

WATER SUPPLY RESERVOIR VIABILITY AND WATER CONVEYANCE OPPORTUNITIES IN OKLAHOMA

GOVERNOR'S WATER CONFERENCE OKLAHOMA WATER RESOURCES BOARD



**Norman, OK
October 27, 2010**

Oklahoma Water History

Oklahoma Water - 2010

Why a Reservoir Viability Study?

Methodology

Results

Conveyance Issues and Opportunities

Conveyance Feasibility

Next Steps for Conveyance

OKLAHOMA WATER HISTORY



1907 Statehood

1910 Byrd's Mill Spring

1919 Lake Overholser

1957 OWRB Created



Engineers

Architects

Consultants



OKLAHOMA WATER HISTORY



1907 Statehood

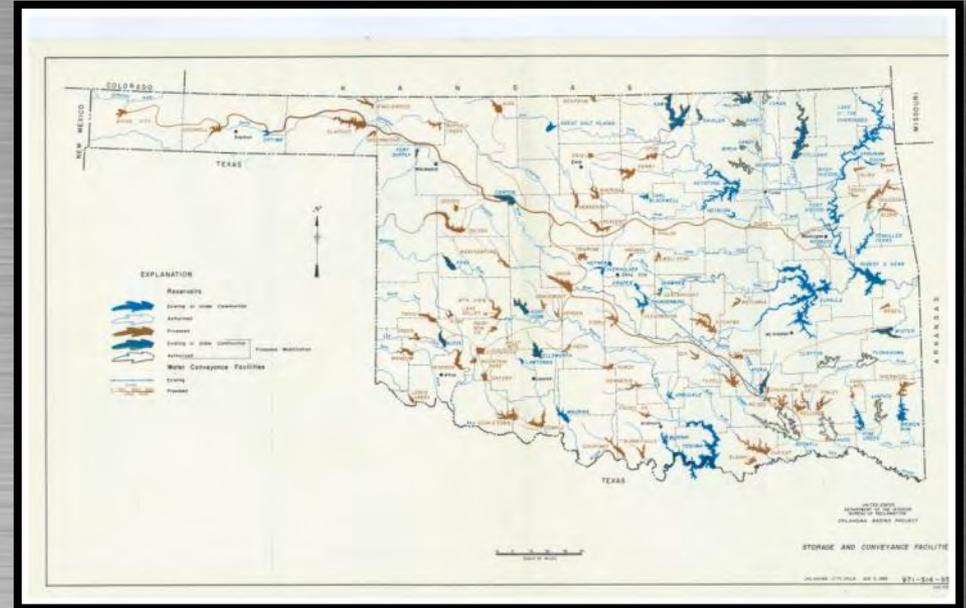
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1919 Lake Overholser

1957 OWRB Created

1966 Potential Reservoirs Identified

1973 Extensive BOR Lake Studies



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OKLAHOMA WATER HISTORY



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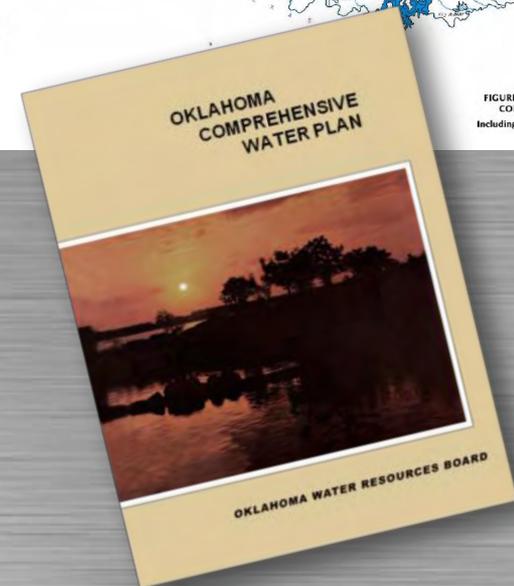
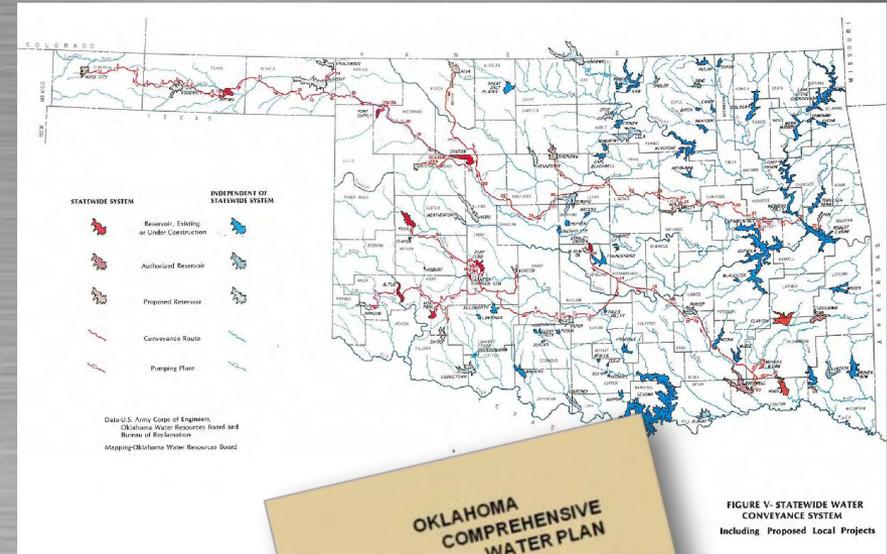
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1973 Extensive BOR Lake Studies

