
Appendix G

CRSS Initial Conditions

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Acronyms and Abbreviations

Acronym or Abbreviation		Full Phrase
af		acre-feet
CRMMS		Colorado River Mid-term Modeling System
CRMMS-ESP	Colorado Basin River Forecasting Center Ensemble Streamflow Prediction	
CRSS		Colorado River Simulation System
EIS		environmental impact statement
maf		million acre-feet
TMD		transmountain diversion
WY		water year

Appendix G. CRSS Initial Conditions

This appendix provides an overview of the three initial conditions used in the Final Environmental Impact Statement (EIS). It also compares these initial conditions to the June 2026 Colorado Basin River Forecasting Center Ensemble Streamflow Prediction (CRMMS-ESP) projected end-of-calendar-year (December 2026) Lake Powell and Lake Mead pool elevations to illustrate how evolving hydrologic conditions informed the selection of the initial condition used in the Final EIS analyses.

G.1 Initial Conditions Used in the Draft Environmental Impact Statement

G.1.1 Initial Reservoir Conditions

For the Final EIS, the Colorado River Simulation System (CRSS) was initialized with three sets of initial conditions to cover a range of possible system conditions on December 31, 2026. Projected system conditions were chosen from Reclamation’s official mid-term operations model, the Colorado River Mid-term Modeling System (CRMMS). CRMMS uses an ensemble of monthly unregulated streamflow forecasts developed by the National Weather Service’s CRMMS-ESP method.

Specifically, the CRSS modeling for the Final EIS used the November 2024¹ CRMMS-ESP projections of system conditions on December 31, 2026 as the initial conditions for CRSS. Three traces from CRMMS-ESP were selected based on Lake Powell and Lake Mead elevations and correspond to projected Low (Trace 14), Mid (Trace 12), and High (Trace 6) conditions at the end of 2026 (**Table G-1**).

Four reservoirs are not modeled in CRMMS: Strawberry, Starvation, Transmountain Diversion (TMD), and McPhee. Strawberry and Starvation Reservoirs assume a static initial condition. TMD and McPhee use a regression based on previous year’s Lake Powell unregulated inflow. For all initial conditions, the December 2026 conditions for TMD and McPhee reservoirs are computed using the Mid initial condition Lake Powell unregulated inflow from CRMMS.

¹ November 2024 CRMMS projections were used as initial conditions because CRSS results for multiple alternatives were finalized in December 2024 and sent to the next stages of resource modeling needed for the Final EIS.

Table G-1
End-of-Month December 2026 Reservoir Conditions Used as Initial Conditions

Reservoir	Low (Trace 14)		Mid (Trace 12)		High (Trace 6)	
	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
Fontenelle	6,485.00	195,027	6,486.07	201,631	6,483.49	185,892
Flaming Gorge	6,015.59	2,763,425	6,023.52	3,031,117	6,022.43	2,993,369
Strawberry	7,589.00	886,880	7,589.00	886,880	7,589.00	886,880
Starvation	5,704.82	141,791	5,704.82	141,791	5,704.82	141,791
TMD ²	5,068.11	593,435	5,068.11	593,435	5,068.11	593,435
Taylor Park	9,294.05	47,513	9,308.16	67,009	9,308.50	67,537
Blue Mesa	7,444.41	279,616	7,477.52	484,034	7,490.00	577,661
Morrow Point	7,153.73	112,001	7,153.73	112,001	7,153.73	112,001
Crystal	6,753.04	16,970	6,753.04	16,970	6,753.04	16,970
McPhee ³	77.10	218,374	77.10	218,374	77.10	218,374
Navajo	6,010.59	785,430	6,039.82	1,058,713	6,052.23	1,197,223
Powell	3,511.36	4,792,558	3,574.39	8,853,268	3,629.01	13,866,921
Mead	1,038.03	6,842,897	1,063.29	8,674,470	1,078.61	9,896,475
Mohave	639.51	1,604,100	639.51	1,604,100	639.51	1,604,100
Havasu	446.50	551,700	446.50	551,700	446.50	551,700

G.1.2 Preceding Lees Ferry Flows

CRSS and the Decision Making under Deep Uncertainty analysis rely on Lees Ferry natural flow for the period prior to 2026 to support various modeling assumptions and to compute hydrologic statistics. **Table G-2** summarizes Lees Ferry natural flow for water years (WY) 2017–2026.

