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Mid- to Long-term Colorado River System Projections

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Upper Colorado River Commission Work Meeting

August 7, 2020

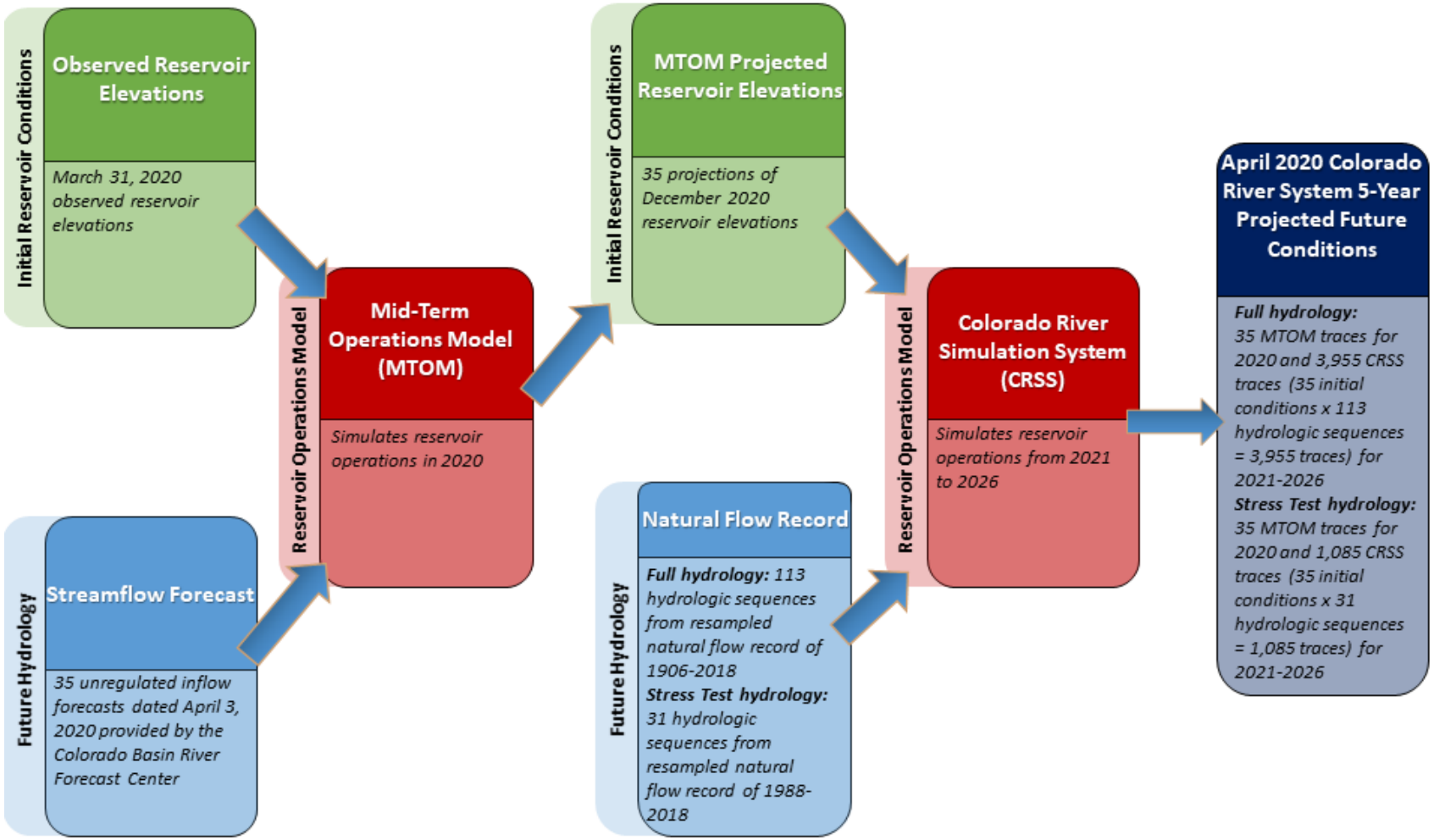
Basin-Wide Model Comparison

	24-MS	MTOM	CRSS
Primary Use	AOP tier determinations and projections of current conditions	Risk-based operational planning and analysis	Long-term planning studies, criteria development, and risk analysis
Probabilistic or Deterministic	Deterministic – single hydrologic trace	Probabilistic 35 (or more) hydrologic traces & 112 (or more) hydrologic traces	
Simulated Reservoir Operations	Operations input manually	Rule-driven operations	
Time Horizon (years)	1 - 2	1 - 5	1 - 50
Upper Basin Inflow	Single trace & Multi-trace unregulated inflow forecast provided by CBRFC		Natural inflow based on historical, paleo-record, or climate-driven hydrology
Upper Basin Demands	Implicitly modeled, estimated in unregulated inflow forecast		Explicitly modeled, based on 2007 UCRC schedules
Lower Basin Demands	Official approved and operational schedules		General schedules, provided by Lower Basin States