1980 Comprehensive Water Plan



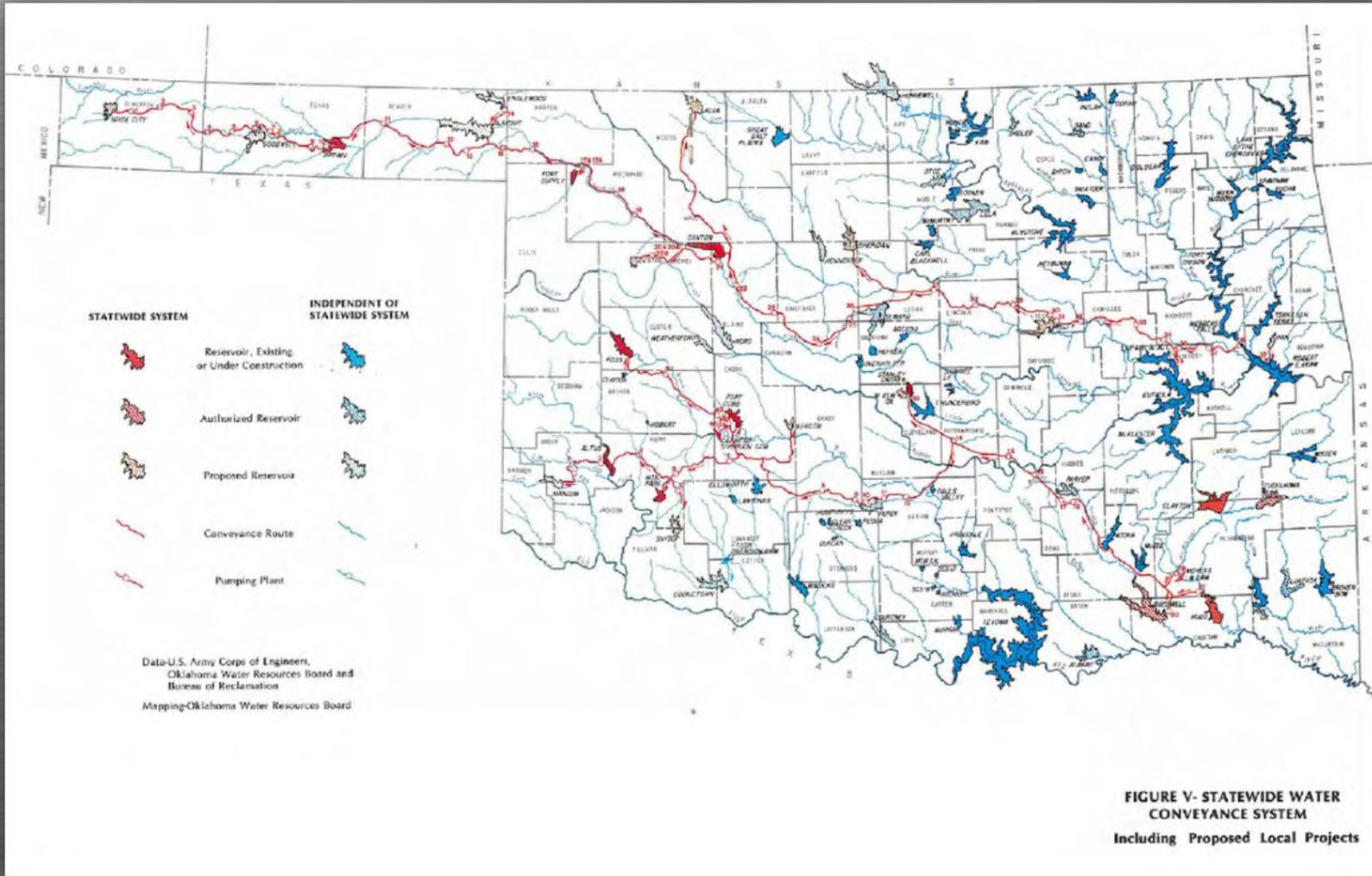
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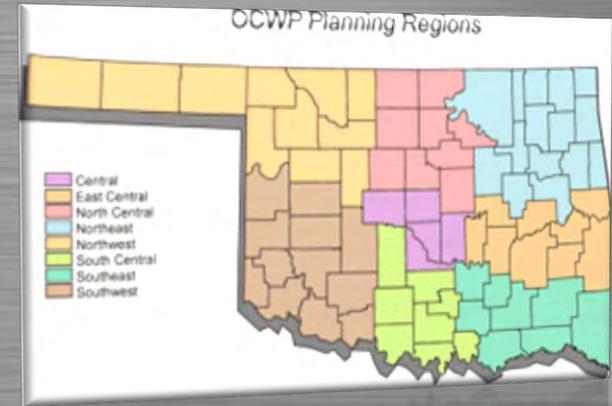
1966 Potential Reservoirs Identified