Historical natural flow estimates are available through 2024, with 2021–2024 values considered provisional. Natural flow estimates for 2025 and 2026 vary by initial condition, as they are derived from CRMMS. Since CRMMS operates in unregulated flow space, the unregulated flow is converted to natural flow using the following equation:

$$NF = (0.7311 * U / 9.60 + 0.2689) * 13.49$$

Where *NF* is the WY Lees Ferry natural flow in million acre-feet (maf); *U* is the WY Lake Powell unregulated inflow in maf; 9.6 is the 1991-2020 average unregulated inflow in maf; 13.49 is the 1991-2020 average Lees Ferry Natural Flow in maf; and 0.7311 and 0.2689 are the slope and intercept of a linear regression between historical WY unregulated and natural flow at Lees Ferry using 1991-2020 data.

² The TMD Reservoir is an aggregate representation of Colorado western slope transmountain diversion storage facilities, including Lake Granby, Willow Creek Reservoir, Dillon Reservoir, and Homestake Reservoir.

³ McPhee elevation in CRSS is the height above dead pool storage.

Table G-2
Lees Ferry Water Year Natural Flow Data

Water Year	Historical Natural Flow (af)	CRMMS-Derived Lees Ferry Flow (af)		
		Low	Mid	High
2017	16,396,512	-	-	-
2018	8,633,462	-	-	-
2019	17,672,049	-	-	-
2020	9,887,593	-	-	-
2021	7,152,000	-	-	-
2022	9,851,000	-	-	-
2023	17,408,000	-	-	-
2024	11,875,000	-	-	-
2025	-	11,130,240	14,021,610	18,805,025
2026	-	6,956,534	10,888,385	12,404,377

In **Chapter 3** and **Volume III** of the Final EIS, conditional boxplots are organized according to the preceding 3-year average Lees Ferry natural flow. Because natural flows in 2025 and 2026 depend on the selected initial condition, the 3-year averages entering 2027 differ across the Low, Mid, and High initial-condition scenarios. Using the values in **Table G-2**, the resulting preceding three-year average flows and the corresponding flow category for each initial condition are shown below:

- Low initial condition: 9,987,258 acre-feet (af) (Critically Dry Flow Category [4.46–10 maf])
- Mid initial condition: 12,261,665 af (Average Flow Category [12–14 maf])
- High initial condition: 14,361,467 af (Moderately Wet Flow Category [14–16 maf])

G.2 Initial Conditions Used in the Final Environmental Impact Statement

The Colorado River system remains under significant hydrologic stress, with both Lake Powell and Lake Mead projected to reach critically low elevations in 2027 unless hydrologic conditions substantially improve. As of June 2026, WY 2026 Lake Powell unregulated inflow is projected to be approximately 3.49 maf (36 percent of average), ranking among the lowest years in the historical record. In light of current conditions, only the Low initial condition was used in the Final EIS (**Section G.1**).

G.2.1 Comparison of the Initial Conditions to the June 2026 CRMMS-ESP Projections

Figure G-1 and **Figure G-2** compare the initial conditions used in the Final EIS to the June 2026 CRMMS-ESP ensemble projections⁴ for Lake Powell and Lake Mead pool elevations, respectively. The June 2026 CRMMS-ESP ensemble projects December 2026 Lake Powell pool elevations

