

OKLAHOMA COMPREHENSIVE WATER PLAN

Ensuring Water Supply

Reliability in Oklahoma

Society of American Military Engineers Tulsa Post
Tulsa District USACE Office
June 21, 2016

Julie Cunningham

Planning & Mgmt. Division Chief



OWRB Mission

To protect and enhance the quality of life for Oklahomans by managing and improving the state's water resources to ensure clean and reliable water supplies, a strong economy, and a safe and healthy environment.

Oklahoma Water Resources Board
(9 members)

Executive
Director

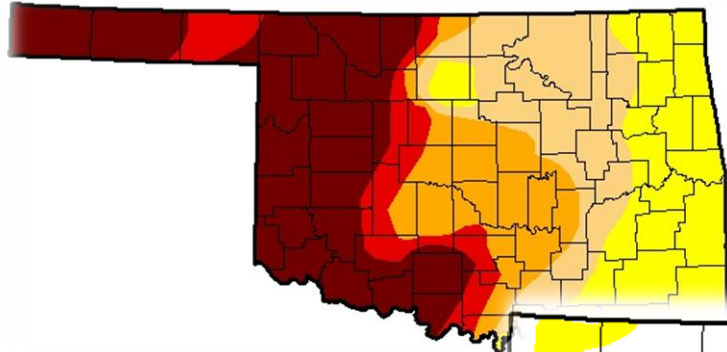
Administrative
Services

Planning &
Management

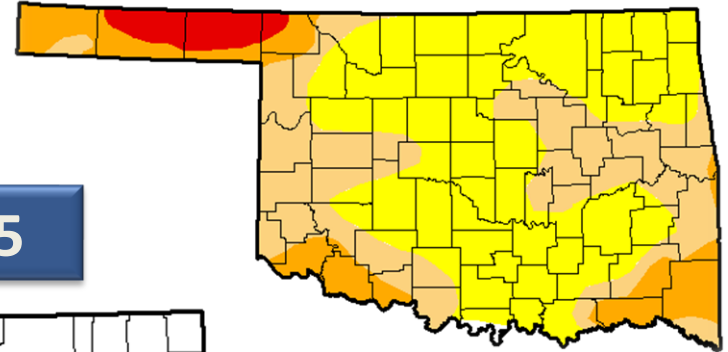
Water Quality &
Monitoring

Financial
Assistance

A Tale of 5 Junes

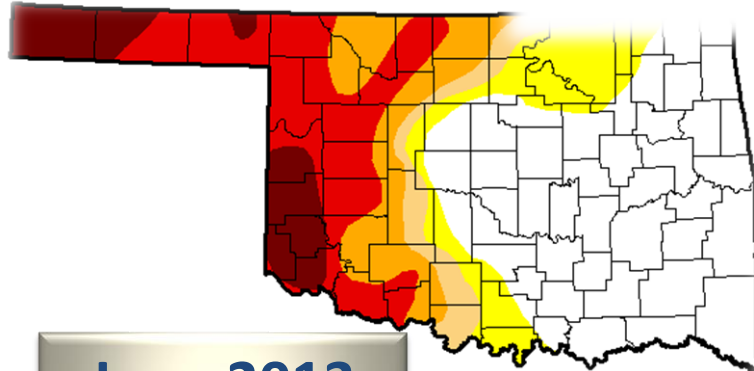


June 2011

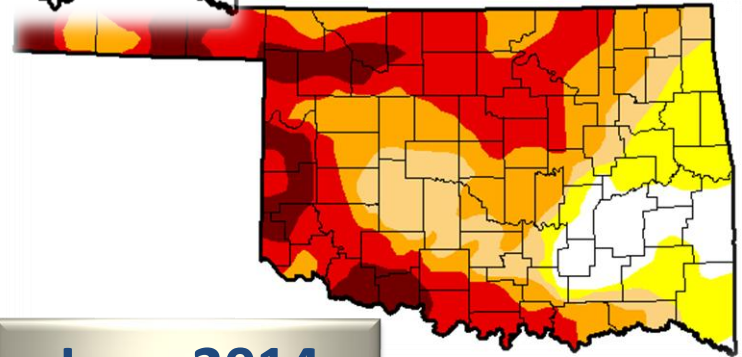


June 2012

June 2015



June 2013



June 2014

WESTBROOK LEADS WEST TO WIN

Russell Westbrook won most valuable player in the NBA's All-Star Game, scoring 41 points as he led the West to victory Sunday night.

BY SC



Speakers remember beginning of civil rights movement

BY SC



MONDAY, FEBRUARY 23, 2015 REACHING MORE THAN 475,000 PEOPLE EACH DAY NEWSOK.COM THEOKLAHOMAN.COM

OKC officials look to pipeline project to help drought

BY SHANE ALLEN
Staff Writer
shane@newsok.com

This week at Lake Overholser or Lake Meador, and it's easy to see it. At the multiple drought has taken on Oklahoma City's

drinking water supply. Water levels at both north Oklahoma City reservoirs have dropped, leaving the city's water supply severely depleted. Now, city officials are working to move more water from reservoirs in the south, where it is more plentiful, to customers on the north side of the city.

The plan is to lay a 30-mile pipeline connecting the Lake Stanley Draper treatment plant with a booster station at W Reno Avenue and N Council Road, and

another 7 miles of pipeline to connect the booster station with an elevated tank on Cemetery Road south of W Reno Avenue.

The pipeline will improve the ability to move water from where it's most plentiful to markets in other areas, said Larry Hays, an engineer with the city's utilities department.

SEE DROUGHT, PAGE 2A

State pension systems show performance is improving

BY RANDY KILLS
Staff Writer
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Boasted by a strong stock market, Oklahoma's seven state pension systems experienced investment income growth ranging from 5-4 percent to 8.6 percent last year, according to a report scheduled to be presented Wednesday to the Oklahoma State Pension Commission.

The Oklahoma Teachers' Retirement System performed the best of the group and grew 8.6 percent in 2014, while the Public Employees Retirement System grew the least at 5.2 percent.

All seven performed below the 9.7 percent growth target set by Standard & Poor's 500 stock index, which tracks the performance of 500 large companies that have their common stock listed on the New York Stock Exchange or Nasdaq.

Because of their conservative investment strategies, pension funds can be expected to underperform or match returns during strong market years, said Tom Spencer, executive director of the Oklahoma Teachers' Retirement System.

SEE PENSIONS, PAGE 2B



DESTROYED MEMORIES

Homeowner fights back against squatting contractor

BY ADAM KEMP
Staff Writer
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It was about three months after the May 2013 tornado almost destroyed her Moore home that Latoya Wright, who was living in a hotel while a contractor allegedly made repairs, became an evictee.

Wright said she thought she'd worked long enough after the terms for all the crowded contractors to have left town. She thought she'd hired a reputable company, one given an A-plus rating by the Better Business Bureau's website, she said.

Another firefighter drowned Saturday night while trying to evacuate stranded residents, Clarence Fire Chief Sean Douglas said.



Above: Latoya Wright shows a piece of decorative plastic she says the contractor who squatted her house up to make it look like he had installed a stained-glass window at her Moore home. Top: Latoya Wright stands near a crack in the slab in her bedroom from the May 20, 2013, tornado at her Moore home.

Online: Scan the QR code at right to see more photos and to see a video of the damage to the contractor, or go to NewsOK.com and search for "contractor scam."



SEE CONTRACTOR, PAGE 2A



OSU FALLS TO TEXAS IN BIG 12 FINAL

BY SC

HIGH-TECH MOVIE MAKING

In Oklahoma Film Institute course, it's lights, cameras, drone!
PAGE 1B



THE OKLAHOMAN

MONDAY, MAY 25, 2015 REACHING MORE THAN 475,000 PEOPLE EACH DAY NEWSOK.COM THEOKLAHOMAN.COM



Left: Eddie Valdez takes pictures Sunday of an overflowing Medicine Creek in Medicine Park.

INSIDE
• Clarence firefighter remembered as a 'selfless, brave person'
• View more photos
PAGE 6A

ONLINE AT NEWSOK.COM
In Purcell, residents describe their experiences after flooding forced them from their homes. Scan the QR code to watch the video.



'KE A MONSTER'

Flooding kills at least two, forces many from homes

BY SHANE ALLEN
Staff Writer
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Yet another round of heavy rain swept across Oklahoma on Saturday night and Sunday, causing floods, forcing evacuations and leading to at least two deaths, authorities reported.

A Clarence firefighter drowned Saturday night while trying to evacuate stranded residents, Clarence Fire Chief Sean Douglas said.

Another firefighter, Lt. Sean James, also was swept into the storm drains while trying to help Wesley, Douglas said. James survived the incident and was taken to a Tulsa hospital for treatment of his injuries.

SEE FLOODING, PAGE 4A



George and Susan Kruger make one of three trips with their animals from their flooded house to safety in Purcell. Overnight rain caused water to rise early Sunday.



Denise Estor looks at his damaged property Sunday after the West Cache Creek overflowed, flooding the area in Cache.

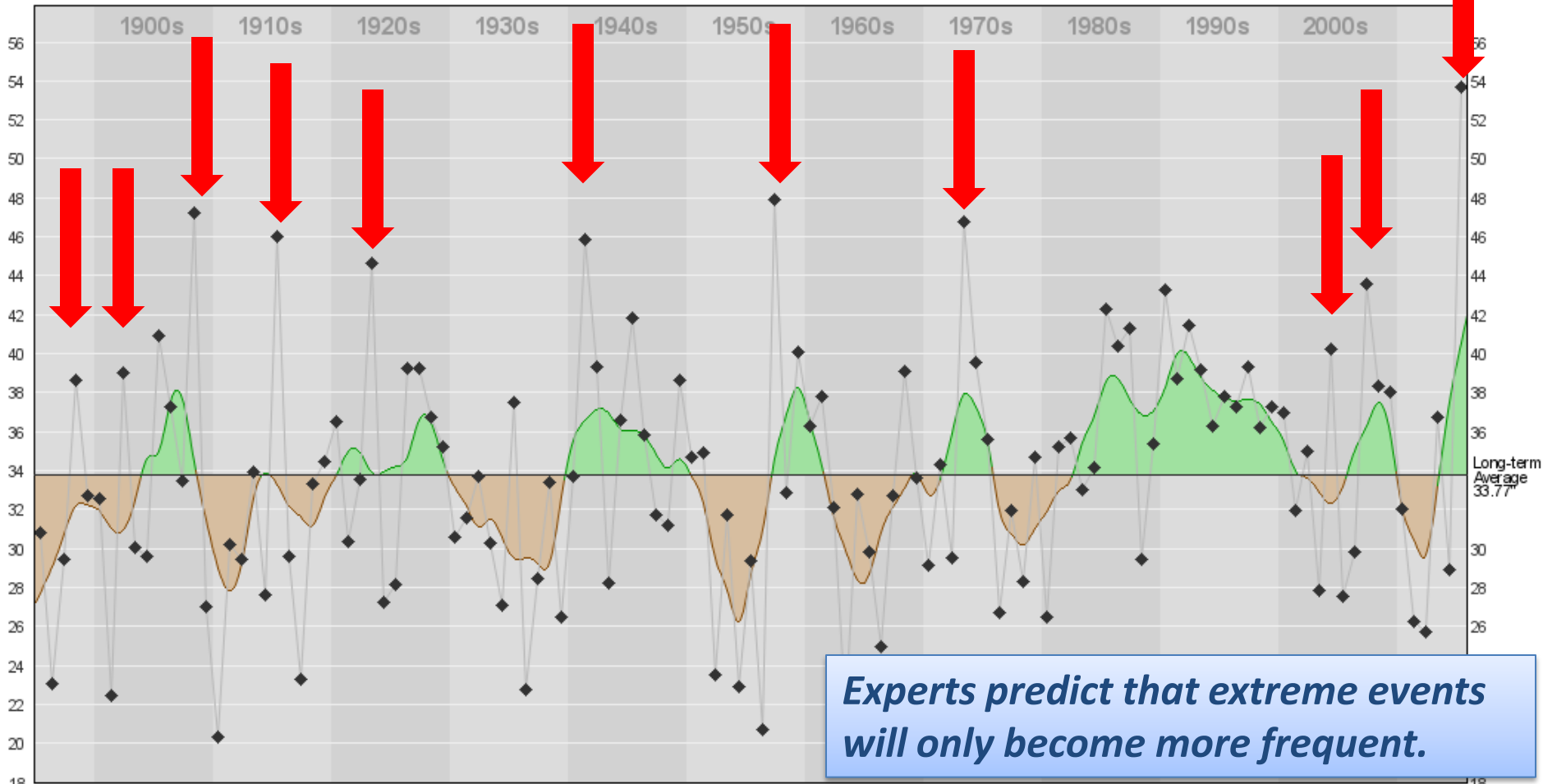
Residents lose belongings, but thankful they are safe

