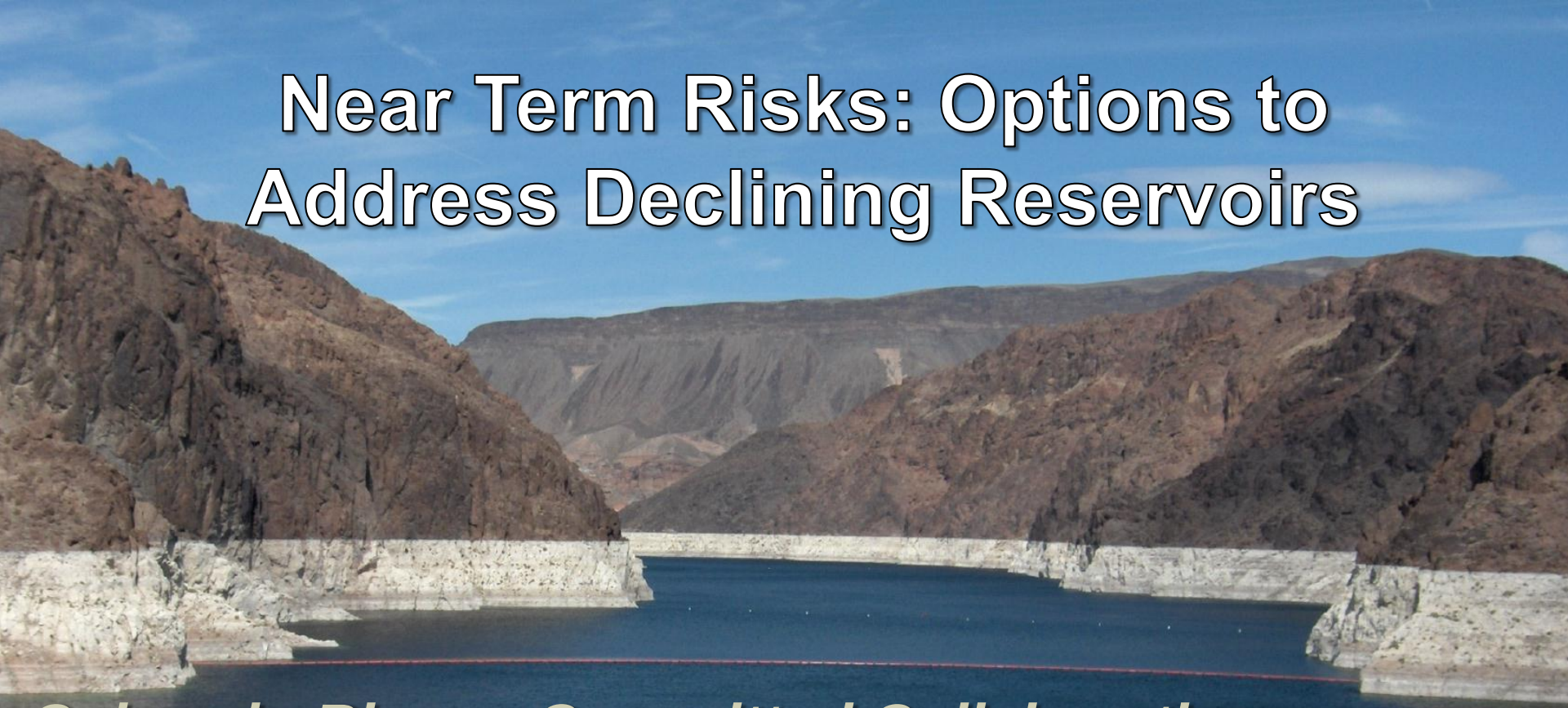
Near Term Risks: Options to Address Declining Reservoirs

