RECLAMATION
Managing Water in the West

# Overview of Colorado River Basin Water Supply and Demand Study

Colorado River Forecasting Service Technical Committee
## March 21, 2013

U.S. Department of the Interior
Bureau of Reclamation

Colorado River Basin Water Supply and Demand Study

- **Study Objective**
  - Assess future water supply and demand imbalances over next 50 years
  - **D**evelop and evaluate opportunities for resolving imbalances
- Study **c**onducted by Reclamation and the Basin States in collaboration with stakeholders throughout the Basin
- A 3 year study that began in January 2010 and completed December 2012
- A planning study – did *not* result in any decisions, but provides the technical foundation for future activities
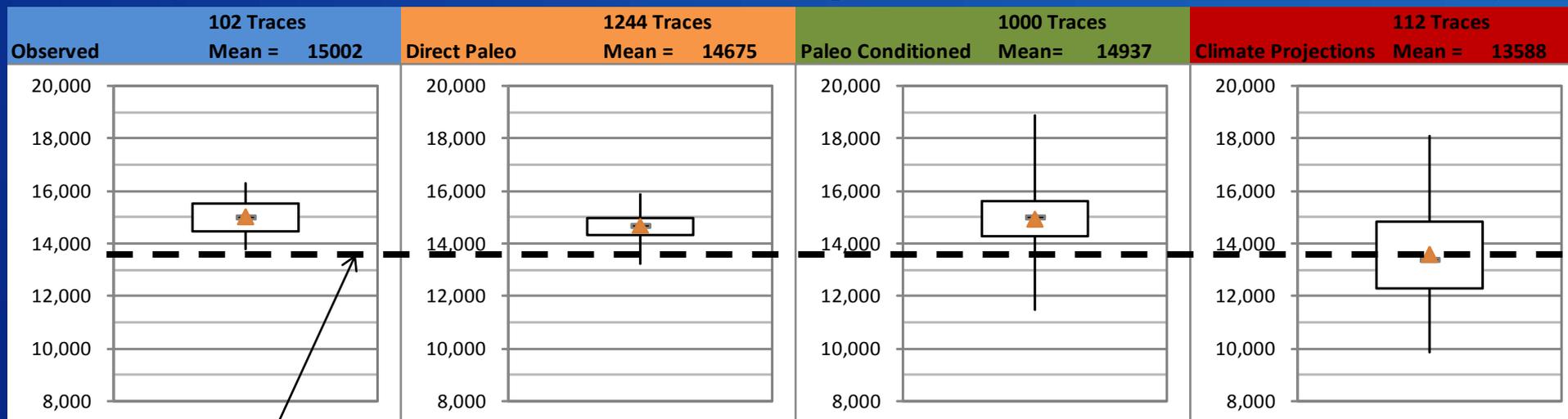