BY JACLYN COSGROVE
Staff Writer
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The 67-year-old Cache resident knew she needed to act fast, for the water in her home was 4-foot high, almost to her necklines.

SEE CACHE, PAGE 5A

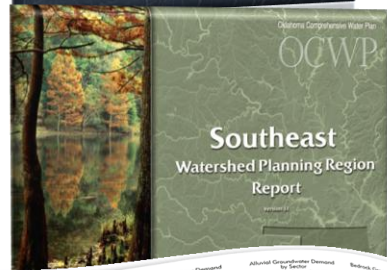
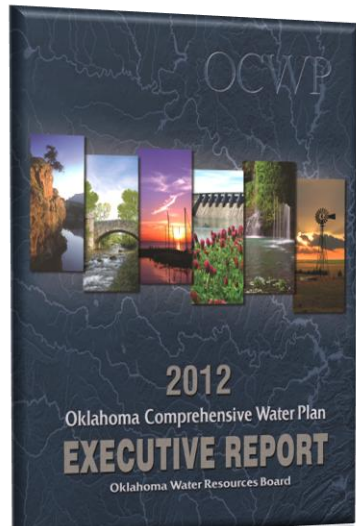
Historical Dipoles in Central Oklahoma



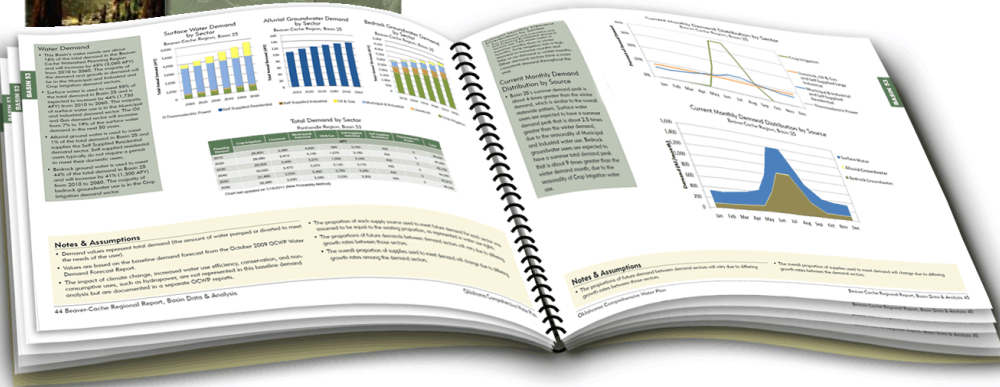
OKLAHOMA CLIMATOLOGICAL SURVEY Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2015

Wetter periods Drier periods
◆ Annual precipitation value

2012 Update of the Oklahoma Comprehensive Water Plan

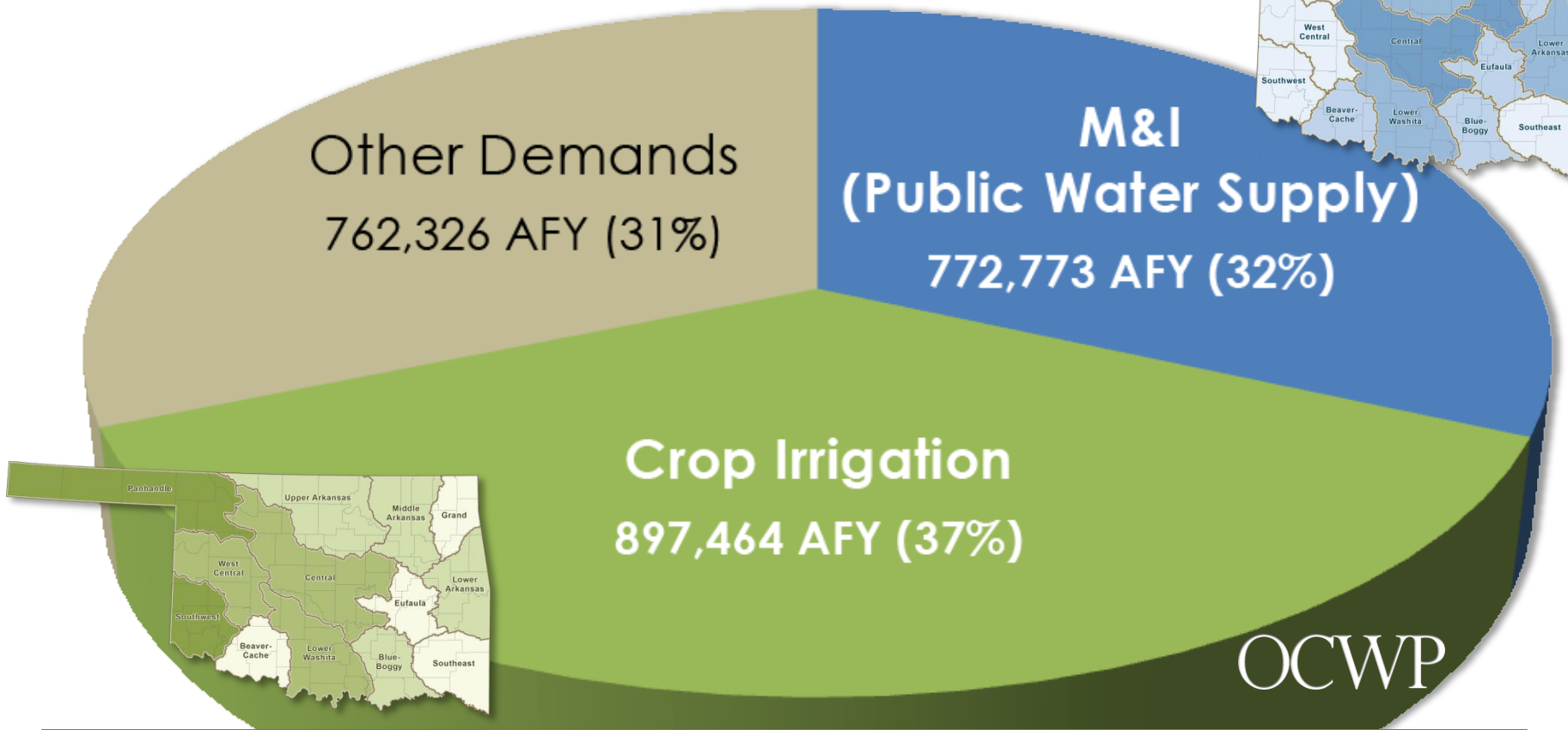


- Over \$13M effort— USACE, USBOR, USGS, State
- Most technically sound, extensively vetted Plan
- 13 Watershed Planning Region Reports and numerous technical studies
- 21 policy recommendations from 3-yr. public process
- Governor and Legislature in 2012 supported with major funding for implementation



Overriding goal to provide safe, reliable water supplies to meet needs of all Oklahomans

2060 Water Demands- Total

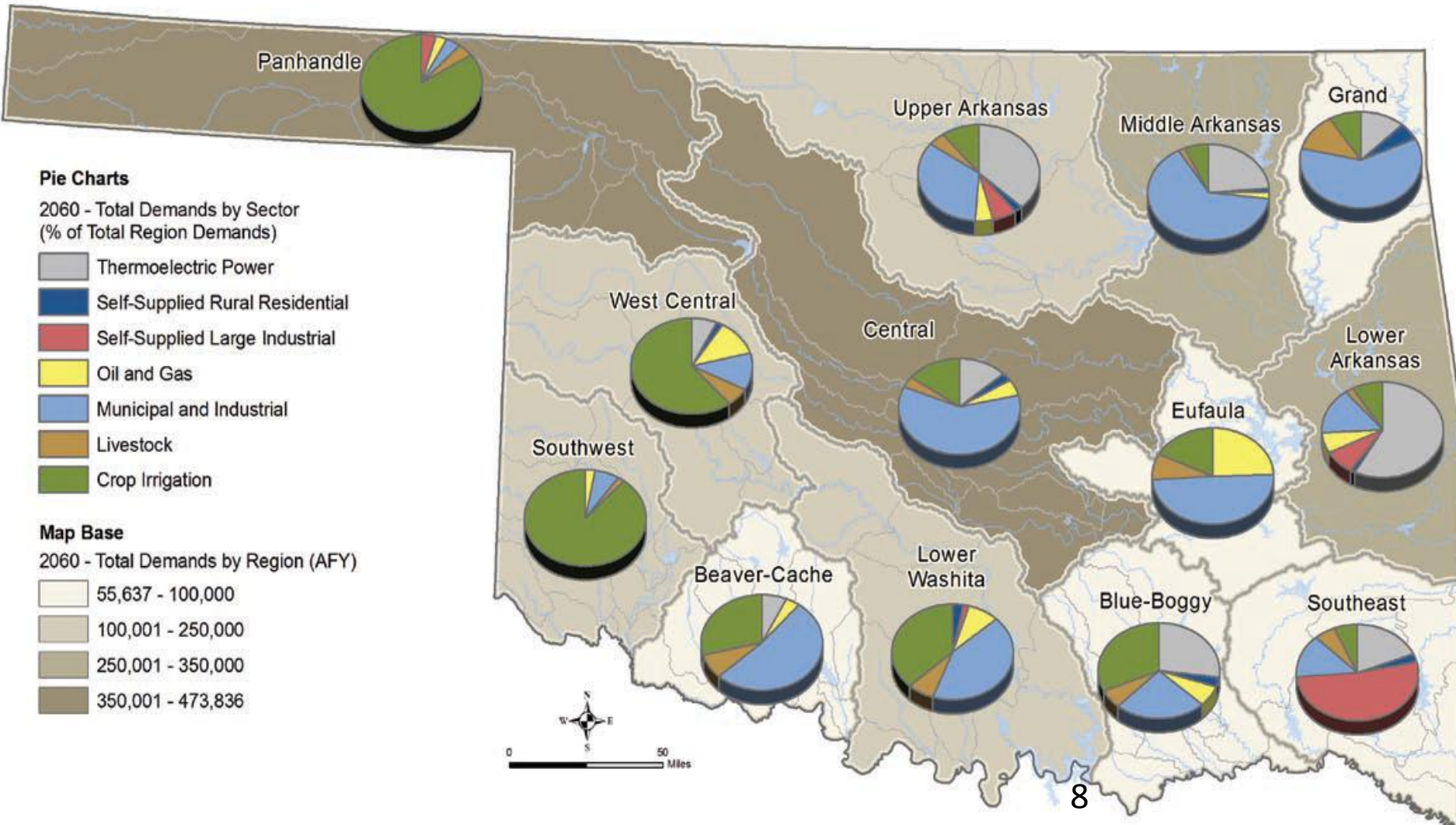


Other Demands:

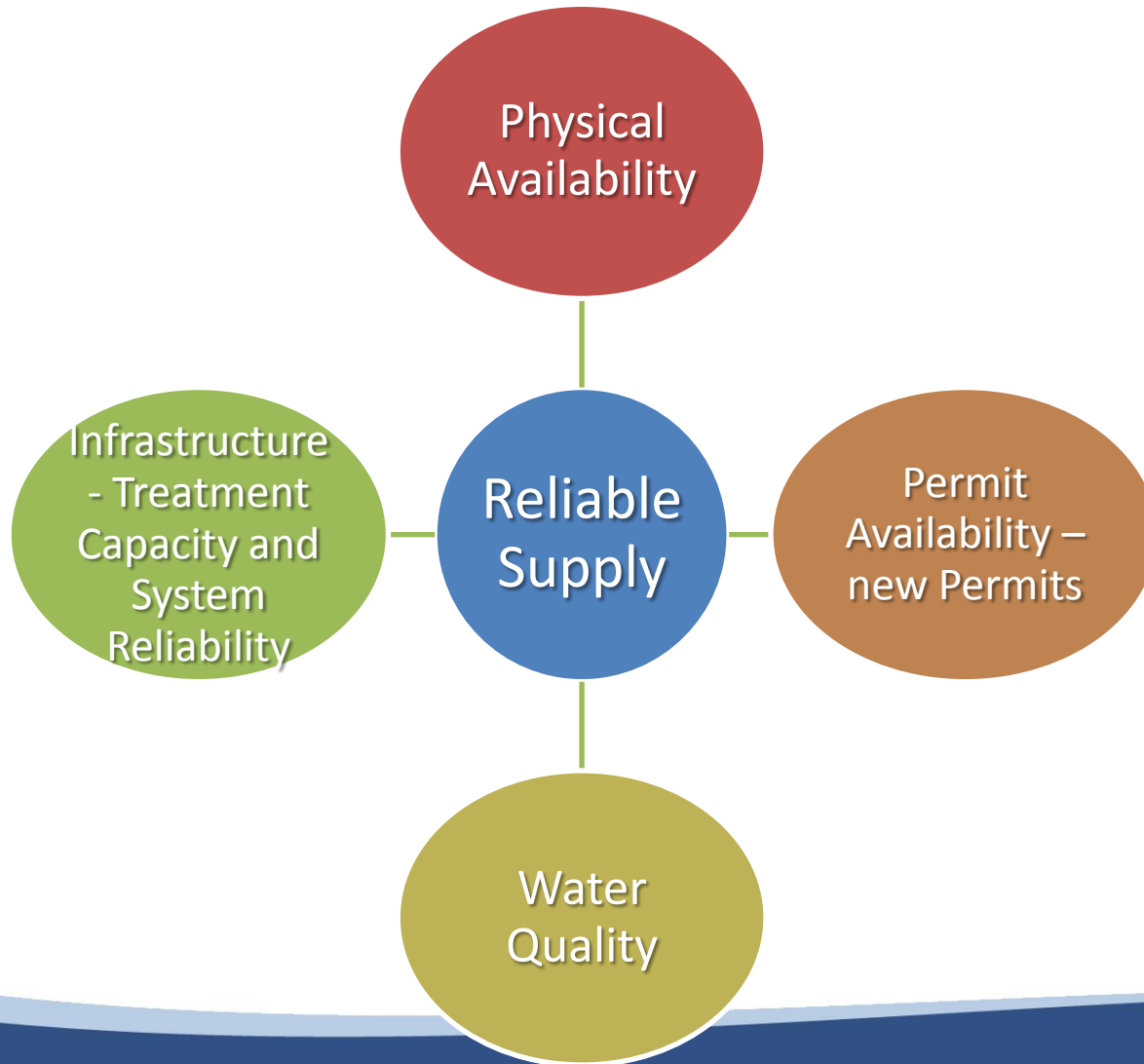
Thermoelectric Power - 450,227 AF (18%)	Oil & Gas - 115,570 AF (5%)	Livestock - 101,040 AF (4%)
Self-Supplied Industrial - 54,334 AF (2%)	Self-Supplied Residential - 41,155 AF (2%)	

OCWP

2060 Demands-Sector/Region

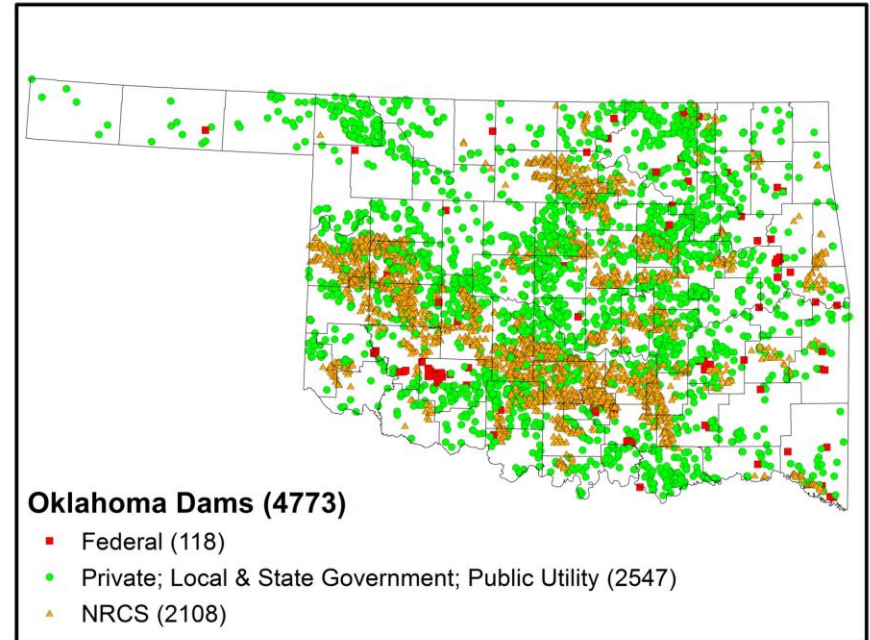


2060 Water Supply Side



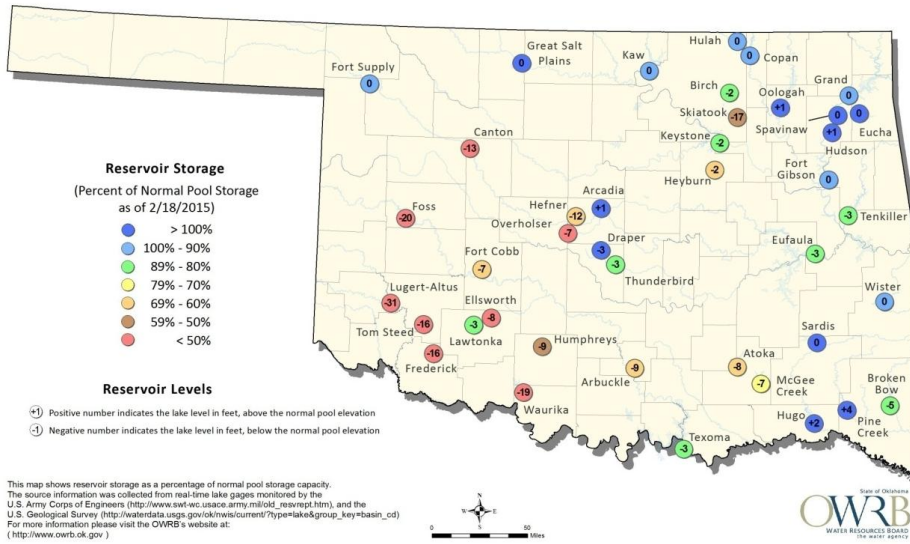
Physical Availability— Reservoir Storage

- Storage essential during times of drought and flooding!
- Ok. has 4th highest # of dams in U.S.
- OK's 34 largest reservoirs have the capacity to store 13 million acre-feet of water
- 4,773 reservoirs (Federal, state, local, public utility, private)
- Vast majority built for flood and sediment control