1973 Extensive BOR Lake Studies

1980 Comprehensive Water Plan

1990 Federal Funding Dries Up

1995 Comprehensive Plan Update



OWRB Embarked on 2011 Comprehensive Water Plan in 2007



OKLAHOMA COMPREHENSIVE WATER PLAN

– VIABILITY STUDY GOALS



Identify End-Users

Collect and Preserve Data

Liaison and Collaborate with Other Agencies

Make Data Available Online

Condense Data into Essential Elements of Information

Assess the Likelihood of a Reservoir Being Developed

Determine How Surplus Water Can Best Help the State

Provide Data for Future Planning and Decision Making



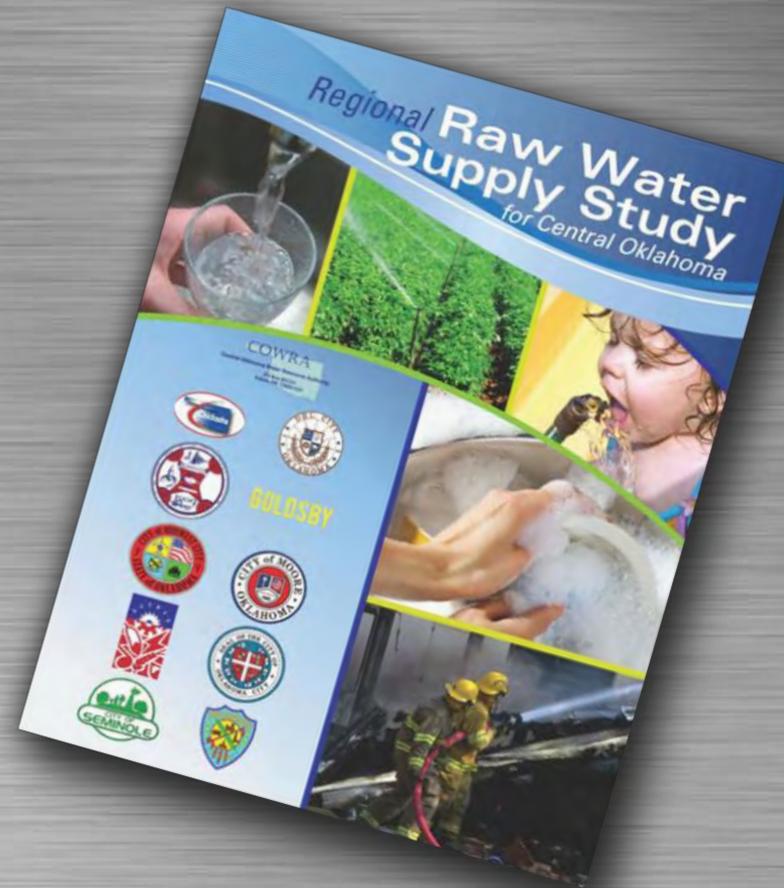
OKLAHOMA WATER 2010



Arbuckle – Simpson Aquifer Study

OWRB Embarked on 2011
Comprehensive Water Plan

**Regional Raw Water Supply Study
for Central Oklahoma**



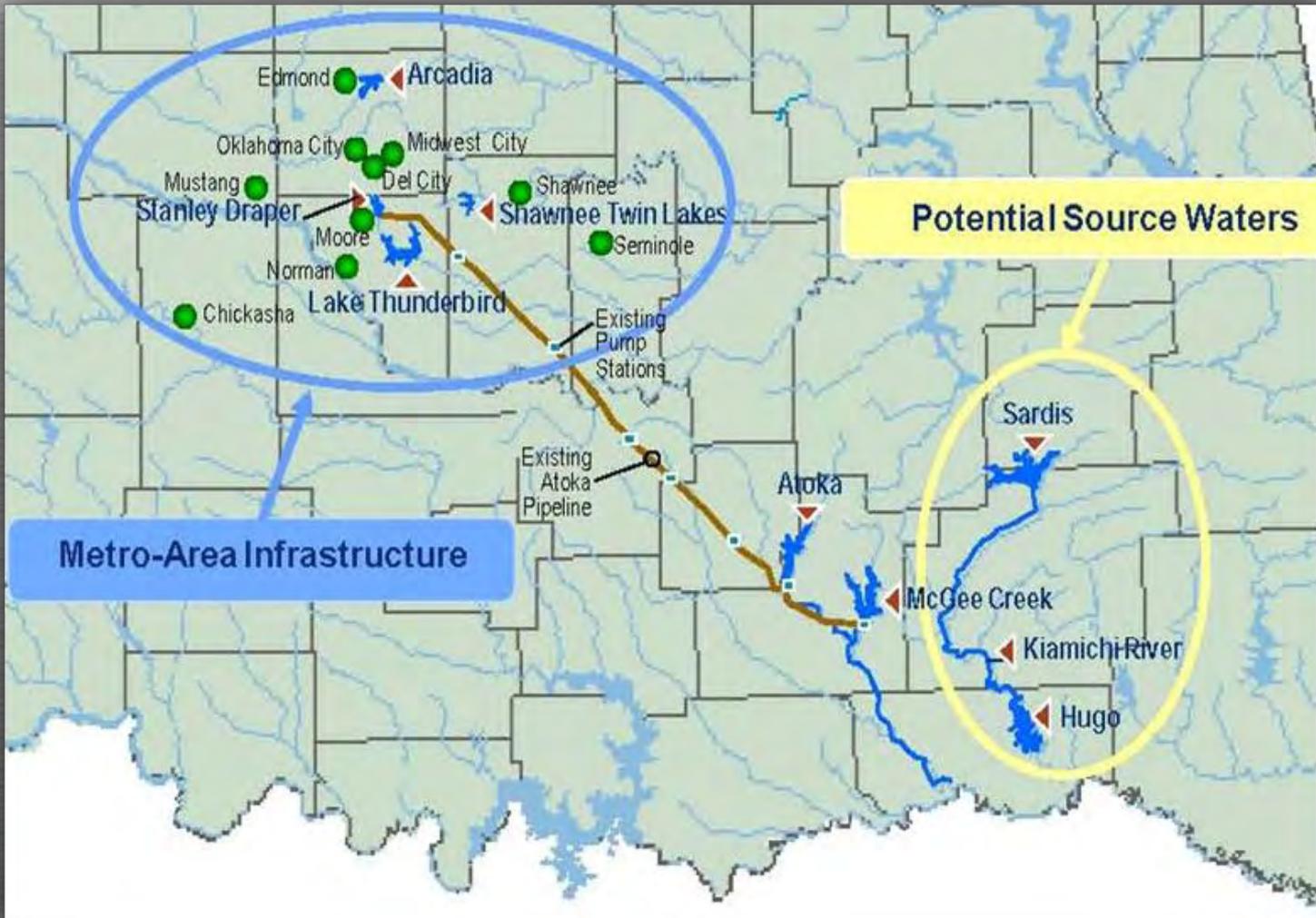
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CENTRAL OKLAHOMA STRATEGY



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WHY A FEASIBILITY STUDY?

Site Change

State Change - Groundwater

National Change - Funding

Climate Change

Consolidate and Protect Data

Stop the Propagation of Bad Information

Increase Focus on “Real” Prospects

Provide Information to “Stakeholders”

Enhance the Comprehensive Planning Process



METHODOLOGY



Literature Search (USACE, BOR, OWRB, NRCS)



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Literature Search (USACE, BOR, OWRB, NRCS) Database Population (EElS)

Reservoir Data Report

| | | | |
|---------------------------------|--|-----------------------------|---------|
| Reservoir Name: | Albany Lake | | |
| Agency: | U.S. Army Corps of Engineers, Tulsa District | | |
| Location: | Bryan County 16 miles southeast of Durant, OK and 1.5 miles southwest of Albany, OK | | |
| Primary Study Document(s): | Comprehensive Basin Study, Red River below Denison Dam, Arkansas, Louisiana, Oklahoma and Texas, Interim Survey Report, Albany Lake, Island Bayou, Oklahoma | | |
| Primary Study Date: | 04/19/78 | | |
| Region: | Blue Boggy | | |
| Basin: | 13-Red River Mainstream (To Washita) | | |
| Streams: | Island Bayou @ river mile 6.5 | | |
| Beneficial Uses: | FC, WS, R, F&W | | |
| DrainArea (Sq Mi): | 134 | | |
| Lat/Long or Section: | Section 8 & 17, T 8 S R 11 E | | |
| Dam Type: | rolled earth embankment with 28' crest width | | |
| Cons. Sto. Surface Area (AC): | 4,960 | Dependable Yield (AF): | 35,847 |
| Dam Crest Elevation: | 549.00 | Max Surface Area (AC): | 11,670 |
| Dam Length (FT): | 10,500 | Dam Height (FT): | 79 |
| Embankment Volume (CY): | 2,460,000 | Flood Pool Elevation: | 526.5 |
| Valley Wall Length (FT): | 5,176 | Top of Sed. Pool Elev.: | |
| Max Water Surface Elev.: | 544.9 | Top of Dead Pool Elev.: | 489 |
| Recreation Boundary (AC): | 12,200 | Top of Cons. Pool Elev.: | 517 |
| Spillway: | 400' wide limited spillway and a 6.5' diameter gated conduit | | |
| Spillway Elevation(s): | 533 | Power Pool Elevation: | |
| Total Storage (AF): | 147,100 | Surcharge (AF): | |
| Conservation Pool Storage (AF): | 85,200 | Flood Control Storage (AF): | 55,100 |
| Sediment Storage (AF): | 6,800 | Dead Storage (AF): | |
| Geology: | | | |
| Water Quality: | High turbidity and Phosphates and Mercury noted in testing. Report on Southeast Oklahoma Water Supply Study, BOR, September 1987 indicates suitable water with standard treatment. | | |
| Previous Cost Estimate: | \$27,100,000 | Year of Cost Estimate: | 01/1978 |
| Grouping: | 4 | | |
| Issues: | Also: Comprehensive Technical Report of Southeast Oklahoma Water Supply Study, Bureau of Reclamation September 1988. Above referenced report shows power as a beneficial use and approximately twice the capacity. | | |
| Fatal Flaw(s): | | | |
| Present?: | <input type="checkbox"/> | | |
| Qualifying Statement(s): | Not near a population center Low cost per unit storage | | |

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METHODOLOGY



Literature Search (USACE, BOR, OWRB, NRCS)

Database Population (EIs)

Weighted Matrix Development

**Reservoir Feasibility Analysis
Criteria Weighting Process**

| | B | C | D | E | F | G | H | I | J | K | L | | Weighted Value | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------|----|--|------|---|---|---|---|---|---|-----------------------------------|-------------------------|-------------------------|------------------------------|----------------------|-----|
| A | 3 | A | 1 | A | 3 | A | 1 | A | 2 | A | 2 | A | A | 16 | Unit costs - \$ per acre ft of storage | 10.0 | | | | | | | | | | | | |
| | B | 1 | C | | D | 1 | E | | F | | G | 2 | H | 2 | I | J | K | L | | | | | | | | | | |
| B | | B | | B | 1 | B | | B | 1 | B | | B | 1 | B | | B | 1 | B | | B | 3 | Mitigatable environmental/cultural issues | 1.9 | | | | | |
| | | 2 | C | 2 | D | 3 | E | 1 | F | 3 | G | 2 | H | 1 | I | 2 | J | 1 | K | | C | 13 | Proximity to demand or conveyance | 8.1 | | | | |
| C | | | 2 | C | | C | 2 | C | 2 | C | | C | 1 | C | 2 | C | 1 | C | | C | | D | 4 | Quality of life impact | 2.5 | | | |
| | | | D | 2 | E | | F | | G | 2 | H | 1 | I | | J | 1 | K | | L | | D | | D | 4 | Quality of life impact | 2.5 | | |
| D | | | | D | 1 | D | | D | 1 | D | | D | 1 | D | | D | 1 | D | | D | | E | 16 | Sponsor(s) availability | 10.0 | | | |
| | | | | 2 | E | 1 | F | 2 | G | 2 | H | 1 | I | 2 | J | 2 | K | | L | | E | | E | 16 | Sponsor(s) availability | 10.0 | | |
| E | | | | | 3 | E | 2 | E | 1 | E | 1 | E | | E | 1 | E | | E | | E | | F | 3 | Water quality | 1.9 | | | |
| | | | | | | F | | G | 1 | H | 1 | I | 2 | J | 1 | K | | L | | F | | F | | F | 3 | Water quality | 1.9 | |
| F | | | | | | | 2 | G | 2 | H | 2 | I | 2 | J | 1 | K | | L | | F | | G | 8 | Beneficial use | 5.0 | | | |
| | | | | | | | | G | 1 | G | | G | | G | | G | | G | | G | | H | 14 | Political support | 8.8 | | | |
| | | | | | | | | | 2 | H | 1 | I | 2 | J | 2 | K | | L | | H | | H | | H | 14 | Political support | 8.8 | |
| | | | | | | | | | | H | 1 | I | 2 | J | 2 | K | | L | | H | | I | | I | 11 | Compatibility with 2011 Plan | 6.9 | |
| | | | | | | | | | | | 1 | I | | I | | I | | I | | I | | J | | J | 11 | Compatibility with 2011 Plan | 6.9 | |
| | | | | | | | | | | | | 1 | J | 2 | K | | L | | J | | J | | J | | J | 13 | Level of net benefit | 8.1 |
| | | | | | | | | | | | | | 2 | K | | L | | L | | K | | K | | K | 14 | Ease of implementation | 8.8 | |
| | | | | | | | | | | | | | | | | K | | L | | L | | L | | L | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | L | | L | | L | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | Max. Value | 16 | | | | | |

