PURPLE MOUNTAIN MAJESTIES
RUNNING DRY?
Who Are We?

- **KIP PETERSEN**
  - President of the Pikes Peak Regional Water Authority (PPRWA)
  - General Manager of Donala Water and Sanitation District

- **WILL KOGER**
  - Division Manager for Forsgren Associates, Inc., Colorado Office
History of “America The Beautiful” & Pikes Peak

• In 1893, Professor Katharine Lee Bates travelled to the top of Pikes Peak.

• Inspired by the scenery, she penned one of the best-known songs in American history.
Colorado Population 1870-2015

Colorado Springs Statistical Area

Year

Population

0  1,000,000  2,000,000  3,000,000  4,000,000  5,000,000  6,000,000


700,000
Overview

- Colorado Springs Utilities
- Colorado’s Water Plan
- Regional Water Planning
- PPRWA
- Denver Basin Supply
Water
“The Divide”

- 80% population on East Slope
- 80% water on West Slope
Colorado Springs Utilities Takes the Lead

- Frying Pan – Arkansas Project
- Fountain Valley Authority
- Southern Delivery System
Pikes Peak Regional Water Authority (PPRWA)

- Water Providers, Monument - Fountain
  - 2008 WIPS (Water Infr. Planning Study)
    - Now updated for larger planning area
Colorado’s Water Plan

- Population double by 2050?
- S. Platte, Arkansas Rivers over-appropriated
- Projected 500,000 AF gap
- Effects of Climate Change

ACTION NEEDED
But 2050 is so far off!
We have plenty of time!
Denver Basin Supply
Colorado Headwaters

- 8 River Compacts
- 19 States & Mexico
- Colorado River Serves 30 M
- ≈ 50 Million by 2050
Denver Basin Supply
Denver Basin

Water Rights based on volume below property

Volume (State Model) 100 years = Annual Pumping Limit

“Paper Water” Not Guaranteed
# Denver Basin Aquifers

<table>
<thead>
<tr>
<th>Location</th>
<th>Wells Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dawson</strong></td>
<td>Domestic, Residential Wells</td>
</tr>
<tr>
<td><strong>Denver</strong></td>
<td>Domestic and Municipal Wells</td>
</tr>
<tr>
<td><strong>Arapahoe</strong></td>
<td>Municipal Wells, High Production</td>
</tr>
<tr>
<td></td>
<td>Iron &amp; Manganese</td>
</tr>
<tr>
<td></td>
<td>Radionuclides</td>
</tr>
<tr>
<td><strong>Laramie – Fox Hills</strong></td>
<td>Municipal, Low Production</td>
</tr>
<tr>
<td></td>
<td>Interbedded Coal = Taste &amp; Odor</td>
</tr>
<tr>
<td></td>
<td>Radionuclides</td>
</tr>
</tbody>
</table>
Denver Basin

Cascading Reduction in Well Yield

- 100 year theoretical life of the aquifer based on supply
- But the economically practical life is only 35 to 55 years

As more wells are drilled in an area, their yield decreases thereby increasing the costs of each unit of water produced: i.e. The Law of Diminishing Returns

Developing Denver Basin Water Rights has a Diminishing Water Return Over Time
Denver Basin – Well Declines

Water for Colorado: What’s next?

A plan to ensure our supply

Rocky Mountain News

$3 billion water fix

Douglas urges supply-sharing with Denver; new-home tap fee $14,800

Running dry

Much of Douglas County’s well water, once thought abundant enough for a century, could drop out of reach in 10 to 20 years
Regional Infrastructure Study

- 8 Participants (Includes C. Springs Utilities)
  - M&I Gap (22,600 AF projected in 2008 Report)
  - Transition from Denver Basin Groundwater (Donala WSD)

- Economy of Scale (Saves 30% Each)
  - Water Rights Not Included
  - Opens the Door for More Cooperation
Denver Basin Assumptions