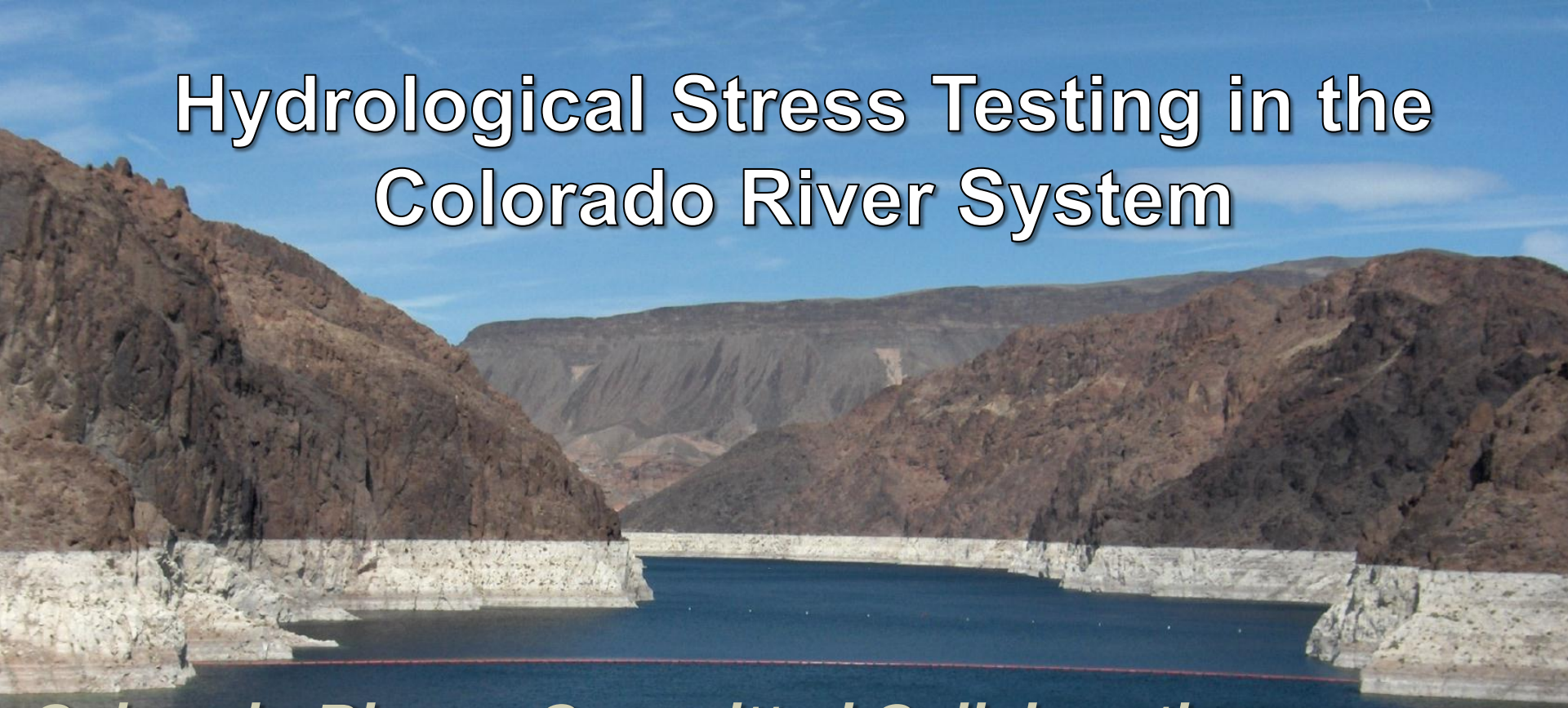


Colorado River – Committed Collaboration

Colorado River Water Users Association Annual Conference
December 11-13, 2013 **- Las Vegas, Nevada**

Eric Kuhn, General Manager
Colorado River District
Protecting Western Colorado Water Since 1937

Hydrological Stress Testing in the Colorado River System



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Stressing the System necessitates cooperative Contingency Planning

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Stress Testing Scenarios

- Different supply and demand scenarios
