Subcommittee on Imported Water

Incorporating Climate Change in the Colorado River Post-2026 Guidelines Analysis

Item 3a

August 26, 2025

Item 3a
Incorporating Climate Change in the Colorado River Post-2026 Guidelines Analysis

Subject
Incorporating Climate Change in the Colorado River Post-2026 Analysis

Purpose
To provide the Board with information on why hydrologic assumptions Reclamation will make when analyzing alternatives as a part of the Post-2026 NEPA process.

Next Steps
Continue efforts to provide the Board with information relevant to the Post-2026 NEPA process

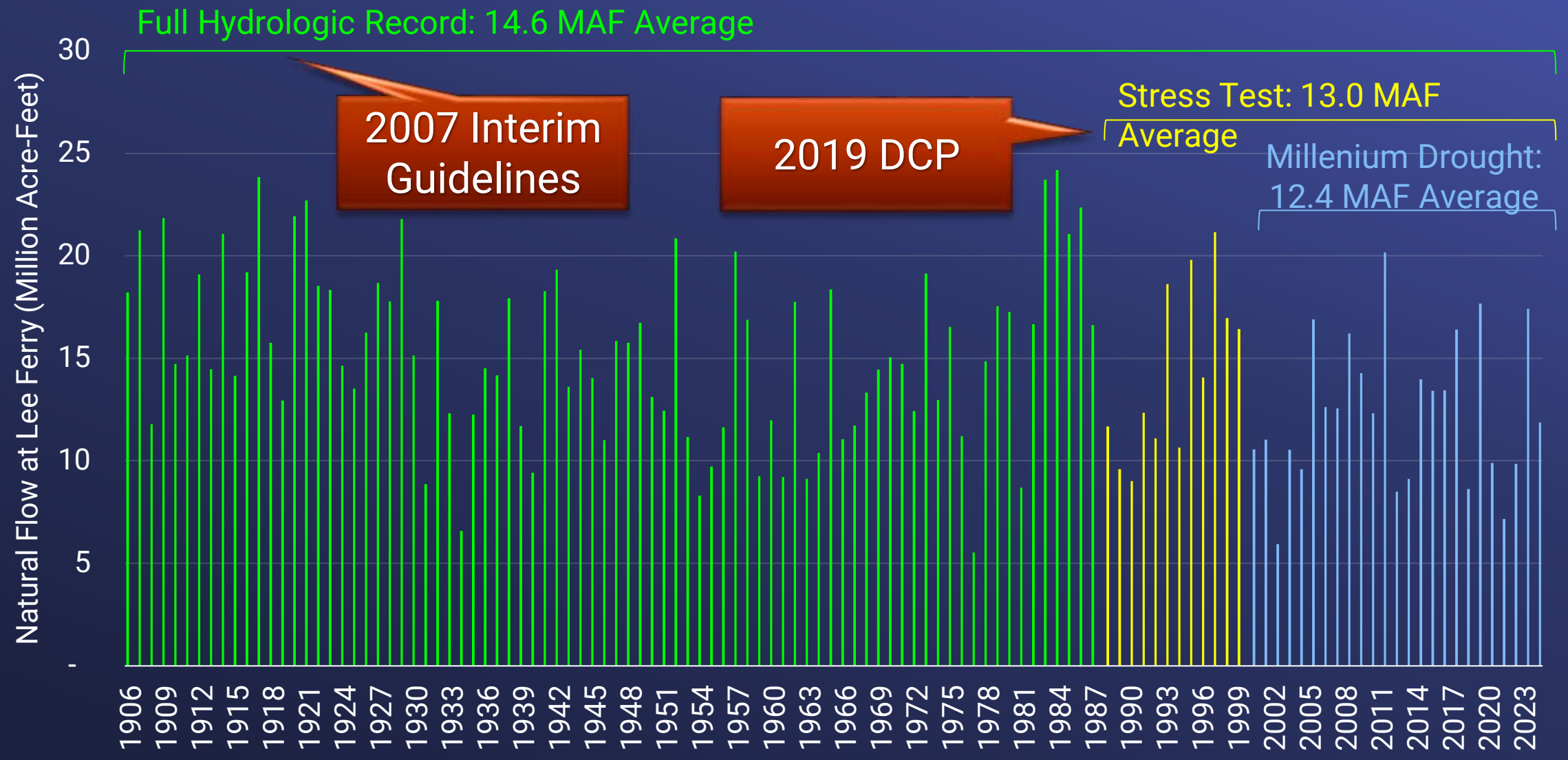
Historically the Indexed Sequential Method Used for Developing Hydrologic Traces for Analysis