• Supply Diminishing, Not Sustainable

• Assumptions
  ➢ 2035 - 35% of Supply Economical
  ➢ 2050 - 0% No Economical Use
<table>
<thead>
<tr>
<th>Study Participants - Projected Supply and Demand</th>
<th>Current</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply (Non-Renewable)</td>
<td>14,566</td>
<td>4,874</td>
<td>0</td>
</tr>
<tr>
<td>Supply (Total)</td>
<td>35,129</td>
<td>25,437</td>
<td>20,563</td>
</tr>
<tr>
<td>Demand</td>
<td>16,284</td>
<td>25,024</td>
<td>29,960</td>
</tr>
<tr>
<td>Supply Deficit (Surplus)</td>
<td><strong>18,845</strong></td>
<td><strong>413</strong></td>
<td><strong>-9,397</strong></td>
</tr>
</tbody>
</table>
Break for Questions & Discussion
System Overview

- Area 1 storage
- Area 2 storage
- Area 3 storage
- Pumping and Conveyance

El Paso County
Pueblo County
### Cost & Timeline Implementation - $280M

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Regionalization Study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preliminary Engineering-Area 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop Governance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure Funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Compliance / Permitting-Area 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detailed Design-Area 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction-Area 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-Up and Commissioning-Area 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure Funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preliminary Engineering-Area 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Compliance / Permitting-Area 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detailed Design-Area 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction-Area 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-Up and Commissioning-Area 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure Funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Rights Acquisition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Court Change of Use Decree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Court Exchange Decree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure Funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preliminary Engineering-Area 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Compliance / Permitting-Area 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detailed Design-Area 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction-Area 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-Up and Commissioning-Area 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15-20 Years
Area 3 Goals

- Use current supplies efficiently
- Network for renewable water delivery

Renewable Water Needs
Costs and Timeline
Next Steps
Solutions

- ASR – Aquifer Storage and Recovery
- Reuse Water
- Reservoir Storage
- Alluvial Storage
- Existing Piping
- Proposed Alignments
- Renewable Water
Area 3 System Overview
Area 3 Home Place Ranch Reservoir Site

- Storage = 2750 AF
- Area = 86 Ac
- Cost = $20.5M
- $7500/AF of storage
Area 3 Renewable Water

- Need 8,600 AFY
- Currently have access to 209 AF connected + 280 AF from upper Arkansas River (via CSU)

Newly Acquired:
- FMIC shares – 350 AFY (Triview MD)
- Laughlin Ditch shares = 324 AFY (Donala WSD)
## Area 3 Costs & Timeline

<table>
<thead>
<tr>
<th>Participant</th>
<th>2050 Avg. Annual Demand AFY</th>
<th>Current Renewable Water Supply Connected to System (AFY)</th>
<th>Area 3 Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town of Palmer Lake</td>
<td>234</td>
<td>134</td>
<td>$650,000</td>
</tr>
<tr>
<td>Town of Monument</td>
<td>870</td>
<td>75</td>
<td>$5,160,000</td>
</tr>
<tr>
<td>Woodmoor Water and Sanitation District</td>
<td>2,628</td>
<td>-</td>
<td>$17,060,000</td>
</tr>
<tr>
<td>Triview Metropolitan District</td>
<td>3,100</td>
<td>-</td>
<td>$20,120,000</td>
</tr>
<tr>
<td>Donala Water and Sanitation District</td>
<td>1,760</td>
<td>-</td>
<td>$11,420,000</td>
</tr>
<tr>
<td><strong>Total =</strong></td>
<td><strong>8,592</strong></td>
<td><strong>209</strong></td>
<td><strong>$54,420,000</strong></td>
</tr>
</tbody>
</table>

**Cost = $6,500/AF**

**Timeline = 5 – 10 years**
Area 3 Next Steps

- Reservoir is the **Key Facility**
- CWCB loan
- Governance structure
  - Grant/local funding by participants
  - Permitting (Mouse, Wetlands, Dam)
  - Capital Expenditure Plan – Phasing
Challenges

- Funding
- Lengthy Schedule
- Political Support

- Many Players
- Continuity & Vision