Projected Texas Population

The Redline represents the **Texas population of the 1950’s**, when the existing water supply projects we rely on today were conceived and undertaken.
Projected Water Demands and Existing Supplies

Projected Water Demands

Existing Water Supplies

Millions of acre-feet

2010 | 2020 | 2030 | 2040 | 2050 | 2060
---|---|---|---|---|---
17.0 | 16.4 | 16.0 | 15.6 | 15.4 | 15.3
18.0 | 19.0 | 19.8 | 20.5 | 21.2 | 22.0
Current Texas Reservoir Storage

In July total storage in 109 of the state’s major water supply reservoirs was 23 million acft*, or 73% of total conservation storage capacity.

Source: TWDB
FIGURE 5.7. PROJECTED EXISTING GROUNDWATER SUPPLIES AND GROUNDWATER AVAILABILITY THOUGH 2060 (ACRE-FEET PER YEAR).

Source: TWDB
U. S. Seasonal Drought Outlook

**KEY:**
- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely
Projected Needs for Additional Water and Water Supplies from Water Management Strategies

<table>
<thead>
<tr>
<th>Year</th>
<th>Needs</th>
<th>Volume from water management strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>3.6</td>
<td>2.0</td>
</tr>
<tr>
<td>2020</td>
<td>4.9</td>
<td>4.5</td>
</tr>
<tr>
<td>2030</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>2040</td>
<td>6.7</td>
<td>6.5</td>
</tr>
<tr>
<td>2050</td>
<td>7.5</td>
<td>7.9</td>
</tr>
<tr>
<td>2060</td>
<td>8.3</td>
<td>9.0</td>
</tr>
</tbody>
</table>
Projected Water Needs By Use Category
(Acre-Feet Per Year)
2010 Water Demand Projections by Use Category (Acre-Feet Per Year)

- Municipal: 4,851,201
- Manufacturing: 1,727,808
- Mining: 296,230
- Steam-Electric: 733,179
- Livestock: 322,966
- Irrigation: 10,079,215
2010 Water Demand Projections by Use Category (By Percentage)

- **Irrigation**: 56%
- **Municipal**: 27%
- **Manufacturing**: 9%
- **Mining**: 2%
- **Steam-Electric Power**: 4%
- **Livestock**: 2%
2060 Water Demand Projections by Use Category (By Percentage)

- **Irrigation**: 38%
- **Manufacturing**: 13%
- **Mining**: 8%
- **Municipal**: 1%
- **Steam-Electric Power**: 2%
- **Livestock**: 14%
53% of the New Supply is Based on Hope in Conservation Strategies.
Region L – Management Strategies

24% of the Strategy is Based on a New Major Reservoir that Cannot be Permitted under TCEQ’s Recently Adopted Environmental Flows.
Total Capital Costs for Texas Water Infrastructure: $231 Billion

- Water Treatment and Distribution: $88.9
- Wastewater Collection and Treatment: $81.7
- Flood control: $7.46
- 2012 State Water Plan: $53.1
What if we do nothing?

If drought of record conditions recur and water management strategies are not implemented, in 2060 the state could face

- water needs of 8.3 million acre-feet
- 83% of population short of water in drought
- $116 billion in lost income
- $9.8 billion in lost state and local business taxes
- 1.1 million lost jobs
- 1.4 million reduced population
- 403,000 fewer students in Texas schools

So What are we doing?
GBRA Mid-Basin Water Supply Project

NOTE: Guadalupe River Raw Surface Water Facilities are investigated under Task G

Note: Location of WTP will be determined during individual water supply option studies.
Brackish Groundwater Desalination Systems (Existing and Recommended) and Public Water Systems Affected by the Drought

- Existing Brackish Groundwater Desalination Plants
- Recommended Brackish Groundwater Desalination Projects
- Public Water Systems Affected by the Drought

Regions underlain by one or more aquifers containing brackish groundwater (total dissolved solids from 1,000 to 10,000 mg/L)
Opportunities for seawater desalination

- Access to a plentiful source
  - 367 miles of coast
  - Multiple sites for locating desalination plants
- Proximity to [large] demand centers
  - ~2/3 of the state’s population located within 150 miles of the coast
- Need for supply diversity
  - Vulnerability of existing sources
- Cost-effective technology
  - New water
Seawater Desalination Plant – Construction Costs

Pretreatment – 15% to 20% of Construction costs

Intake – 5 to 20% of Construction Costs

Discharge – 5 to 15% of Construction Costs

RO System – 40% to 60% of Construction Costs

Pretreatment – 15% to 20% of Construction costs
Desalination Plant Construction Cost as Function of Capacity

Unit Construction Cost (US$ MM/MGD)
## Seawater Desalination: Present Status & Future Forecasts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Today</th>
<th>Within 5 Years</th>
<th>Within 20 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Water (2010 US$/kgal)</td>
<td>US$2.0-3.0</td>
<td>US$1.5-2.5</td>
<td>US$1.0-1.5</td>
</tr>
<tr>
<td>Construction Cost (Million US$/MGD)</td>
<td>4.5-8.0</td>
<td>4.0-6.5</td>
<td>2.0-3.5</td>
</tr>
<tr>
<td>Power Use of SWRO System (kWh/kgal)</td>
<td>9.5-10.5</td>
<td>8.0-10.0</td>
<td>5.0-6.5</td>
</tr>
<tr>
<td>Membrane Productivity (gallons/day/membrane)</td>
<td>6,500-12,500</td>
<td>9,000-15,000</td>
<td>25,000-40,000</td>
</tr>
<tr>
<td>Membrane Useful Life (years)</td>
<td>5-7</td>
<td>7-10</td>
<td>10-15</td>
</tr>
<tr>
<td>Plant Recovery Ratio (%)</td>
<td>45-50</td>
<td>50-55</td>
<td>55-65</td>
</tr>
</tbody>
</table>
Obstacles to Gulf Coast Desalination

- Those Invested in Other Approaches
  - Reuse, Conservation, Brackish Desal
  - Political Manipulation of Existing Resources
- Stakeholder “Buy-In”
  - May Require a Financial Model (PPP, BOO, etc.) incompatible with the traditional
  - Large Projects Require Many Participants
- Environmental & New Paradigm Sentiment
  - **However** Seawater Presents Fewer Environmental Risk Than Other Alternatives
- Challenge of New Technology
  - The Least Significant Obstacle
Guadalupe Blanco River Authority

Q & A

GBRA