- USBR and Metropolitan have both used Index Sequential Method (ISM)
- 2020 IRP adjusted the ISM hydrologic traces to account for climate change

ISM Example Hypothetical Data 1901-2000

Potential Future	Forecast Year						
	Yr1	Yr2	Yr3	Yr4	Yr5	…	Yr30
Trace 1	1901	1902	1903	1904	1905	…	1930
Trace 2	1902	1903	1904	1905	1906	…	1931
Trace 3	1903	1904	1905	1906	1907	…	1932
Trace 4	1904	1905	1906	1907	1908	…	1933
Trace 5	1905	1906	1907	1908	1909	…	1934
Trace 6	1906	1907	1908	1909	1910	…	1935
	⋮	⋮	⋮	⋮	⋮		⋮
Trace 100	2000	1901	1902	1903	1904	…	1929

USBR Has Looked at Drier Conditions Over Time



Different Ways of Developing Hydrologic Conditions for Consideration

Observed History

Global Climate Models

Paleohydrology

Other Approaches

- Temperature Adjusted

What is USBR Assuming

Observed History

Stress Test (1988-2023)

Global Climate Models

CMIP5 LOCA VIC[1] CMIP3*

Paleohydrology

Paleo Drought Resampled*

Other Approaches

Post-Pluvial Temp-Adjusted

Super Ensemble

400 Traces
(30 Years for Each Trace)

[1] LOCA = Localized Constructed Analogs; VIC = Variable Infiltration Capacity

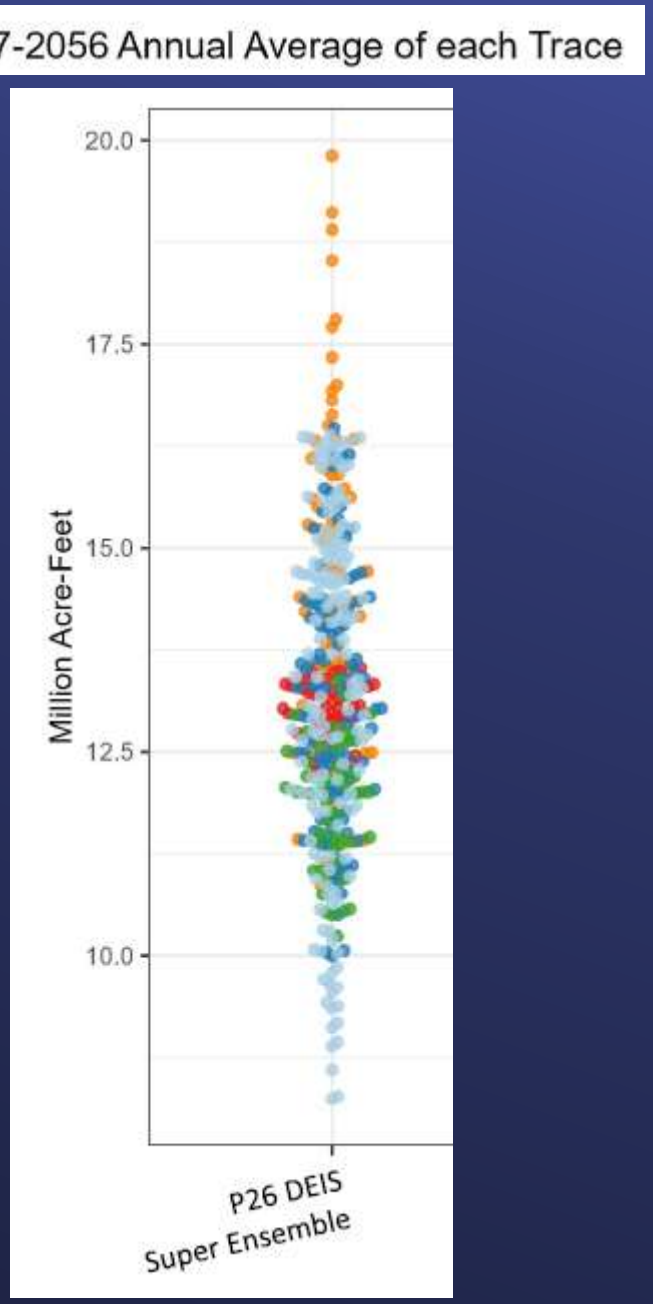
*A portion of the hydrology set was used to develop the Super Ensemble