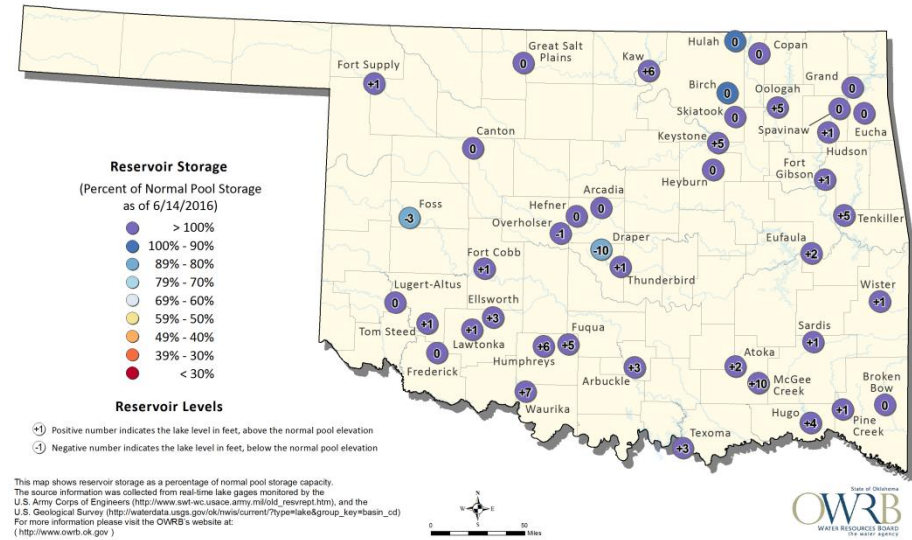


RESERVOIR LEVELS 2015 VS. 2016

Oklahoma Surface Water Resources
Reservoir Levels and Storage as of 2/18/2015

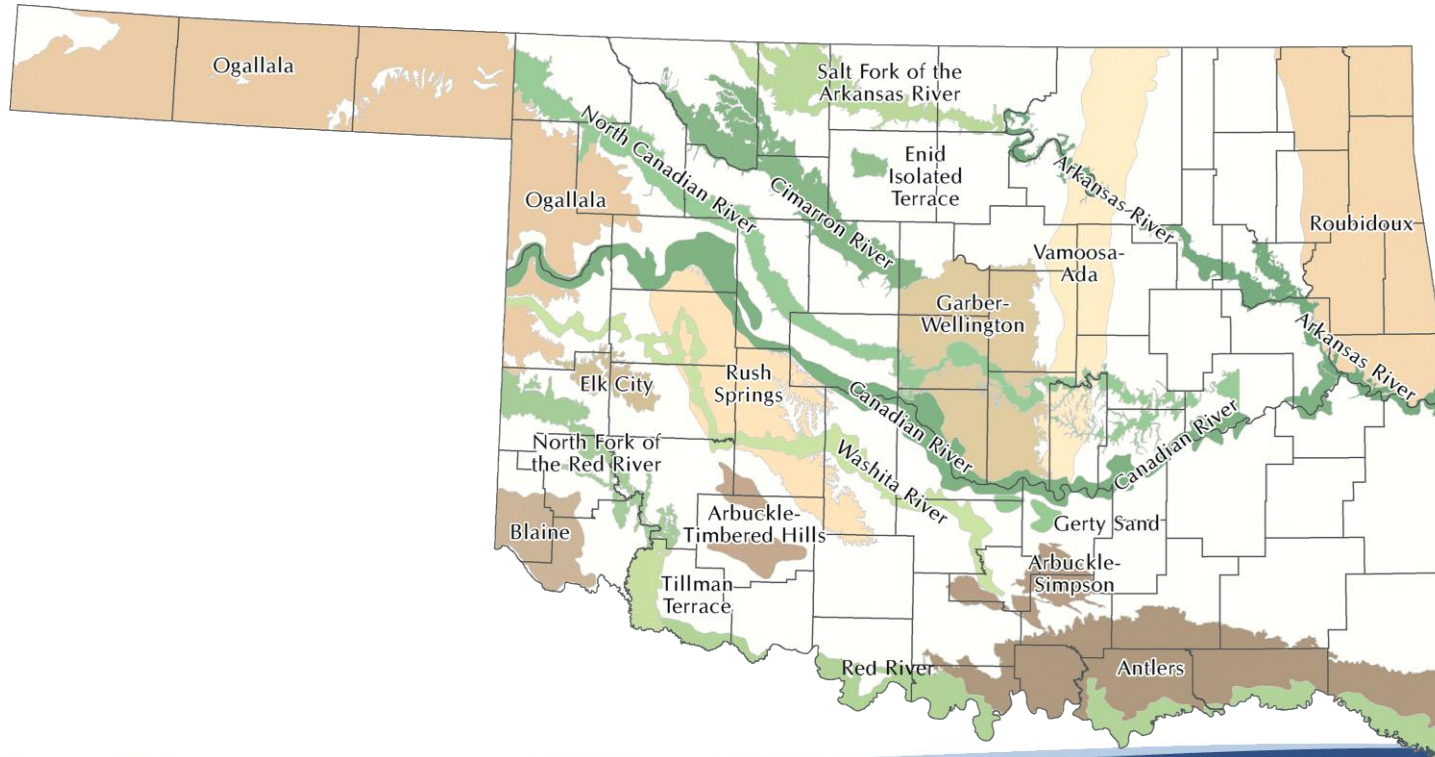


Oklahoma Surface Water Resources
Reservoir Levels and Storage as of 6/14/2016

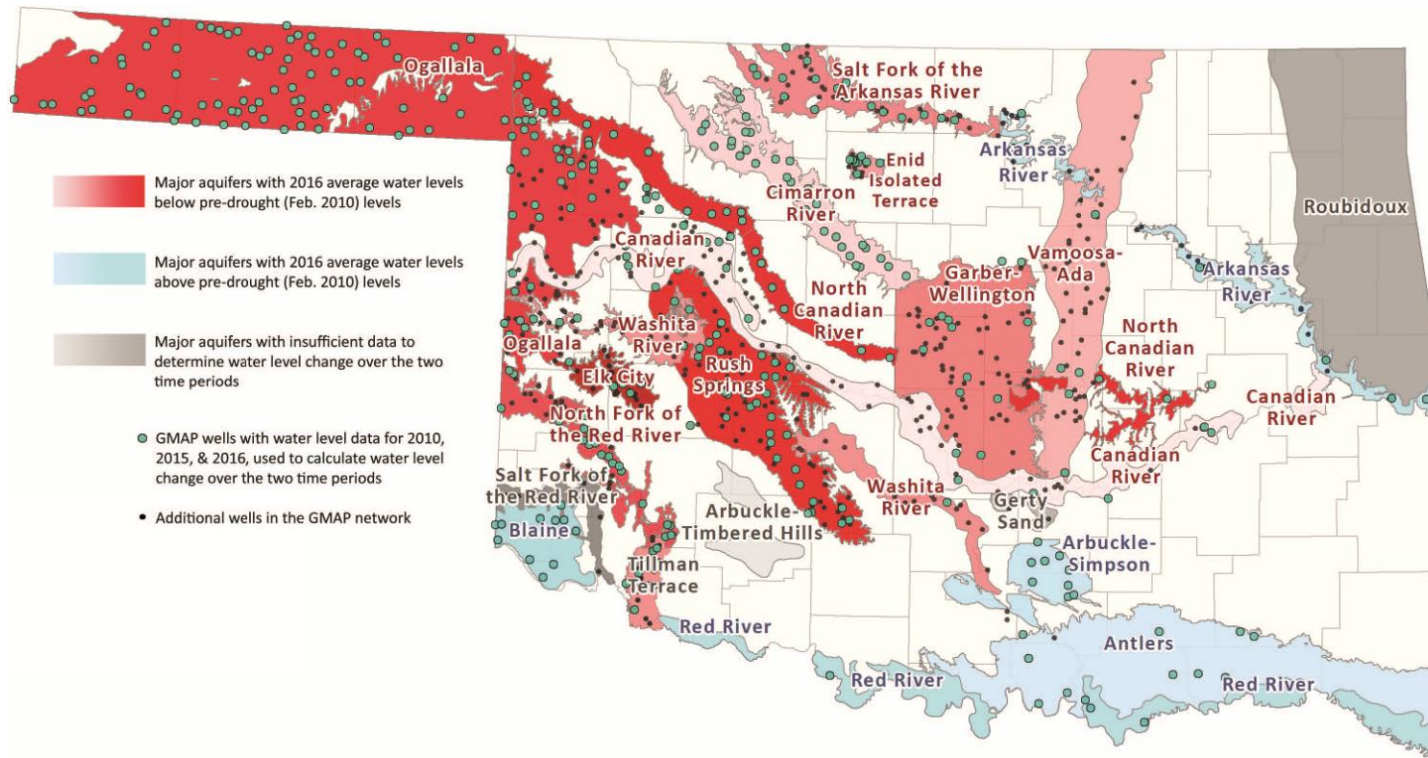


Physical Availability— Ground Water Resources

23 major groundwater aquifers store an estimated 320 million acre-feet of water

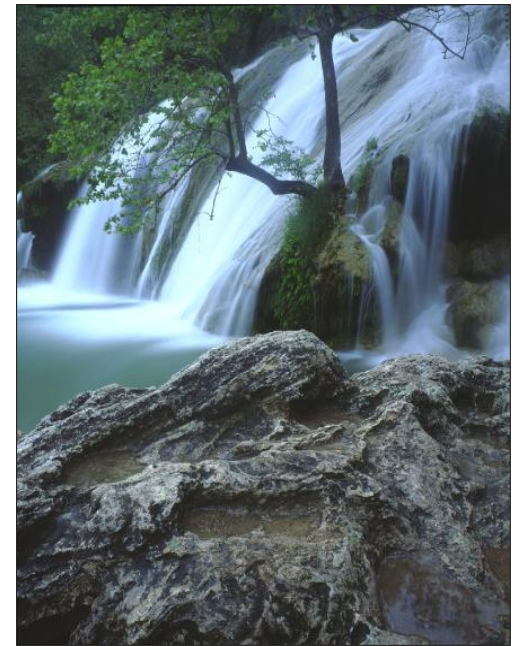


GW LEVELS 2010 VS. 2016



Permit Availability—Oklahoma Stream Water Law

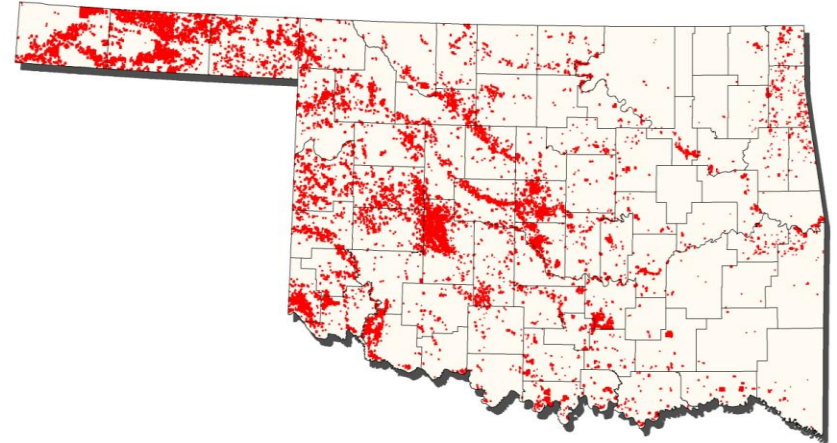
- Stream water publicly-owned and subject to appropriation by the OWRB (“domestic uses” exempt)
- Law requires OWRB to determine if water available prior to permit issuance
- Model based on avg. annual rainfall, existing water rights, reservoirs, compacted water, etc.
- Permit does not guarantee water—Seniority of use by water right date
- No priority of use type