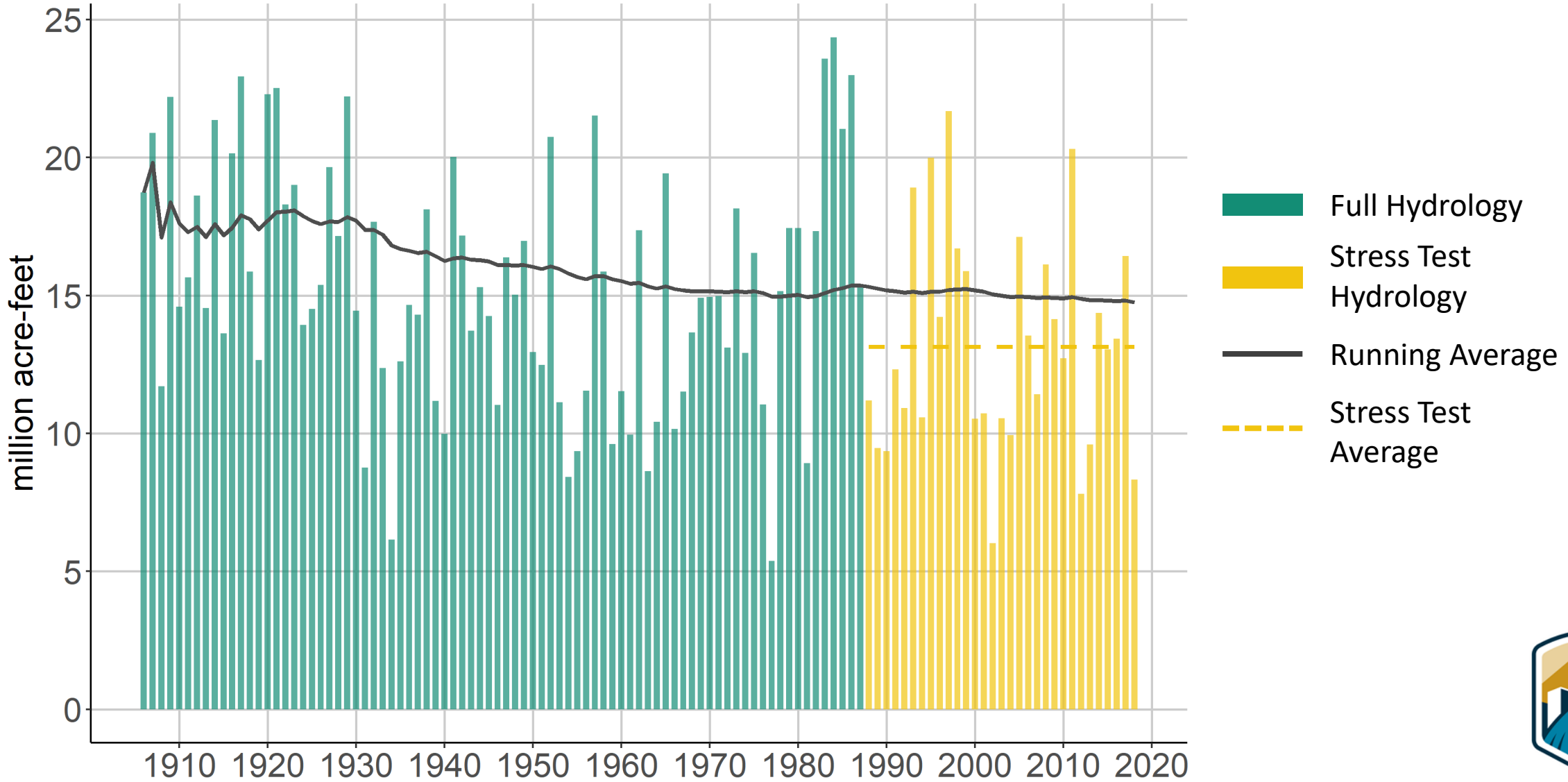
Mid- to Long-term Projections

- 24-MS projections made monthly
- MTOM projections made ~monthly but published 2x year