Using Hydrology from Multiple Approaches Provides Coverage for Unknown Future

USBR Evaluating Hydrology in Many Ways

- Annual Average Runoff
- Annual Minimum
- Annual Maximum
- Min/Max/Median of 2-year to 20-year running averages
- 30-year trend

The Super Ensemble is Comprehensive



Wide Range of Annual Average Conditions

20 MAF – 8.5 MAF

A Shift is Needed When Thinking About Results

Understanding the Likelihood of a Given Future

Simulate Every Possible Future

Identify the Conditions that Cause Undesirable Outcomes

DEIS Evaluation: Robustness and Vulnerability NOT Probability

Robustness

- A property of how well an alternative performs over many possible futures
- Provides information about outcomes across large numbers of traces
- Robustness thresholds represent a desirable outcome

Vulnerability

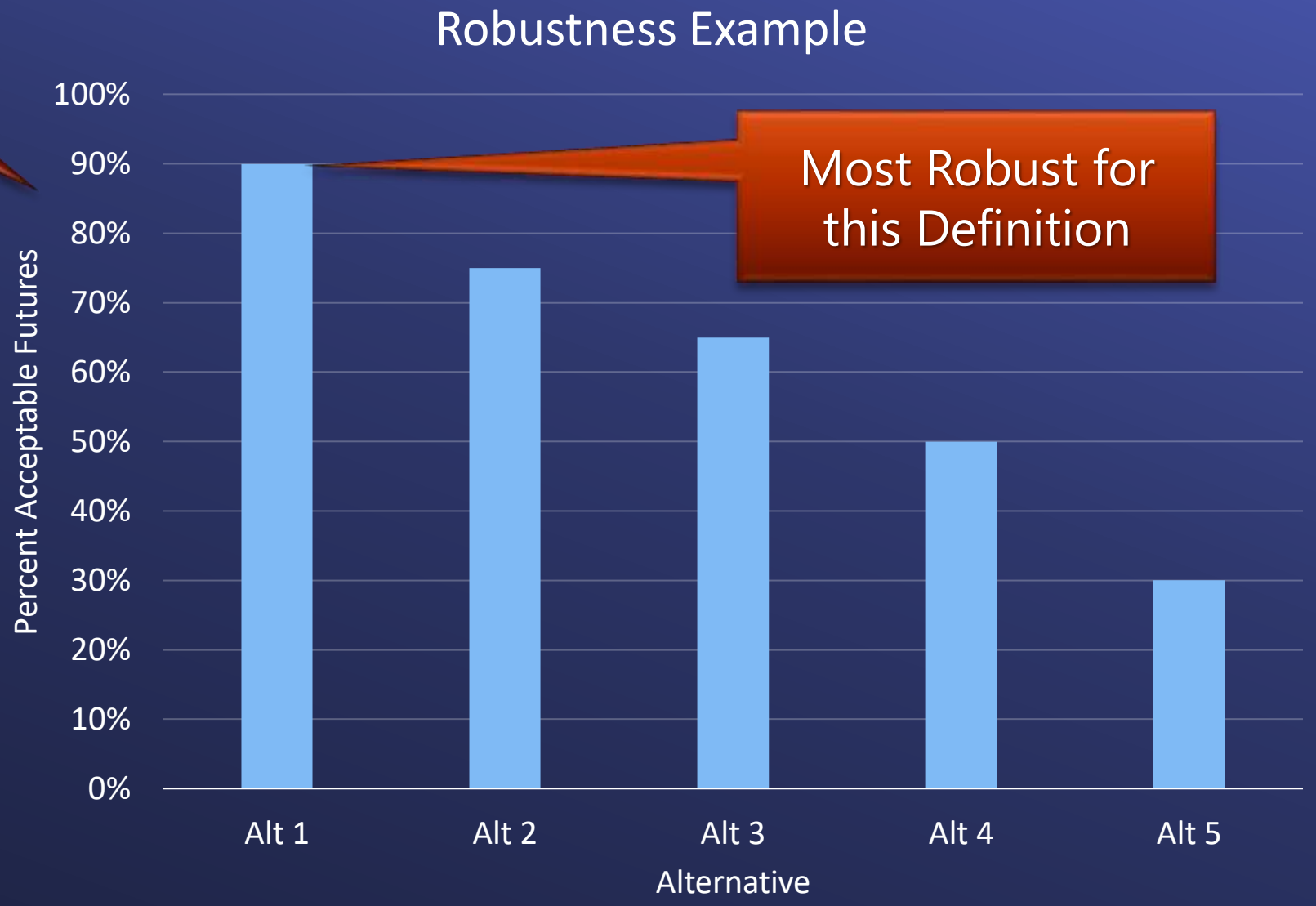
- Vulnerability analysis discovers the conditions that cause a strategy to have unacceptable performance

