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?
- Infrastructure
- Efficiencies
- Funding & Finance

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

2008
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

TODAY

IMPLEMENTATION

2011: Final OCWP

Long-Term Alternatives

Near-Term Alternatives

Characterize Shortages

Assess Supply Availability

Project Demands

Peer Review

Management

Public Input / Communication

Uncertainties

Funding Levels

Technical Approaches

INFORMATION

ACTION

TODAY

TODAY

Characterize Shortages

Assess Supply Availability

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Technical Approaches
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)

Reliable Data for Informed Decisionmaking

Information & Analysis

Technical Analysis of Public / Policy Concepts

Technical Studies
Major Technical Work Elements

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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?

- Water Rights
- Infrastructure
- "Wet" Water
- Water Quality
Priority Sites and Areas

Projected Demands
- Public Water Supply
- Agriculture
- Industrial & Power

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

Groundwater

Management
- Water Uses
- Efficiencies
- Policy & Administration

Detailed Analysis and Alternatives Assessment

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

Legend
- Red: Interstates
- Blue: Rivers

Watersheds will be evaluated by each stream reach, which is shown by a bold black or white number and separated by a white line. Watersheds without numbers will be evaluated as a single reach.
Major Groundwater Aquifers
OWRB Permitted Wells and Diversions

Groundwater Wells
Surface Diversions
Focused Planning Process for OCWP

Baseline

Physical Availability and Infrastructure Screening Assessment

No gap

Hot Spot

Hot Spot

No gap

Explore Causes and Conceptual Solutions

Simple

Complex

Water Allocation Modeling

Basin A Supply Plan

Basin B Supply Plan

Basin C Supply Plan

Basin D Supply Plan

Provider-Level Supply Plans

Characterize Supply/Demand Gaps

Explore Solutions and Develop Plans
Demand and Supply Evaluations

• Overview
• Demand Projections
• Groundwater Supply Availability
• Surface Water Supply Availability
• GIS Tool for Assessing Potential Shortages
Major Water Use Sectors

- Residential
- Commercial
- Industrial
- Self-Supplied Domestic
- Power Plants
- Oil and Gas
- Tribal Industries
- Other Large Industries
- Livestock
- Irrigated Crops
What Level of Geography?

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

- By location

- By County
Public Supply Residential

Based on population projections and per person residential use

ODOC Statewide Population Estimates

+ 31%
Where Will Population Growth Occur?  
(number of persons)

Statewide Population  
2010: 3,700,000
2060: 4,800,000

Source: ODOC 2002
Where Will Population Growth Occur?
(percent growth 2010-2060)

Statewide Population
2010: 3,700,000
2060: 4,800,000

Source: ODOC 2002
Public Supply Nonresidential

Statewide Employment Projections

Employment (millions)

+ 29%

2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060
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*

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
Preliminary Estimate of 2060 Agriculture Surface Water Use
Demand Work Groups

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

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

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

- Overview
- Demand Projections
- Groundwater Supply Availability
- Surface Water Supply Availability
- GIS Tool for Assessing Potential Shortages
OCWP Supply Availability Sub-Basins

Legend
- Red: Interstates
- Blue: Rivers

Watersheds will be evaluated by each stream reach, which is shown by a bold black or white number and separated by a white line. Watersheds without numbers will be evaluated as a single reach.
Reservoir End-of-Month Storage in 10-Year Periods

Month and Year

Quantity (Acre-Feet)
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
- OMRL was assigned 390 surveys
- ORWA 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

- Not completed to date: 281
- Online: 244
- Manual: 236
Provider Survey Response: Have an Existing Water Supply Plan?

PRELIMINARY: Online survey responses collected through mid-October 2008
Existing Water Supply Plans

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

Shaded counties: One or more providers with plan

PRELIMINARY: Online survey responses collected through mid-October 2008
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
Looking Ahead
Integrating the Technical Elements

Water Supply Gaps

Physical Supply Availability

Demands

Public Water Supplier Survey & Existing Plans

Basin & Provider Supply Plans
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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