How Important
 4 Major Preference
 3 Medium Preference
 2 Minor Preference
 1 Slight / No Preference

METHODOLOGY



Literature Search (USACE, BOR, OWRB, NRCS)

Database Population (EElS)

Weighted Matrix Development

Environmental-Cultural Screen



METHODOLOGY



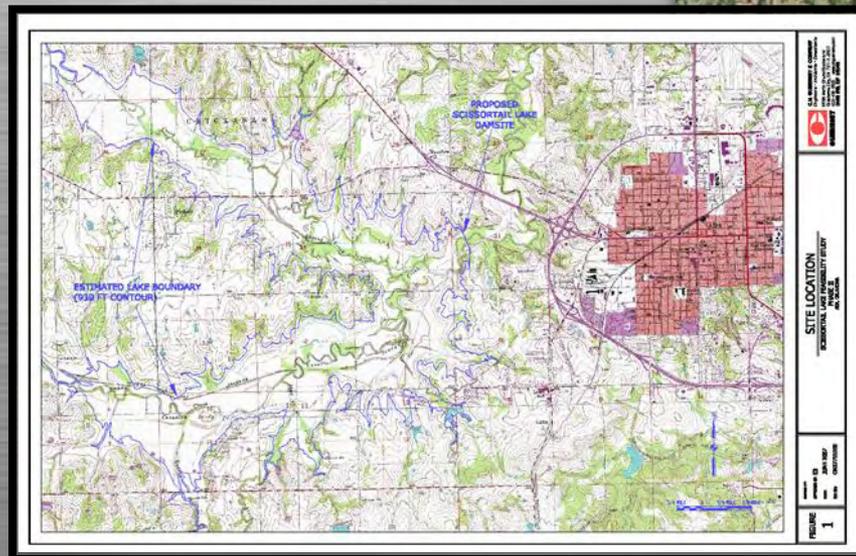
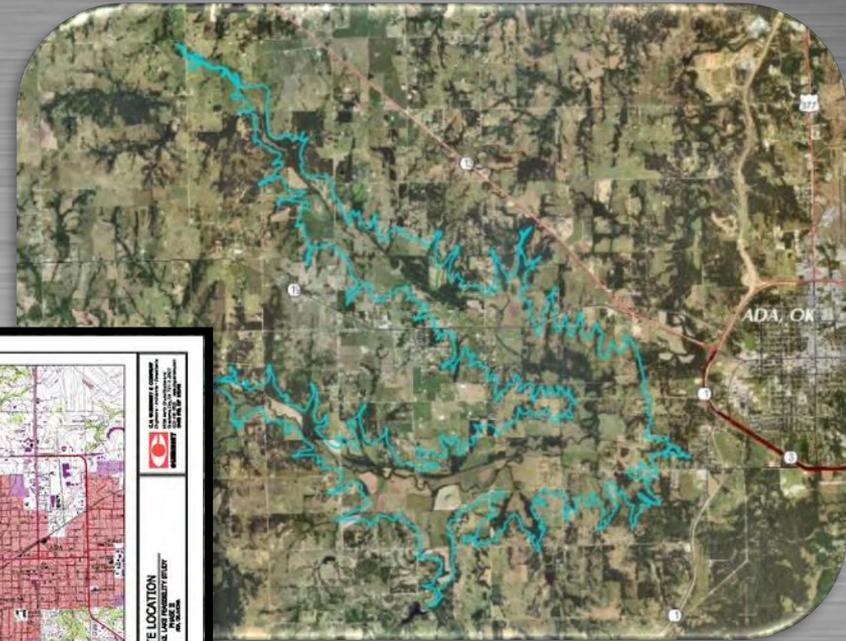
Literature Search (USACE, BOR, OWRB, NRCS)

Database Population (EElS)

Weighted Matrix Development

Environmental-Cultural Screen

Mapping



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Literature Search (USACE, BOR, OWRB, NRCS)

Database Population (EElS)

Weighted Matrix Development

Environmental-Cultural Screen

Mapping

Map Reconnaissance

Cost Estimate

TOPOGRAPHIC/AERIAL PHOTOGRAPH REVIEW/FATAL FLAWS CHECKLIST

Reservoir Name/Location: _____
Date: _____
Reviewer: _____

| Issues | Topographic Review | | Aerial Review | Remarks/Comments |
|--|--------------------|---------------|---------------|------------------|
| | Topographic Review | Aerial Review | | |
| Residential/commercial/industrial development within the reservoir or just downstream | | | | |
| Other activities/areas downstream of the potential dam that might pose a risk from a breach standpoint | | | | |
| Obvious archeological, cultural, environmental, and/or wetlands exist | | | | |
| Parks or refuges; sensitive areas | | | | |
| Major highways | | | | |
| Major electric/other utilities | | | | |
| Heavy concentration of oil and gas exploration | | | | |
| Oil and gas pipelines | | | | |
| Mining activities | | | | |
| Wind farms | | | | |
| Railroads | | | | |
| Observed or documented environmental conditions present in the watershed that could adversely impact water quality | | | | |
| Other | | | | |
| | | | | |
| | | | | |

LEGEND:

| | |
|-------------|----|
| Present | P |
| Not Present | NP |



METHODOLOGY



Literature Search (USACE, BOR, OWRB, NRCS)

Database Population (EEl's)

Weighted Matrix Development

Environmental-Screen

Mapping

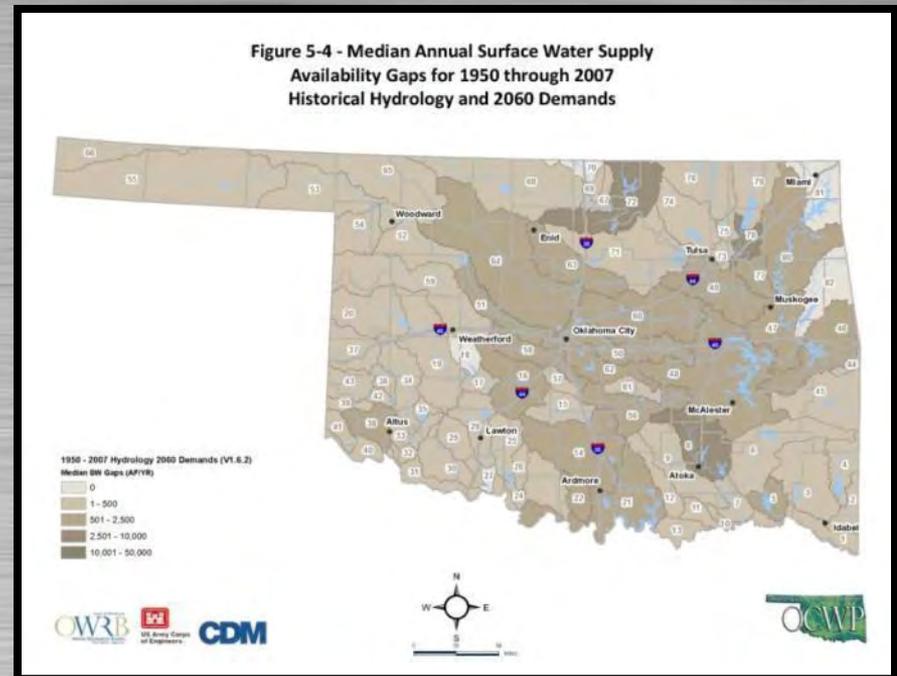
Map Reconnaissance

Cost Estimate

Gap Analysis

Evaluation Workshop

Figure 5-4 - Median Annual Surface Water Supply Availability Gaps for 1950 through 2007
Historical Hydrology and 2060 Demands



