Agenda (1:00 PM – 4:00 PM)

1:00   Introduction
1:15   Water Supply Assessment
1:30   Water Demand Assessment
1:45   Options and Strategies Development
2:05   Break
2:15   System Reliability Analysis Methodology
2:35   System Reliability Analysis Results
3:20   Study Limitations and Next Steps
3:30   Open Question and Answer Session
4:00   Closing Comments and Adjourn
Introduction

- Background
- WaterSMART Program
- Colorado River Basin Study Overview
- Reporting and Public Comments
Colorado River Basin

- Basin approximately 250,000 sq. miles
- Annual allocations exceed the Basin’s long-term average flow
- 15.0 maf average annual “natural” inflow into Lake Powell over past 100 years
- Inflows are highly variable year-to-year
- 60 maf of storage
- Managed in accordance with the Law of the River
Historical 10-Year Running Average Colorado River Basin Supply & Use

- 10-YEAR RUNNING AVERAGE BASIN WATER SUPPLY
- 10-YEAR RUNNING AVERAGE BASIN WATER USE

Million acre-feet

RECLAMATION
Reclamation WaterSMART (SECURE Water Act, Section 9503)

Landscape Conservation Cooperatives
Science / Coordination / Communication

Risks
Impacts
Adaptation / Mitigation
Feasibility

West-Wide Climate Risk Assessments
Basin Studies
Colorado River Basin Water Supply and Demand Study

- **Study Objective**
  - Assess future water supply and demand imbalances over the next 50 years
  - Develop and evaluate opportunities for resolving imbalances
- **Study conducted by Reclamation and the Basin States, in collaboration with stakeholders throughout the Basin**
- **Began in January 2010 and completed in December 2012**
- **A planning study – does not result in any decisions, but will provide the technical foundation for future activities**

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<tr>
<td>Arizona Department of Water Resources</td>
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<td>(California) Six Agency Committee</td>
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<tr>
<td>Utah Division of Water Resources</td>
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<td>Wyoming State Engineer’s Office</td>
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<td>Reclamation’s Upper and Lower Colorado Regions</td>
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Study Phases and Tasks

Phase 1: Water Supply Assessment

1.1 – Select Methods to Estimate Current Supply
1.2 – Select Methods to Project Future Supply
1.3 – Conduct Assessment of Current Supply
1.4 – Conduct Assessment of Future Supply

1.1 – Select Methods to Estimate Current Supply
1.2 – Select Methods to Project Future Supply
1.3 – Conduct Assessment of Current Supply
1.4 – Conduct Assessment of Future Supply

Phase 2: Water Demand Assessment

2.1 – Select Methods to Estimate Current Demand
2.2 – Select Methods to Project Future Demand
2.3 – Conduct Assessment of Current Demand
2.4 – Conduct Assessment of Future Demand

2.1 – Select Methods to Estimate Current Demand
2.2 – Select Methods to Project Future Demand
2.3 – Conduct Assessment of Current Demand
2.4 – Conduct Assessment of Future Demand

Phase 3: System Reliability Analysis

3.1 – Identify Reliability Metrics
3.2 – Estimate Baseline System Reliability
3.3 – Project Future System Reliability
3.3.5-3.3.8 – Project Future Reliability with Opportunities

3.1 – Identify Reliability Metrics
3.2 – Estimate Baseline System Reliability
3.3 – Project Future System Reliability
3.3.5-3.3.8 – Project Future Reliability with Opportunities

Phase 4: Development & Evaluation of Opportunities

4.1 – Develop Opportunities
4.2 – Evaluate and Refine Opportunities
4.3 – Finalize Opportunities

4.1 – Develop Opportunities
4.2 – Evaluate and Refine Opportunities
4.3 – Finalize Opportunities
Contracted Services

• CH2M Hill and Black & Veatch were brought on in April 2010
  – Overall support for the Study
  – Water supply and demand assessment; option development and characterization; and portfolio development and evaluation
  – Technical integration and Study documentation support

• The RAND Corporation was brought on in March 2012
  – Support for system reliability analysis
  – Vulnerability assessment; portfolio development and evaluation
Final Study Reports

- The final Study is a collection of reports available at: http://www.usbr.gov/lc/region/programs/crbstudy/report1.html