Permit Availability- Oklahoma

Groundwater Law

2016



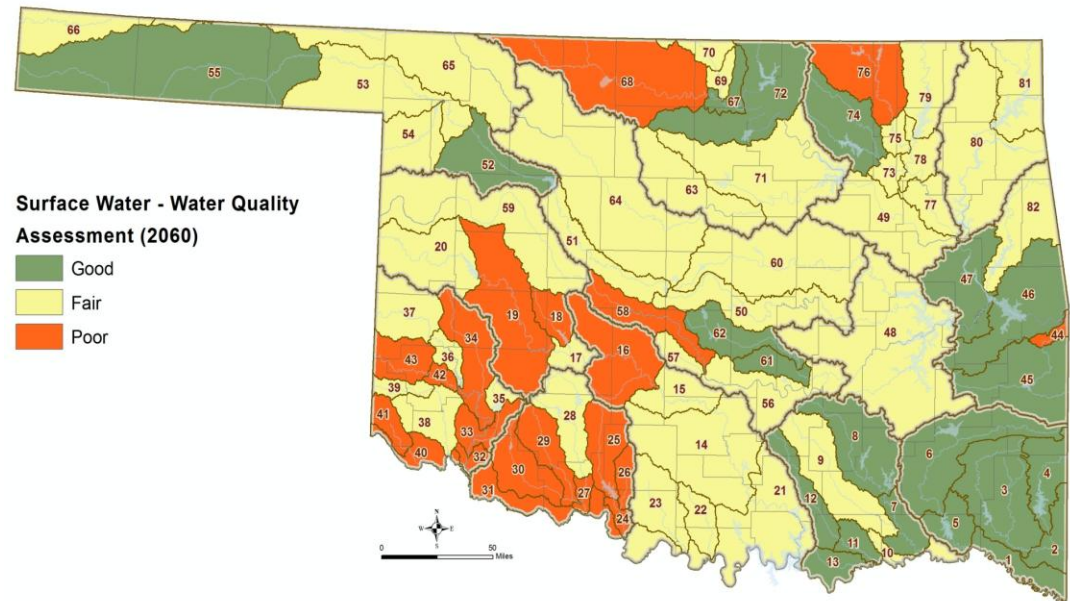
- Groundwater considered private property belonging to the overlying surface owner, although subject to reasonable regulation by the OWRB
- Current law enacted in 1973 as a utilization law
 - Created for economic development; mining law allowing for depletion
 - Requires OWRB to base appropriation on hydrologic study

- 10,929- Active Permits
- 3.4 million a.f. per year Permitted

<u>Purpose</u>	<u>Total Amount (AF/YR)</u>
Irrigation	2,834,853
Public Water	661,897
Other	1,063

2060 Water Quality Availability Assessment

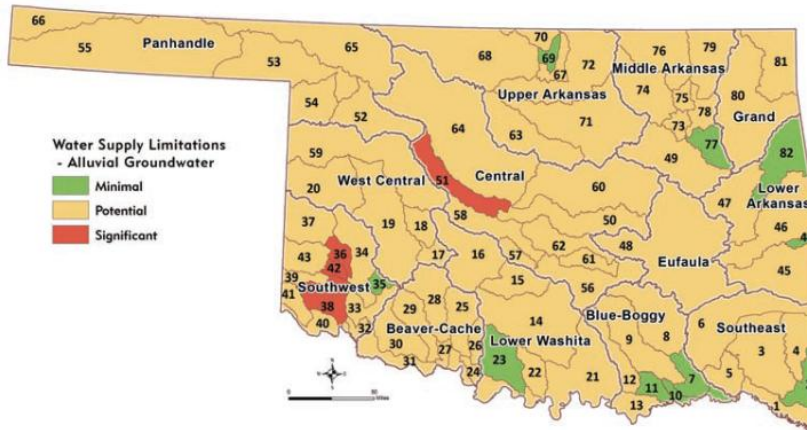
Watershed mgmt. decreases water supply treatment, dredging, and capacity expansion costs.



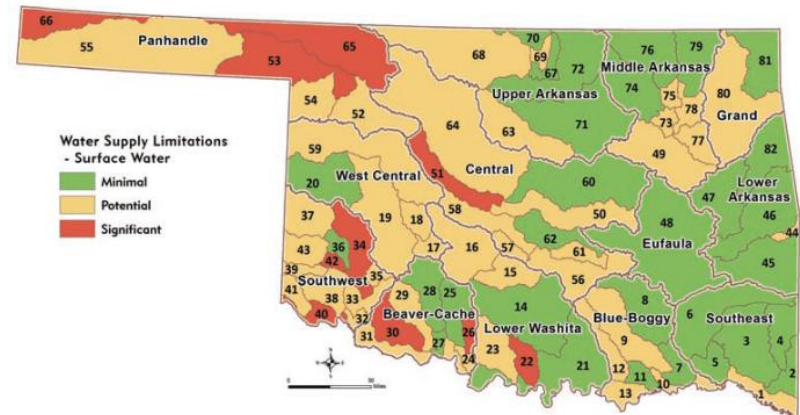
- assessed trends in designated beneficial uses for impaired or threaten waters (e.g. turbidity, nitrogen, phosphorus, turbidity, chlorophyll-a (lakes), PPWS, and Ag uses)

Projected 2060 Supply Limitations

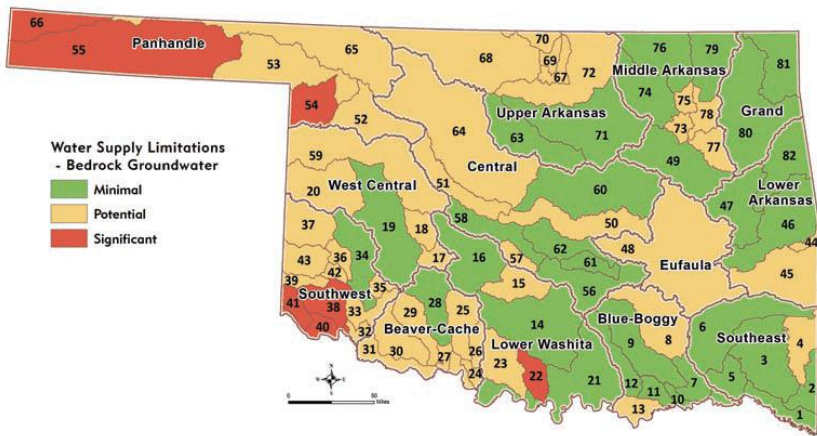
Alluvial Groundwater



Surface Water



Bedrock Groundwater



Oklahoma Comprehensive Water Plan

OCWP

BIG 8

PRIORITY

RECOMMENDATIONS



Infrastructure Financing



Conservation, Reuse, Recycling



Monitoring



Supply Reliability



Fish & Recreation Flows



Excess/Surplus



State/Tribal Resolution



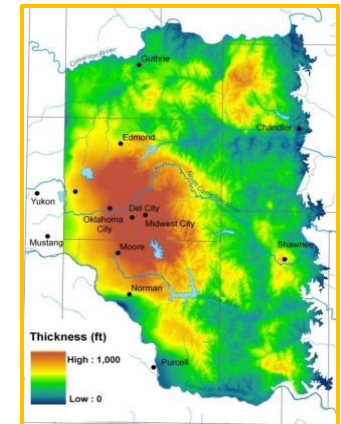
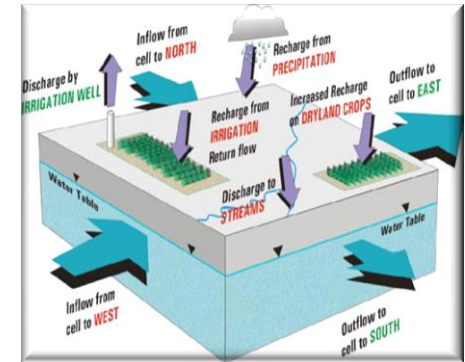
Regional Planning

OCWP Priority Recommendation

Water Supply Reliability- Availability Studies

Recommendation called for ensuring water availability for future growth through **fair and sustainable water allocation**

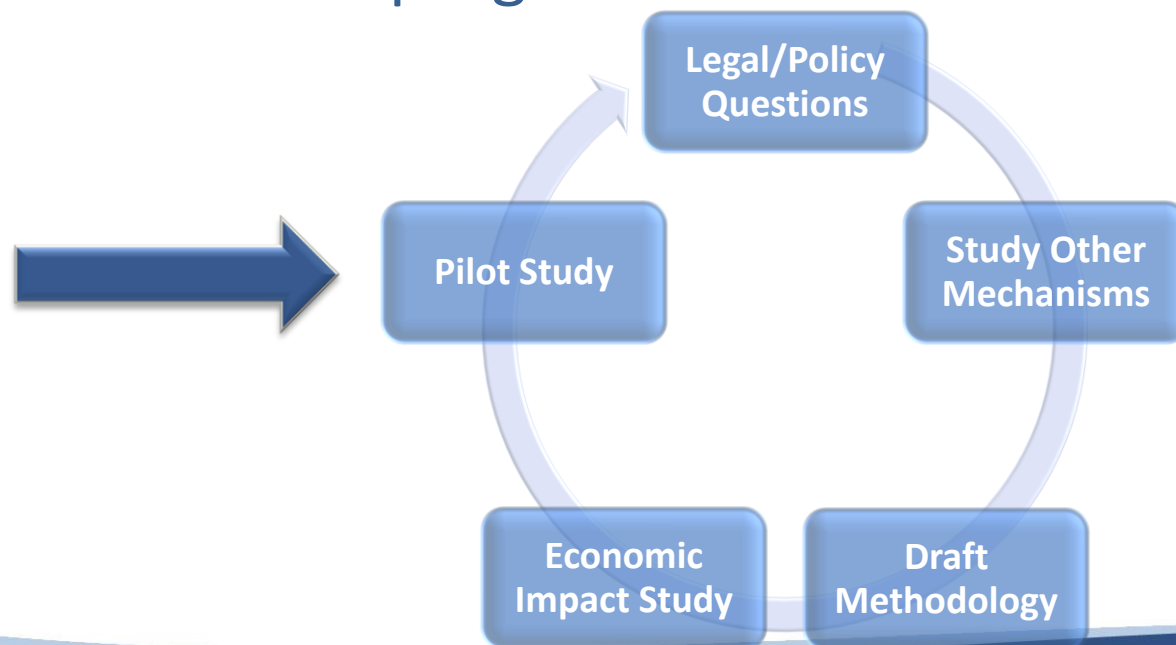
- aquifer yield studies- Statutorily mandated
- stream water allocation models
- Analysis of various water rights management approaches
- Funded through 2012 Gross Production Tax, extended with 2016 legislation



2012 Update of the OCWP

Fish & Recreation Flows

- Recognized non-consumptive water needs that support recreational & local economic interests
- Assess the suitability & structure of a potential in-stream flow program for Oklahoma



Water Infrastructure Financing

- **Address Oklahoma’s projected \$82+ billion water and wastewater infrastructure need by 2060.**
- **OWRB’s 5 successful (“AAA”) grant & loan programs could only satisfy an estimated 4-9% of this need**
- **In 2012 SQ 764 established the Water Infrastructure Credit Enhancement Reserve Fund to provide additional leveraging capacity in the municipal bond mkt.**

OWRB Financial Assistance Prog.

