Update on Colorado River Basin Water Supply and Demand Study – Next Steps

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Overview of Colorado River Basin Water Supply and Demand Study

- **Study Objective**
  - Assess Colorado River supply and demand imbalances
  - Consider impacts of climate change
  - Identify ways to resolve imbalances

- **50 year planning study (~ 2060)**

- **Cooperative effort - USBR, Basin States, with stakeholders**

- **3 year study**

- **~$5.5 million**
  - 50/50 USBR and States
CAP’s Unique Vulnerability

- **Junior Priority = Increased Risks**

- **Supply Vulnerabilities from:**
  - Increasing demands
  - Drought and climate change

- **Range of Future Supply/Demands:**
  - 4 Supplies
  - 6 Demands

- **Provide Credible Basis for Action**
  - Broad stakeholders supporting the effort
  - Large capacity options require basin-wide support
Basin Study - A Call to Action:

- Significant imbalances by 2060
- Potential for critical imbalances begin as early as 2025.
- Imbalances are driven by climate change/prolonged droughts plus increasing demands.
- Augmentation projects, increased conservation, and reuse can resolve the “average” imbalances – protecting the Colorado River and its users.
- Implementation of large-scale projects and programs will take more than a decade.
- Efforts to develop augmentation, conservation and reuse programs and projects must begin now.
Key Next Steps:

- **Resolve Critical Uncertainty of Conservation Programs - One Size Does Not Fit All**
  - Municipal water use is a modest portion of overall Colorado River consumption
  - Municipal water conservation has matured in the past 15 years (CAP, MWD, and SNWA)
  - Municipal water conservation is not “free” - cost and benefits must be evaluated
  - Ag conservation benefits to the Colorado River are location, crop, and technology dependent
  - Power generation conservation (“dry cooling”) will be evaluated on cost and production basis
  - Reuse programs will be evaluated on cost, impacts, and energy use basis

- **Define Scope and Funding for Augmentation Feasibility Studies**
  - Multi-year, multi-million dollar efforts to lead to design and permitting
  - Desalination projects are the likely target
  - Significant resistance to Mississippi River to Front Range delivery

- **Develop Scope and Yield of Regional Snowpack Augmentation Programs**
  - Leverage the Basin States pilot program to develop a basin-scale program

- **Improve Modeling Tools**

- **Continue Collaborative Efforts**
Summary of Options Submitted

- Over 150 options were submitted to the Study
- Several robust options were identified, along with options that address more challenging conditions

**Increased Supply** - importation, reuse, desalination, weather modification, etc.

**Reduced Demand** - M&I, reuse and agricultural conservation, etc.

**Modify Operations** - transfers & exchanges, water banking, etc.

**Governance & Implementation** - stakeholder committees, population control, re-allocation, etc. (SET ASIDE FROM CONSIDERATION)
### Summary of Option Portfolios

- 4 portfolios explore different approaches to bridge imbalances
- Annual costs range from $3.5B to $4.5B

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Which Options?</th>
<th>Water Delivery Vulnerabilities</th>
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</table>
| "Highly Inclusive" | • Most cost effective  
  • Highly inclusive set of option preferences  
  • Considers the **largest set** of options | • Upper Basin Shortage  
• Lower Basin Shortage |
| **Ordered by least-cost, but higher risk strategy** | **High feasibility and long-term reliability** | • Demands above Apportionment  
• Lee Ferry Deficit |
| "Low Impact" | • Low energy intensity (except reuse)  
  • Excluding those with high permitting risk | • Lake Mead Pool Elevation Less than 1,000 ft |
| "Highly Selective" | • High technical feasibility and long-term reliability  
  • Low energy intensity  
  • Excluding those with high permitting, legal, and policy risk  
  • Considers **smallest set** of options |
Dynamic Portfolio Results - Vulnerable Years

<table>
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<tr>
<th>Time Period</th>
<th>Portfolio</th>
<th>Baseline</th>
<th>Highly Selective</th>
<th>Low Impact</th>
<th>Long Term Reliability</th>
<th>Highly Inclusive</th>
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<tbody>
<tr>
<td>2012-2026</td>
<td>Upper Basin Shortage (Exceeds 25% of R)</td>
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<td>2027-2040</td>
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<td>2041-2060</td>
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<tr>
<th>2012-2026</th>
<th>Lower Basin Shortage (Exceeds 1 MAF Off-Allocation)</th>
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<tr>
<td>2027-2040</td>
<td>-</td>
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<td>2041-2060</td>
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<th>2012-2026</th>
<th>Remaining Demand Above Apportionment</th>
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Modeling Conclusions

• Without action, the system will become increasingly vulnerable.

• Vulnerabilities are most pronounced under GCM-projected conditions, but exist under all supply/demand conditions.

• Vulnerabilities emerge by the mid-2020s.

• Sizable reductions in vulnerabilities occur in later periods as more options are deployed.

• Options demonstrate improvements for all resource categories, but not all vulnerabilities are eliminated.
Next Steps - Planning and Investment:

• Themed Work Groups On M&I, Ag, Energy Conservation, Plus Reuse

• Define Scope and Funding Approach for Augmentation Feasibility Studies (Key Water Users and US)

• Develop Basin-Scale Snowpack Augmentation Program (includes verification research)

• Continue Vegetation Management Programs (includes verification research)

• Work Group on Modeling and Climate Change Impacts

• Continued Collaboration - BOR Workshop in 2013
Questions?
Why Now?

Basin Study Average Projected Imbalance vs. Large Capacity Project Timelines (For Illustration Purposes Only)

- Carlsbad Seawater Desalination Plant: Permitting – San Diego
- Boulder Canyon Project Act: Fall-Davis Report 1918 - Hoover Dam 1936

Graph showsproject timelines over the years 2015 to 2060, with projected imbalances and various project milestones.
Study Release and Communication Efforts:

- Study released on 12/12/12 and available at the Colorado River Water Users Association (CRWUA) meeting
- Basin States (AZ, CA, CO, NM, NV, UT, WY) Agreement on Next Steps
- Joint Statement from CAP, ADWR, AMWUA, SRP, and SAWUA for Arizona’s Perspective
- White Paper (fact sheet) on Basin Study and Next Steps
- Education Effort with Arizona State and Federal Delegations
- Local, Regional, and National newspaper articles