Jordan River Basin

Planning for the Future

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Utah Division of Water Resources

Salt Lake County Watershed Symposium
(August 11, 2011)
DILBERT

THAT CONCLUDES MY TWO-HOUR PRESENTATION. ANY QUESTIONS?

DID YOU INTEND THE PRESENTATION TO BE INCOMPREHENSIBLE, OR DO YOU HAVE SOME SORT OF RARE “POWER-POINT” DISABILITY?

ARE THERE ANY QUESTIONS ABOUT THE CONTENT?

THERE WAS CONTENT?

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Overview of Presentation

- Basin Planning Process

- Jordan River Basin Plan Overview
  - Review content
  - Discuss highlights
Mission Statement:
Plan, conserve, develop and protect Utah’s water resources.
Basin Planning Process

- Gather input: (JVWCD, MWDSLS, Cities)
- Develop the document
- Committee Review:
  - Division of Water Rights
  - Division of Wildlife Resources
  - Division of Parks and Recreation
  - Division of Drinking Water
  - Division of Water Quality
  - others
- Advisory Review: (JVWCD, MWDSLS, Cities)
- Public Review
- Publish Final
Review of State Water Planning and the Jordan River Basin

1990 State Water Plan
1997 Jordan River Basin Plan
2001 State Water Plan
Current Plan
Document Chapters

- Chp. 1 – Introduction: Waters of the Jordan River Basin
- Chp. 2 – Water Supply
- Chp. 3 – Population and Water Use Trends and Projections
- Chp. 4 – Meeting Future Water Needs
- Chp. 5 – Municipal and Industrial Water Conservation
- Chp. 6 – Agricultural Conversion and Other Management Strategies
- Chp. 7 – Water Development
- Chp. 8 – Water Quality and the Environment
Chapter 1
Introduction: Waters of the Jordan River Basin

- Purpose of the Plan
- Description of the Basin
- Significance of Water Resources to the Basin
- Brief History of Water Use and Development
- State Water Planning
Purpose of the Plan

• “…to describe the current status of the water resources in the Jordan River Basin and estimate the demands that will be placed upon them in the future.”

• “…to help water managers, planners and other parties formulate the management strategies and policies needed to assure a bright future for waters in the basin.”
Brief History of Water Development

- July 25, 1849 – City Creek diverted
- 1860 – Mtn. streams largely appropriated
- 1882 – Jordan-SLC Canal completed
- 1888 – First water exchange negotiated
- 1892 – Dam on Utah Lake constructed
- 1915-1925 – Mountain reservoirs built
- 1928 – SLC Water Supply Advisory Board recommends Provo River importation
History (continued)

- 1931 – Provo River Project
- 1935 – Metro. Dist. of Salt Lake formed (Sandy added in 1990)
- 1951 – Salt Lake Co. WCD formed (changed name to JVWCD in 1998)
- 1967 – Central Utah Project
- 1993 – Little Dell Reservoir built
Chapter 2
Water Supply

- Climate

- Available Water Supply
  - Surface Water
  - Ground Water
  - Imported Water

- Variability of Supply
  - Drought

- Developed Supply

- Water Rights
Basin Precipitation
Low: 10-15 inches/year
High: 51-70 inches/year
Average: 23 inches/year
<table>
<thead>
<tr>
<th>Category</th>
<th>Water Supply (acre-feet/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Precipitation</td>
<td>900,000</td>
</tr>
<tr>
<td>Used by vegetation and natural systems</td>
<td>503,000</td>
</tr>
<tr>
<td>Ground Water Recharge</td>
<td>219,000</td>
</tr>
<tr>
<td>Surface Water Flow</td>
<td>178,000</td>
</tr>
<tr>
<td>Basin Yield (Ground Water + Surface Water)</td>
<td>397,000</td>
</tr>
<tr>
<td>Inflow to the Basin (Jordan River)</td>
<td>295,000</td>
</tr>
<tr>
<td>Imports to the basin</td>
<td>171,000</td>
</tr>
<tr>
<td><strong>Total Available Supply</strong></td>
<td><strong>863,000</strong></td>
</tr>
</tbody>
</table>
FIGURE 4
Ground Water Cross-Sectional Schematic

