Surface Water Management Strategies in the 2011 South Central Texas Regional Water Plan

GSA BBASC Meeting

March 15, 2011
Five WMS Evaluated in the Plan

• GBRA Mid-Basin (SW)
• GBRA New Appropriation (Lower Basin)
• GBRA Lower Basin Storage
• Storage Above Canyon Reservoir
• CRWA Siesta Project
GBRA Mid-Basin
(Surface Water)
GBRA Mid-Basin (Surface Water)
GBRA Mid-Basin (Surface Water)

• Supply:
  – Potential Customers include WUGs in Caldwell and Hays Counties
  – Sources include Guadalupe River Diversions and Stored Water in Gonzales County
  – 25,000 acft/yr (22.3 MGD) Uniform Delivery
    • 21,000 acft/yr delivered to San Marcos WTP
    • 4,000 acft/yr delivered to Luling WTP
    • Firm yield is subject to the Instream Flows Process
  – 2 Scenarios for Surface Water Availability
    • Region L: Surface water available constrained by the Consensus Criteria for Environmental Flows Needs (CCEFN) and includes treated effluent.
    • Permitting: Surface water available constrained by Modified Lyons Method (Lyons) and does not include treated effluent.
  – Project subject to senior water rights, full application of environmental flow standards adopted pursuant to Section 11.1471 of the Texas Water Code, and the TCEQ permitting process.
Instream Flow Requirements

Potential Instream Flow Requirement (cfs)

Month

Consensus Criteria
- Median
- Quartile
- 7Q2
- Modified Lyons Method
GBRA Mid-Basin *(Surface Water)*

**Region L (CCEFN)**

- **Facilities:**
  - Off-Channel Reservoir (188,800 acft)
  - 517 MGD intake
  - 2 Pump Stations and 1 Booster Station
  - Transmission Pipelines:
    - 2 - 120-inch, 7 miles each
    - 36-inch, 44 miles
  - Water Treatment Plant expansions and enhancements at Luling and San Marcos

- **Cost:**
  - Capital Facilities = $345,899,000
  - Total Project Cost = $546,941,000
  - Annual Cost = $55,097,000/yr
  - Unit Cost = $2,204/acft/yr

**Permitting (Lyons)**

- **Facilities:**
  - Off-Channel Reservoir (105,500 acft)
  - 323 MGD intake
  - 2 Pump Stations and 1 Booster Station
  - Transmission Pipeline:
    - 2 - 96-inch, 7 miles each
    - 36-inch, 44 miles
  - Water Treatment Plant expansions and enhancements at Luling and San Marcos

- **Cost:**
  - Capital Facilities = $294,210,000
  - Total Project Cost = $457,611,000
  - Annual Cost = $46,985,000/yr
  - Unit Cost = $1,879/acft/yr
GBRA New Appropriation (Lower Basin)
GBRA New Appropriation (Lower Basin)

*Location to be determined and size based on 25,000 acft at 25-foot depth*
GBRA New Appropriation (Lower Basin)

• Source and Supply:
  – Up to 189,484 acft/yr of New Diversion from Guadalupe River via Calhoun County Canal System, Maximum Diversion Rate of up to 500 cfs
  – Off-Channel Storage of 100,000 acft (Assumed 25-foot depth)
  – Diversions subject to Consensus Criteria for Environmental Flow Needs, all existing water rights, and Mid-Basin Application
  – Firm Yield of ~11,300 acft/yr Municipal/Industrial Delivery

• Facilities:
  – Main Pump Station and Canal Upgrades
  – New Intake and Pump Station from Main Canal (~250 cfs)
  – 10-mile, 96-inch diameter Diversion Pipeline
  – Off-Channel Storage of 100,000 acft
  – Integration
**GBRA New Appropriation (Lower Basin)**

<table>
<thead>
<tr>
<th>Off-Channel Reservoir Size</th>
<th>100,000 acft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Yield (acft/yr)</td>
<td>11,300</td>
</tr>
<tr>
<td>Capital Facilities Cost ($)</td>
<td>$160,021,000</td>
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<tr>
<td>Total Project Cost ($)</td>
<td>$246,849,000</td>
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<tr>
<td>Annual Cost ($/yr)</td>
<td>$21,585,000</td>
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<tr>
<td>Unit Cost ($/acft/yr)</td>
<td>$1,910</td>
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</tbody>
</table>

*Note: Costs are based on Raw Water at the Reservoir(s) + Integration*
GBRA Lower Basin Storage
GBRA Lower Basin Storage

• **Source and Supply:**
  – Existing Interruptible GBRA/Dow Lower Basin Water Rights to be Made Firm with Off-Channel Storage
  – Diversions Subject to Senior Water Rights
  – Proposed Off-Channel Reservoir Size of 2,500 acft (100 acre site)
  – Maximum Diversion Rate of 50 cfs into Off-Channel Reservoir
  – Firm Yield of ~26,400 acft/yr with 100 acre site and Allocation of ~28,900 acft/yr of Interruptible Water Rights

• **Facilities:**
  – Dam & Spillway
  – Pump Station on Main Canal (50 cfs)
  – Inlet & Outlet Pipelines & Structures
GBRA Lower Basin Storage
Calhoun Canal System
GBRA Lower Basin Storage Sites

Existing Vistron Pipeline & Potential GBRA/Exelon Pipeline

500-acre site

100-acre site
## GBRA Lower Basin Storage

<table>
<thead>
<tr>
<th>Off-Channel Reservoir Size</th>
<th>2,500 acft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Yield (acft/yr)</td>
<td>28,369</td>
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<tr>
<td>Capital Facilities Cost ($)</td>
<td>$23,187,000</td>
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<tr>
<td>Total Project Cost ($)</td>
<td>$33,800,000</td>
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<tr>
<td>Annual Cost ($/yr)</td>
<td>$2,962,700</td>
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<tr>
<td>Unit Cost ($/acft/yr)</td>
<td>$104</td>
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</table>

*Note: Costs are based on Raw Water delivered to the GBRA Main Canal.*
Storage Above Canyon – ASR
Storage Above Canyon – ASR

• Aquifer Storage and Recovery (ASR) sites above Canyon Reservoir identified.
• Potential Customers include entities in Comal and Kendall Counties.