- CRSS projections in January, April, and August

April 2020 5-year projected future conditions process



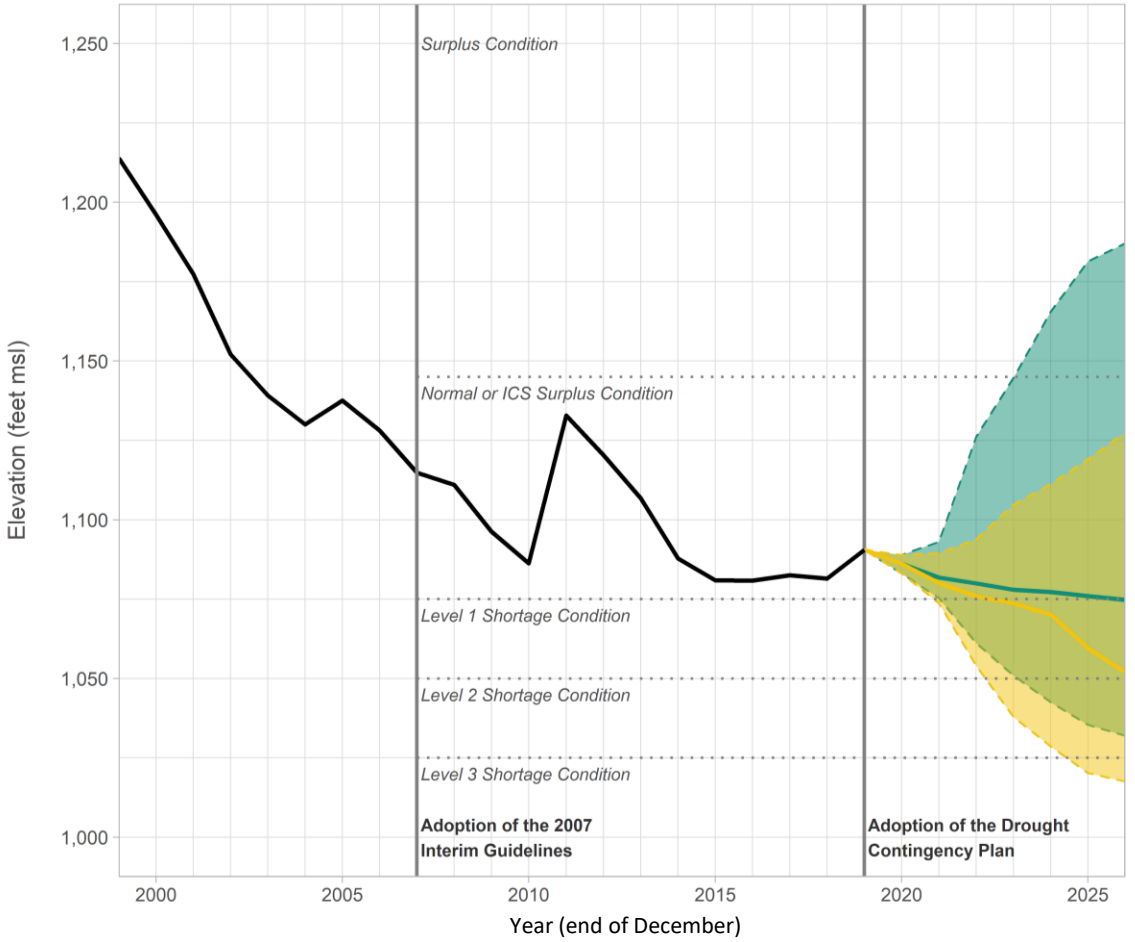
Full (1906-2018) and Stress Test (1988-2018) Hydrology