- **Supply:** extend recent observed drought into future
- **Demand:** utilize different demand sets
- **Mitigation:** Implement different demand management and operational strategies in BOTH Upper and Lower Basins

Supply (Hydrology) Stress Test

- Assume 1988-2007 hydrology follows 2000-2013 drought
- 2000-2013 12.2 MAF @ Lee Ferry
- 1988-2007 13.1 MAF @ Lee Ferry
- Combined 34 yrs 12.7 MAF @ Lee Ferry
- Includes 21 yrs of 11.7 MAF @ Lee Ferry

aka VERY DRY (like the mid 1100's)

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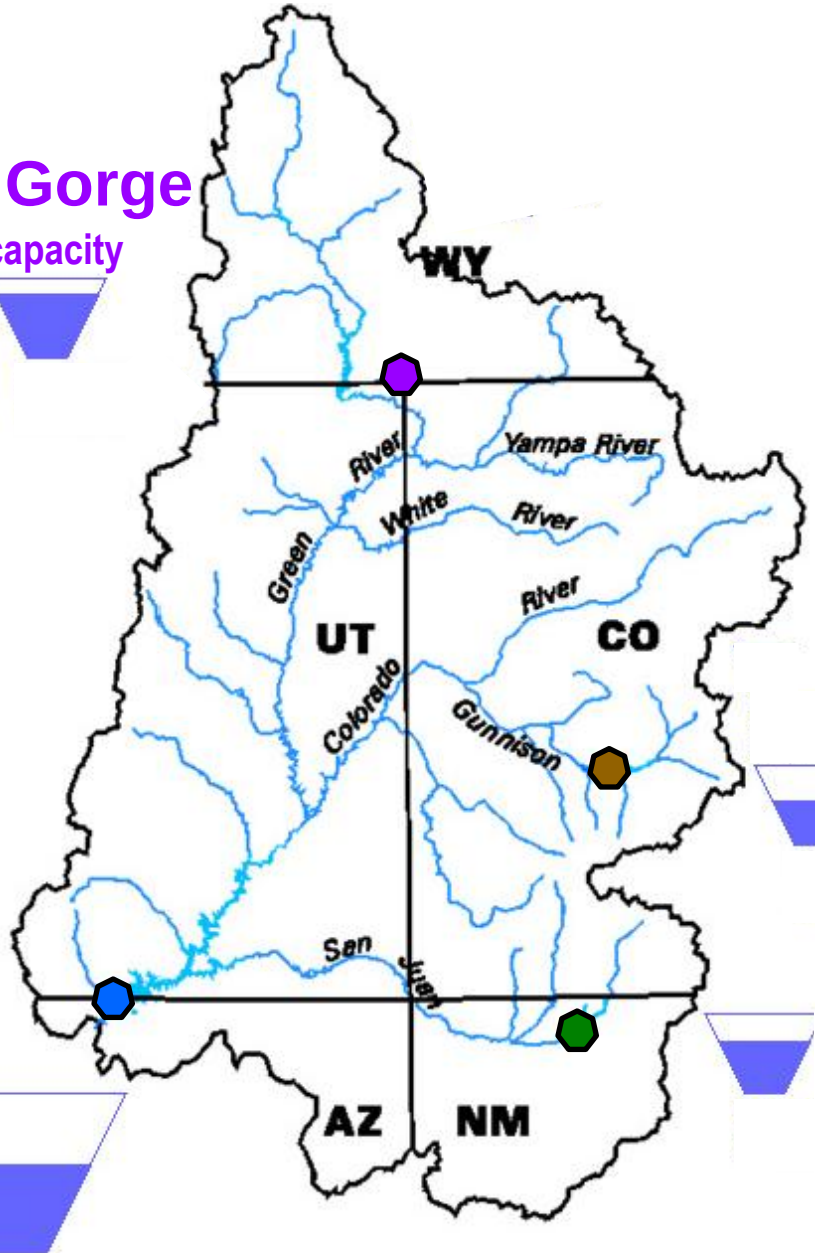
Possible Actions