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RESULTS -125 SITES



Category 4 – Apparently Feasible - 38 Sites

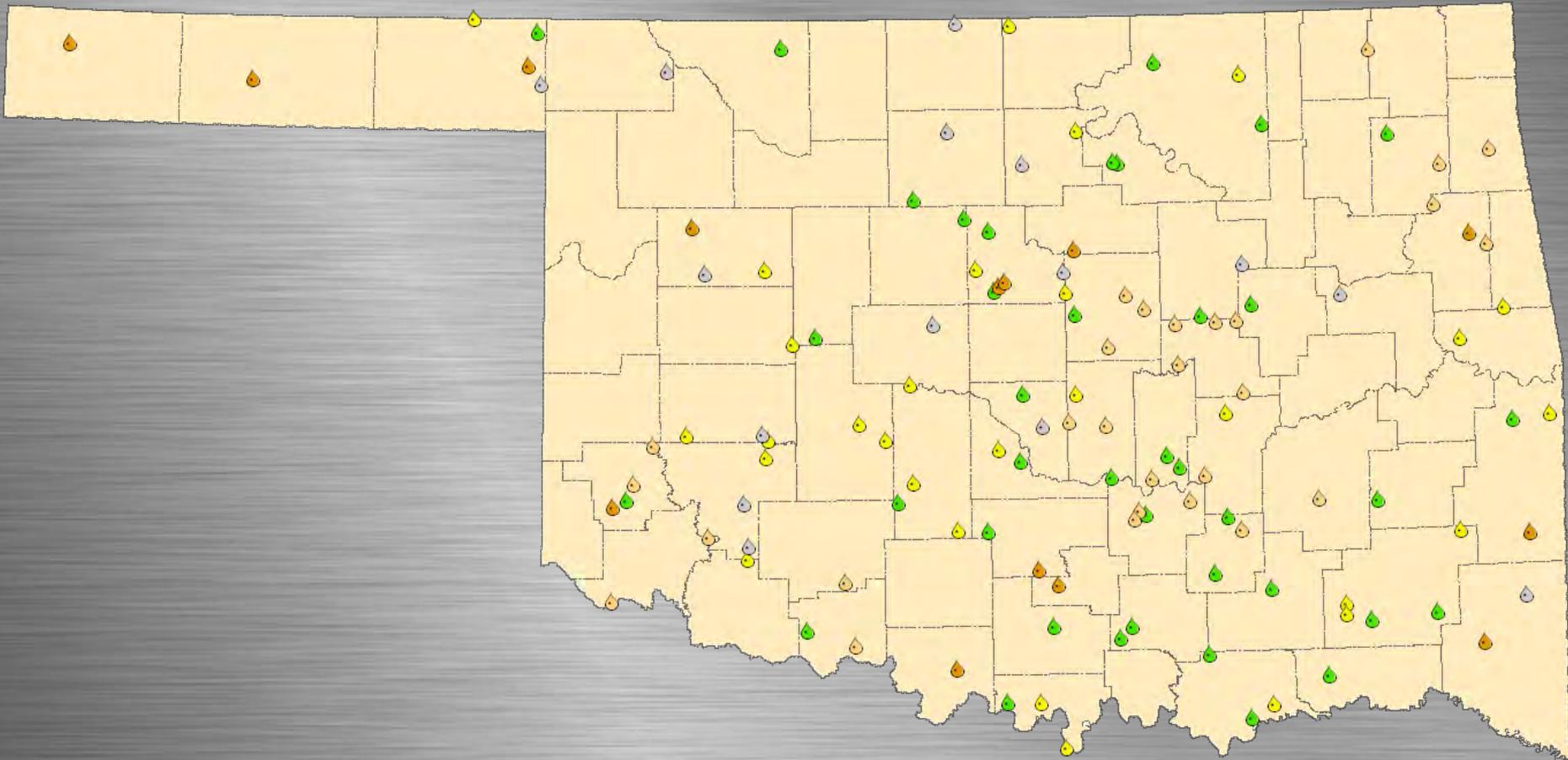
Category 3 – Possibly Feasible - 30 Sites

Category 2 – Sites with Fatal Flaws - 14 Sites

Category 1 – Insufficient Information - 29 Sites

Category 0 – No Information Available - 14 Sites

RESULTS -125 SITES



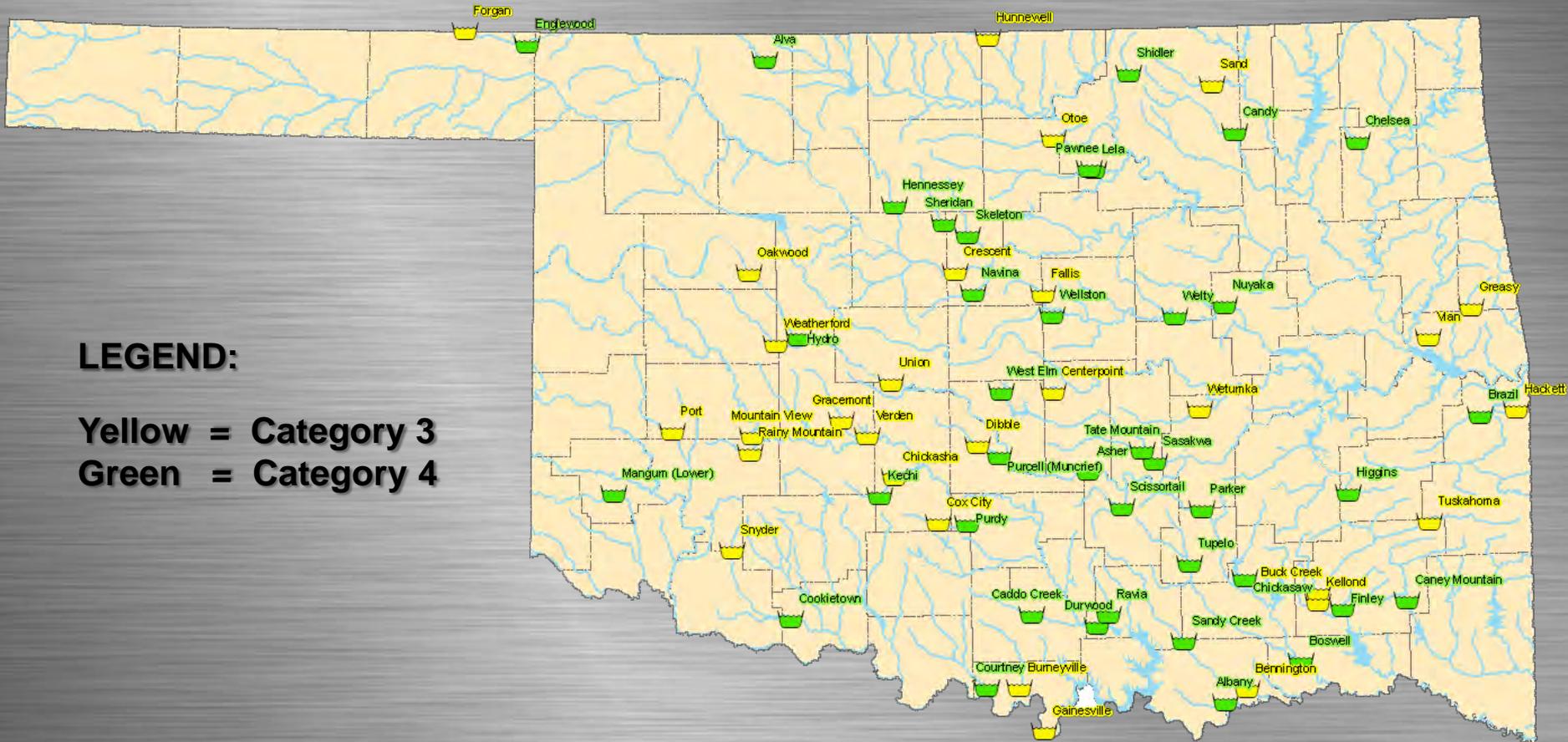
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RESULTS – CATEGORIES 3 AND 4