RECLAMATION
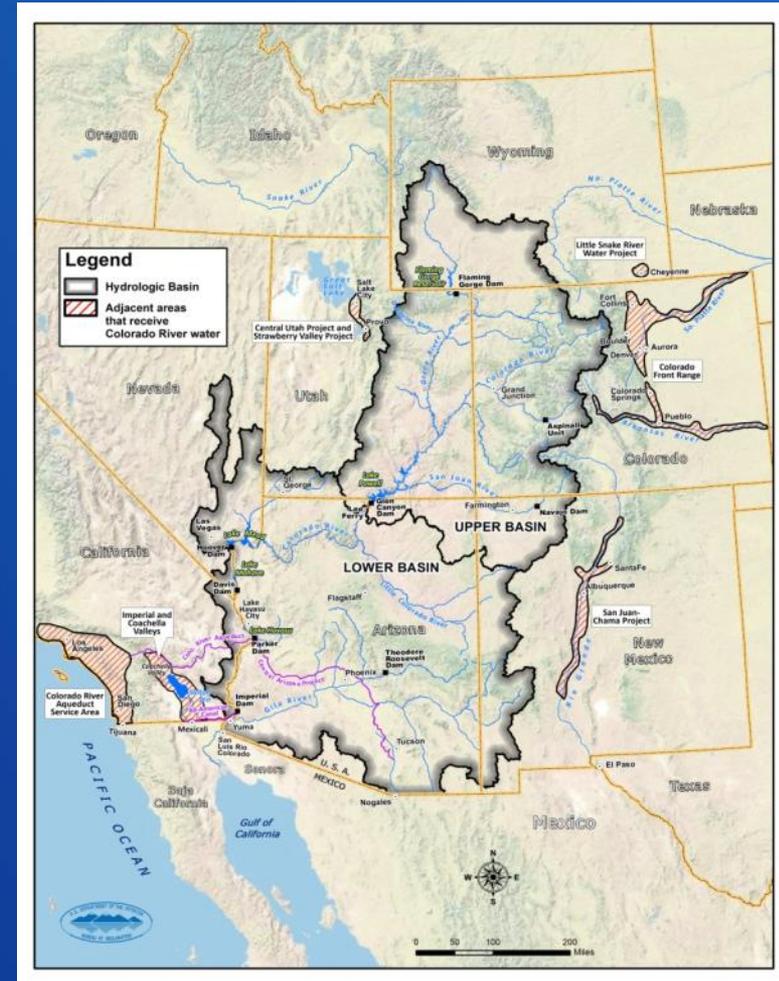
System Reliability Analysis Approach
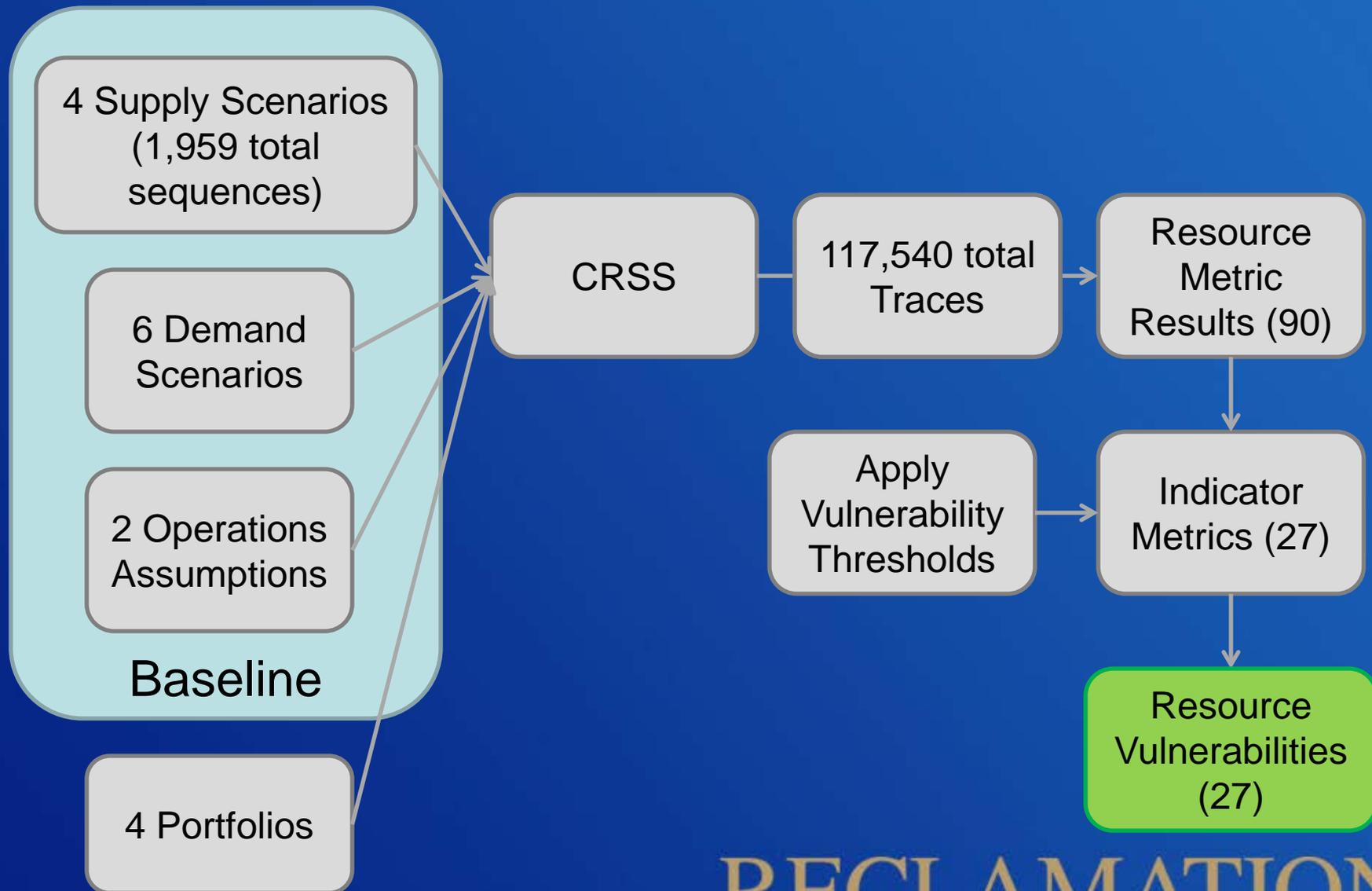
Quantification of Water Supply Scenarios

Projections of 2011-2060 Average Natural Flow at Lees Ferry

102 Traces	1244 Traces	1000 Traces	112 Traces
Observed Mean = 15002	Direct Paleo Mean = 14675	Paleo Conditioned Mean= 14937	Climate Projections Mean = 13588