Assist communities and rural water districts in financing water and wastewater infrastructure improvements

- \$3.4 billion in loans and grants to date

OWRB
Loan and
Grant
Programs

- Clean Water State Revolving Fund Loans
- DW State Revolving Fund Loans
- State Revenue Bond Loan Program Loans
- Emergency Grants
- Rural Econ. Action Plan Grants

Funding Sources—

- Federal dollars
- Debt Issuance
- Loan Repayments
- Interest on Bond Loan Program Reserve
- General appropriations
- Special Appropriations

Oklahoma Funding Agency Coordinating Team



- Fed. and state water financing agencies—drinking water, sewer, and “green” projects for Oklahoma public entities
- Meet quarterly to identify best funding source, cross-train funding agencies, adopt streamline application/guidance

Members	
Oklahoma Water Resources Board	USDA Rural Development
Oklahoma Department of Commerce	Oklahoma Council of Governments
Indian Health Service	Community Resource Group
Oklahoma Department of Environmental Quality	

Future Supply Infrastructure Opportunities

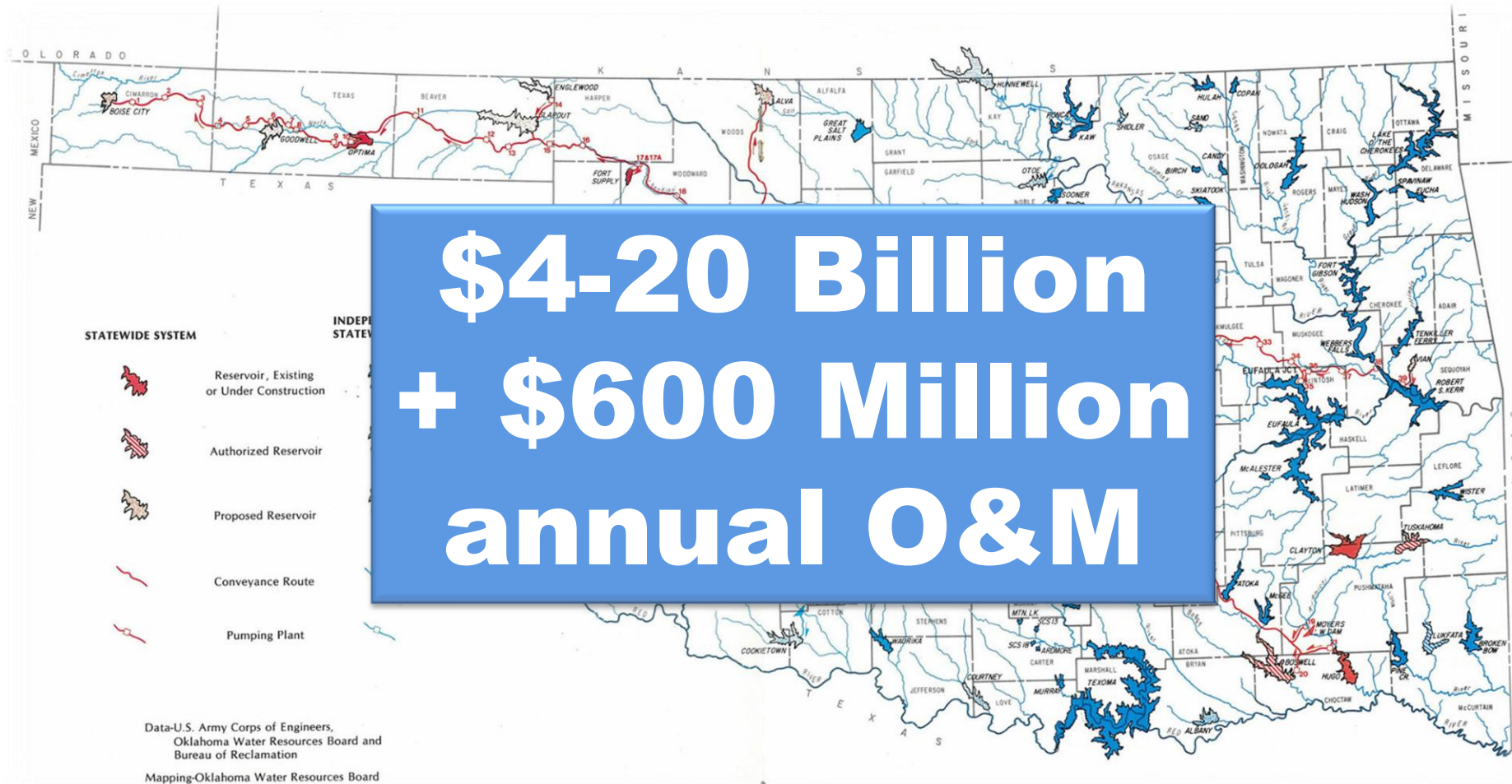
OCWP assessed several options— generally more statewide in perspective:

1. Reservoir Viability
2. Conservation- Efficiency and Reuse
3. Marginal Quality Water
4. Artificial Recharge
5. Regionalization

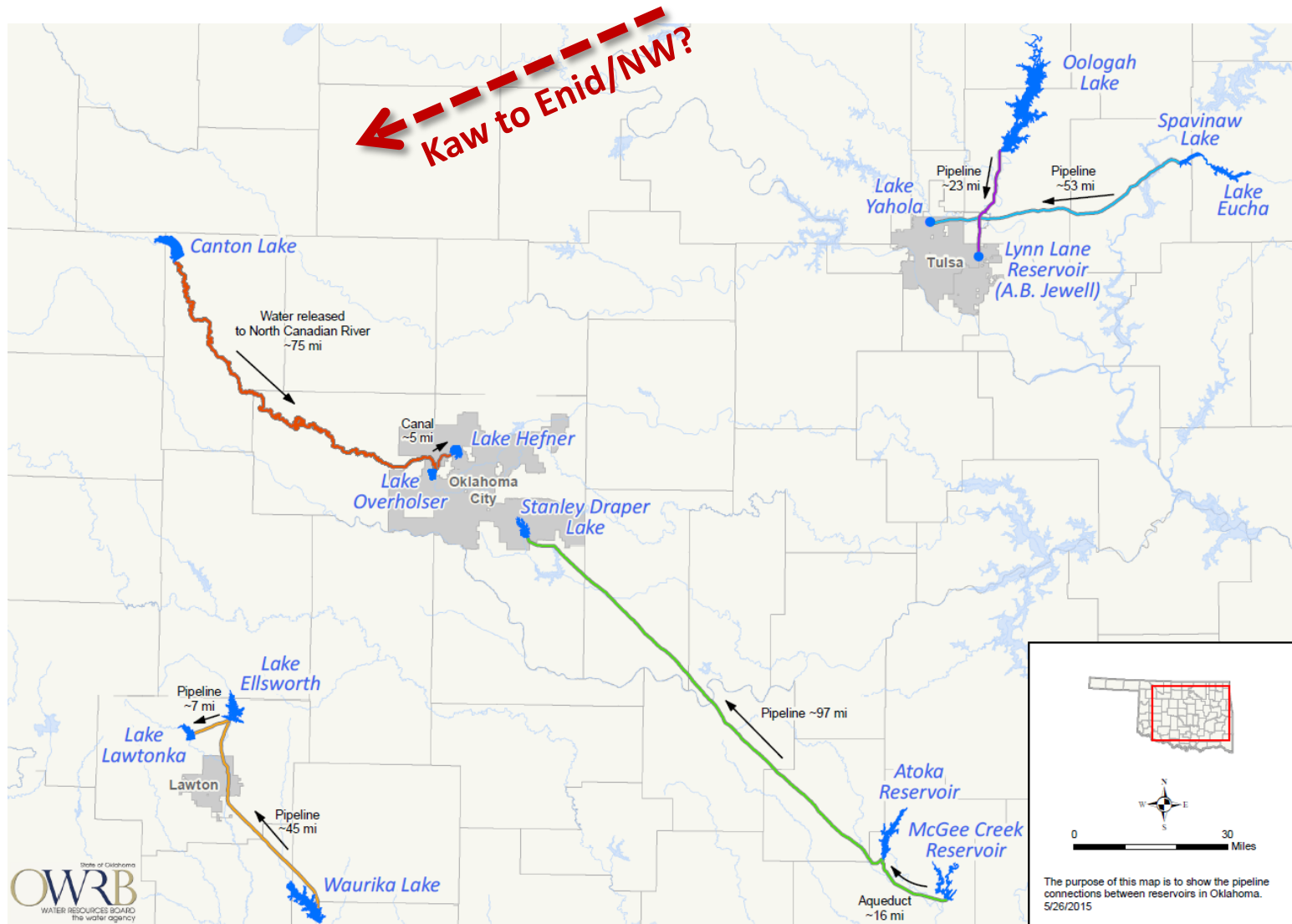
New Reservoirs?



East-West Conveyance?

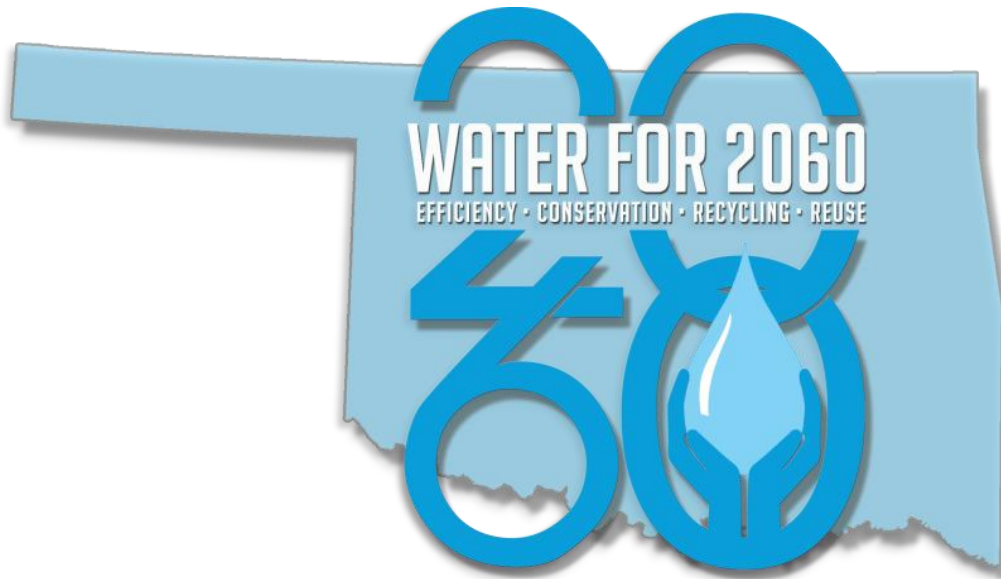


Smaller Out-of-Basin Water Transfers?