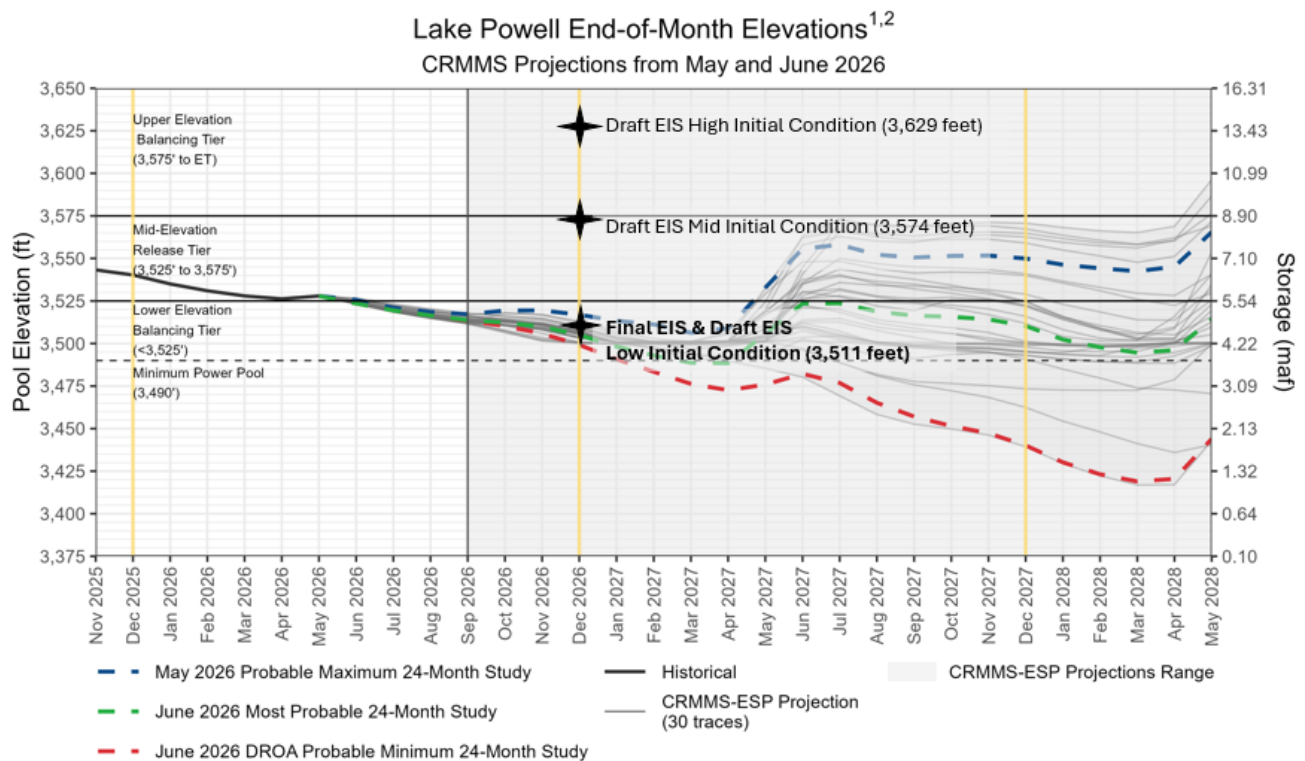
⁴ The June 2026 CRMMS-ESP projections are the most recent projections available at the time this EIS was prepared.

ranging from 3,500.01 to 3,513.07 feet. The Low initial condition falls within this projected range, while the Mid and High initial conditions exceed the upper bound of the ensemble by 61.32 and 115.94 feet, respectively.

Similarly, the June 2026 CRMMS-ESP ensemble projects December 2026 Lake Mead pool elevations ranging from 1,031.52 to 1,042.31 feet. The Low initial condition also falls within this projected range, whereas the Mid and High initial conditions exceed the upper bound of the ensemble by 20.98 and 36.30 feet, respectively.

These comparisons demonstrate that the Low initial condition used in the Final EIS is representative of current hydrologic conditions and projected end-of-calendar-year reservoir elevations. Accordingly, the Final EIS only uses the Low initial condition.

Figure G-1
Lake Powell Initial Pool Elevations: Final EIS Assumptions and Current Projections