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<th>Executive Summary</th>
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<td>Technical Report B – Water Supply Assessment</td>
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<td>Technical Report C – Water Demand Assessment</td>
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<td>Technical Report F – Development of Options and Strategies</td>
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Comments

• Should be submitted by April 19, 2013
• May be submitted in the following ways:
  – Study website at: 
    http://www.usbr.gov/lc/region/programs/crbstudy.html
  – E-mail to: ColoradoRiverBasinStudy@usbr.gov
  – U.S. mail to:
    U.S. Bureau of Reclamation
    Attention Ms. Pam Adams, LC-2721
    PO Box 61470
    Boulder City NV 89006-1470
  – Fax to: 702-293-8418

• Comments will be summarized, posted to the website, and considered in future Basin planning activities
Water Supply Assessment
Technical Report B

- Objective
- Development of Water Supply Scenarios
- Quantification of Water Supply Scenarios
Objective of the Water Supply Assessment

- The objective of the Water Supply Assessment is to assess the probable magnitude and variability of historical and future natural flow\(^1\) in the Basin.
- The assessment includes the potential effects of future climate variability and climate change.

\(^1\)Natural flow represents the flow that would have occurred at a location had depletions and reservoir regulation not been present upstream of that location.
Water Supply Scenarios

**Observed Resampled**
- future hydrologic trends and variability will be similar to the past 100 years
- 103 sequences of future streamflow
Water Supply Scenarios

Paleo Resampled

- Future hydrologic trends and variability are represented by the distant past (approximately 1250 years)
- 1,244 sequences of future streamflow
Water Supply Scenarios

Paleo Conditioned

- future hydrologic trends and variability are represented by a blend of the wet dry states of the paleo-climate record but magnitudes are more similar to the observed period
- 500 sequences of future streamflow
Water Supply Scenarios

**Downscaled Global Climate Model (GCM) Projected**

- future climate will continue to warm with regional precipitation trends represented through an ensemble of future GCM projections
- 112 sequences of future streamflow
Quantification of Water Supply Scenarios

Projections of 2011-2060 Average Natural Flow at Lees Ferry

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1994 – 2013 average = 13.6 MAF

Box represents 25th – 75th percentile, whiskers represent min and max, and triangle represents mean of all traces

From Figure B-53
### Projections of Natural Flow at Lees Ferry

**Deficit and Surplus Statistics**

Computed over the 2011-2060 Period

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<th>Paleo Conditioned</th>
<th>Downscaled GCM Projected</th>
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<td>Frequency of Deficit(^1) lasting 5 years or longer</td>
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<td>30%</td>
<td>25%</td>
<td>48%</td>
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<td>Frequency of Surplus(^1) lasting 5 years or longer</td>
<td>28%</td>
<td>15%</td>
<td>18%</td>
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\(^1\)A deficit/surplus period occurs whenever the 2-year running mean is below/above the observed mean of 15.0 maf
Objective
Development of Water Demand Scenarios
Quantification of Water Demand Scenarios
Objective of the Water Demand Assessment

• The objective of the Water Demand Assessment is to assess the quantity and location of current and future water demands in the Study Area\(^1\) to meet the needs of Basin resources.

• Basin resources include: municipal and industrial (M&I) use, hydropower generation, recreation, and fish and wildlife habitat.

\(^1\)The Study Area is defined as the hydrologic boundaries of the Basin plus the adjacent areas of the Basin States that receive Colorado River water.
Water Demand Scenarios

**Current Projected (A):**
- growth, development patterns, and institutions continue along recent trends

**Slow Growth (B):**
- low growth with emphasis on economic efficiency

**Rapid Growth (C1 and C2):**
- economic resurgence (population and energy) and current preferences toward human and environmental values
  - C1 – slower technology adoption
  - C2 – rapid technology adoption

**Enhanced Environment (D1 and D2):**
- expanded environmental awareness and stewardship with growing economy
  - D1 – with moderate population growth
  - D2 – with rapid population growth
Approach to Quantifying Demand Scenarios

Figure C-2 Approach to Quantifying Demand Scenarios
Water Demand Quantification Results

- Demand for consumptive uses ranges between 13.8 and 16.2 maf by 2060 (including Mexico and losses 18.1 and 20.4 maf by 2060)

- Approximately a 20% spread between the lowest (Slow Growth) and highest (Rapid Growth – C1) demand scenarios