- Status Quo – Hope for wet years
- Action Alternatives:
  - Decrease uses (voluntary demand mgmt. approach)
  - Improve System Efficiency
  - Re-operate Upper Basin reservoirs

Colorado River Storage Project Units (CRSP)



Flaming Gorge

3.7MAF active capacity

75% full

CRSP Acts of 1956 and 1968 authorized construction of facilities for long-term regulation and development of Colorado River water resources

Aspinall Unit:

Blue Mesa, Morrow Point & Crystal Res.

Blue Mesa

0.84MAF active capacity

45% full

Navajo

1.7 MAF active capacity

57% full

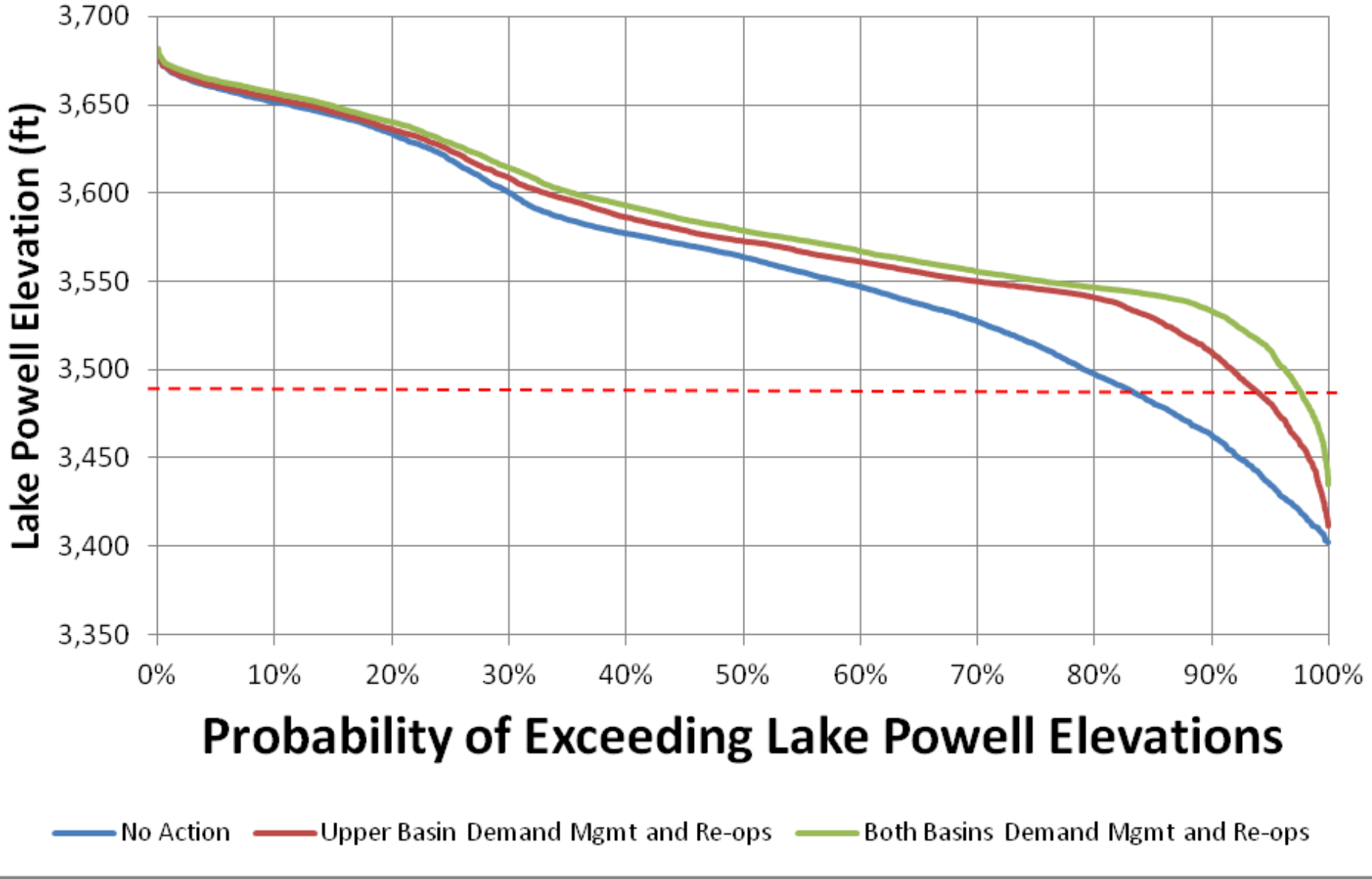
Lake Powell

26 MAF active capacity

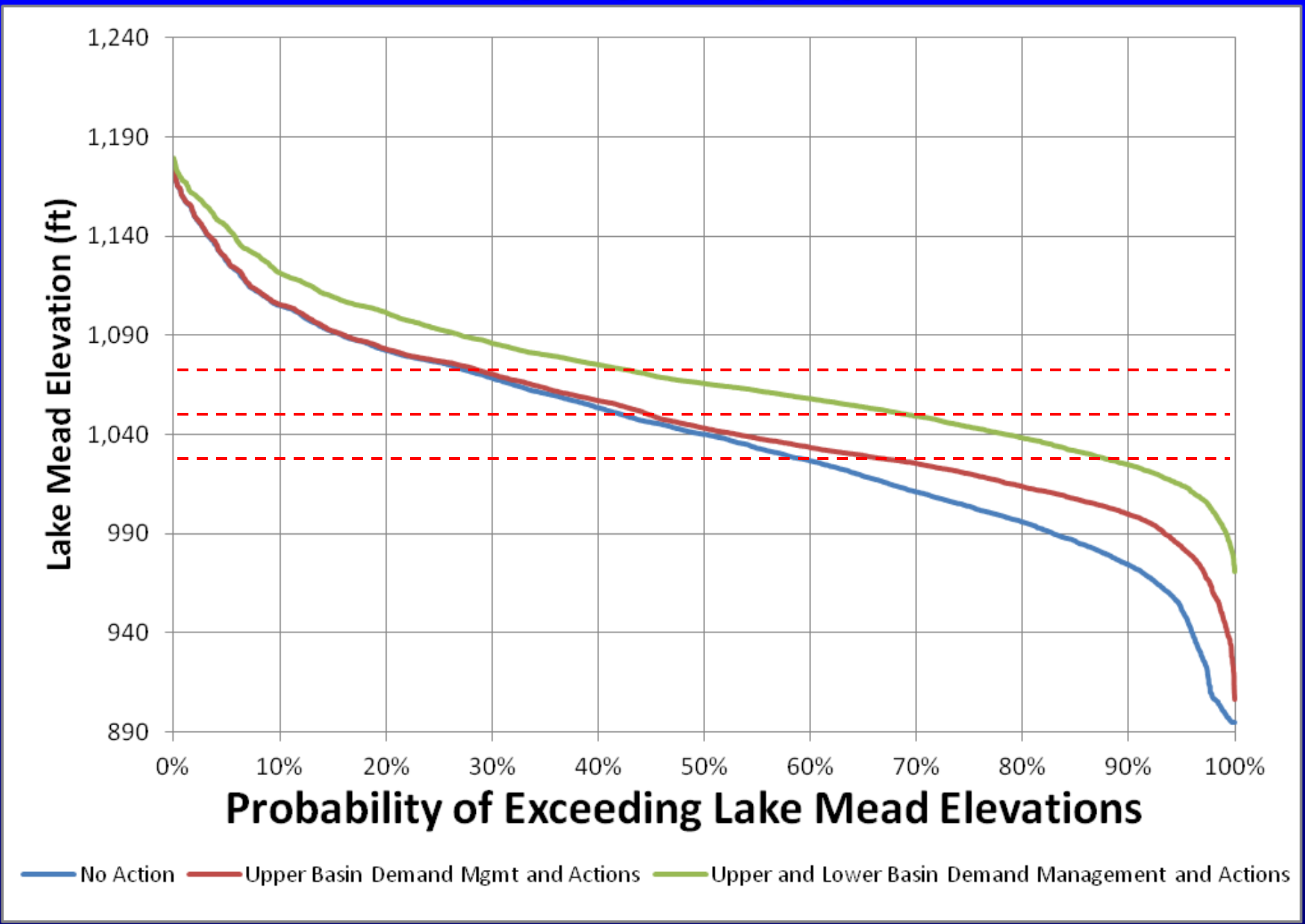
43% full

SOURCE: USBR UPPER COLORADO REGION STORAGE LEVELS AS OF 12/09/13

Lake Powell

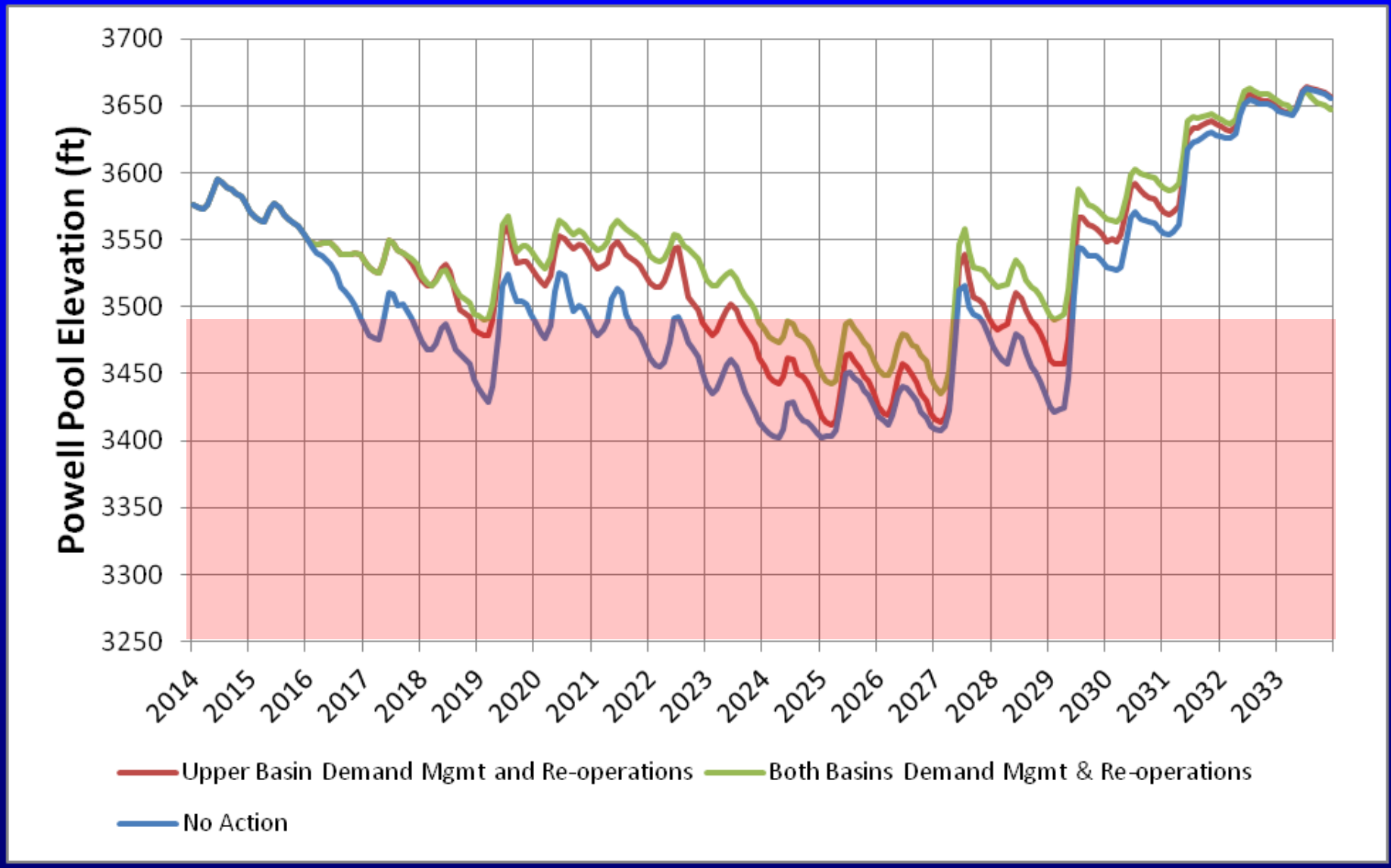

3,700
3,650
3,600
3,550
3,500
3,450
3,400
3,350
Lake Powell Elevation (ft)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Probability of Exceeding Lake Powell Elevations
No Action
Upper Basin Demand Mgmt and Re-ops
Both Basins Demand Mgmt and Re-ops