LEGEND:

Yellow = Category 3

Green = Category 4

RESULTS – WEBSITE



OWRB
the water agency

theoklahomawaterresourcesboard

skip nav | rules | forms | FAQs | reports | board meetings | OCWP | site map | help

Search

home
water quality
water supply & availability
water & wastewater financing
technical studies
hazard mitigation
data & maps
· maps
· data
· map server
news
about us

Reservoir Viability Study

QUICK LINKS

- Report Text
- Bibliography

Oklahoma Comprehensive Water Plan
OCWP

- Regional Planning Watersheds
- Comprehensive Water Plan Basins

Click on Area of Interest

Reservoirs by Category

- Reservoir Sites w/ High Potential
- Reservoir Sites w/ Potential
- Reservoir Sites w/ Serious Flaws
- Reservoir Sites w/ Little Information
- Reservoir Sites w/ No Information

top | contact OWRB | water related links | accessibility | disclaimer

Many documents available on this site are in Adobe® Acrobat (.PDF) format and require the free Adobe® Reader software to view and print.

Visit www.ok.gov, the Oklahoma State Portal

(Note: These links will take you to the respective category page)

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AVAILABLE INFORMATION



- **Reservoir of Interest by Area**
- **Reservoir Data Sheet**
- **Maps/Aerials and Topographic Maps**
 - Regional Planning Watersheds**
 - Basins**
- **Category Lists**

Moving Water East to West



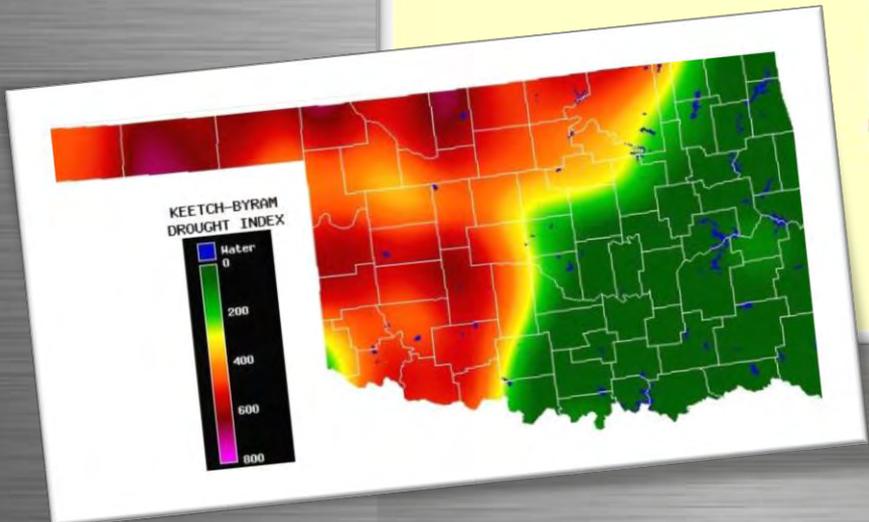
CONVEYANCE ISSUES AND OPPORTUNITIES



16 inches



56 inches



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CONVEYANCE ISSUES AND OPPORTUNITIES



Rainfall Distribution

Allocated Water Supply, Unused But Available



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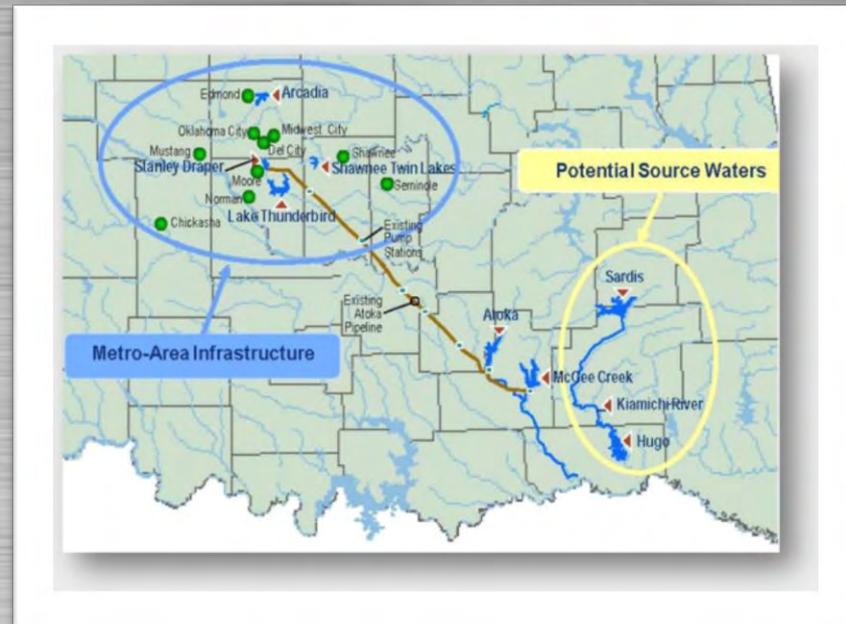
CONVEYANCE ISSUES AND OPPORTUNITIES



Rainfall Distribution

Underutilized Existing Resources

Precedence – Atoka to Oklahoma City Pipeline



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CONVEYANCE ISSUES AND OPPORTUNITIES