April 2020 CRSS Projections
Full Hydrology vs. Stress Test Hydrology

Powell End-of-December Elevation

Mead End-of-December Elevation



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April 2020 CRSS Projections

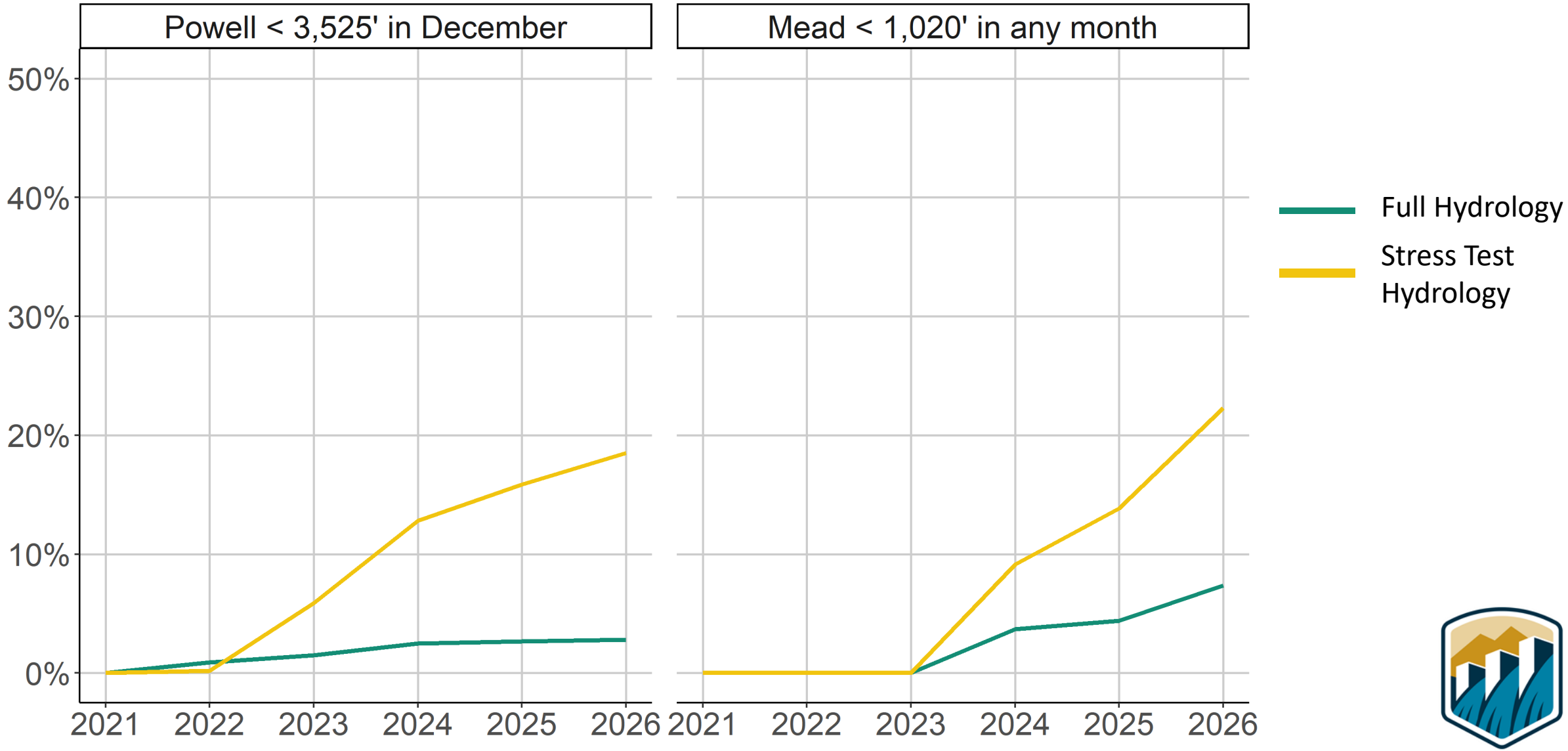
Upper Basin – Lake Powell
Percent of Traces with Event or System Condition
Results from April 2020 MTOM/CRSS using the Full Hydrology and Stress Test Hydrology (values in percent)

