Texas Water Reuse

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Erika Mancha
The following presentation is based upon professional research and analysis within the scope of the Texas Water Development Board’s statutory responsibilities and priorities but, unless specifically noted, does not necessarily reflect official Board positions or decisions.
Mission

To provide
• Leadership,
• Information,
• Education, and
• Support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas.
Regional Water Planning Areas
Projected Existing Water Supplies by 2060

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (acre-feet per year)</th>
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<tbody>
<tr>
<td>2010</td>
<td>482,164</td>
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<tr>
<td>2020</td>
<td>510,692</td>
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<tr>
<td>2030</td>
<td>549,497</td>
</tr>
<tr>
<td>2040</td>
<td>581,817</td>
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<td>2050</td>
<td>593,312</td>
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<td>2060</td>
<td>613,701</td>
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Recommended Water Management Strategies by 2060

- Irrigation Conservation, 16.4%
- New Major Reservoir, 16.4%
- Reuse, 10.0%
- Groundwater, 8.8%
- Municipal Conservation, 7.1%
- Groundwater Desalination, 2.0%
- Conjunctive Use, 1.5%
- Seawater Desalination, 2.8%
- Aquifer Storage and Recovery, 0.9%
- Other Conservation, 0.3%
- Brush Control, 0.2%
- Weather Modification, 0.2%
- Surface Water Desalination, <0.1%
- Other Surface Water, 33.4%

~915,000 acre-feet per year

Source: Amended 2012 State Water Plan
Capital Costs

Capital costs of wastewater treatment and collection: $81.7 billion

Capital costs of water treatment and distribution: $88.9 billion

Capital costs of flood control: $7.5 billion

Total capital costs: $231 billion

$5.15 Billion for Reuse Water Management Strategies

Capital costs of water management strategies recommended in 2012 State Water Plan: $53.1 billion

2012 State Water Plan
Clean Water State Revolving Fund

Who can apply?
• Political subdivisions
• Federally recognized tribes
• Private entities for newly eligible projects
  – Reduce publically-owned water treatment works capacity through reuse
  – Reduce energy consumption needs for publically-owned treatment works
  – Reuse or recycling wastewater

Eligible Projects:
• Wastewater infrastructure
• Reuse/conservation/stormwater facilities
• Nonpoint source pollution control
State-Funded Financial Programs

**Programs**
- Agricultural Water Conservation
- Economically Distressed Areas Program
- State Participation Program
- Texas Water Development Fund
- State Water Implementation Fund for Texas (SWIFT)

**Project Types**
- Sewer treatment plants
- Collection systems
- Lift stations
- System acquisition
- System Rehabilitation
- Non-point source pollution abatement
- Trunk lines
- Reuse projects
Direct Potable Water Reuse
Existing and Proposed Facilities

- Raw Water Production Facility
  - Operating since May 2013

- Direct Potable Reuse Project
  - Operating since July 2014 (emergency project)

- Advanced Purified Water Treatment
  - Completed piloting protocol

- Direct potable reuse project
  - Awaiting city council approval
Raw Water Production Facility in Big Spring, Texas
Direct Potable Reuse Project in Wichita, Texas
## Advanced Purified WTP Concept

### Advanced Purified WTP

1. **Source Water**
   - MF/UF
   - NF or RO

2. **Backwash Concentrate**

3. **UV/AOP**

4. **Cl₂**

5. **GAC for H₂O₂ Quenching**

6. **Engineered Storage**

7. **Distribution System**

### Treatment Processes

<table>
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<tr>
<th>Process</th>
<th>MF/UF</th>
<th>NF or RO</th>
<th>UV-AOP</th>
<th>GAC</th>
<th>Cl₂</th>
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### Removal Effectiveness

- **Primary removal mechanism:** >90% effectiveness
- **Additional removal mechanism:** >90% effectiveness
- **75 to 90% effectiveness**
- **50 to 75% effectiveness**
- **25 to 50% effectiveness**
- **None to <25% effectiveness**
Water Reuse Research

Evaluating the Potential for Direct Potable Reuse

- Contaminants of Concern
- Water quality performance targets
- Water quality characterization
- Source control
- Treatment technologies
- Environmental buffers
- Quantitative relative risk assessment
- Pilot protocols
- Regulatory summary
- Public awareness and outreach
Testing Water Quality in a Municipal Wastewater Effluent Treated to Drinking Water Standards

- Quarterly sampling
  - Chemicals of Emerging Concern
  - Microbial pathogens
- Develop correlations for surrogates compounds
- Guidance document for monitoring at direct potable reuse facilities
Brazos River Wetland

- Engineered wetland constructed in Waco, Texas to evaluate how endocrine disrupting compounds can be reduced from treated wastewater effluent.
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Innovative Water Technologies
http://www.twdb.texas.gov/innovativewater/reuse/index.asp

Texas Water Development Board
www.twdb.texas.gov