Lake Mead

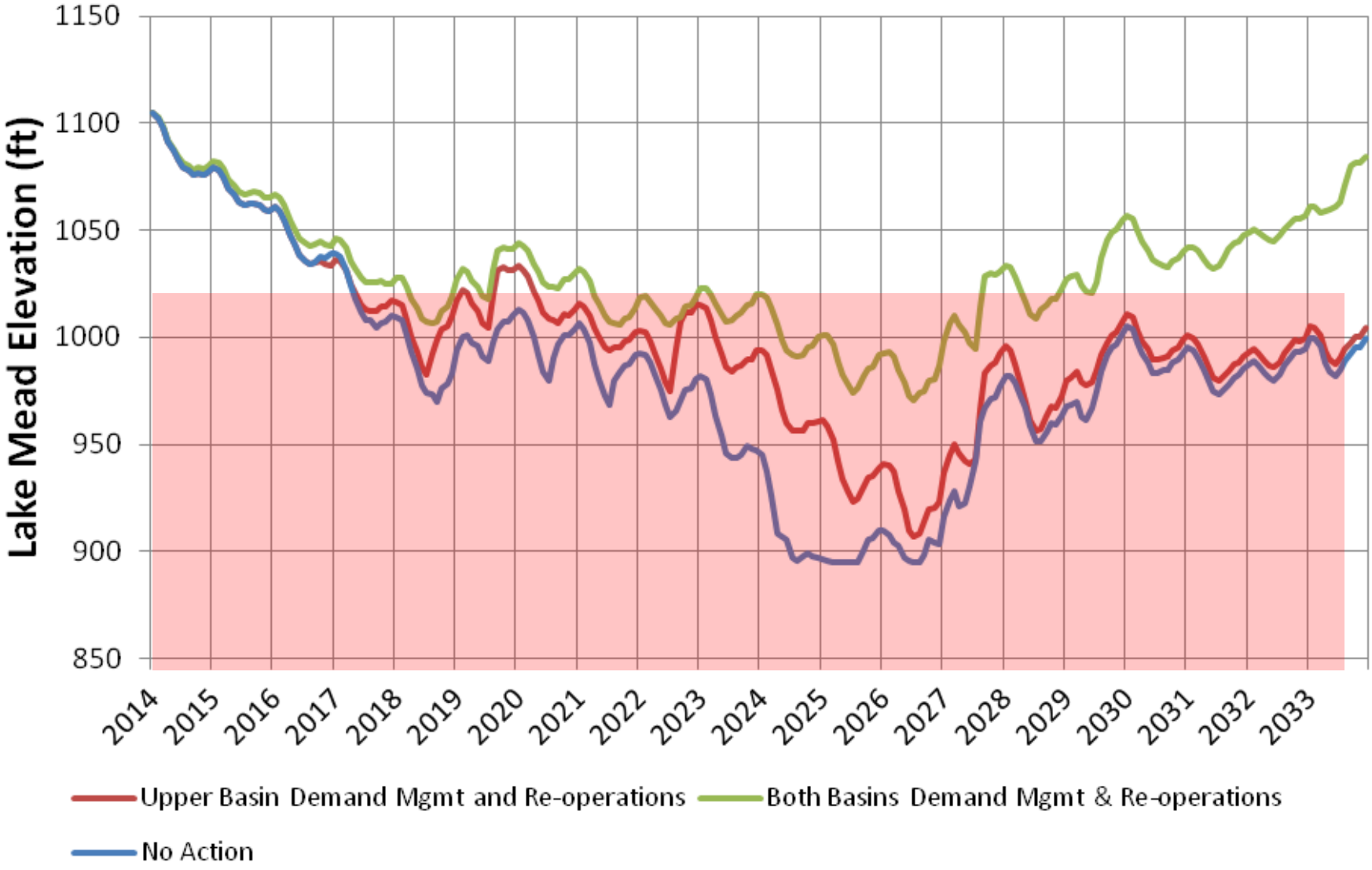

1,240
1,190
1,140
1,090
1,040
990
940
890
Lake Mead Elevation (ft)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Probability of Exceeding Lake Mead Elevations
No Action
Upper Basin Demand Mgmt and Actions
Upper and Lower Basin Demand Management and Actions

Lake Powell - Demand Mgmt and Re-Operations

(single trace 2000-2007; 1988-1999)



Lake Mead - Demand Mgmt Actions (single trace 2000-2007; 1988-1999)



Uncertain Future:

"Past performance does not guarantee future results"