*Figure C-4 Colorado River Basin Historical Use and Projected Demand*

*Quantified demand scenarios have been adjusted to include Mexico’s allotment and estimates for future reservoir evaporation and other losses.*
Water Demand Quantification Results

Parameters driving demands include population, per capita water use, and irrigated acreage and are projected to change from 2015 to 2060:

- Population increase from about 40 million people by 23% (49 million) to 91% (77 million)
- Per capita water use decrease by 7% to 19%
- Irrigated acreage decrease from about 5.5 million acres by 6% (5.2 million) to 15% (4.6 million)

Figure C-7 Study Area, Colorado River, and Change in Colorado River Demand
Projected Future Colorado River Basin Water Supply and Demand

- Average supply-demand imbalances by 2060 are approximately 3.2 million acre-feet.

- This imbalance may be more or less depending on the nature of the particular supply and demand scenario.

- Imbalances have occurred in the past and deliveries have been met due to reservoir storage.

Figure C-9 Historical and Future Projected Colorado River Basin Use and Demand

RECLAMATION
Options and Strategies Development
Technical Report F

- Objective
- Options Considered
- Characterization of Options
- Development of Portfolios

Warren H. Brock Storage Reservoir
Objective of Options and Strategies Development

• The objective of the options and strategies development is to explore a broad range of options and groups of options (portfolios) for resolving future supply and demand imbalances.

• The Study did not intend to result in the selection of a particular portfolio or option. Rather, the objective is to demonstrate the effectiveness of different strategies at resolving future supply and demand imbalances.
Summary of Options Submitted

- 160 options were submitted to the Study from Nov 2011 – Feb 2012
- All options received were included and are reflected in the Study

**Increased Supply** – reuse, desalination, importation, etc.

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

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

**Governance & Implementation** – stakeholder committees, population control, re-allocation, etc.
Organizing and Characterizing Options

- Characterization Criteria includes:
  - Quantity of yield
  - Timing of implementation
  - Technical feasibility
  - Energy needs
  - Cost
  - Permitting
  - Legal and policy considerations
  - Implementation risk

Does not represent all option categories
### Option Characterization Results

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<th>Technical</th>
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Portfolio Development

• “Portfolios” are combinations of options that implement a particular strategy

• Strategy expressed through characterization criteria which determines how options are combined

• Four portfolios were developed to demonstrate potential ways options could be combined

Portfolio performance assessed for all future supply-demand scenarios across all resources
Summary of Portfolios

Option Selection

- Least restrictive resulting in a highly inclusive set of option preferences
- Considers the largest set of options

- Low-risk strategy in the long-term with high reliability
- High technical feasibility
- Excludes options with high permitting, legal and policy risks

- Prioritizes options that have low environmental impacts and long-term flexibility
- Excludes options with high permitting risk

- High technical feasibility and long-term reliability
- Low energy intensity
- Excludes options with high permitting, legal, and policy risk
- Considers smallest set of options
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BREAK 2:05 – 2:20 PM

Study website:  http://www.usbr.gov/lc/region/programs/crbstudy.html
System Reliability Analysis Methodology
Technical Report E, G

- Overall Approach
- Model and Methods to Perform System Reliability Analysis
- Evaluation of System Performance
- Identification of Conditions Causing Vulnerability
- Modeling of Portfolios
System Reliability Analysis

- Simulate the state of the system over the next 50 years for each scenario, with and without options and strategies
- Use metrics and vulnerabilities to quantify impacts to Basin resources
- **Resource Categories**
  - Water Deliveries
  - Electrical Power Resources
  - Water Quality
  - Flood Control
  - Recreational Resources
  - Ecological Resources

RESOURCES CATEGORIES
- Water Deliveries
- Electrical Power Resources
- Water Quality
- Flood Control / Reservoir Spills
- Recreational Resources
- Ecological Resources

*For clarity, water delivery locations are not indicated, rather multiple aggregate metrics are defined for the category*
15 System Response Variables (e.g. Mead pool elevation)

90 Reliability Metrics (e.g. Mead < 1,000 ft)

27 Indicator Metrics (Mead < 1,000 ft)

Vulnerability Thresholds (e.g. Mead < 1,000 ft at least once per trace)

Vulnerabilities (% of traces, % of years)

Vulnerable Conditions (e.g. Mean river flow < 15.5 MAF AND > 8 year drought)

Signposts (e.g. Mead <= 1,025 ft)

