Lake Powell Pipeline
Salinity Control
Drought Contingency Planning

Colorado River District Annual Water Seminar
September 14, 2018

Eric L. Millis, PE
Utah Division of Water Resources
Utah Division of Water Resources’ Mission
Plan, Conserve, Develop and Protect Utah’s Water
Multi-faceted Challenges Need Multi-Faceted Solutions

- Conservation
- Water Use Conversions
- New Water Development

Climate Change & Drought; Environmental Needs

Double the Population

3 Million $\rightarrow$ 6 Million
Principal River Basins in Utah

- Upper Colorado River Basin
- Lower Colorado River Basin
- Great Basin
- Columbia River Basin
Utah’s Use of its Colorado River Allocation

Utah’s average annual depletion is 875,800 acre feet.* adding Utah’s share of evaporation and losses makes a total average annual depletion of 1,008,000 acre feet

*Utah Division of Water Resources, Colorado River Depletions, five-year averages from 2013 – 2017
**2015 municipal use
<table>
<thead>
<tr>
<th>Description</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UTAH'S COLORADO RIVER ALLOCATION</strong></td>
<td>1.369 MAF</td>
</tr>
<tr>
<td><strong>CURRENT USE</strong></td>
<td>1.008 MAF</td>
</tr>
<tr>
<td><strong>UNUSED ALLOCATION</strong></td>
<td>361 KAF</td>
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<tr>
<td><strong>FUTURE USE</strong></td>
<td></td>
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<tr>
<td>Navajo Nation</td>
<td>81 KAF</td>
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<tr>
<td>Ute Tribe Reserve Water (compact)</td>
<td>105 KAF</td>
</tr>
<tr>
<td>New Ag Uses</td>
<td>40 KAF</td>
</tr>
<tr>
<td>New M&amp;I Uses</td>
<td>29 KAF</td>
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<tr>
<td>Lake Powell Pipeline</td>
<td>86 KAF</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>341 KAF</td>
</tr>
<tr>
<td><strong>BALANCE</strong></td>
<td>20 KAF</td>
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Utah's Use of its Remaining Colorado River Allocation

Additional Water Needs:
- Energy
- M&I
- Agriculture
Lake Powell Pipeline to Address Future Water Needs
And in case you hadn’t heard...
US Census Report Ranking

Top 10 fastest-growing metro areas by percentage, 2016-2017:

1. St. George, Utah, 4 percent to 165,662.
2. Myrtle Beach-Conway-North Myrtle Beach, S.C. and N.C., 3.7 percent to 447,793.
3. Greeley, Colo., 3.5 percent to 294,243.
4. Bend-Redmond, Ore., 3.4 percent to 180,675.
5. Coeur d'Alene, Idaho, 2.9 percent to 153,144.
6. Lakeland-Winter Haven, Fla., 2.9 percent to 667,018.
7. Boise City, Idaho, 2.8 percent to 690,810.
8. Provo-Orem, Utah, 2.7 percent to 601,478.
9. Austin-Round Rock, Texas, 2.7 percent to 2,060,558.
10. The Villages, Fla., 2.5 percent to 125,165.
What has Made St. George *Sooooo* Enticing?

- Unparalleled land formations
- Proximity to National Parks and Recreation areas
- A mild winter climate not found in any other part of the State
- Accessibility by the most populous regions of the State
Washington County Population Projections

Washington County Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
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<tbody>
<tr>
<td>2015</td>
<td>154,602</td>
</tr>
<tr>
<td>2025</td>
<td>219,019</td>
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<tr>
<td>2035</td>
<td>286,768</td>
</tr>
<tr>
<td>2045</td>
<td>355,549</td>
</tr>
<tr>
<td>2055</td>
<td>429,295</td>
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<tr>
<td>2065</td>
<td>508,952</td>
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</table>
Anticipated Timeline

- **2006**
  - Lake Powell Pipeline Dev. Act Passed

- **2006-2016**
  - Research/studies and preliminary design

- **2015**
  - Preliminary license application submitted

- **2016**
  - Final license application submitted

- **2018**
  - Additional data submittals and agency coordination
  - FERC releases draft EIS
  - FERC releases final EIS
  - Records of Decision
  - Final Project Design
  - Final Financing Plan
  - Construction

- **2015**
  - Preliminary license application submitted

- **2018**
  - Final license application submitted

- **2018**
  - FERC releases draft EIS
  - FERC releases final EIS

- **TODAY**
  - Records of Decision
  - Final Project Design
  - Final Financing Plan
  - Construction

- **WATER DELIVERY**
Colorado River Salinity Control Program
The Colorado River Basin Salinity Control Program...

- Reduced the annual salt load by about 1.33M tons
- Reduced quantified damages by approximately $300 million annually
- Approximately $1 B spent thus far
- Current cost of about $50/ton

Involves:
  - Multiple federal agencies (Reclamation, NRCS and BLM)
  - 7 states
  - Hundreds of local agencies, organizations and companies
  - Thousands of individual producers
Salinity Damages

- Increased salinity causes significant economic damage to M&I water delivery infrastructure
- Degrades plumbing and appliances in homes
- Increases costs for recycling and wastewater treatment
- Reduces agricultural crop productivity and increases water use for soil leaching purposes
Public Enemy #1

Mancos Shale
Colorado River Basin

Mancos Shale
≈80% salt load from base flow
The Colorado River’s salinity concentration increases from about 50 mg/L to 700 mg/L plus as it flows from its headwaters to the lowest diversion in the United States.
Colorado River
Salinity Concentrations at Numeric Criteria Sites

879 mg/L
747 mg/L
723 mg/L

TDS (mg/L)

below Hoover Dam
below Parker Dam
at Imperial Dam
Flow Weighted Average Annual Salt Concentrations at Numeric Criteria Stations

TDS (mg/L)

Calendar Year

- Below Hoover
- Below Parker
- At Imperial
- Hoover Criteria: 723 mg/L
- Parker Criteria: 747 mg/L
- Imperial Criteria: 879 mg/L
Salinity Control Program Efforts

● Non-Point Source Activities
  ● Lining and piping of canals and ditches (Reclamation)
  ● On-farm irrigation efficiency improvements (NRCS)
  ● Rangeland improvements (BLM)

● Point Source Activities
  ● State NPDES administration pursuant to Forum’s policies (7 States and EPA)
  ● Saline spring disposal (Paradox Valley Unit, Reclamation)
  ● Plugging of saline wells (BLM)
Paradox Valley Unit (PVU)

La Sal Mountains (recharge)

Dolores River

deep injection well

brine

shallow collection wells
Pah Tempe Hot Springs
U.S. Drought Monitor
West

September 11, 2018
(Released Thursday, Sep. 13, 2018)
Valid 8 a.m. EDT

Intensity:
- Yellow: Abnormally Dry
- Light Orange: Moderate Drought
- Dark Orange: Severe Drought
- Red: Extreme Drought
- Maroon: Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Miskus
NOAA/NWS/NCEP/CPC

http://droughtmonitor.unl.edu/
Drought Contingency Planning

• Utah supports

• Need to have a plan in our pocket in case the drought continues

• Questions Utah needs to be able to answer about demand management and demand management storage:
  • How can quantify the water saved?
  • How can we quantify the water that makes it to Lake Powell?
  • How can we ensure the water is shepherded to Lake Powell?
  • How do we get the needed amount of water saved?
For More information:

• Lake Powell Pipeline
  • lpputah.org

• Colorado River Salinity Control Program
  • coloradoriversalinity.org
Finally!

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