EXPLANATION:
- Direction of ground-water movement
- Primary recharge area
- Secondary recharge area
- Discharge area
- Great Salt Lake
- Shallow unconfined water
- Confining bed
- Deeper basin fill aquifer
- Confining bed more closely resembles a series of overlapping clay lenses than a single homogeneous material
- Shallow aquifer
- Water level in shallow aquifer
- Confined principle aquifer
- Potentiometric surface of principle aquifer
- Basin fill deposits of Quaternary age
- Basin fill deposits of Tertiary age
- Consolidated rock
Chapter 3
Population and Water Use Trends and Projections

- Population Trends and Projections
- Economic Trends and Projections
- Water Use Trends and Projections
- Environmental and Recreational Water Uses
<table>
<thead>
<tr>
<th>Cities</th>
<th>2000</th>
<th>2030</th>
<th>2060</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alta</td>
<td>370</td>
<td>378</td>
<td>400</td>
</tr>
<tr>
<td>Bluffdale</td>
<td>4,700</td>
<td>55,219</td>
<td>62,988</td>
</tr>
<tr>
<td>Cottonwood Heights</td>
<td>35,168</td>
<td>45,920</td>
<td>50,990</td>
</tr>
<tr>
<td>Draper (pt.)</td>
<td>25,220</td>
<td>54,006</td>
<td>57,989</td>
</tr>
<tr>
<td>Herriman</td>
<td>1,523</td>
<td>47,689</td>
<td>82,637</td>
</tr>
<tr>
<td>Holladay</td>
<td>14,561</td>
<td>34,333</td>
<td>44,508</td>
</tr>
<tr>
<td>Midvale</td>
<td>27,029</td>
<td>46,566</td>
<td>65,497</td>
</tr>
<tr>
<td>Murray</td>
<td>34,024</td>
<td>73,792</td>
<td>77,985</td>
</tr>
<tr>
<td>Riverton</td>
<td>25,011</td>
<td>54,063</td>
<td>82,663</td>
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<tr>
<td>Salt Lake City</td>
<td>181,743</td>
<td>208,822</td>
<td>225,956</td>
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<tr>
<td>Sandy</td>
<td>88,418</td>
<td>98,298</td>
<td>120,348</td>
</tr>
<tr>
<td>South Jordan</td>
<td>29,437</td>
<td>102,406</td>
<td>139,973</td>
</tr>
<tr>
<td>South Salt Lake</td>
<td>22,038</td>
<td>32,391</td>
<td>47,530</td>
</tr>
<tr>
<td>Taylorsville City</td>
<td>57,439</td>
<td>70,062</td>
<td>90,477</td>
</tr>
<tr>
<td>West Jordan City</td>
<td>68,336</td>
<td>138,549</td>
<td>174,966</td>
</tr>
<tr>
<td>West Valley City</td>
<td>108,896</td>
<td>160,637</td>
<td>179,965</td>
</tr>
<tr>
<td>Balance of County</td>
<td>174,474</td>
<td>245,484</td>
<td>499,902</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>898,387</td>
<td>1,468,615</td>
<td>2,004,773</td>
</tr>
</tbody>
</table>
FIGURE 14
Breakdown of Public Community Water Use Including Secondary Water Use (2005)

Total Public Community Water Use
(207 gpcd)

- Residential (132 gpcd) 64%
- Commercial (31 gpcd) 15%
- Institutional (18 gpcd) 9%
- Industrial (9 gpcd) 4%
- Non-Potable Secondary Water (17 gpcd) 8%

Residential (132 gpcd)

- Indoor (62 gpcd) 47%
- Outdoor (70 gpcd) 53%
Chapter 4
Meeting Future Water Needs

- **Municipal and Industrial Water Needs**
  - Jordan Valley Water Conservancy District
  - Metropolitan Water District of Salt Lake and Sandy

- **Proposed Water Management Strategies and Development Projects**

- **Agricultural, Environmental and Recreational Water Needs**
### TABLE 17
Current Public Community System Water Supplies vs. Future Demands