Portfolio Analysis

System Reliability Framework

Portfolio Development
1. Identify strategy
2. Identify vulnerabilities to address
3. Select options that fit strategy
Colorado River Simulation System (CRSS)

- Reclamation’s official Basin-wide long-term planning model
- Implemented in RiverWare™
- Simulates operations at 12 reservoirs and deliveries to over 500 individual ‘water users’
- Simulates at a monthly time-step
- Model logic reflects reservoir operations
- Gives a range of potential future system conditions
RiverWare™ Study Manager

- Manage input and output for all 240 scenarios
- Automate simulation process
- Can automate generation of results
Computation of Daily Flows in CRSS

- CRSS simulates at a monthly time-step, however daily information was needed to assess many ecological and recreational resource metrics.

- Ecological
  - Can monitor daily flow targets below Navajo and Flaming Gorge.
  - Use monthly, volumetric approximations of daily targets at other locations, e.g., Colorado River near UT/CO State Line, Gunnison River near Whitewater.
Recreational Resources: Boating Flow Days Metric

• Developed with American Whitewater and Hydros Consulting
• Public survey determined ranges for optimal and acceptable boating flow days
• Evaluates number of optimal and acceptable boating flow days by converting monthly volume from CRSS to daily flows
  – Uses 30 years of historical gage data to create an ensemble of plausible daily flow patterns
• 8 locations

Figure D2-2
Indicator Metrics

- For each resource category, indicator metrics were developed to offer a summary of the full suite of metrics within that category

  - Water Delivery (6)
    - Examples: Lee Ferry Deficit, Lower Basin shortage
  - Electric Power (3)
    - Example: Total Upper Basin power generated
  - Water Quality (1)
  - Flood Control (1)
  - Recreational (11)
    - Examples: Upper Colorado Basin boating flow days, Powell shoreline recreation
  - Ecological (5)
    - Examples: Yampa near Maybell, Colorado near Stateline
### Example Path of Metric to Vulnerability

<table>
<thead>
<tr>
<th>Resource Category</th>
<th>System Reliability Metric (90 total)</th>
<th>Indicator Metric (27 total)</th>
<th>Vulnerability Threshold (27 total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Delivery</td>
<td>Lake Mead elevation &lt; 1,000’</td>
<td>Lake Mead elevation &lt; 1,000’</td>
<td>One occurrence in any month</td>
</tr>
<tr>
<td>Electrical Power</td>
<td>Upper Basin Electrical Power Generated</td>
<td>Upper Basin Electrical Power Generated</td>
<td>Generation &lt; 4,450 GWh/yr for more than 3 consecutive years</td>
</tr>
<tr>
<td>Recreational</td>
<td>Boating flow days on the Yampa River at Maybell and Deerlodge; Green River at Jensen and Greendale</td>
<td>Total Boating Flow Days in the Green River Basin</td>
<td>Days less than current conditions with variable hydrology</td>
</tr>
</tbody>
</table>

Flood control and water quality followed path similar to water delivery; ecological followed path similar to recreational.
Vulnerable Conditions

• Determine what external conditions lead to vulnerabilities for water delivery indicator metrics
• Reduce dimensionality and inform sign post selection

• External Conditions Considered:
  – Natural flow at Lees Ferry
    • Mean, trends, minimum annual flows, maximum annual flows, number of dry years, dry spell length, minimum mean flows during 5/8/10-year drought
  – Demand
    • Post 2040 demand
    • Demand trend
  – Post-2026 operation of Lakes Powell and Mead
Lee Ferry Deficit Vulnerable Conditions

Figure G-15

Natural Flow at Lees Ferry Annual Mean of Driest Eight Year Period 2012-2060 [maf]

In Vulnerable Conditions?
- O Not In Vulnerable Conditions
- X In Vulnerable Conditions

Lee Ferry Deficit Vulnerability
- Vulnerable
- Not Vulnerable
### Summary of Vulnerable Conditions for Lee Ferry Deficit