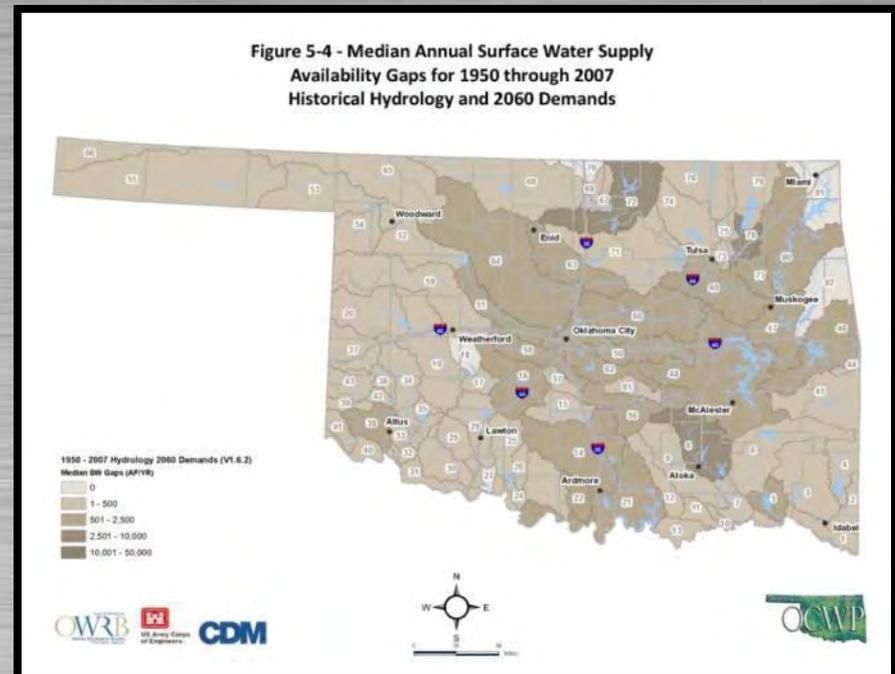


Rainfall Distribution

Underutilized Existing Resources

Precedence – Atoka to Oklahoma City Pipeline

Increasing Demands



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CONVEYANCE ISSUES AND OPPORTUNITIES



Rainfall Distribution

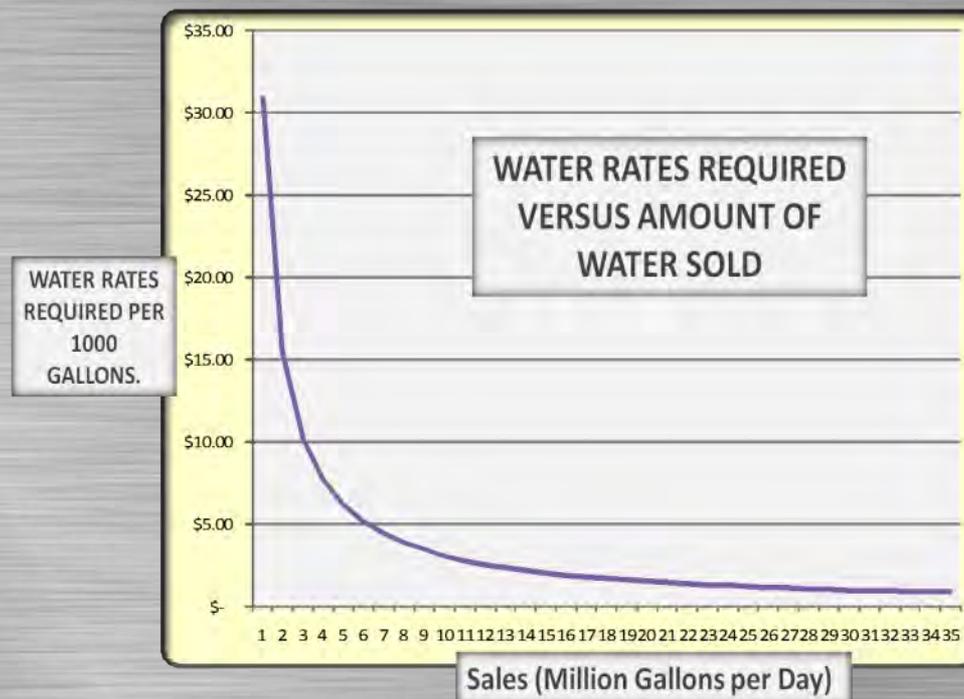
Underutilized Existing Resources

Precedence – Atoka to Oklahoma City Pipeline

Increasing Demands

Political Resistance

Costs



CONVEYANCE ISSUES AND OPPORTUNITIES



Rainfall Distribution

Underutilized Existing Resources

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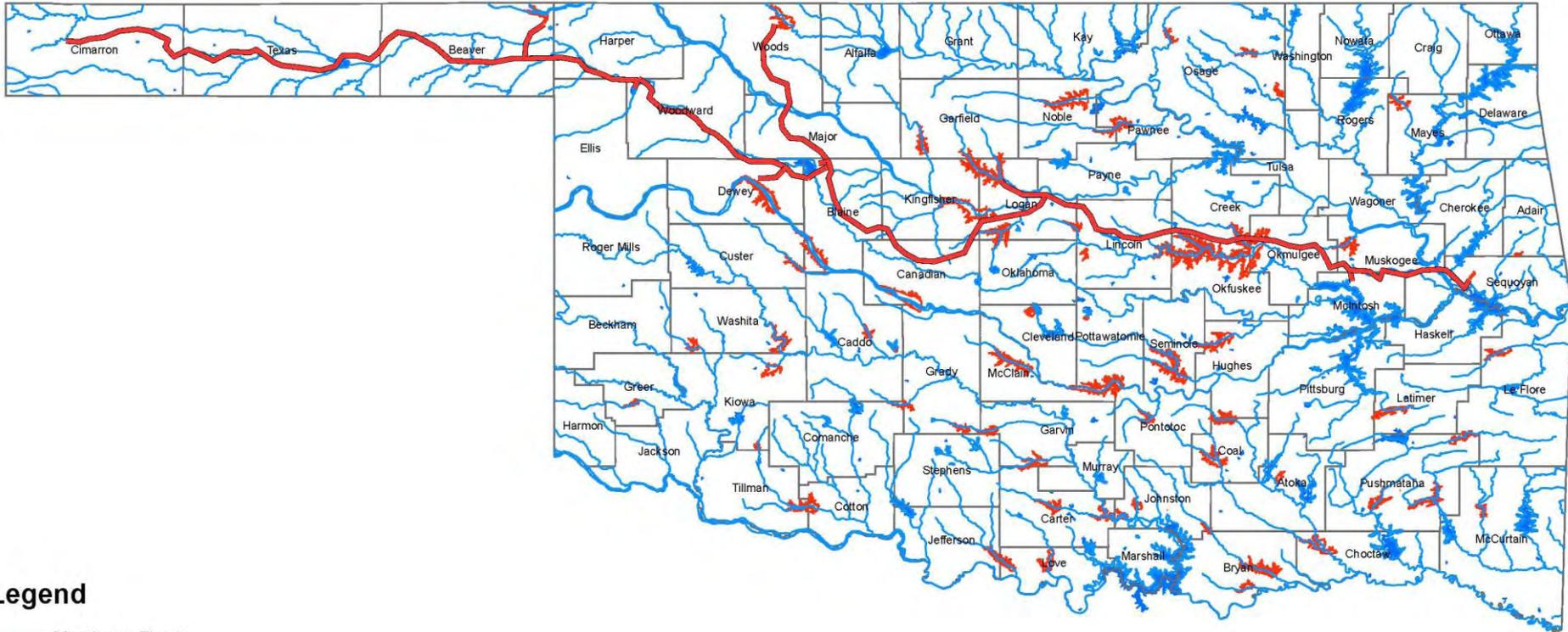
Political Resistance

