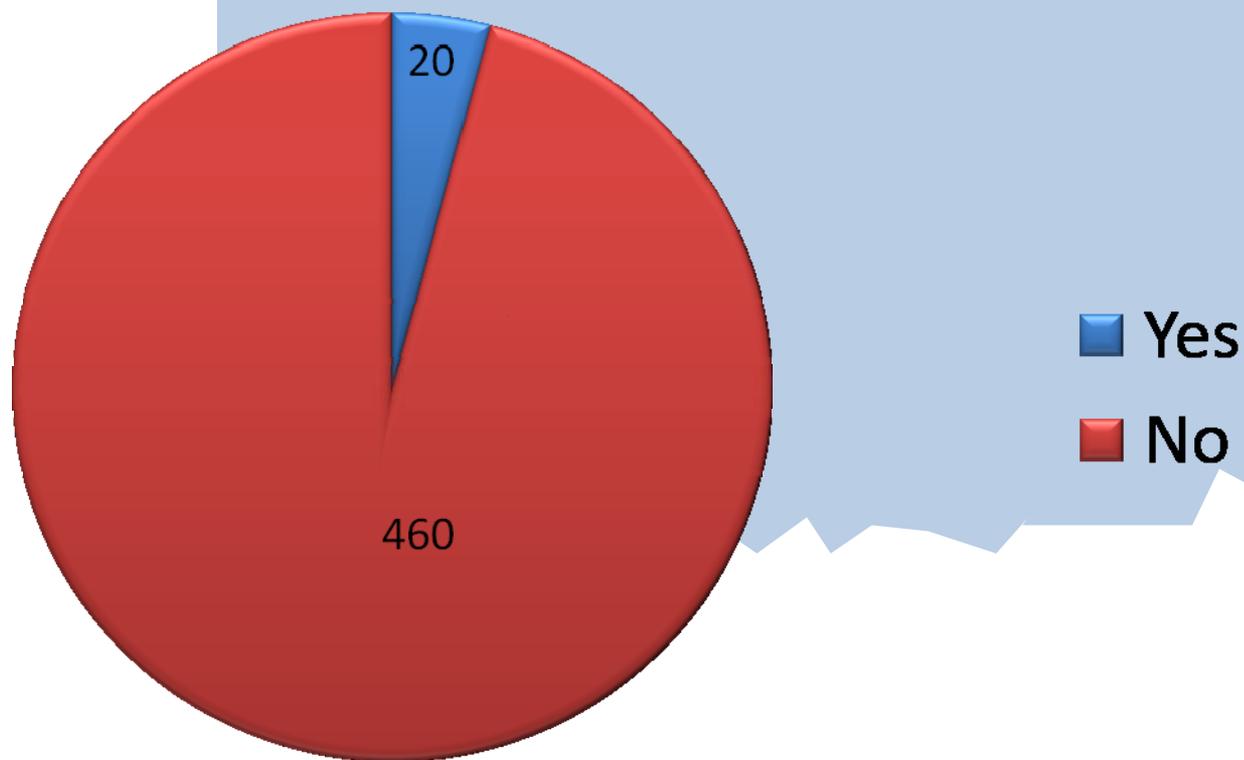
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Provider Survey