<table>
<thead>
<tr>
<th>Vulnerable Condition Name:</th>
<th>Below Average Long-Term Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric:</td>
<td>Lee Ferry Deficit</td>
</tr>
<tr>
<td>Vulnerable Traces:</td>
<td>19%</td>
</tr>
<tr>
<td>Vulnerability Statistics:</td>
<td></td>
</tr>
<tr>
<td>- Explains 78% of all</td>
<td></td>
</tr>
<tr>
<td>vulnerabilities</td>
<td></td>
</tr>
<tr>
<td>- 80% of traces meeting</td>
<td></td>
</tr>
<tr>
<td>this condition are</td>
<td></td>
</tr>
<tr>
<td>vulnerable</td>
<td></td>
</tr>
<tr>
<td>Definition of Vulnerability:</td>
<td></td>
</tr>
<tr>
<td>- Flow at Lees Ferry</td>
<td></td>
</tr>
<tr>
<td>annual mean &lt; 13.8</td>
<td></td>
</tr>
<tr>
<td>MAF AND 8 year</td>
<td></td>
</tr>
<tr>
<td>drought &lt; 11.2 MAF</td>
<td></td>
</tr>
</tbody>
</table>

Table G-7
Signposts

- **Signposts** are observable conditions that anticipate vulnerable conditions
- Used to trigger options in dynamic portfolios
- Identify with exploratory analysis and skill tradeoffs
Approach to Implement and Analyze Portfolios

- Input to CRSS included option timing, yield, and cost
- Options were implemented, based on cost-effectiveness, when signposts indicated an approaching vulnerability
  - This dynamic approach avoids implementing options when not needed
  - Once options are selected, they remain ‘on’ for the duration of the simulation
- All portfolios were assessed across all future conditions
Dynamic Portfolio Example

Vulnerability Already Addressed?

Yes: Continue Simulation

No: Review Option N

Addresses Vulnerability?

Yes: Is Option Available?

No: Continue Simulation

Yes: Meets minimum magnitude?

Yes: Select Option N

No: Continue Simulation

Option Year Available Magnitude [KAF] Addresses Vulnerability 1 Addresses Vulnerability 2

<table>
<thead>
<tr>
<th>Option</th>
<th>Year Available</th>
<th>Magnitude [KAF]</th>
<th>Addresses Vulnerability 1</th>
<th>Addresses Vulnerability 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2031</td>
<td>200</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>2021</td>
<td>75</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>2045</td>
<td>150</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
System Reliability Analysis Results

- Key Modeling Assumptions
- System Response Variables
- Resource Metrics
- Resource Vulnerabilities
- Vulnerable Conditions
- Portfolio Tradeoff and Options
System Reliability Framework

15 System Response Variables
(e.g. Mead pool elevation)

90 Reliability Metrics
(e.g. Mead < 1,000 ft)

27 Indicator Metrics
(Mead < 1,000 ft)

Vulnerability Thresholds
(e.g. Mead < 1,000 ft at least once per trace)

Vulnerabilities
(% of traces, % of years)

Vulnerable Conditions
(e.g. Mean river flow < 15.5 MAF AND > 8 year drought)

Signposts
(e.g. Mead <= 1,025 ft)

Portfolio Analysis

Portfolio Development
1. Identify strategy
2. Identify vulnerabilities to address
3. Select options that fit strategy
System Reliability Analysis
Key Modeling Assumptions

- All combinations (6 x 4 = 24) of supply/demand are modeled both with and without options and strategies
- 2 assumptions for Powell and Mead operations from 2027 - 2060
  - Continuation of the 2007 Interim Guidelines (IG) and revert to Interim Guidelines EIS No Action Alternative
- Upper Basin Shortage
  - Shortages are primarily hydrologic
  - Import deficit water above Powell to ensure 75 MAF over 10 years arrives at Lee Ferry, AZ
    - Report as “Lee Ferry Deficit” and do not assign to any particular state or user
- Lower Basin Shortage
  - For shortages beyond the IG (or No Action), do not assign to any particular state or user
  - Mexico shortage assumed to be 16.67% of total Lower Basin shortage (consistent with modeling supporting the IG EIS)
System Reliability Analysis
Key Modeling Assumptions

• “Baseline” Simulations: Demands above apportionment
  – Deliveries in accordance with the Law of the River
  – Deliveries above apportionments in the Lower Basin occur only during Surplus Conditions

• Simulations with Options and Strategies: Demands above apportionment
  – Conservation in the Lower Basin is applied first towards demands above apportionment in the Lower Basin
  – For options that import water in the Lower Basin, the imported water is assumed to go towards a system benefit when Lake Mead is < 1,050 feet
Modeled Scenarios