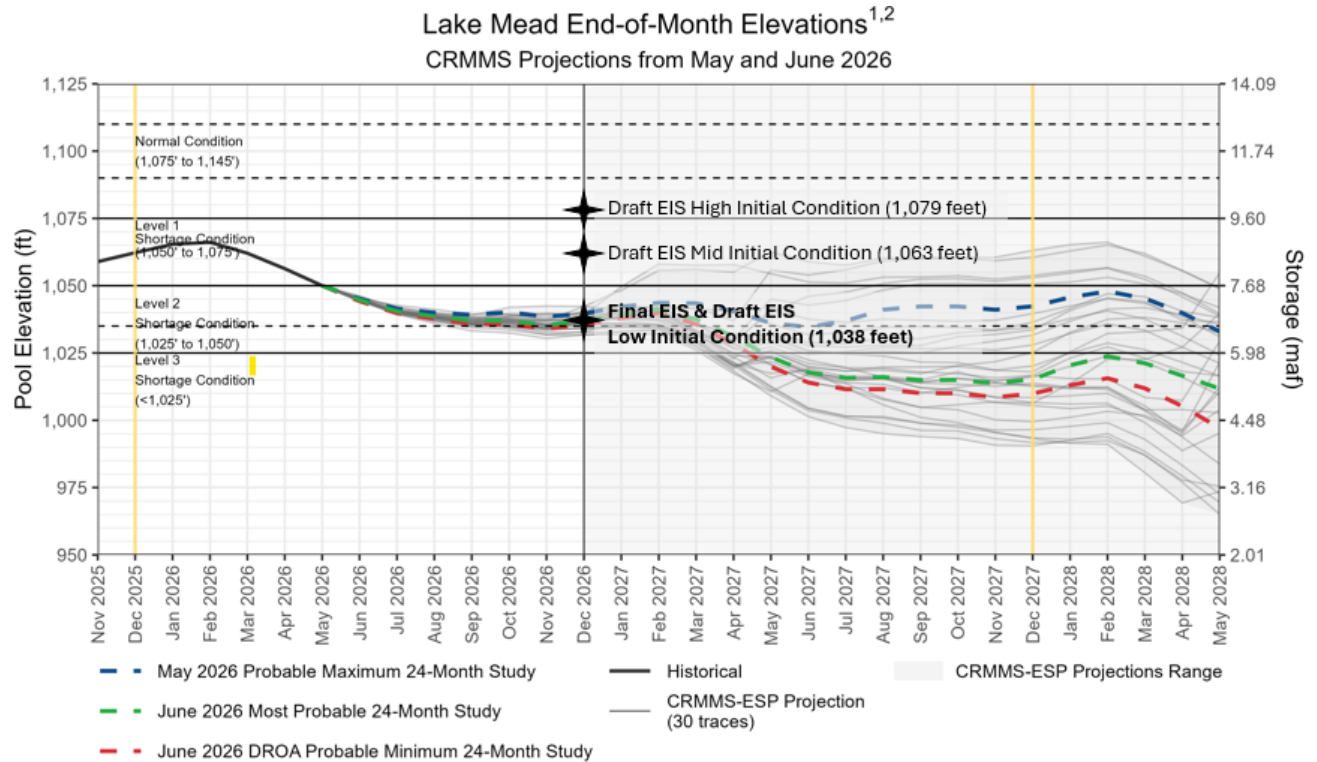


¹For modeling purposes, simulated years beyond 2026 assume a continuation of the 2007 Interim Guidelines including the 2024 Supplement to the 2007 Interim Guidelines (no additional SEIS conservation is assumed to occur after 2026), the 2019 Colorado River Basin Drought Contingency Plans, and Minute 323 including the Binational Water Scarcity Contingency Plan. With the exception of certain provisions related to ICS recovery and Upper Basin Demand management, operations under these agreements are in effect through 2026.

²In water year 2026, Reclamation will reduce the annual release volume from Lake Powell to Lake Mead to 6.0 maf through September 2026 by implementing Section 6.E. of the Supplement to the 2007 Colorado River Interim Guidelines (Interim Guidelines SEIS). Beyond water year 2026, for modeling purposes, this graphic contains existing operational assumptions built into CRMMS that constrain Glen Canyon Dam releases, to prevent Lake Powell from falling below elevation 3,500 feet. As described in Sections 6.E and 7.B of the Interim Guidelines SEIS, Reclamation will consider all tools that are available to avoid Lake Powell elevation declining below 3,500 feet and any actual constraining of Lake Powell releases is subject to appropriate consultation between Reclamation and other Basin partners with respect to the implementation of potential releases. Whereas, the Probable Minimum scenario shows Lake Powell elevations without any Glen Canyon Dam release constraints, beyond water year 2026, so Reclamation and Basin partners can assess the hydrology and be prepared to discuss appropriate solutions.



Figure G-2
Lake Mead Initial Pool Elevations: EIS Assumptions and Current Projections



¹For modeling purposes, simulated years beyond 2026 assume a continuation of the 2007 Interim Guidelines including the 2024 Supplement to the 2007 Interim Guidelines (no additional SEIS conservation is assumed to occur after 2026), the 2019 Colorado River Basin Drought Contingency Plans, and Minute 323 including the Binational Water Scarcity Contingency Plan. With the exception of certain provisions related to ICS recovery and Upper Basin Demand management, operations under these agreements are in effect through 2026.

²In water year 2026, Reclamation will reduce the annual release volume from Lake Powell to Lake Mead to 6.0 maf through September 2026 by implementing Section 6.E. of the Supplement to the 2007 Colorado River Interim Guidelines (Interim Guidelines SEIS). Beyond water year 2026, for modeling purposes, this graphic contains existing operational assumptions built into CRMMS that constrain Glen Canyon Dam releases, to prevent Lake Powell from falling below elevation 3,500 feet. As described in Sections 6.E and 7. B of the Interim Guidelines SEIS, Reclamation will consider all tools that are available to avoid Lake Powell elevation declining below 3,500 feet and any actual constraining of Lake Powell releases is subject to appropriate consultation between Reclamation and other Basin partners with respect to the implementation of potential releases. Whereas, the Probable Minimum scenario shows Lake Powell elevations without any Glen Canyon Dam release constraints, beyond water year 2026, so Reclamation and Basin partners can assess the hydrology and be prepared to discuss appropriate solutions.



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