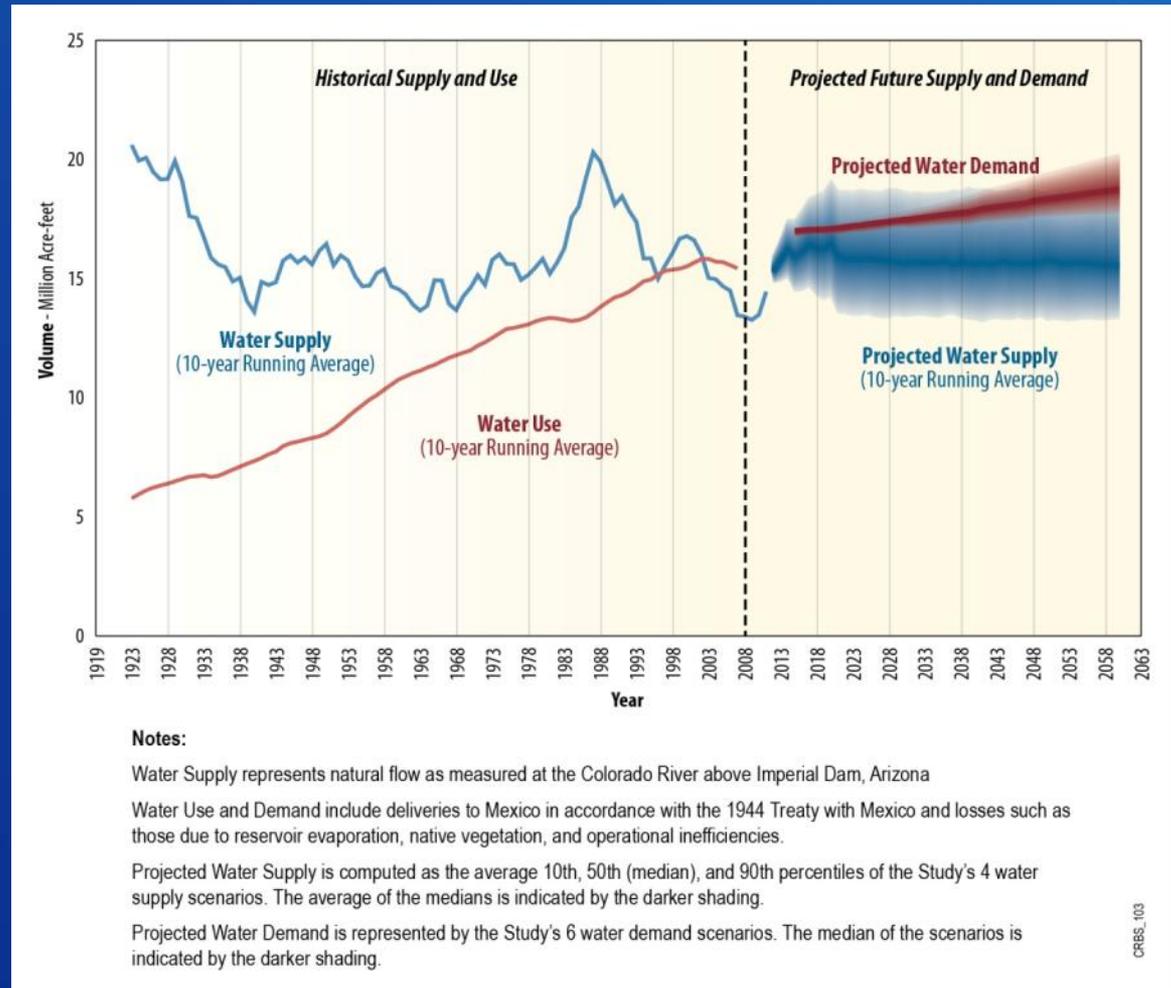1991 – 2010 average = 13.7 MAF

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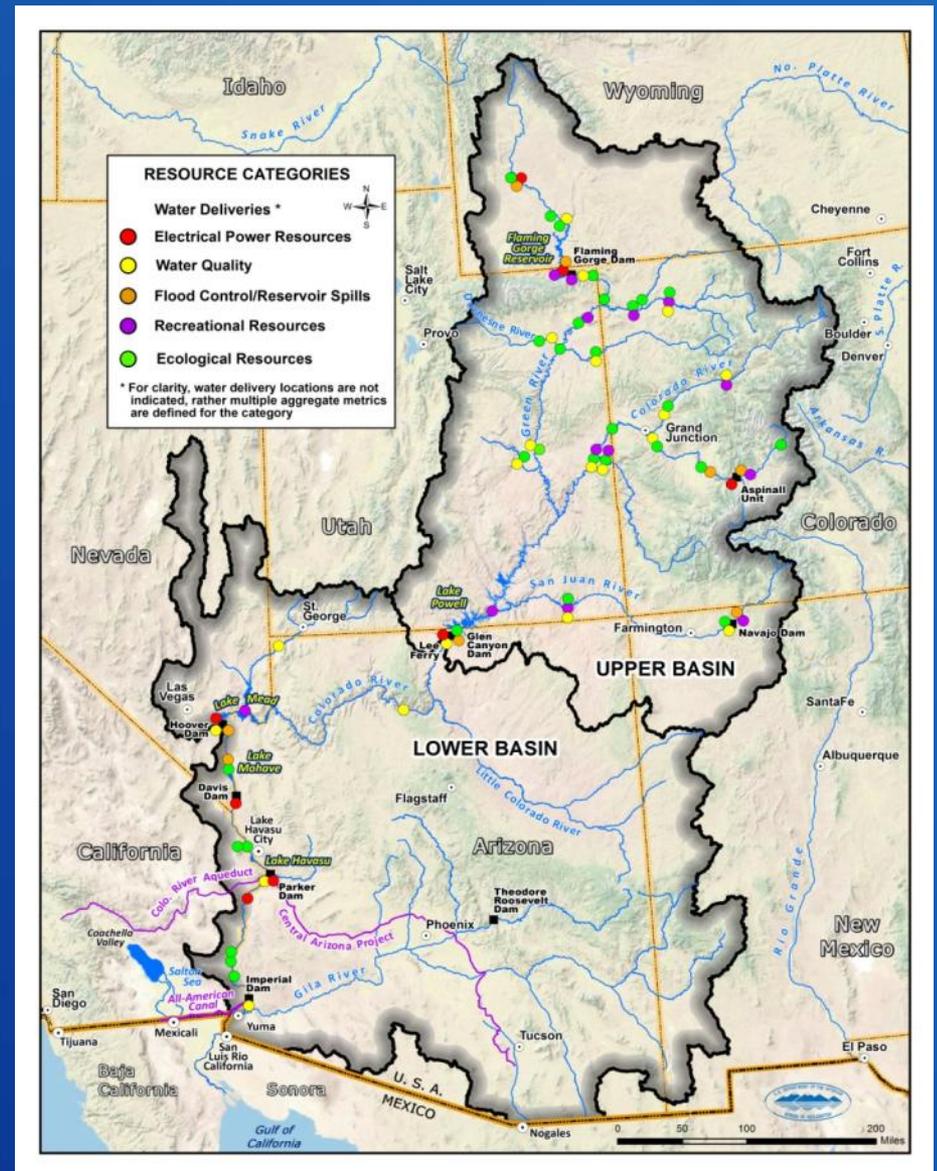
RECLAMATION

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

Historical Supply and Use | **Projected Future Supply and Demand**

Volume - Million Acre-feet

Projected Water Demand

Water Supply (10-year Running Average)

Water Use (10-year Running Average)

Projected Water Supply (10-year Running Average)

Year

Notes:

Water Supply represents natural flow as measured at the Colorado River above Imperial Dam, Arizona

Water Use and Demand include deliveries to Mexico in accordance with the 1944 Treaty with Mexico and losses such as those due to reservoir evaporation, native vegetation, and operational inefficiencies.

Projected Water Supply is computed as the average 10th, 50th (median), and 90th percentiles of the Study's 4 water supply scenarios. The average of the medians is indicated by the darker shading.