<table>
<thead>
<tr>
<th>Water System</th>
<th>2010 Demand (acre-feet)</th>
<th>2010 Dry-year Supply</th>
<th>Water Use Projections \ Water Conservation (acre-feet)</th>
<th>Water Supply Deficits/Surpluses (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2030</td>
<td>2060</td>
</tr>
<tr>
<td><strong>Jordan Valley Water Conservancy District (JVVCD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bluffdale</td>
<td>5,957</td>
<td>0</td>
<td>10,454</td>
<td>10,551</td>
</tr>
<tr>
<td>Draper City Water</td>
<td>4,642</td>
<td>0</td>
<td>5,205</td>
<td>5,435</td>
</tr>
<tr>
<td>Draper Irr. Co. (Water Pro)</td>
<td>11,574</td>
<td>4,583</td>
<td>12,595</td>
<td>13,551</td>
</tr>
<tr>
<td>Granger-Hunter WID</td>
<td>22,896</td>
<td>9,393</td>
<td>26,974</td>
<td>26,737</td>
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<tr>
<td>Herriman</td>
<td>4,680</td>
<td>434</td>
<td>8,512</td>
<td>13,050</td>
</tr>
<tr>
<td>Kearns WID</td>
<td>11,758</td>
<td>1,816</td>
<td>18,481</td>
<td>34,141</td>
</tr>
<tr>
<td>Magna Water Company</td>
<td>6,081</td>
<td>4,308</td>
<td>9,558</td>
<td>17,657</td>
</tr>
<tr>
<td>Midvale City Water</td>
<td>3,905</td>
<td>2,800</td>
<td>4,934</td>
<td>5,767</td>
</tr>
<tr>
<td>Riverton Water</td>
<td>11,175</td>
<td>5,040</td>
<td>14,132</td>
<td>19,118</td>
</tr>
<tr>
<td>South Jordan</td>
<td>13,174</td>
<td>0</td>
<td>21,499</td>
<td>26,000</td>
</tr>
<tr>
<td>South Salt Lake Water</td>
<td>3,364</td>
<td>3,157</td>
<td>4,376</td>
<td>5,682</td>
</tr>
<tr>
<td>Taylorsville-Bennion WID</td>
<td>12,490</td>
<td>7,500</td>
<td>13,388</td>
<td>15,297</td>
</tr>
<tr>
<td>West Jordan City Water</td>
<td>21,248</td>
<td>3,000</td>
<td>24,343</td>
<td>27,199</td>
</tr>
<tr>
<td>White City Water</td>
<td>2,948</td>
<td>4,052</td>
<td>2,742</td>
<td>2,971</td>
</tr>
<tr>
<td>JVVCD</td>
<td>11,391</td>
<td>102,335</td>
<td>15,019</td>
<td>14,043</td>
</tr>
<tr>
<td><strong>JVVCD TOTAL</strong></td>
<td><strong>147,283</strong></td>
<td><strong>148,418</strong></td>
<td><strong>191,912</strong></td>
<td><strong>237,199</strong></td>
</tr>
</tbody>
</table>

| **Metropolitan Water District of Salt Lake and Sandy (MWDSLS)** |                         |                      |      |      |      |                |
|---------------------------------------------------------------|-------------------------|----------------------|      |      |      |                |
| Salt Lake City Public Utilities                               | 79,501                  | 59,500               | 88,028 | 100,308 | (44,426) | (56,706) |
| Sandy City Water                                               | 25,589                  | 28,026               | 23,805 | 25,786  | (3,805)  | (5,786)  |
| MWDSLS                                                         | 0                       | 53,514               | 0      | 0      | 77,438   | 77,438   |
| **MWDSLS TOTAL**                                               | **105,090**             | **141,040**          | **111,833** | **126,094** | **29,207** | **14,946** |
FIGURE 15
Water Supply vs. Demand for the Jordan River Basin

Approximate dates when demands with and without water conservation are projected to exceed current supplies.
FIGURE 16
Water Supply vs. Demand for Jordan Valley Water Conservancy District

Approximate dates when demands with and without water conservation are (or were) projected to exceed current supplies.
FIGURE 17
Water Supply vs. Demand for Metropolitan Water District of Salt Lake & Sandy

- Demand w/o Conservation
- Demand w/ Conservation

Estimated Water Conservation
MWDSLS Water Supply (dry-year supply)
Individual System Water Supplies (dry-year supply)

Thousand Acre-Feet/Year

2000 2010 2020 2030 2040 2050 2060
FIGURE 18
Current Supplies vs. 2050 Demands for Selected Individual Water Systems

Note: The top of the yellow box in each column denotes the 2060 demand without water conservation, the bottom denotes the 2060 demand with water conservation (as labeled for Salt Lake Public Utilities).
Meeting Utah’s Future Water Needs

- **Water Management Strategies (demand-side approach)**
  - Water Conservation
  - Agricultural Water Conversion
  - Convert Industrial Water to Municipal Use
  - Water Reuse
  - Conjunctive Management of Surface and Groundwater (ASR)