Conserve/Reuse/Recycle

- Recommended voluntary programs/policies, financial incentives and education



- Water for 2060 Act sets statewide goal of consuming no more **fresh** water in 2060 than we consumed in 2010.
- Advisory Council recently sent recommendations to Governor and Legislature

Case Studies in Conservation

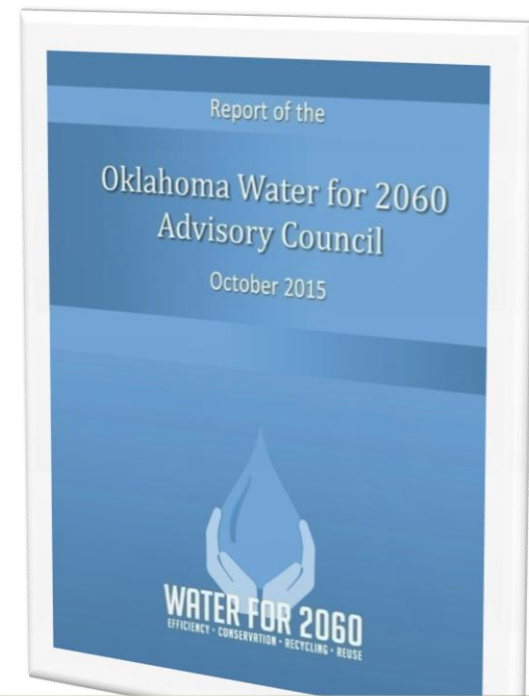
City	Problem	Examples of Approach	Goal/Results
Albuquerque, NM	Dry climate and > population growth	Conservation rates, education, high-efficiency plumbing, landscaping & large-use programs	Decreased peak demand by 14%
Cary, NC	Dry, hot summers and > population growth	Conservation rates, education, landscape & irrigation codes, toilet flapper rebates, residential audits, other	Reduce retail water production by 4.6 mgd by end of 2028 (16% savings)
Goleta, CA	Dry climate and > population growth	Plumbing retrofits such as high-efficiency toilets & showerheads & increased rates	Decreased use by 30%; <u>delayed WW treatment plant expansion</u>
Irvine Ranch Water District, CA	Drought and > population growth	New rate structure	Water use declined by 19% after 1 st year
Seattle, WA	Dry summers and > population growth	Seasonal rate structure, plumbing codes, leak reduction	Per-capita consumption dropped by 20%

Source: EPA Cases in Water Conservation 2002

Final Report Submitted!

Water for 2060 Advisory Council Recommendations

All Water Use Sectors (A)	A-1 Develop public education and outreach materials, a statewide resources conservation campaign, and an Oklahoma water efficiency portal.
Public Water Supply (PWS)	<p>PWS-1 Develop an Oklahoma public water supply system water efficiency best practices guide.</p> <p>PWS-2 Develop a state recognition and rewards program for highly efficient public water supply systems.</p> <p>PWS-3 Develop an Oklahoma water system loss reduction best practices guide.</p> <p>PWS-4 Provide state funding and financing for water system loss reduction.</p> <p>PWS-5 Encourage regionalization and supply sharing.</p>
Crop Irrigation (CI)	<p>CI-1 Apply state financing programs to water-efficient crop irrigation equipment conversion and practices.</p> <p>CI-2 Develop an Oklahoma crop irrigation best practices guide.</p> <p>CI-3 Actively support federal crop insurance reform.</p>
Energy & Industry (EI)	<p>EI-1 Facilitate increased sharing of information and supplies between energy and industry water users.</p> <p>EI-2 Develop an energy and industry water use best practices guidance and recognition program.</p> <p>EI-2 Promote industrial use of marginal quality waters.</p>



- Education & outreach
- Online portal to share best practices
- Recognition/reward programs
- Financial incentives

Education & Outreach Campaigns

Squeeze Every Drop

FOLLOW US



SIGN UP TO RECEIVE OUR NEWSLETTER

- HOME
- SAVING WATER OUTDOORS
- SAVING WATER INDOORS
- WORKSHOPS AND EVENTS
- ASK THE EXPERTS
- WATER CONSERVATION PROGRAM
- CONSUMER CONFIDENCE REPORT
- CONTACT



Dewey says, "Adjust your sprinkler system to the change of the season. Plants need a lot less water in the fall and winter."

Fall tips to save even more.



WATER CONSERVATION NEWS

WATERING DURING FREEZING TEMPERATURES COULD RESULT IN A FINE

Even though it's cold outside doesn't mean it's alright to forget about water...

[READ MORE](#)

POSTED 11/19/2015

FALL IS IN THE AIR BUT LEAVES ARE ON THE GROUND

Now that Oklahoma is experiencing cool, crisp mornings, warm, sunny days and...

[READ MORE](#)

POSTED 11/12/2015

[MORE NEWS](#)

DROUGHT MONITOR



IRRIGATION PLANNER



HOW TO VIDEOS

WATER SCHEDULE

UPCOMING EVENTS

COMBINED LAKE CAPACITY

Save Our Water



The California lifestyle

English | Español

Agency & Business Toolkit



What You Should Know
Drought Facts



What You Can Do
Ways to Save



What's New
In the News



SAVING TOGETHER
WITH A SELFIE

Find Out How

Reuse: Marginal Quality Waters

SOURCES

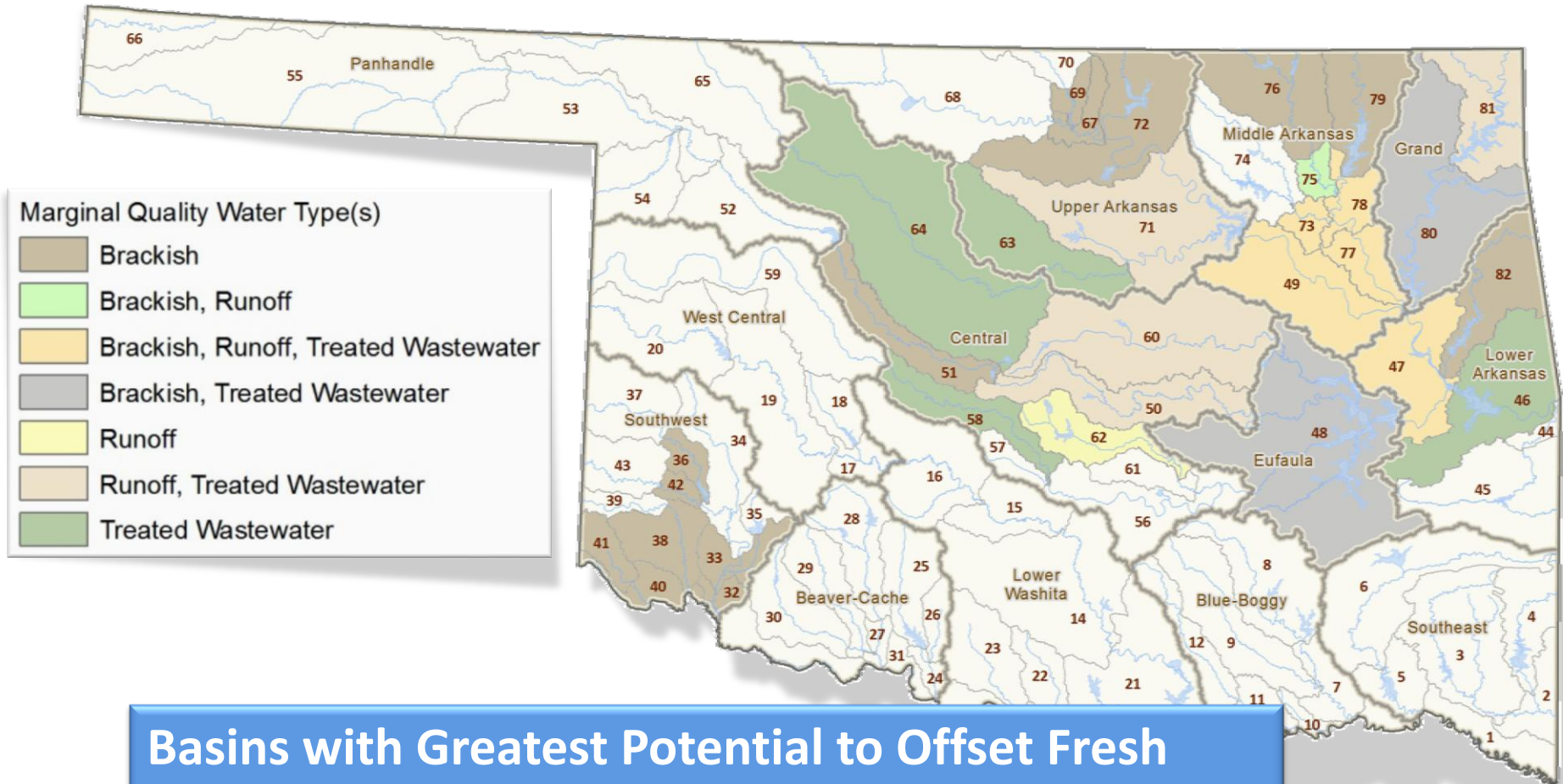
- Stormwater runoff
- Oil & gas flowback/
produced water
- Brackish water
- Treated wastewater
- Other lower-quality sources

POTENTIAL USES

- M&I – potable & nonpotable
- Self-supplied residential
- Self-supplied industrial
- Thermoelectric power
- Oil & gas
- Crop irrigation
- Livestock watering

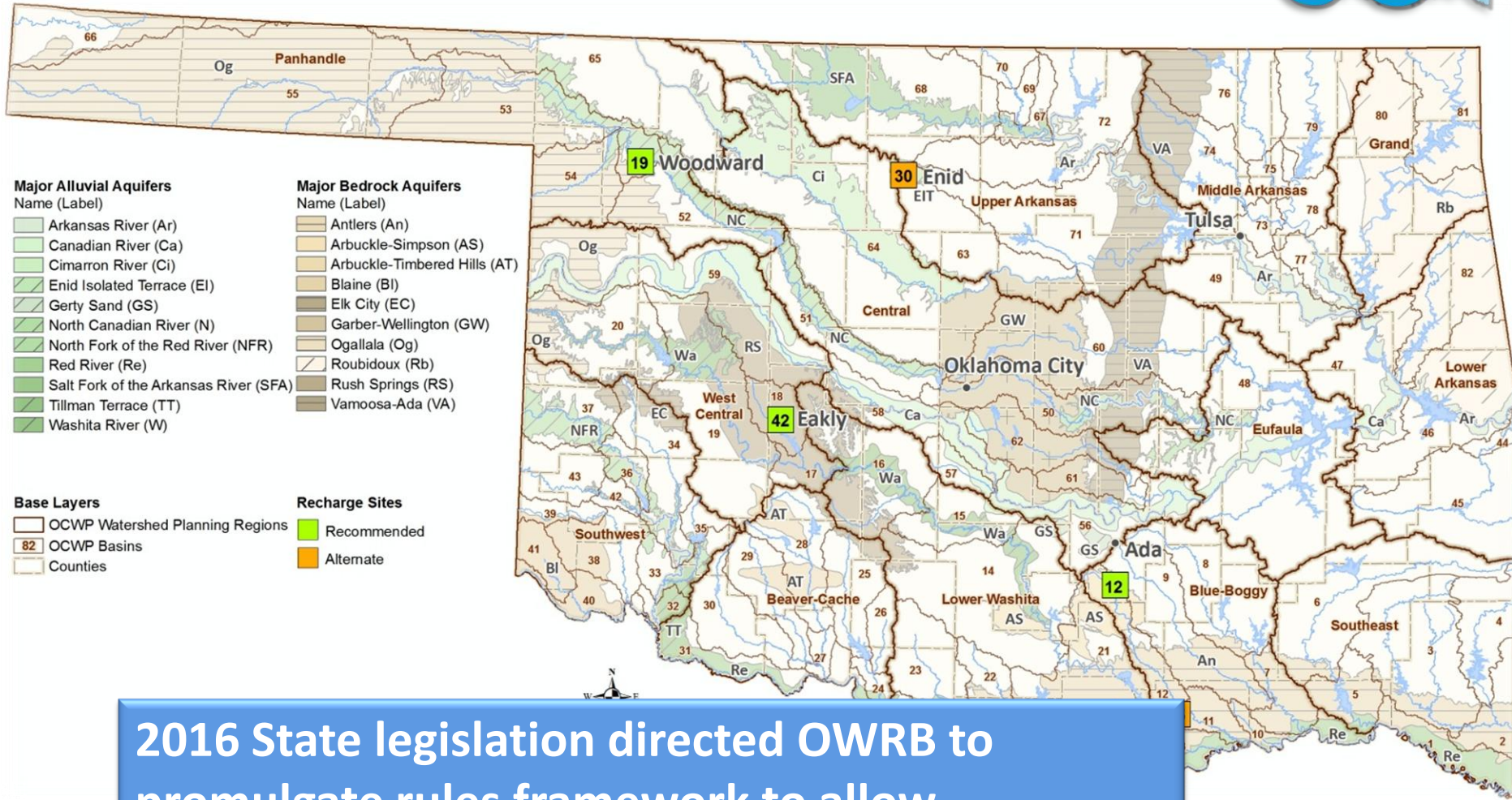
2016 Governor directed OWRB to establish Produced Water Working Group to identify potential sources and uses.