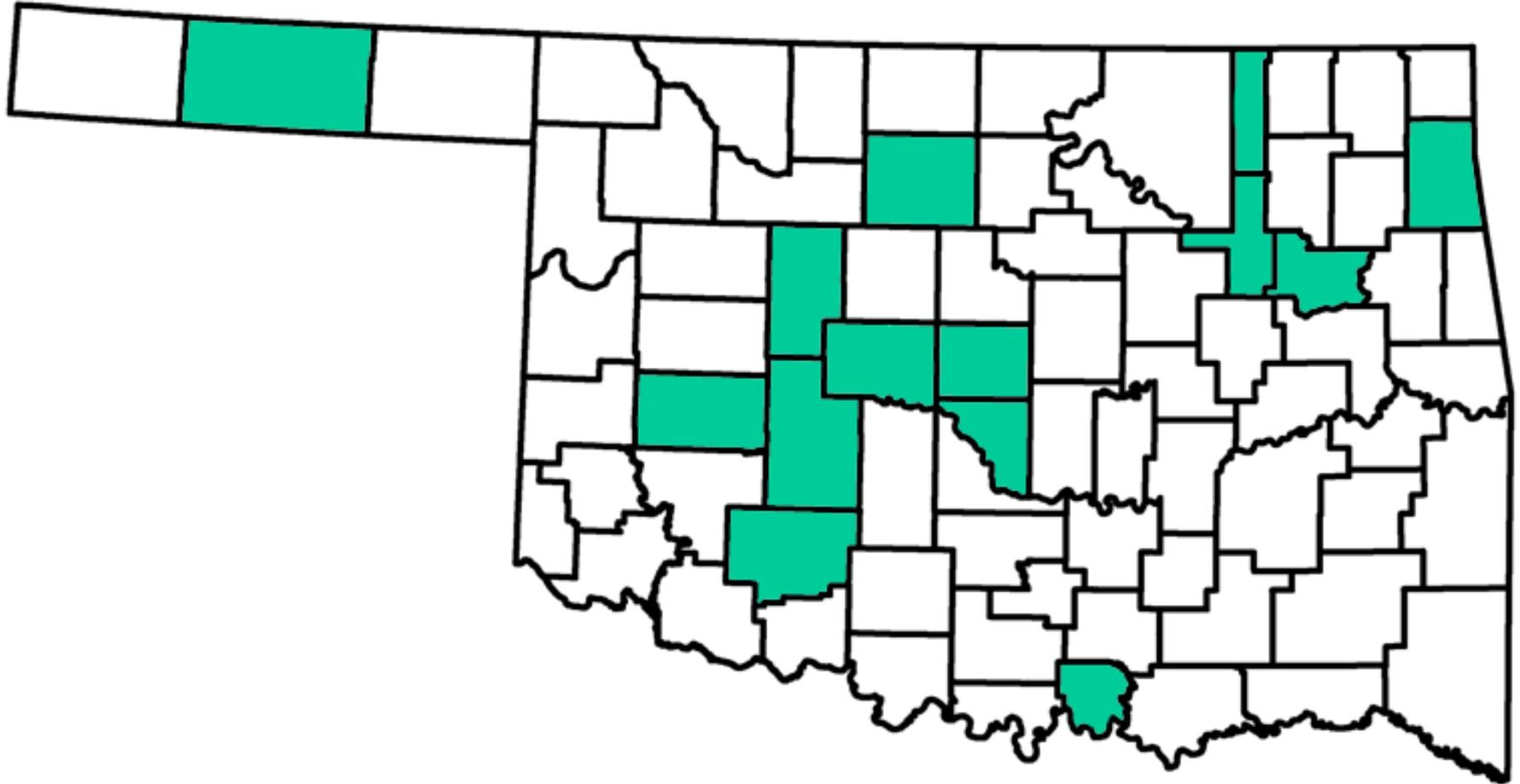
Have an Existing Drought Management Plan?