Projected Water Demand is represented by the Study's 6 water demand scenarios. The median of the scenarios is indicated by the darker shading.

CRBS_103

RECLAMATION

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

RESOURCE 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

RECLAMATION

Reduction in Key Vulnerabilities by Water Supply Scenario (2041-2060)

Water Supply Scenario	Portfolio	Upper Basin Vulnerability (Lee Ferry Deficit)	Lower Basin Vulnerability (Lake Mead Pool Elevation < 1,000 feet msl)
Observed Resampled	Baseline	0%	7%
	Portfolio A	0%	0%
	Portfolio B	0%	0%
	Portfolio C	0%	0%
	Portfolio D	0%	0%
Paleo Resampled	Baseline	0%	9%
	Portfolio A	0%	0%
	Portfolio B	0%	0%
	Portfolio C	0%	0%
	Portfolio D	0%	1%
Paleo Conditioned	Baseline	5%	16%
	Portfolio A	0%	2%
	Portfolio B	2%	2%
	Portfolio C	0%	3%
	Portfolio D	2%	4%
Downscaled GCM Projected	Baseline	18%	44%
	Portfolio A	3%	11%
	Portfolio B	8%	11%
	Portfolio C	4%	17%
	Portfolio D	11%	18%
		10% 20% 30% 40% 50% Percent Years Vulnerable	10% 20% 30% 40% 50% Percent Years Vulnerable