Event or System Condition	2021	2022	2023	2024	2025	2026	2021	2022	2023	2024	2025	2026
Equalization Tier (Powell ≥ Equalization [EQ] Elevation)	**7**	**21**	**21**	**25**	**27**	**29**	**2**	**6**	**10**	**13**	**10**	**11**
Equalization – annual release > 8.23 maf	*7*	*21*	*21*	*25*	*25*	*27*	*2*	*6*	*10*	*13*	*10*	*11*
Equalization – annual release = 8.23 maf	*0*	*<1*	*<1*	*<1*	*1*	*2*	*0*	*0*	*0*	*0*	*0*	*<1*
Upper Elevation Balancing Tier (Powell < EQ Elevation and ≥ 3,575 ft)	**93**	**65**	**59**	**56**	**52**	**48**	**98**	**72**	**56**	**50**	**47**	**37**
Upper Elevation Balancing – annual release > 8.23 maf	*38*	*39*	*40*	*37*	*35*	*37*	*45*	*46*	*42*	*39*	*32*	*26*
Upper Elevation Balancing – annual release = 8.23 maf	*55*	*26*	*20*	*18*	*16*	*11*	*53*	*26*	*14*	*11*	*13*	*11*
Upper Elevation Balancing – annual release < 8.23 maf	*0*	*<1*	*<1*	*1*	*1*	*1*	*0*	*<1*	*0*	*<1*	*1*	*<1*
Mid-Elevation Release Tier (Powell < 3,575 and ≥ 3,525 ft)	**0**	**14**	**19**	**18**	**19**	**21**	**0**	**22**	**33**	**31**	**30**	**36**
Mid-Elevation Release – annual release = 8.23 maf	*0*	*0*	*0*	*<1*	*2*	*2*	*0*	*0*	*0*	*0*	*3*	*3*
Mid-Elevation Release – annual release = 7.48 maf	*0*	*14*	*19*	*18*	*17*	*19*	*0*	*22*	*33*	*31*	*27*	*33*
Lower Elevation Balancing Tier (Powell < 3,525 ft)	**0**	**0**	**<1**	**1**	**3**	**3**	**0**	**0**	**<1**	**6**	**13**	**16**
Below Minimum Power Pool (Powell < 3,490 ft)	0	0	0	<1	1	1	0	0	0	<1	5	10