- **Development Projects (supply-side approach)**
  - Completion of Central Utah Project
  - Develop Additional Water from Wasatch Range Streams
  - Develop Additional Ground Water
  - Bear River Development
### TABLE 18
Estimated Water Conservation (2050)

<table>
<thead>
<tr>
<th>Water Supplier</th>
<th>Water Conservation (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JVVWCD</td>
<td>67,400</td>
</tr>
<tr>
<td>MWDSLS</td>
<td>44,700</td>
</tr>
<tr>
<td>Other Systems</td>
<td>5,600</td>
</tr>
</tbody>
</table>

### TABLE 19
Estimated Agricultural Conversions (2050)

<table>
<thead>
<tr>
<th>Water Supplier</th>
<th>Agricultural Conversion (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JVVWCD</td>
<td>19,600</td>
</tr>
<tr>
<td>MWDSLS</td>
<td>5,300</td>
</tr>
</tbody>
</table>

### TABLE 20
Estimated Water Reuse (2030)

<table>
<thead>
<tr>
<th>Water Supplier</th>
<th>Water Reuse* (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JVVWCD</td>
<td>9,600</td>
</tr>
<tr>
<td>MWDSLS</td>
<td>8,400</td>
</tr>
<tr>
<td>Other Systems</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>18,100</strong></td>
</tr>
</tbody>
</table>

*In irrigated agriculture in Utah Resources.*
<table>
<thead>
<tr>
<th>Water Development</th>
<th>Approximate Year(s)</th>
<th>JVWCD (acre-feet)</th>
<th>MWDSLS (acre-feet)</th>
<th>Salt Lake City (acre-feet)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Groundwater Wells</td>
<td>2015-2020</td>
<td>5,000</td>
<td></td>
<td>12,000</td>
<td>17,000</td>
</tr>
<tr>
<td>Millcreek Surface Water</td>
<td>2013</td>
<td></td>
<td>3,300</td>
<td></td>
<td>3,300</td>
</tr>
<tr>
<td>Little Cottonwood and Bell Canyon</td>
<td>2010-2020</td>
<td></td>
<td>1,094</td>
<td></td>
<td>1,094</td>
</tr>
<tr>
<td>Central Utah Project, Utah Lake System†</td>
<td>2020-2030</td>
<td>21,400</td>
<td>8,600</td>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td>Central Water Project</td>
<td>2014</td>
<td>11,680</td>
<td></td>
<td></td>
<td>11,680</td>
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<tr>
<td>Bear River Project</td>
<td>2040</td>
<td>50,000</td>
<td></td>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>-</td>
<td>88,080</td>
<td>8,094</td>
<td>15,300</td>
<td>113,074</td>
</tr>
</tbody>
</table>
Chapter 5
Municipal & Industrial Water Conservation

- Utah’s M&I Water Conservation Goal
  - conserve at least 25% by 2050
  - progress thus far

- Water Conservation’s Role in Meeting Future Needs

- Water Provider Activities to Meet Water Conservation Goals

- Discussion of Best Management Practices
The Utah Division of Water Resources began collecting detailed M&I water use information at the river basin level in the early 1990s. Four comprehensive surveys have been conducted. Three of the four data points are shown for the Jordan River Basin and correspond to the years 1995, 1999 and 2005.
FIGURE 9
Example Rate Structures

### Increasing Block

- **Base Fee:** $5.00
- **Gallons:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000
- **$ per 1,000 gal.:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000

### Seasonal

- **Base Fee:** $5.00
- **Summer:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000
- **Winter:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000
- **$ per 1,000 gal.:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000

### Increasing Seasonal Block

- **Base Fee:** $5.00
- **Gallons:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000
  - $2.00: 100,000 - 200,000
- **$ per 1,000 gal.:**
  - $1.00: 10,000 - 40,000
  - $1.50: 40,000 - 100,000
  - $2.00: 100,000 - 200,000

### Target Block

- **Base Fee:** $5.00
- **TU = Target Use:**
  - Summer
  - $1.00: 10,000 - 40,000
  - $2.00: 40,000 - 100,000
  - $4.00: 100,000 - 200,000
- **$ per 1,000 gal.:**
  - TU: 10,000 - 40,000
  - 150% TU: 40,000 - 100,000
  - 200% TU: 100,000 - 200,000