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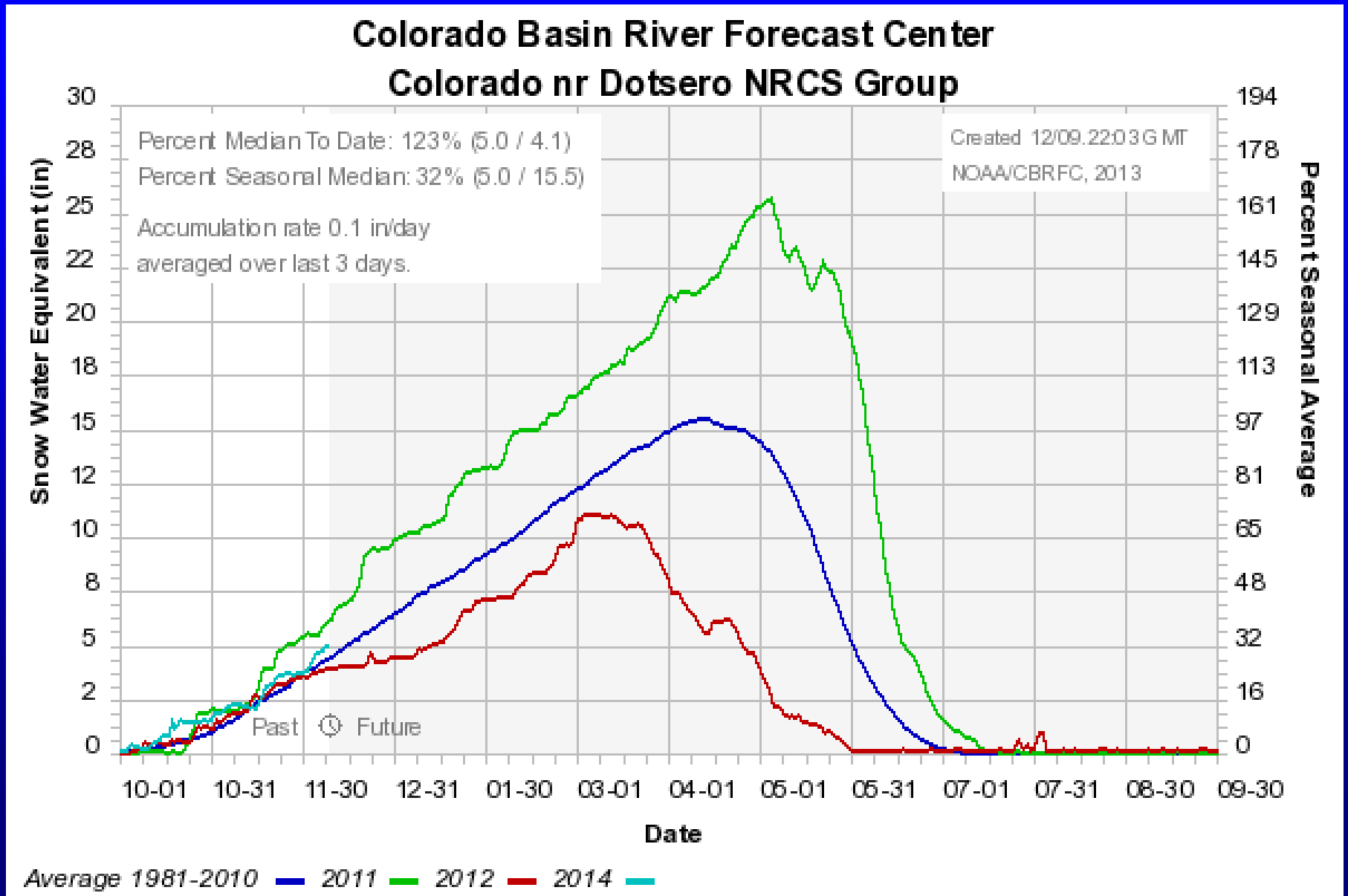
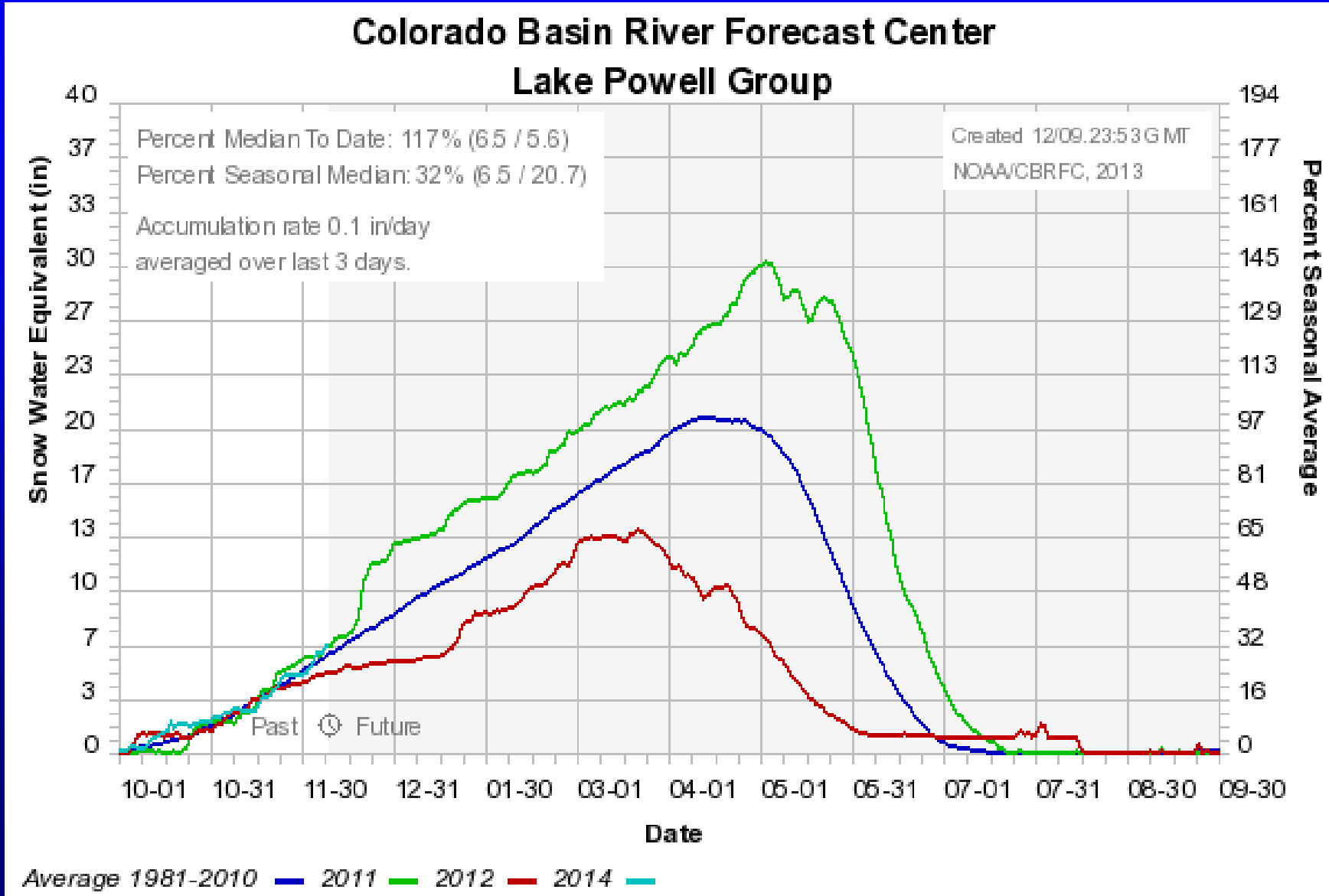
Current Hydrological Conditions in Upper Basin