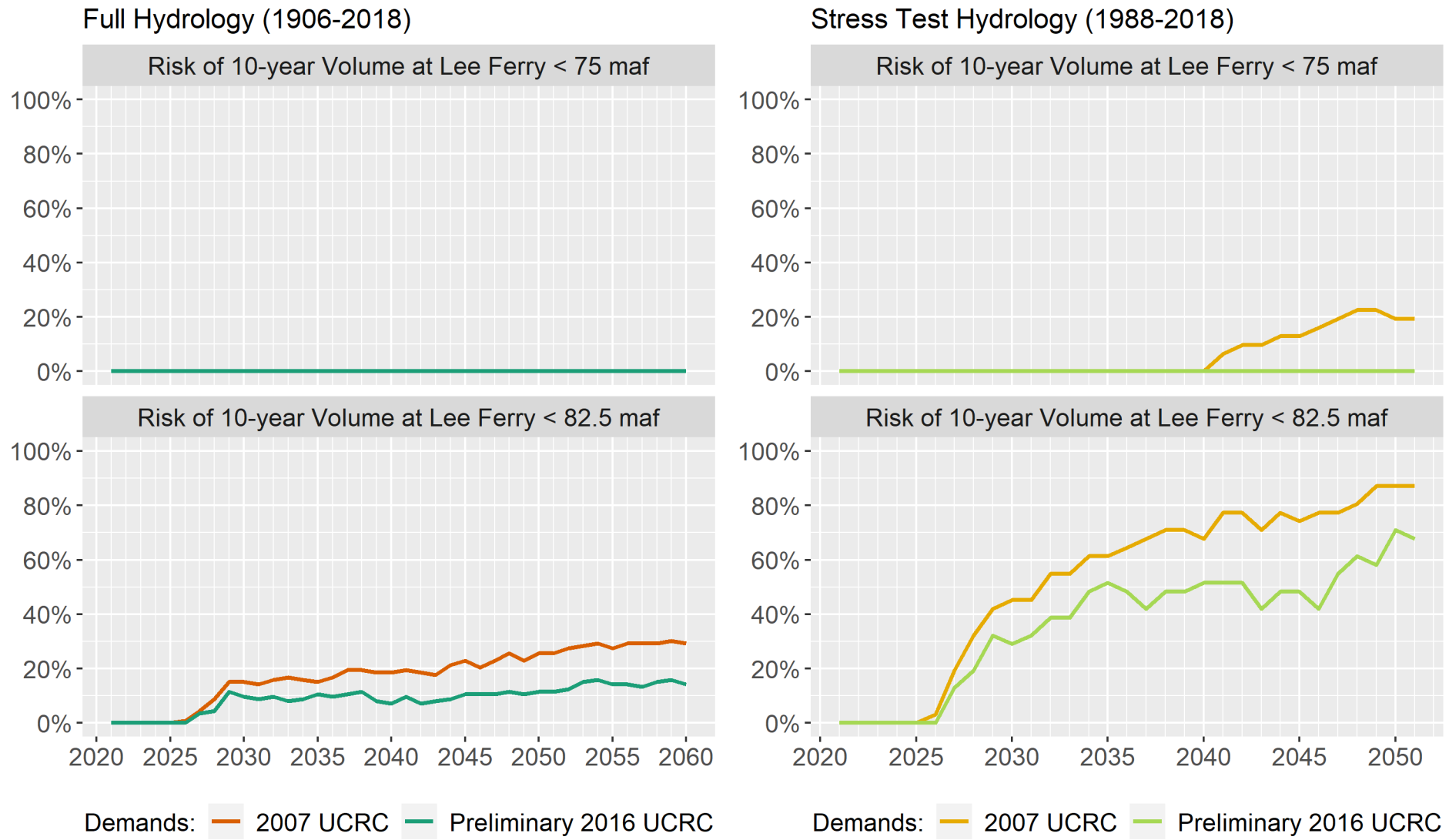
Notes:
[1] Modeled operations include the 2007 Interim Guidelines, Upper Basin Drought Response Operations, Lower Basin Drought Contingency Plan, and Minute 323, including the Binational Water Scarcity Contingency Plan.
[2] Reservoir initial conditions on December 31, 2020 were simulated using the April 2020 MTOM based on the CRRFC unregulated inflow forecast ensemble dated April 3, 2020.
[3] Each of the 35 initial conditions from MTOM were coupled with 113 hydrologic inflow sequences from the Full Hydrology that resamples the observed natural flow record from 1906-2018 for a total of 3955 traces analyzed and with 31 hydrologic inflow sequences from the Stress Test Hydrology that resamples the observed natural flow record from 1988-2018 for a total of 1,085 traces analyzed.
[4] Percentages shown in this table may not be representative of the full range of future possibilities that could occur with different modeling assumptions.
[5] Percentages shown may not sum to 100% due to rounding to the nearest percent.
[6] The published version of this table includes data for 2020-2024.

Available at https://www.usbr.gov/lc/region/g4000/riverops/crss-5year-projections.html

April 2020 CRSS Projections
Risk of Reaching Critical Elevations



10-year Lee Ferry Volume



Thank you

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