*Target use varies according to household size and monthly irrigation need. Example shown is for July.*
<table>
<thead>
<tr>
<th>Community System</th>
<th>Number of Accounts</th>
<th>Estimated Cost per 1,000 gallons</th>
<th>Average Monthly Bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alta</td>
<td>63</td>
<td>$2.00</td>
<td>$89.66</td>
</tr>
<tr>
<td>Bluffdale</td>
<td>1,120</td>
<td>$1.21</td>
<td>$28.81</td>
</tr>
<tr>
<td>Draper</td>
<td>2,510</td>
<td>$2.79&lt;sup&gt;a&lt;/sup&gt;</td>
<td>$44.99</td>
</tr>
<tr>
<td>Herriman City</td>
<td>340</td>
<td>$0.99</td>
<td>$27.91</td>
</tr>
<tr>
<td>Holladay</td>
<td>3,750</td>
<td>$1.01</td>
<td>$33.62</td>
</tr>
<tr>
<td>Midvale</td>
<td>2,650</td>
<td>$0.93</td>
<td>$21.52</td>
</tr>
<tr>
<td>Murray</td>
<td>8,500</td>
<td>$1.66&lt;sup&gt;b&lt;/sup&gt;</td>
<td>$37.37</td>
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<tr>
<td>Riverton</td>
<td>6,700</td>
<td>$1.42</td>
<td>$22.62</td>
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<tr>
<td>Salt Lake City</td>
<td>80,500</td>
<td>$1.55</td>
<td>$38.47</td>
</tr>
<tr>
<td>Sandy</td>
<td>25,400</td>
<td>$2.27</td>
<td>$40.53</td>
</tr>
<tr>
<td>South Jordan</td>
<td>11,300</td>
<td>$2.60&lt;sup&gt;c&lt;/sup&gt;</td>
<td>$52.00</td>
</tr>
<tr>
<td>South Salt Lake</td>
<td>2,250</td>
<td>$1.65</td>
<td>$44.17</td>
</tr>
<tr>
<td>Taylorsville-Bennion</td>
<td>16,000</td>
<td>$1.00</td>
<td>$24.56</td>
</tr>
<tr>
<td>West Jordan</td>
<td>22,330</td>
<td>$1.84&lt;sup&gt;d&lt;/sup&gt;</td>
<td>$25.83</td>
</tr>
<tr>
<td>West Valley City</td>
<td>24,000</td>
<td>$1.08</td>
<td>$35.17</td>
</tr>
<tr>
<td>Jordan River Average</td>
<td>--</td>
<td>$1.60</td>
<td>$35.87</td>
</tr>
<tr>
<td>Utah State Average</td>
<td>--</td>
<td>$1.15</td>
<td>$32.96</td>
</tr>
<tr>
<td>National Average</td>
<td>--</td>
<td>$2.50</td>
<td>$25.70</td>
</tr>
</tbody>
</table>

<sup>a</sup> Includes the cost of well water.  
<sup>b</sup> Includes the cost of well water oe.  
<sup>c</sup> Includes the cost of well water.  
<sup>d</sup> Includes the cost of well water.  
<sup>e</sup> Includes the cost of well water.
Chapter 6
Agricultural Conversion and other Water Management Strategies

- Agricultural to M&I Conversions
- Water Reuse
- Conjunctive Management of Surface and Ground Water
- Water Banking and Cooperative Agreements
- Secondary Water Systems
Modeling the Conversion of Agricultural Land to Urban Development

Jordan River Basin's Irrigated Agricultural Land

acres

year
Chapter 7
Water Development

- Completion of the Central Utah Project
- Develop Utah Lake/Jordan River Water
- Convert Industrial Water to Municipal Use
- Develop Additional Water From Wasatch Mountain Streams
- Develop Additional Groundwater
- Bear River Water Development
- Weather Modification
Chapter 8
Water Quality and the Environment: Critical Components of Water Management

- **Water Quality**
  - Total Maximum Daily Load Program
  - Preservation of the Riparian and Flood Plain Corridors
  - Storm Water Discharge Permitting
  - Nutrient Loading
  - Concentrated Animal Feeding Operations
  - Septic Tank Densities
  - Groundwater Contamination

- **The Environment**
  - Threatened, Endangered, and Sensitive Species
  - Wetlands and the Great Salt Lake Ecosystems
  - Instream Flow Maintenance
Jordan River Basin: Planning for the Future