Costs

Alternatives



CONVEYANCE FEASIBILITY -- NORTHERN OKLAHOMA



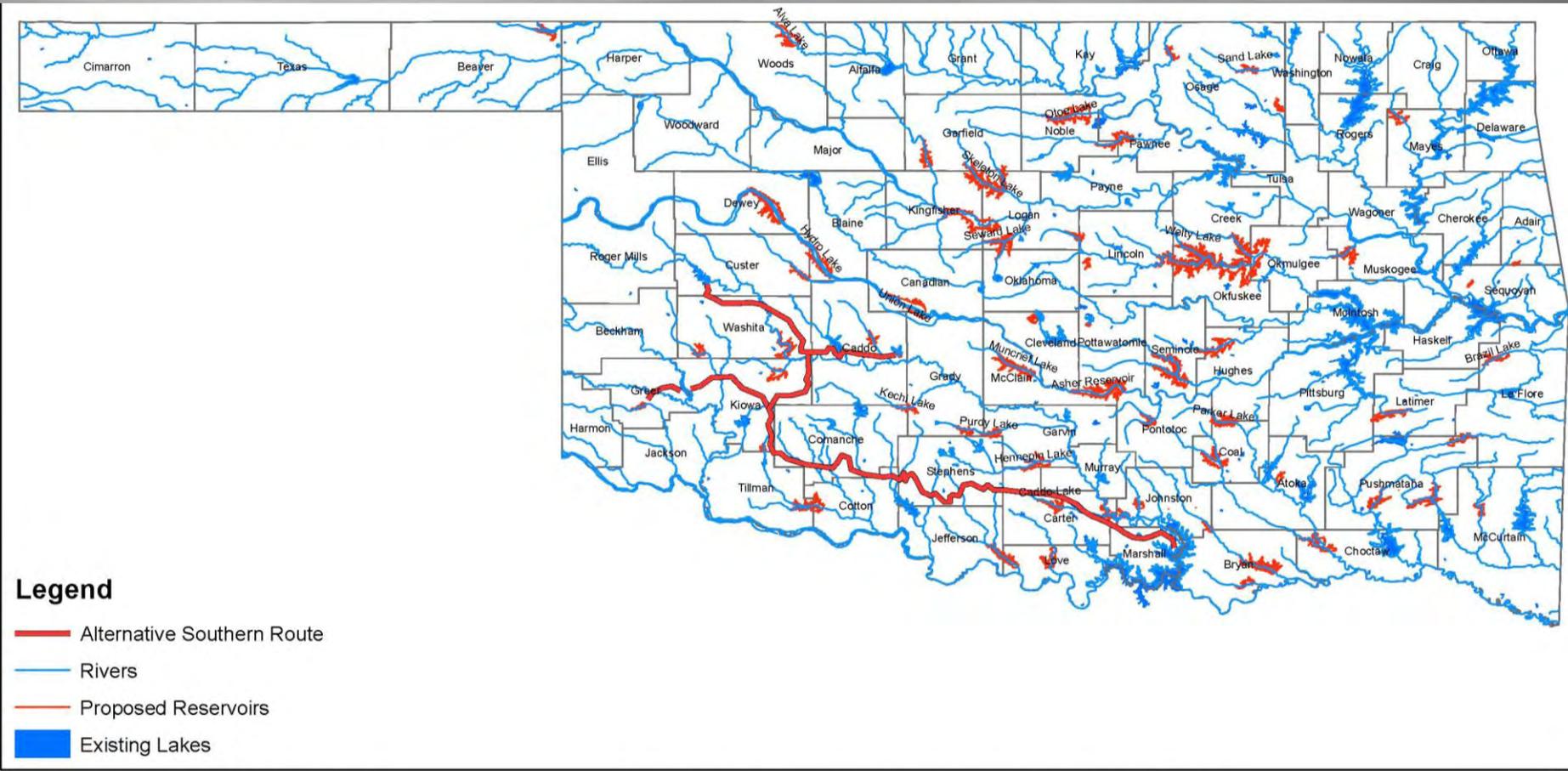
Legend

- Northern Route
- Rivers
- Proposed Reservoirs
- Existing Lakes

Figure 1 - Northern Conveyance Route



CONVEYANCE FEASIBILITY -- ALTERNATIVE SOUTHERN OKLAHOMA



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Figure 3 - Alternative Southern Conveyance Route



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THE NEXT STEP FOR CONVEYANCE



Refine a business approach to “right-size” alternatives to the future demands, customer objectives and fiscal practicality; address reality.

CONTACTS



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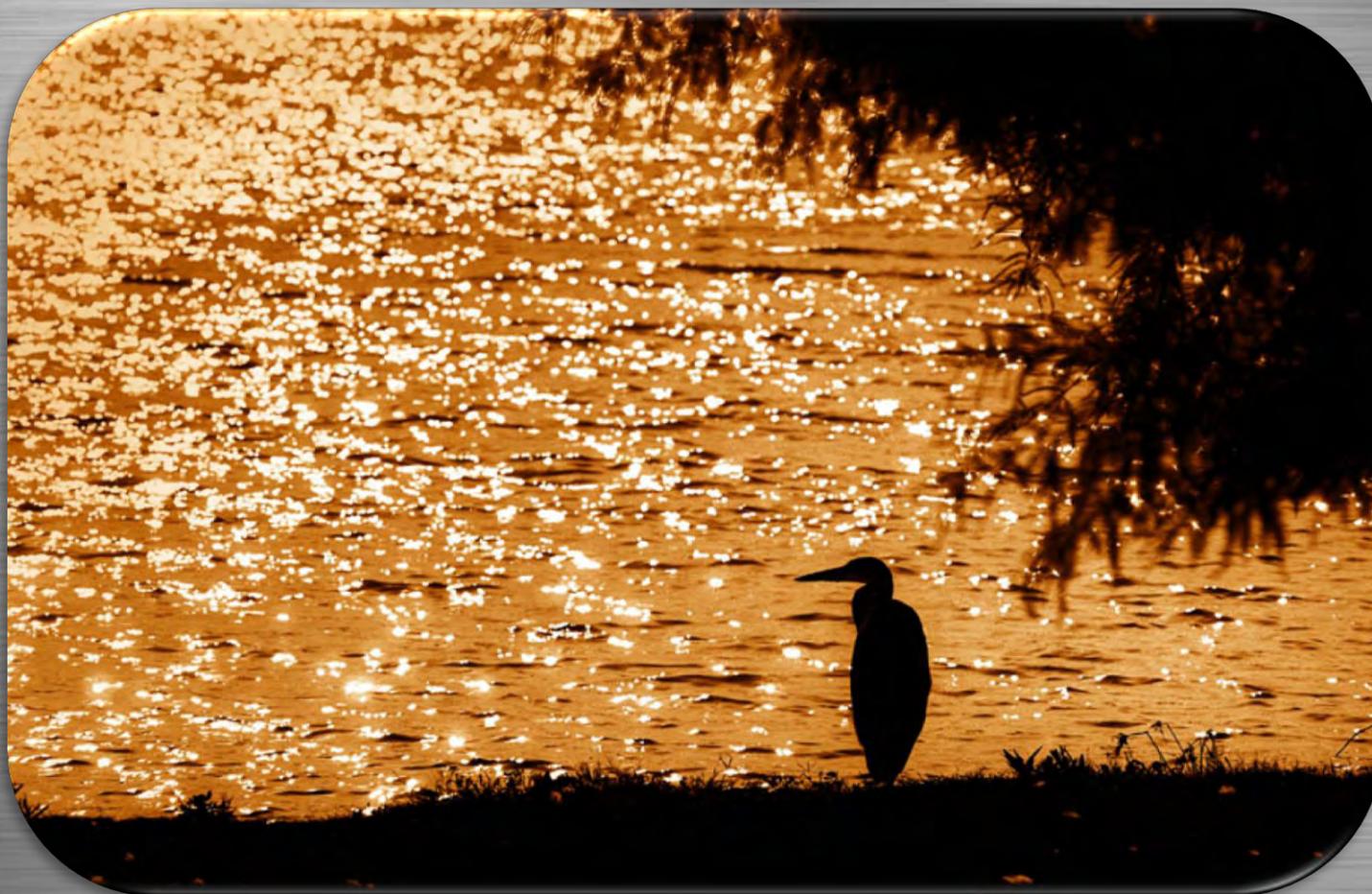
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QUESTIONS ?



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