Groundwater Storage Summary:
• Using ASR to firm-up interruptible run-of-river water available under new appropriation to meet demands in Kendall and/or Comal Counties.
  – 10,000 acft assumed storage capacity in Trinity Aquifer in immediate area
  – 3,140 acft/yr of firm supply

• Facilities include:
  – Intake(s) and Pump Station(s) at Guadalupe River
  – Transmission Pipeline
  – Treatment Plant
  – 10 ASR Wells (350 gpm/each)

• Cost Estimates (Treated Water at ASR Field):
  – Capital Facilities = $26,297,000
  – Total Project Cost = $37,326,000
  – Annual Cost = $5,020,000/yr
  – Unit Cost = $1,599/acft/yr
CRWA Siesta Project
CRWA Siesta Project

• Source and Supply:
  – Amendment to existing CRWA’s Siesta Water Right on Cibolo Creek
  – Acquisition and consolidation of other existing water rights on Cibolo Creek
  – Purchase of reuse make-up water from upstream WWTPs
  – Alternate backup is Brackish Wilcox GW
  – Potential Customers are Existing CRWA Members

• Facilities:
  – Intake and Pump Station on Cibolo Creek
  – 23-mile, 20-inch Diameter Transmission Pipeline
  – 1 Booster Station
  – 7 MGD WTP
  – Delivery point is FM1518 Elevated Tank
  – Sized for Peak Monthly Delivery on Municipal Pattern
CRWA Siesta Project

- Firm Yield = 5,042 acft/yr

- Costs:
  - Capital Cost = $37,444,000
  - Project Cost = $53,481,000
  - Annual Cost = $7,167,000/yr
  - Unit Cost = $1,421/acft/yr
## WMS Summary

<table>
<thead>
<tr>
<th>Region L Recommended Water Management Strategy</th>
</tr>
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<tbody>
<tr>
<td>GBRA Mid-Basin (SW) WMS</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Type Of Project</td>
</tr>
<tr>
<td>River Basin</td>
</tr>
<tr>
<td>Project Firm Yield (acft/yr)*</td>
</tr>
<tr>
<td>Relies on New Surface Water Right</td>
</tr>
<tr>
<td>Instream Habitat/Geomorphology Science Available</td>
</tr>
<tr>
<td>Not Dominated by Senior Water Rights</td>
</tr>
</tbody>
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*Based on Consensus Criteria for Environmental Flow Needs (CCEFN)

## GSA BBEST Theoretical Projects

<table>
<thead>
<tr>
<th>GSA BBEST Theoretical Projects</th>
<th>Alternative</th>
</tr>
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<tbody>
<tr>
<td>Run-Of-River Example @ Cuero</td>
<td></td>
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<tr>
<td>Reservoir Example @ Goliad</td>
<td></td>
</tr>
<tr>
<td>Run-Of-River Example @ Goliad or Elmendorf</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type Of Storage</th>
<th>Off-Channel</th>
<th>On-Channel</th>
<th>Off-Channel</th>
</tr>
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<tbody>
<tr>
<td>River Basin</td>
<td>Guadalupe</td>
<td>San Antonio</td>
<td>San Antonio</td>
</tr>
<tr>
<td>Project Firm Yield (acft/yr)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Relies on New Surface Water Right</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Not Dominated by Senior Water Rights</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Blanco River @ Wimberley, TX
Plum Creek near Luling, TX
Guadalupe River @ Gonzales, TX
Sandies Creek near Westhoff, TX
Guadalupe River @ Cuero, TX
San Marcos River @ Luling, TX
San Antonio River near Elmendorf, TX
San Antonio River @ Goliad, TX
Guadalupe River near Spring Branch, TX
Medina River @ Bandera, TX
Medina River @ San Antonio, TX
Mission River @ Refugio, TX
Cibolo Creek near Falls City, TX
San Antonio River near Falls City, TX
Guadalupe River @ Comfort, TX
Guadalupe River @ Victoria, TX
Guadalupe River @ Cuero, TX
Guadalupe River near Spring Branch, TX
TCEQ Water Availability

Guadalupe River Basin

San Antonio River Basin
Edwards Springflow Options

GWSIM-4 (1934-1989)

- **Original WAM Springflow Set (TCEQ)**
  - Outdated CPM Rules, Outdated Edwards Pool Designations

- **SB3 Springflow Set (Region L)**
  - CPM Consistent with SB3, Full Authorized Withdrawals when available, Minimum Pumpage ~347,000 acft/yr

MODFLOW (1947-2000)

- **SB3 Springflow Set (EARIP)**
  - CPM Consistent with SB3, Full Authorized Withdrawals when available, Minimum Pumpage ~347,000 acft/yr

- **Bottom-Up Program (EARIP)**
  - Assumes Minimum Springflows at Comal and San Marcos Springs *if* Facilities are in Place, Full Authorized Withdrawals when available, Minimum Pumpage ~320,000 acft/yr (less suspended irrigation & other dedicated rights)

- **454k Pumpage (EARIP)**
  - Up to 454,000 acft/yr of Withdrawals when available, CPM consistent with SB3, Minimum Pumpage ~347,000 acft/yr

*Note: Period of Record for GSA WAM is 1934-1989*