LOWER COLORADO REGION

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Colorado River System 5-Year Projected Future Conditions

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General Modeling Information

Overview

Projections of future conditions of the Colorado River system are updated at least twice annually in January and August. The modeling approach and assumptions are included below along with the results of the most recent projection.

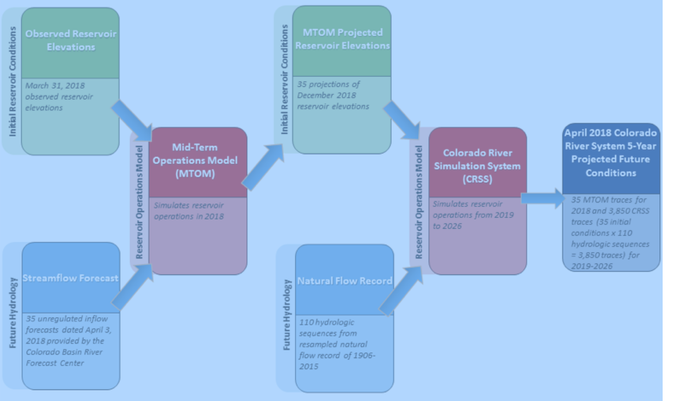
The most recent projection of future Colorado River system conditions was produced in April of 2018.

Modeling Approach

The April 2018 projections are developed using a combination of Reclamation reservoir operations models, the Mid-term Operations Model (MTOM) and the Colorado River Simulation System (CRSS) (see General Modeling Information for details). The system conditions for April 2018 through December 2018 are simulated in MTOM and then the end-of-year conditions are imported into CRSS to continue simulating from January 2019 onward. This process utilizes the current Colorado Basin River Forecasting Center (CBRFC) forecast for the potential near-term inflows, and methods to incorporate hydrologic uncertainty resulting in a wide range of plausible future inflows for the mid- to long-term.

MTOM uses 35 potential inflow sequences forecast by the CBRFC that incorporates hydrologic uncertainty by considering current conditions and historical temperature and precipitation patterns.

Each MTOM simulation results in a set of December 2018 system conditions that are used as initial conditions in CRSS. This means initializing CRSS 35 times- once for each set of initial system conditions. Each CRSS initialization is combined with 110 future inflow sequences developed by resampling the 1906-2015 natural flow record using the Index Sequential Method. This results in a total of 3,850 future projections, i.e., traces, for analysis.



Modeling Approach Flow Chart

Future Projections

CRSS and MTOM model results are reported as the percentage of future projected Lake Powell and Lake Mead operations that are within each operational tier in the next five years. The percentages are computed out of the total 3,580 future projections (i.e., traces), however; the percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions. These operational tiers are depicted in the coordinated operations diagram.

Table 1: Percent of Traces with Event or System Condition. Results from April 2018 MTOM/CRSS

Event or System Condition	2019[a]	2020	2021	2022	2023
Upper Basin - Lake Powell					
Equalization Tier	2	15	17	20	24
Equalization - annual release > 8.23 maf	2	15	17	20	22
Equalization - annual release = 8.23 maf	0	0	0	0	2
Upper Elevation Balancing Tier	96	51	53	52	45
Upper Elevation Balancing - annual release > 8.23 maf	76	44	44	43	35
Upper Elevation Balancing - annual release = 8.23 maf	19	6	8	9	9
Upper Elevation Balancing - annual release < 8.23 maf	0	1	1	0	1
Mid-Elevation Release Tier	3	34	21	16	18
Mid-Elevation Balancing - annual release = 8.23 maf	0	0	0	1	2
Mid-Elevation Release Tier - annual release = 7.48 maf	3	34	21	15	16
Lower Elevation Balancing Tier	0	0	8	11	13
Lower Basin - Lake Mead					
Shortage Condition - any amount (Mead <= 1,075 ft)	N	52	64	68	65
Shortage - 1st Level (Mead <= 1,075 and >= 1,050	0	51	43	38	29
Shortage - 2nd Level (Mead < 1,050 and >= 1,025	0	1	21	23	24
Shortage - 3rd Level (Mead < 1,025)	0	0	0	6	12
Surplus Condition - any amount (Mead>= 1,145 ft)	0	0	3	6	10
Surplus - Flood Control	0	0	0	1	2
Normal Year or ICS Surplus Condition	100	48	33	26	25

[a] The chance of a Lower Basin Shortage in calendar year 2019 is negligible.

Download Table 1

For additional information or questions, please contact us via email at: ColoradoRiverModeling@usbr.gov.

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