Marginal Quality Water



Basins with Greatest Potential to Offset Fresh Water Use with MQ Water

Aquifer Storage & Recovery



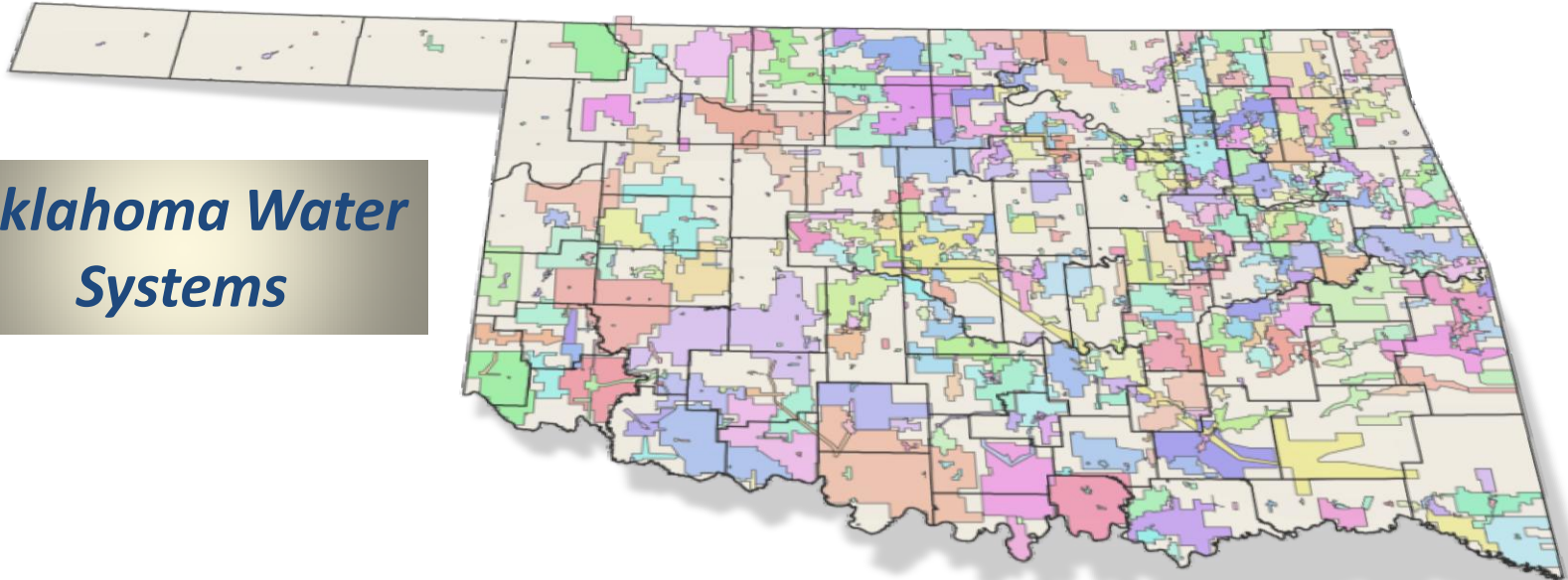
2016 State legislation directed OWRB to promulgate rules framework to allow permitting for Aquifer Storage and Recovery.

Regionalization



- Oklahoma has ~700 water systems serving less than 1,000 customers
- Economy of scale benefits; systems with multiple sources more resistant to drought

*Oklahoma Water
Systems*

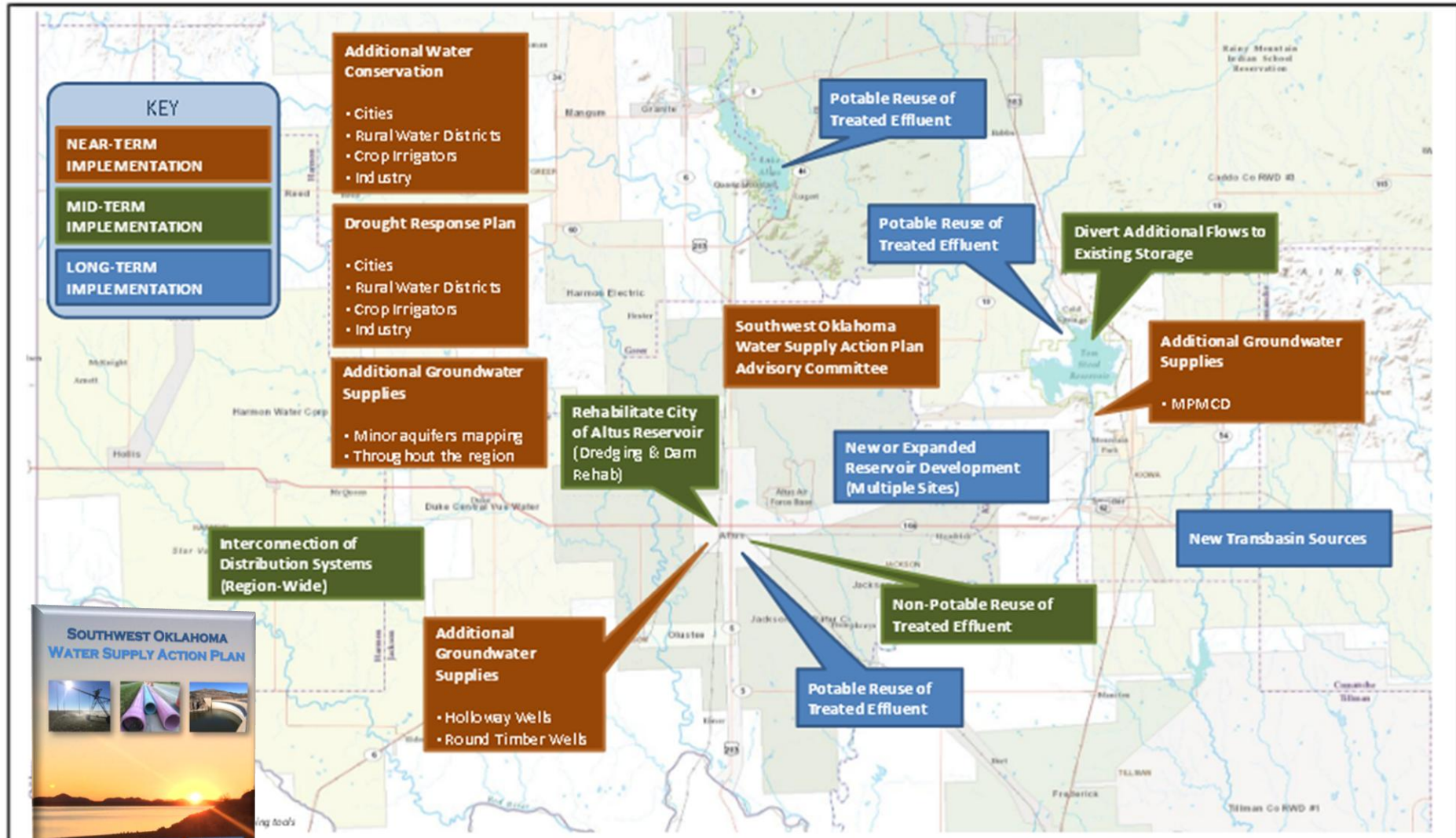


OCWP Priority Recommendation

Regional Planning

- “Bottom-up” water planning & implementation of OCWP initiatives at the regional level
- Local stakeholders representing unique interests of each region
- Happening organically now
- Developing short, med., long-term strategies





KEY

- NEAR-TERM IMPLEMENTATION
- MID-TERM IMPLEMENTATION
- LONG-TERM IMPLEMENTATION

Additional Water Conservation

- Cities
- Rural Water Districts
- Crop Irrigators
- Industry

Drought Response Plan

- Cities
- Rural Water Districts
- Crop Irrigators
- Industry

Additional Groundwater Supplies

- Minor aquifers mapping
- Throughout the region

Interconnection of Distribution Systems (Region-Wide)

Additional Groundwater Supplies

- Holloway Wells
- Round Timber Wells

Rehabilitate City of Altus Reservoir (Dredging & Dam Rehab)

Southwest Oklahoma Water Supply Action Plan Advisory Committee

New or Expanded Reservoir Development (Multiple Sites)

Divert Additional Flows to Existing Storage

Additional Groundwater Supplies

- MPMCD

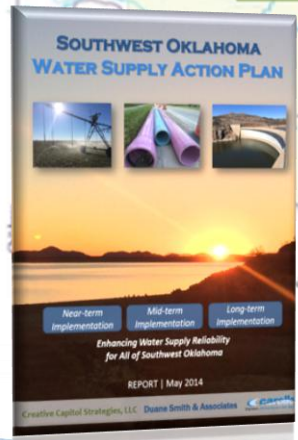
New Transbasin Sources

Potable Reuse of Treated Effluent

Non-Potable Reuse of Treated Effluent

Potable Reuse of Treated Effluent

Potable Reuse of Treated Effluent



PHASED IMPLEMENTATION PLAN

Double-Down on Drought

- Plan... locally, ahead, for the worst
- Conserve, reuse, recycle, find/create new untapped sources and storage!
- Invest in the repair and construction of smart, efficient projects
- Monitor & measure
- (Rinse.) Repeat.

Questions?

Julie Cunningham

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