Percent of the 400 Traces

Robustness

Example Robustness Definition:

Performance will be acceptable if the Mead Pool Elevation stays above 1,050 feet 80% of the time or more over the next 20 years.



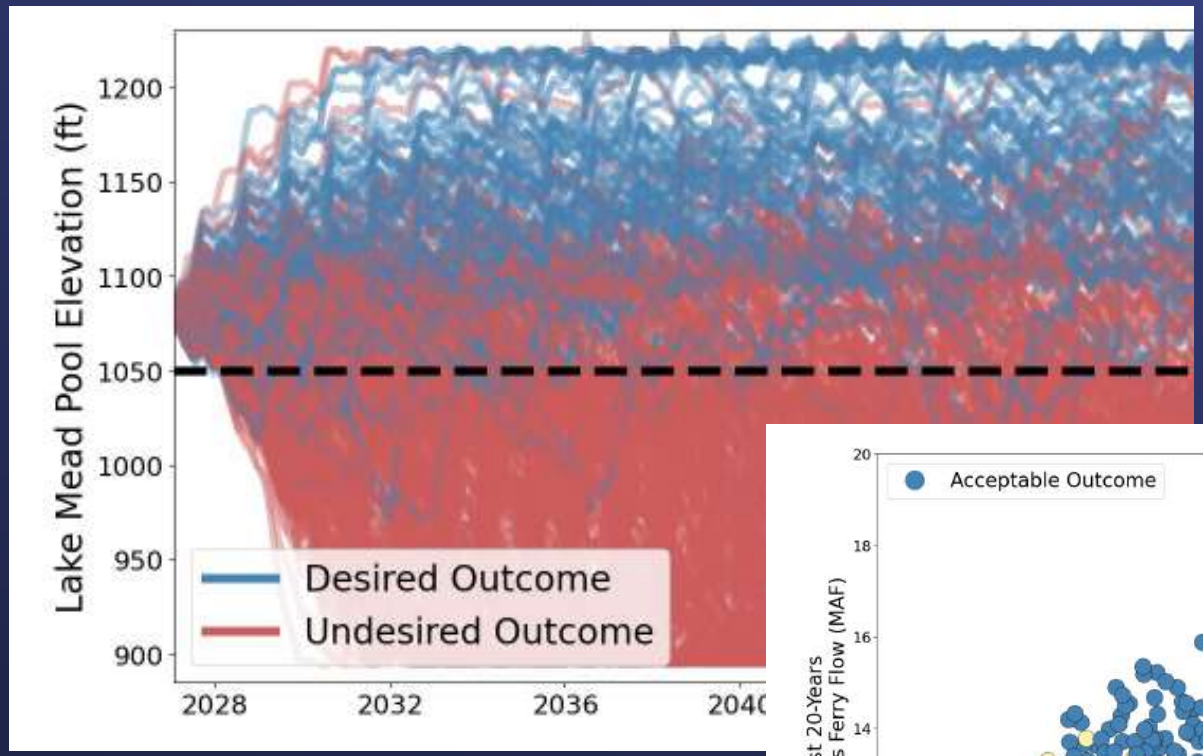
Percent of the 400 Traces

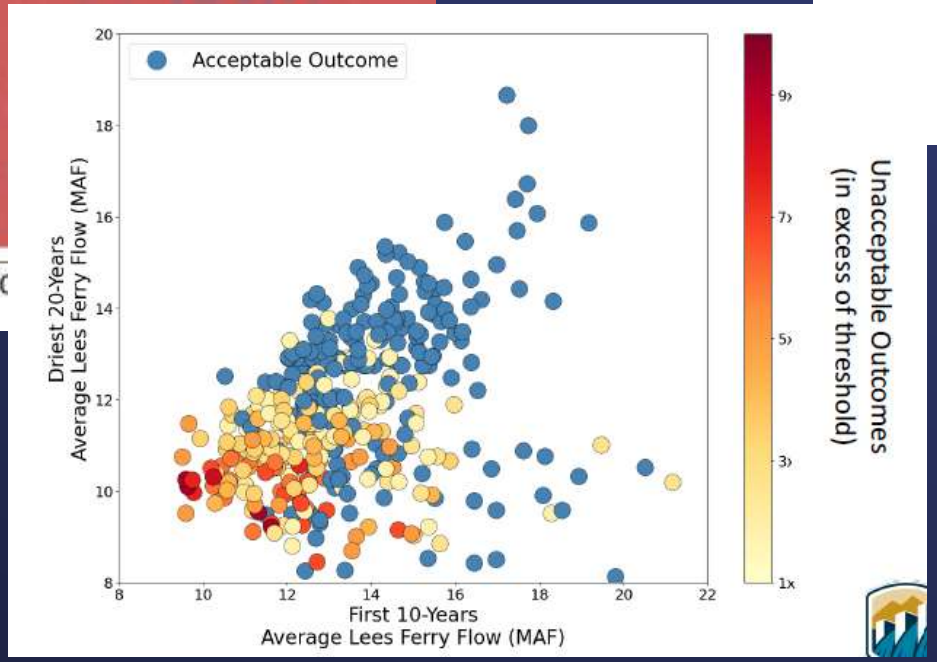
Vulnerability

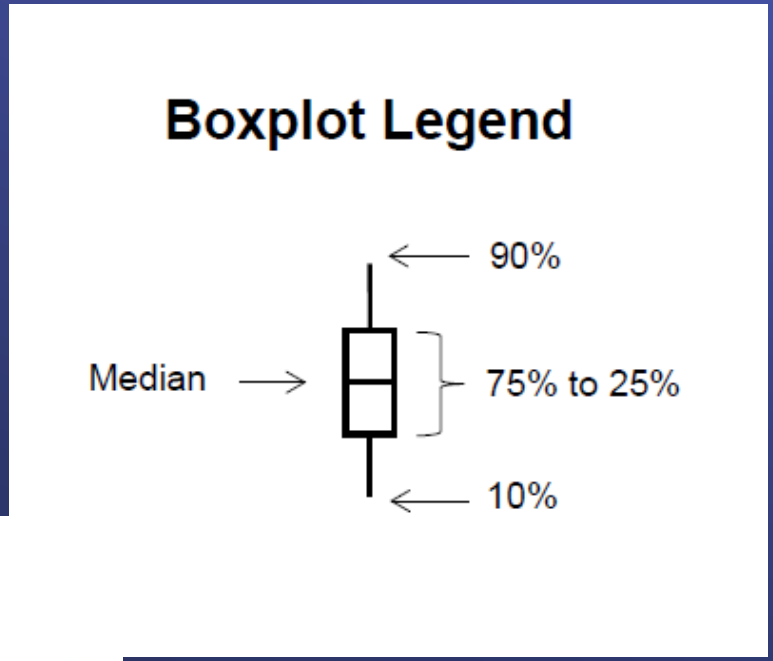
Example Vulnerability Definition:

Performance will be unacceptable if the Mead Pool Elevation stays below 1,000 feet 10% of the time or more over the next 20 years.

There are Many Ways to Display Robustness and Vulnerability Metrics







Additional Information is Available

USBR Presentations on Hydrology and Robustness/Vulnerability Metrics

- Hydrology
  - https://www.usbr.gov/ColoradoRiverBasin/post2026/ITEW%20Session%203%20Hydrology_WebPosting_508.pdf
- Metrics
  - https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/itew/ITEWSession5_MORDM_WebPosting_508.pdf

THE METROPOLITAN WATER DISTRICT OF
SOUTHERN CALIFORNIA
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