Existing Drought Management Plan



PRELIMINARY: Online survey responses collected through mid-October 2008

Existing Drought Management Plans



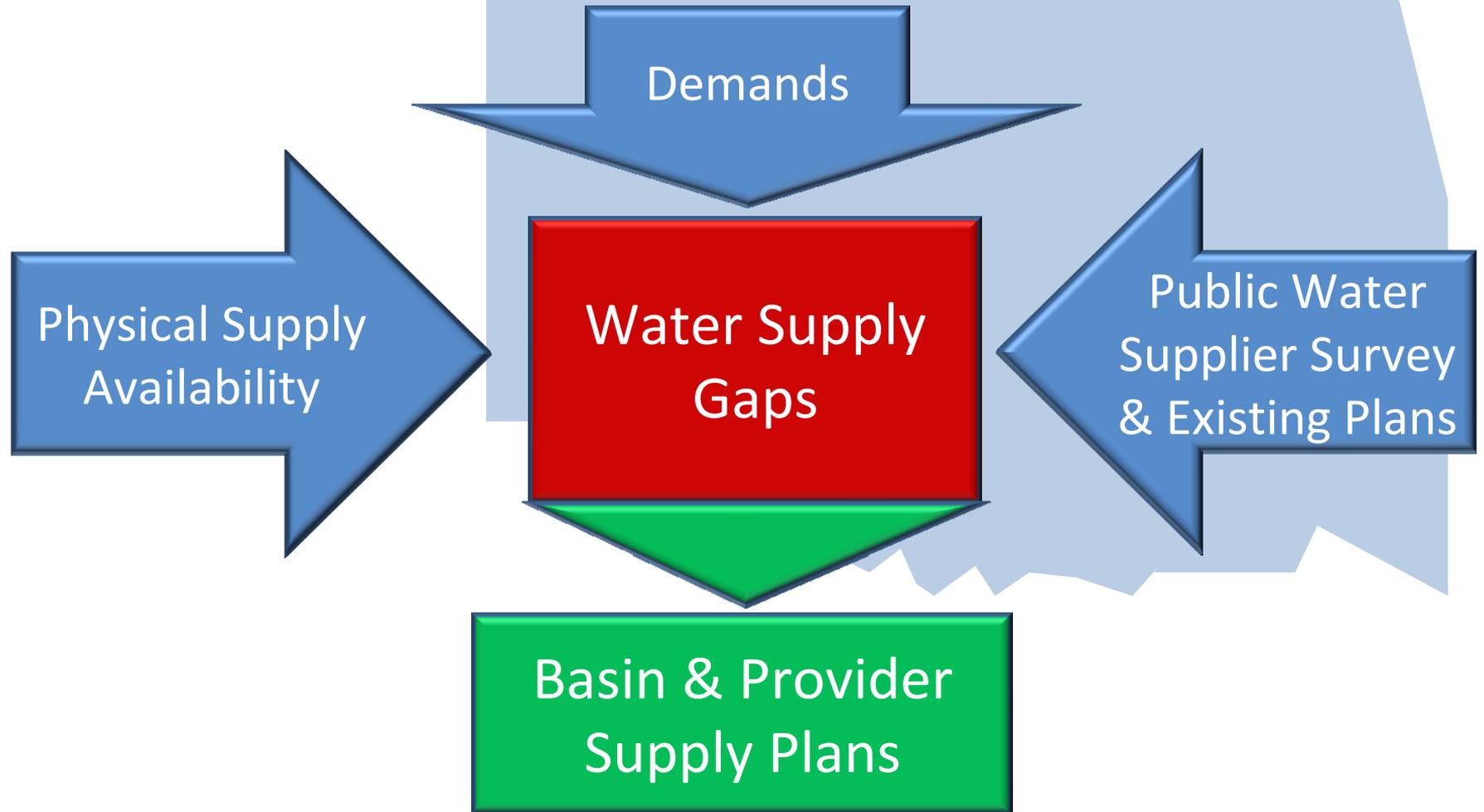
Shaded counties: One or more providers with plan

PRELIMINARY: Online survey responses collected through mid-October 2008

Oklahoma COMPREHENSIVE
Water
PLAN

Looking Ahead

Integrating the Technical Elements



OCWP Technical Studies: A Look Ahead

- Efforts underway:
 - *Demand projections*
 - *Supply availability analyses*
- Spring 2009: Preliminary "gap" area or "hot spots"
- 2009: Initial investigations of supply alternatives and potential supply plans
- 2010-2011: Develop OCWP supply plans and initial implementation activities



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