- Utilize CRSS to model system conditions over next 50 years
- Evaluate system reliability through reliability metrics
- 23,508 traces/portfolio
- 5.8 million years of data across all portfolios
System Response Variables

- Raw modeling output
- Describes system under different future scenarios
- Examples: Gage flow, reservoir conditions, water deliveries

Lake Powell Pool Elevation  Figure G-6

Highlighted Scenario Names
- Paleo Conditioned, Enhanced Environment (D1)
- Paleo Conditioned, Current Projected (A)
- Observed Resampled, Rapid Growth (C1)
- Downscaled GCM Projected, Enhanced Environment (D1)
- Downscaled GCM Projected, Rapid Growth (C1)
- All Other Scenarios
System Response Variables

See Tableau Workbook
Resource Metrics

- Raw modeling output processed to offer resource and location specific insight
- Examples: Flow or pool elevation for recreation, releases within safe channel capacity, water delivery shortages

Blue Mesa Pool Elevation and Marina/Boat Ramp Reference Values

Figure G4 E-2
Vulnerability Results

- Vulnerability combines metrics and threshold
- Provides resource specific perspective on system condition
- Results presented as percent of traces and percent of years

Lake Mead Percent of Traces Below 1,000’ Pool Elevation  Figure G-9
Vulnerability Results

See Tableau Workbook
Vulnerable Conditions

- Vulnerable conditions offer alternate analysis of vulnerability
- Identifies conditions associated with vulnerability
- Examples: Drought magnitude, reservoir conditions, demands

Lee Ferry Deficit Vulnerable Conditions
Figure G-32
Vulnerable Conditions

See Tableau Workbook
Portfolio Tradeoffs and Options

- Analysis explores portfolio differences
- Examples:
  - Vulnerability reductions
  - Cost
  - Options implemented
- Not intended to identify a ‘best’ portfolio, but understand strategy tradeoffs
Portfolio Tradeoffs and Options

See Tableau Workbook
Summary, Study Limitations and Next Steps

- Summary
- Study Limitations
- Next Steps
Summary

• The system is vulnerable if we do nothing
• Doing something greatly reduces that vulnerability and makes us more resilient to adverse conditions but does not eliminate vulnerability
• In the near term, all portfolios show that conservation, transfers, and reuse are cost-effective ways to reduce vulnerability
• In the longer term, more tradeoffs emerge to achieve an acceptable level of risk in terms of options, cost, resources, and other implications.
Study Limitations

- The detail and depth to which analyses were performed was limited by the availability of data, methods, and capability of existing models.

- Some of these limitations include:
  - Ability to assess impacts to Basin resources
  - Options characterization process
  - Consideration of options
  - Treatment of Lower Basin tributaries
Next Steps

• The Study lists 10 areas where next steps should be taken:
  – M&I and Agricultural Water Conservation and Reuse
  – Water Banks
  – Watershed Management
  – Augmentation
  – Water Transfers
  – Tribal Water
  – Environmental Flows
  – Data and Tool Development
  – Climate Science Research
  – Partnerships
Next Steps

• Educational Outreach Sessions
  – March 25 in Salt Lake City, UT
  – March 26 in Phoenix, AZ
  – April 3 via Webinar

• Reduce uncertainties related to water conservation, reuse, water banking, augmentation, and weather modification concepts

• Further study of tribal water issues

• Advance science and modeling tools used in the Study

• Consider strategies that provide a wide-range of benefits to all water users
OPEN QUESTION & ANSWER SESSION

Study website:  http://www.usbr.gov/lc/region/programs/crbstudy.html
Colorado River Basin Water Supply and Demand Study

Study Contact Information

• Website:  http://www.usbr.gov/lc/region/programs/crbstudy.html
• Email:  ColoradoRiverBasinStudy@usbr.gov
• Telephone:  702-293-8500; Fax:  702-293-8418
Extra Results
Recreation Resource Metrics

Yampa Boating Flow Days Figure G4 E-11a
Power Resource Metrics

Hoover Generation Capacity Figure G4 B-6
Water Delivery Resource Metrics

Annual Lower Basin Shortage  Figure G4 A-3
Year Type Frequency Colorado River near Cameo, CO and Target Reference Values  

Figure G4 F-3
Flood Control Resource Metrics

Flow Below Navajo Dam and Safe Channel Capacity  Figure G4 D-8
Water Quality Resource Metrics

Green River near Green River, UT Annual Salinity  Figure G4 C-14