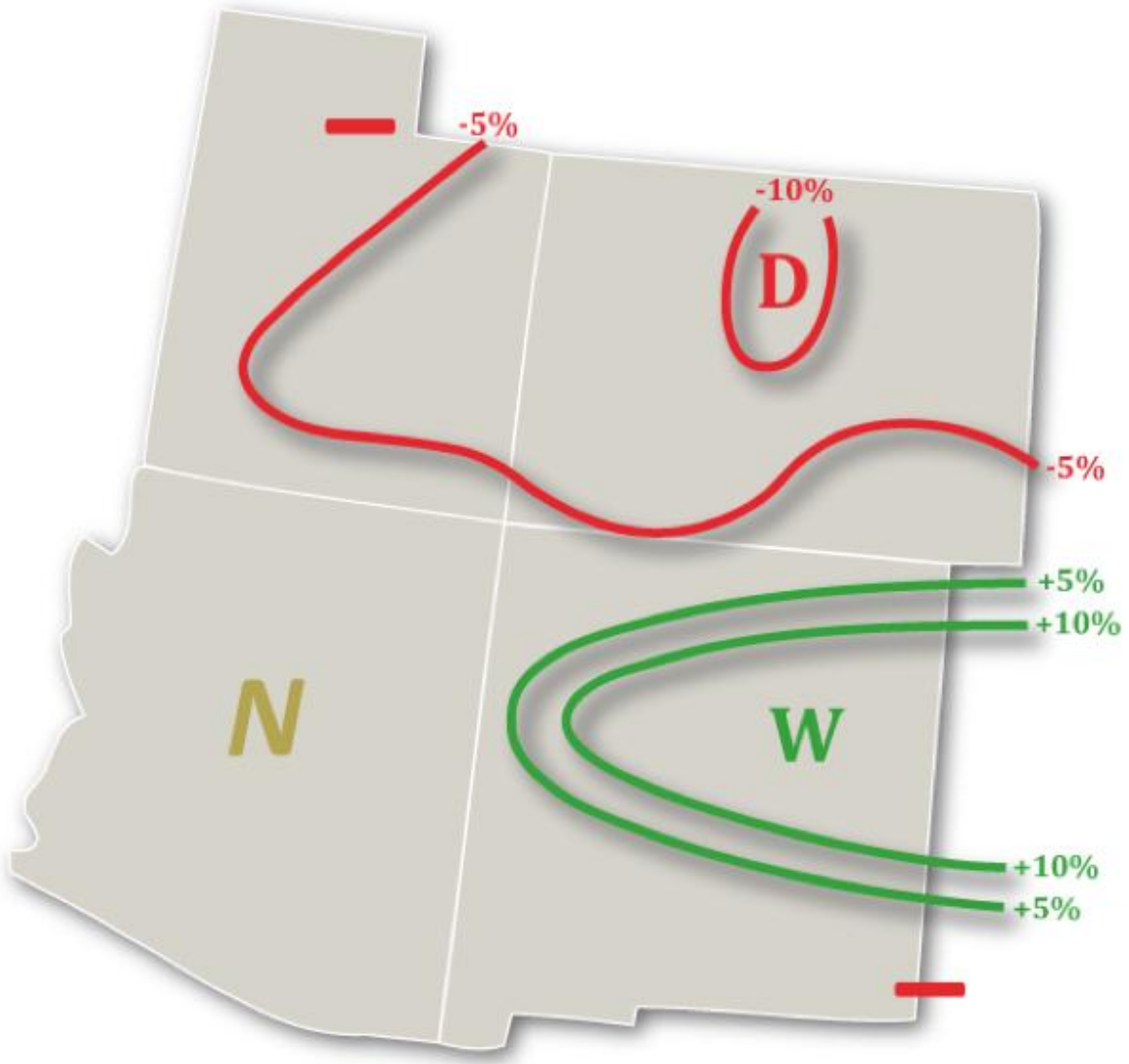


Current Hydrological Conditions in Upper Basin



Experimental PSD Precipitation Forecast Guidance

JAN – MAR 2014 (Issued November 13, 2013)



Courtesy of Klaus Wolter, PhD, *Cooperative Institute for Research in Environmental Sciences*

Take Away Summary

1. Results are preliminary
2. Based upon contingency planning, not a prediction of future
3. All planning honors "Law of the River"
4. Not easy, will require further modeling, evaluation and outreach
5. Continued cooperation toward **BASIN-WIDE** contingency planning essential

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Planning for the Ultimate Stress Test

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